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AN EVALUATION OF THE PRIMARY CARE PROVIDERS' PERSPECTIVE OF
THE EFFECTS OF MODERATE ALCOHOL CONSUMPTION ON HEALTH

by

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AN EVALUATION OF THE PRIMARY CARE PROVIDERS' PERSPECTIVE OF
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Gisele Tchamba, Ph.D.

Western Michigan University, 2015

The complexity of health benefits of moderate alcohol consumption (MAC) is well documented. From the World Health Organization recent report, impact of harm from alcohol consumption was 3.3 million deaths or 5.9 percent of all global deaths (WHO, 2014).

Yet, the benefits of MAC for better health and longer life expectancy compared with abstinence are advocated in numerous studies (Nova, Baccan, Zapatera and Marcos, 2012). However, the nature of alcohol, its role on human sufferings has generated disagreements in the scientific community. Analysis of the results of early studies advocating better health for moderate drinkers, reveal discrepancies regarding the influence of confounding factors and systematic errors (Chikritzhs, Fillmore, and Stockwell, 2009) that might explain previous findings. Additionally, evaluation of risks/benefits of MAC reveals detrimental effects on health and accidents related injuries (NIAAA, 2003)

There is lack of knowledge in understanding how primary care providers (PCPs) perceive the health risks/benefits of MAC and subsequently what they recommend to patients. Therefore the purpose of this study was to evaluate the phenomenon understudy

in order to develop a substantive theory that explains the experiences of PCPs as they interact with patients in a Midwestern city of the United States.

A constructivist grounded theory approach was used to conduct the study. A sample of nine PCPs, mainly Physicians Assistants (PAs) was recruited permitting the formulation of a substantive theory regarding the perspective of these PAs on the issue. This substantive theory contributes knowledge relevant to better understanding of the complexity of MAC, evaluation research of alcohol prevention/treatment program, formulation of better alcohol policies as it relates to definition of MAC in context where alcohol is accepted.

This was achieved through discovering, describing and explaining the phenomenon of "conflict" which participants experienced as a result of the interrelationship and interactions of *subjectivity*, *vulnerability*, *expressing doubt* and *imparting knowledge*. These interactions intersect and describe the influence of culture and context which in turn influence participants' ability to control patients' choice of that which can harm them. A cost-effectiveness evaluation is necessary to fully understand risks/benefits of MAC on health to make corrective strategies on existing policies.

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CHAPTER I

INTRODUCTION

Facts about alcohol and the human sufferings are well-known. Cook (2006) referred to the effects of alcohol use and abuse as an ever-present social problem with the burden of disease and the ensuing economic liability. Alcohol exacts a great toll of human suffering as a result of the social, psychological and medical harms to which it gives rise (Cook, 2006). The World Health Organization (WHO) stated alcohol-related morbidity and mortality are high in most parts of the world, and in many developing nations consumption and its related harms are on the rise (WHO, 1999). According to WHO estimates, 1.1 million people worldwide died of alcohol-related causes in 1990, and by 2004 this had risen to 1.8 million per annum (WHO, 2004).

In 2004, 4.6% of the global burden of disease and injury was attributable to alcohol: 7.6% for men and 1.4% for women. The relative effect of neuropsychiatric disorders on the burden of disease was far more pronounced than was its effect on mortality, since 36.4% of all neuropsychiatric disorders (Rehm, Mathers, Popova, Thavorncharoensap, Teerawattananon, and Patra. (2009) are attributable to alcohol consumption. In addition, Murray and Lopez (1996) as cited in Rhem et al., 2009) in the 1990 Global Burden of Disease (GBD) study, identified alcohol as one of the major global risk factors, accounting for 1.5% of global deaths, 2.1% of years of healthy life lost owing to premature mortality, 6.0% of years of life lost owing to disability and 3.5% of disability-adjusted life years (DALYs) (Murray & Lopez, 1996 as cited in Rhem et al.,

1

2009). In Europe and in France to be more specific, there were 49 000 deaths reported for the year 2009 (Guerin, Laplanche, Dunant and Hill, 2013). Guerin and colleagues indicate the alcohol toll is high; the effects of alcohol are detrimental even at low dose, and alcohol consumption is responsible for a large proportion of premature deaths (Guerin et al., 2013). However, claims about medicinal benefits of alcohol are being emphasized in many epidemiological literatures. Since the French Paradox (low mortality rate from ischemic heart disease and cardiovascular diseases displayed by French men despite a high level of risk factors, such as cholesterol, diabetes, hypertension, and a high intake of saturated fat (Renaud & Guegen, 1998), scientific curiosity has increased and numerous epidemiological studies during the past decades have increasingly revealed potential health benefits of alcohol when used in moderation (Sierksma, et al., 2004; Sacco et al., 1999; Truelsen et al., 1998; Reynolds et al., 2003; Klatsky et al., 1990; Maclure, 1993; Doll, 1997; Corrao, Bagnardi, Zambon et al., 2004; Zhu et al., 2004). The seeming beneficial effects of moderate alcohol use are mostly related to cardiovascular health in general and coronary heart diseases (CHD) in particular, including some types of cognitive problems like dementia (Peters et al., 2008).

For the most part results of these studies are summarized in a J- or U-shaped curve relationship between moderate drinking and cardiovascular diseases (Garcia-Valdecasas-Campelo et al., 2007; Reynolds et al., 2003); suggesting moderate alcohol consumption is inversely associated with cardiovascular disease, and thus, moderate alcohol can be used to decrease mortality and morbidity from these diseases. Recently data from two large prospective cohort studies conducted in the U.S. suggest the magnitude of coronary heart disease (CHD) risk reduction associated with moderate

alcohol consumption may be closer to 30% (Corrao, Rubbiati, Bagnardi, Zambon and Poikolainen, 2000). Likewise a 12-year study of more than 38,000 male health professionals, those who consumed alcohol at least 3-4 times weekly, had a risk of myocardial infarction (heart attack) that was 32% lower than men who drank alcohol less than once weekly (Mukamal et al., 2003). Similarly, in a 20-year study of more than 120,000 men and women, those who reported consuming 1-2 alcoholic drinks daily had a risk of death from CHD that was 30% lower than those who did not drink alcohol (Klatsky et al., 2003). Sacco and colleagues in the Northern Manhattan Stroke Study and Berger and colleagues in the Physicians' Health Study suggest low and moderate alcohol intake may be protective against clinical stroke (Sacco et al., 1999; Berger, Ajani, Kase et al. (1999). In "The Framingham Study", alcohol intake was associated with reduced incidence of clinical stroke only in participants aged 60 to 69 years but not in those younger (aged 50 to 59 years) or older (aged 70 years) (Djousse et al., 2002).

While these studies have found health benefits of moderate alcohol consumption for cardiovascular health, other epidemiological studies consider moderate alcohol consumption to be detrimental to the health of the drinker. These studies have suggested moderate alcohol use can cause harm to one's health by increasing risk of certain cancers, high blood pressure, impair memory, hemorrhagic strokes, intentional and unintentional accidents etc. (Taylor et al., 2010; Bacchiocchi, 2002; Zakhari, 1994; Au Yeung et al., 2013; Benedetti, Parent, Siemiatycki et al., 2009). Benedetti and colleagues, in large-population case-control study in Canada on the incidence of 13 types of cancer, concluded moderate and high alcohol intake levels over the lifetime may increase the risk of cancer at six sites (esophagus, stomach, colon, liver, pancreas, lung and prostate), with

odds ratios ranging from 1.6 for lung cancer to a high of 7.9 for cancer of the liver (Benedetti et al., 2009; Santos-Buelga & González-Manzano, 2011; Altura & Altura, 1990).

The International Agency for Research on Cancer (IARC, 1988) classified alcohol as a Group 1 carcinogen, being considered to be causally associated with the development of cancers of the oral cavity, pharynx, larynx, esophagus, and liver, and suggested to be positively associated with rectal and breast cancer (Santos-Buelga and González-Manzano, 2011). Moreover, other studies revealed there is a correlation between alcohol consumption and cardiovascular health even with small amounts of alcohol consumed. McFadden et al. (2005) reviewed nine studies which found increase in blood pressure with moderate alcohol intake. Other studies contend the effects of alcohol are detrimental even at low dose, and alcohol consumption is responsible for a large proportion of premature deaths (Guerin et al., 2013).

The Problem

In spite of extensive research showing thorough analysis of health risks and benefits of moderate drinking (Sierksma et al., 2004), researches examining health effects of moderate alcohol consumption, from primary care provider's perspective are lacking. Given the complexity of alcohol's effects on the body and the complexity of the people who drink alcohol, primary care providers represent a credible source of information regarding this issue for patients. Therefore seeking their perspective on the health effects of moderate drinking is central to this investigation. Primary care providers have the ability to contribute knowledge about health effects of alcohol during their interactions

with patients and may encourage patients who are at risk of excessive drinking to use alcohol in moderation (Abrams, Nuzum, Mika & Lawlor, 2011; Arborelius and Takker, 1995). In other words, primary care providers in their preventative role, inform patients of benefits of adopting a lifestyle that can help prevent illness, unnecessary emotional, physical sufferings and costly treatments due to addictive behaviors.

In addition, Primary care providers through screening and assessment instruments can determine the effects of alcohol on patients' health on the basis of factors such as age, gender, genetic vulnerability and health status (Whitlock et al., 2004). Based on those factors, the primary care providers may discourage patients from drinking any level of alcohol if it endangers their health. However, the conflicting findings of the scientific studies regarding health effects of moderate alcohol consumption can also reflect primary care providers' personal beliefs and perceptions of the health effects of moderate drinking. This may in turn influence how primary care providers choose to recommend or not recommend moderate drinking for patients' health.

Moreover, greater burden of disease may occur because existing public health guidelines on lifestyle can imply moderate alcohol use may be part of a healthy lifestyle; which in turn may motivate abstainers, adolescents, and young adults to start drinking (Au Yeung et al. 2012). Further, the message concerning benefits of moderate alcohol use has overshadowed the detrimental effects of alcohol such as its carcinogenicity (Boffetta & Hashibe, 2006).

Other detrimental effects of moderate alcohol use such as the neurological impairment at very low blood alcohol concentration and motor vehicle crash for example have not been clearly delivered to the public, nor has the message concerning risk

differences across different levels of the population (Ronksley, Brien, Turner, Mukamal, and Ghali, 2011), or possibly different ethnicities (Brooks, Enoch, Goldman, Li, and Yokoyama, 2009). Existing advice on alcohol (1-2 drinks for men and 1drink a day for women) may also have failed to inform the public comprehensively and specifically about the effects of alcohol and current advice about the detrimental effects of alcohol (NIAAA, 2003; Costanzo, Di Castelnuovo, Donati, Iacoviello, De Gaetano, 2006; Mukamal et al., 2005; Agarwal, 2002; Rehm et al., 2009) mainly refer to heavy alcohol consumption.

Statement of Purpose

Primary care providers have the advantage of interacting daily with patients and can best determine under what circumstances moderate alcohol consumption can provide better health outcomes or interfere with a specific individual's health. The phenomenon under investigation is important and requires evaluation using lenses that have not been explored up to this point, i.e. the primary care providers' standpoint. Studies exploring the health effects of moderate alcohol consumption from primary care providers' perspective on this issue are lacking. In addition, the complex nature of the phenomenon under study indicates a probability of health care providers having different perspectives, yet their perspective is useful for policy decisions and for reassuring the general public about the health effects of moderate alcohol consumption.

The purpose of this study is to use a constructive evaluation approach (Lincoln & Guba, 2001) to explore the effects of moderate alcohol consumption on health from

primary care perspective. The study also seeks to understand factors that can influence

their perspectives and whether or not they recommend its use for patients' health.

Research Questions

The overarching questions this study aimed to answer are 1) how primary care

providers perceive the effects of moderate alcohol consumption on health? 2) What

factors influence PCPs' perception of the effects of moderate alcohol consumption on

health and disease?

Rationale/Significance

This study will contribute to the body of knowledge on alcohol research in

general and the complex topic of the health effects of moderate drinking in particular, by

evaluating Primary care providers' perspective. It will examine possible factors that

influence the recommendations PCPs may choose to give patients. By using a qualitative

approach it will explore the phenomenon under study through the lens of primary care

providers, thereby adding to the qualitative literature by evaluating effects of moderate

alcohol consumption on health. Many if not almost all the epidemiological literature on

the health effects of moderate drinking are based on quantitative methods and have used

very large samples (Ronksley et al., 2011; Xin et al., 2001; Espeland, Gu, Masaki et al.,

2005) thus the use of the qualitative approach diversifies the different approaches use to

understand the phenomenon understudy.

In addition, no study has examined the perspective of primary care providers

based on their daily practice experiences and that position them to interact daily with

patients. Also none of the studies have evaluated factors that can influence health care

providers' perceptions and recommendations. Therefore this study is meaningful for

evaluation theory and practice because it will add new knowledge to the evaluation

literature and practice that is currently nonexistent in the alcohol evaluation literature.

Moreover, the constructivist evaluation approach used in this study is also currently

nonexistent, but is necessary because this evaluation approach focuses on valuing (Alkin

& Christie, 2004). One aspect of this study is to try to understand the value that health

care providers assigned to moderate drinking and if moderate drinking is useful enough

to be recommended for health. According to Alkin & Christie (2004) "Guba and Lincoln

believe that the role of the evaluator is to facilitate negotiations between individuals

reflecting these multiple realities." Based on the scientific evidence on moderate

drinking, it is likely this study will reveal that health care providers' construction of

reality on the health effects of moderate alcohol consumption will indicate presence of

multiple realities.

Some studies have examined patients' perspectives of moderate drinking

(Mukamal et al., 2008) and others have examined primary care providers' contribution on

methods to detect potential problem drinkers to prevent alcohol dependence (Aira et al.,

2003). Of those studies none have specifically sought to understand possible factors that

can influence PCPs' recommendation or how these providers perceive the effects of

moderate alcohol consumption on health. The use of the constructivist evaluation

approach (Guba & Lincoln, 1989), which according to Alkin and Christie (2004), "put

emphasis on testing and enlarging within-group constructions by introducing new or

additional information," will give insight into what primary care providers think, based

on their experiences with patients. By investigating primary care providers' perspective, new information will be discovered on the topic and mostly, information constructed from participants' perspective, specifically the value they place on the health effects of moderate drinking.

Significance for Evaluation

The constructivist evaluation approach is based on the assumptions undergirding the constructivist paradigm (Guba and Lincoln, 2001). It has not been used in studies assessing the health effects of moderate drinking, let alone primary care providers' perceptions of the effects of moderate alcohol consumption on health. Its methodology fits well with the qualitative paradigm being used in this study. This study can bring about meaningful implications for evaluation research. According to Shadish, Cook and Leviton discussion on the evaluation theory use, evaluation must influence decision makers, judge program worth, provide useful information, to explain how the intervention, or one like it works, to help solve social problems (Shadish, Cook and Leviton, 19991). In keeping with this view, this study will a) attempt to obtain results hopefully important enough to impact the evaluation of alcohol prevention and treatment; thereby providing policy makers with useful information for the creation of new policies to improve prevention and treatment programs.

There are many conflicting point of views with relation to how moderate alcohol consumption affects one's health. Most of the information in the literature is provided by researchers, and not primary care providers who have daily interactions with patients and who may or may not recommend the use of moderate drinking to alleviate patients'

health problems. Understanding primary care providers' perspectives and their experiences with patients can shed light to what is not clear about moderate alcohol consumption, thereby helping to influence the decision makers, which in turn can lead to the creation of new alcohol policies. b) Evaluation is useful to judge program worth. This study is attempting to understand the value of moderate alcohol consumption on health, by seeking the perspective of experts in human body (health care providers) who can clarify the conflicting information from the epidemiological literature based on their experiences with patients. c) Finally, evaluation is helpful to solve social problems from useful information obtained from data collected from participants.

The amount of social problems resulting from alcohol consumption in general is well-known (Cook, 2006; Rehm et al., 2009; WHO, 2004). There can be serious social problems resulting from moderate alcohol consumption, especially with regard to injuries, the global burden of diseases (Taylor et al., 2010; Bacchiocchi, 2002). Seeking the opinion of experts such as primary care providers can provide useful information to add knowledge to all the facets of the social problem so it can be minimized. Useful information can help ease the current tension in the literature on this public health issue.

Significance for Practice and Policies

Results of this study will help to improve social programs in that, if practitioners have a better understanding of the health effects of moderate alcohol consumption based on primary care providers' recommendations, this can help to improve alcohol prevention and treatment programs. Health care providers' recommendation can also help clarify the points and counterpoints (Klaktsy, 2010) currently found in the epidemiological

literature, which at this point in time can create uncertainty for evaluators, researchers and the general public. Although moderate drinking is difficult to define, the result of this study can guide policy makers toward the crucial need to provide a definition of moderate drinking that takes into account factors such as genetic vulnerability, drinking experience and tolerance, as well as health status.

Conclusions

Since many epidemiological studies have revealed health benefits of moderate drinking on the one hand, and others have found detrimental health effects, on the other hand, to seek primary care providers' perspectives can be useful. Seeking the opinion of primary care providers can help enlighten the public and the research community on how moderate alcohol consumption affects the health of the drinker positively or negatively.

While, the epidemiological and clinical literatures present two opposing view of the effects of moderate alcohol consumption on health and diseases, no studies have evaluated Primary care providers' perspectives, rather some studies have evaluated primary care providers (physicians) perspectives of screening of at-risk drinking in patients as well as barriers that prevent physicians from screening for alcohol use (Arborelius & Thakker, 1995; Aira et al., 2003). Others have examined the patients' motivations, beliefs and opinions about moderate drinking (Mukamal and Rimm, 2008). There have been international conventions to discuss risks and benefits of moderate drinking on health (Ashley et al., 1994; Poli, Marangoni,, Avogaro, et al., 2013). Later in 1998, there was debate at the Royal College in Canada discussing whether medical doctors should promote moderate alcohol consumption (Harrisson, 1998).

Studies assessing factors that can influence health care providers'

recommendation or non-recommendation of moderate drinking are lacking. Up to this

point the literature is inconclusive and that can be a challenge for practitioners. It is still

not clear whether moderate drinking is beneficial enough to be recommended for health.

The purpose of this dissertation therefore is to evaluate the health effects of

moderate alcohol consumption as perceived by primary care providers in order to

discover the theory that explains the experiences of these providers. In addition the study

seeks to understand how primary care providers explain the nuances in the definition of

moderate drinking, factors that influence their decision to recommend or not recommend

moderate drinking for health, and finally how the providers perceive risk and benefits of

moderate drinking for health and disease.

Definition of Concepts

Primary care Providers: According to the Medline, a primary care provider

(PCP) is a health care practitioner who sees people that have common medical problems.

This person is usually a doctor, but may be a physician assistant or a nurse practitioner. A

PCP is the main health care provider in non-emergency situations. A PCP's role is to: 1)

Provide preventive care and teach healthy lifestyle choices. 2) Identify and treat common

medical conditions. 3) Assess the urgency of patients' medical problems and direct them

to the best place for that care. 4) And make referrals to medical specialists when

necessary (http://www.nlm.nih.gov). In this study the term PCP will be used to refer to

physician assistant (PA).

Physician Assistants (PA): A physician assistant (or PA) is a nationally certified and state-licensed medical professional. PAs practice medicine on healthcare teams with physicians and other providers. They practice and prescribe medication in all 50 states, the District of Columbia and all U.S. territories, with the exception of Puerto Rico. Physician assistants work in physicians' offices, hospitals, and other healthcare settings (aapa.org).

Moderate Alcohol Consumption/Moderate Drinking: These two terms are used interchangeably, to express pattern of drinking that does not cause harm. However, it is a very subjective concept and difficult to define (Dufour, 1994; NIAAA, 1995; Heng et al., 2006). It is sometimes confused with social drinking, which refers to drinking patterns that are accepted by the society within which it occurs (NIAAA, 1992). Guidelines put forth jointly by the U.S. Department of Agriculture (USDA) and the U.S. Department of Health and Human Services (DHHS) define moderate drinking as no more than one drink a day for most women, and no more than two drinks a day for most men.

Moderate drinking is difficult to define. The difficulty in defining moderate drinking is to some extent a result of individual differences. The amount a person can drink without intoxication may vary according to drinking experience and tolerance (Bondy et al., 1999). Individual metabolic differences can lead to a wide range of blood alcohol content (BAC) levels for the same consumption (Ramchandani, Bosron, and Li, 2001). Also important is the time over which the alcohol is consumed: 3 drinks in one hour will produce a much higher BAC than 3 drinks over the course of 3 hours, and therefore different effects. Thus, definitions solely based on the number of drinks are not the best approach (NIAAA, 2003).

Standard Drink: A standard drink is generally considered to be 12 ounces of beer, 5 ounces of wine, or 1.5 ounces of 80-proof distilled spirits. Each of these drinks contains roughly the same amount of absolute alcohol approximately 0.5 ounce or 12 grams (NIAAA, 1992).

Cardiovascular Diseases (CVD): The World Health Organization (WHO) defines cardiovascular diseases as a group of disorders of the heart and blood vessels and include 1)coronary heart disease: disease of the blood vessels supplying the heart muscle; Coronary heart disease (CHD) is the most common form of heart disease in the U.S. and affects approximately 13 million Americans (American Heart Association, 2003); 2) cerebro-vascular disease: disease of the blood vessels supplying the brain; 3) peripheral arterial disease: disease of blood vessels supplying the arms and legs; 4) rheumatic heart disease: damage to the heart muscle and heart valves from rheumatic fever, caused by streptococcal bacteria; 5) congenital heart disease: malformations of heart structure existing at birth; 6) deep vein thrombosis and pulmonary embolism: blood clots in the leg veins, which can dislodge and move to the heart and lungs (www.euro.who.int/en/health).

Atherothrombosis: is characterized by atherosclerotic lesion disruption with superimposed thrombus formation, is the major cause of acute coronary syndromes (ACS) and cardiovascular death. It is the leading cause of mortality in the industrialized world (Viles-Gonzalez, Fuster, and Badimon, 2004).

Atherosclerosis: is a diffuse process that starts early in childhood and progresses asymptomatically through adult life. Later in life, it is clinically manifested as coronary artery disease, stroke, transient ischaemic attack, and peripheral arterial disease ((Viles-Gonzalez, Fuster, and Badimon, 2004).

Limitations and Delimitations of the Study

Although this study is evaluating an important public health issue, its explorative nature creates several limitations. The first limitation has to do with generalizability. Because of its explorative nature, the study will not use a sample large enough to be representative of the perspective of most physicians Assistants in the country or Midwestern city where participants were selected. This will be an obstacle to the study being considered robust enough to influence the present discussion. However, the goal of this study is not generalization, but an attempt to understand the meaning participants give to the phenomenon under study (Effects of moderate alcohol consumption on health). Therefore, the sample used here satisfies the qualitative approach, which seeks an in depth understanding, illumination and extrapolation (Hoepfl, 1997) of the phenomenon from a relatively small group of participants. Thus it is not necessary for this study to select a sample that represents the entire population of physician assistants.

This, however, does not prevent its transferability, which is one of the strengths of qualitative inquiry. The rigor and systematic description of the methods can facilitate transferability. The use of a small sample size may appear as a limitation in a quantitative inquiry. Given the nature of this topic, and the statistics on alcohol and the global burden of diseases, not using a representative sample limits the scope of the study. This limitation does not, however, prevent the dependability or confirmability of the methods. On the contrary, it reinforces the aim of qualitative research, which seeks to understand the meaning of the phenomenon from the participant's perspective. In this study the goal

is to understand the meaning of moderate drinking and its impact on health from the participants' perspective (primary care providers/physician assistants).

Another limitation is the study is bounded to the United States, even though, issues resulting from alcohol consumption contribute largely to the global burden of disease and is a public health problem everywhere, a part from Islamic countries (Cook, 2006). Limiting the study to the United States will certainly give perspectives of PCPs as it pertained to the western world only. Finally, a qualitative study demonstrates strength when its data collection uses multiple methods such as participant observation, in-depth interviews, focus groups, document analysis and others. The nature of this study will not permit extensive use of multiple methods of data collection due to time and availability of participants.

CHAPTER II

LITERATURE REVIEW

Organization of the Chapter

This chapter is organized into several sections. 1) The first section will include literature discussing the effects of moderate drinking on health and diseases and the related theories. Emphasis will be on theories which recommend moderate alcohol consumption for cardiovascular health. This will be followed by analysis of studies disputing cardioprotective effects of moderate alcohol consumption or any other health benefits.

2) The second section will be a critical analysis of problems with the theories favorable or unfavorable to moderate drinking. In this section, emphasis will be placed on the theoretical and methodological issues of previous literature on health effects of moderate drinking.

3) The third section will examine primary care providers' perception of the effects of moderate drinking on health and diseases including possible and more specifically factors (age and gender, and genes) that can influence their recommendation or non-recommendation of moderate drinking for health.

4) The fourth section will include summary of the literature review with the researcher's own evaluation of the theories with attention to scientists' recommendation, around the world, research and evaluation will be discussed.

Description of the Literature Search

Research on the health effects of moderate alcohol consumption is as recent as the insertion of the National Institute of Alcohol Abuse and Alcoholism (NIAAA) in 1971(Dufour, 1999). Many empirical studies around the world, specifically North America, Europe and Asia have examined both the beneficial and harmful effects of moderate drinking on health. The search engines used were MEDLINE, PSYCHINFO, Google Scholar, ERIC etc. The dominant names in the literature include the following authors and their colleagues: Rehm, Ronksley, Mukamal, Dufour, Ashley in North America (Di Castelnuevo and other, De Gaetano and colleagues, Costanzo and colleagues in Italy), (Ferrieres, De Lorgeril and Renaud, Guerin for the French paradox), (Klastsy; Dufour, NIAAA, Agarwal, Ashley and others, Roerecke , Reynolds, Zakary and many other in North America), (Cheng et colleagues, Au Yeung and colleagues in China); (Fillmore et al; Shaper et al. in England). Before the surge in the scientific curiosity on how moderate drinking affects health and disease, emphasis was on alcohol dependence, treatment and prevention strategies. Many observational studies and their theories on the health effects of moderate alcohol consumption are discussed in this study.

Introduction

The purpose of this study is to evaluate the association of moderate alcohol consumption on health and disease as perceived by primary care providers (PCPs) who are physician assistants (PAs). Ultimately the theory that explains PAs experience as they

explain their perspective will be developed. The researcher is especially interested in developing an understanding of factors that influence PAs stance on the health effects of moderate drinking, how PAs define moderate drinking, and whether PAs will recommend or not recommend moderate drinking to their patients.

The effects of moderate alcohol consumption (MAC) on health are multiple, some beneficial, but mostly detrimental (Roerecke & Rehm, 2012). While the influence on injuries (intentional or unintentional), and several cancers has been shown to be negative with substantial public health impact, the effect on some health outcomes, such as ischemic stroke, possibly diabetes, but most strongly ischemic heart disease (IHD), are said to be beneficial when drinking is not heavy on average (Rehm et al., 2010). According to Mukamal and colleagues, many drinkers cite cardioprotective health benefits, as reason for consuming alcohol (Mukamal, Phillips & Mittleman, 2008), despite often-raised concern in the scientific literature about the causality of a cardioprotective effect (Reorecke & Rehm, 2012; AuYeung et al., 2013).

Often referred to as a J-shaped curve, several meta-analyses of observational studies show relatively strong evidence for a cardioprotective association of moderate alcohol intake on IHD risk (Corrao, Rubbiati, Bagnardi, Zambon, Poikolainen, K. (2000) Alcohol and coronary heart disease: a meta-analysis. (Costanzo, Di Castelnuovo, A., Donati, M.B., Iacoviello, L., de Gaetano et al., 2010; Maclure, 1993; Ronksley et al., 2011). Yet, there has been constant dispute on the limitations of existing observational evidence, much of which relates to questions of exposure assessment (Dawson, 1998; Greenfield, 2000; Midanik, 1990 in Roereke and Rehm, 2012), the choice of the reference group (sick-quitter effect) (Shaper et al., 1987; Shaper, Wannamethee and

Walker, 1998) and residual confounding and/or over-adjustment for intermediate risk

factors for IHD (Rehm et al., 2010; Jackson 2005; Kloner and Rezkalla, 2007; O'Keefe,

Bybee and Lavie, 2007).

According to Roereke & Rehm, all these limitations make clinical and public

health recommendations for low levels alcohol consumption almost impossible at this

point; and concern about assuming a causal relationship between alcohol consumption

and IHD incidence seems to be well justified (Roereke and Rehm, 2012). This also

suggests primary care providers will consider these options carefully before giving any

recommendation. The limitations or even contradictions of the observational studies have

led this researcher to seek a deeper understanding of the phenomenon under study. This

study therefore explores the different points of contention regarding health effects of

moderate drinking to bring insights to this public health issue. The study will closely

discuss 1) the theories ascribing to the health benefits of moderate alcohol consumption

as it relates to IHD risks and overall mortality, 2) the detrimental health effects of

moderate alcohol consumption, 3) the theoretical and methodological issues, 4) the

mechanisms of action of moderate alcohol consumption on health, 5) factors that can

influence PCPs' recommendation of moderate alcohol consumption to patients.

Section I: Effects of Moderate Alcohol Consumption on Health and Diseases: Related Theories

Health Benefits of Moderate Alcohol Consumption and Related Theories

Although heavy drinking may lead to poor health status, several studies suggest

moderate drinking has beneficial health and societal outcomes, such as reduced use of

expensive acute healthcare, increased wages, and reduced risk of cardiovascular disease i.e. coronary heart disease (CHD) and associated myocardial infarction (Murray et al., 2002; Rehm, Greenfield and Rogers, 2001; Rimm, 2000; Booyse and Parks, 2000; MacDonald & Shields, 2001; Wannamethee and Shaper, 1997 as cited in French and Zavala, 2007). Undeniably, a number of studies have found a J-shaped relationship between alcohol consumption and total mortality (Carmago et al., 1997; Doll et al., 1994; Gaziano et al. (2000)). This relationship suggests moderate drinkers have the lowest mortality rates, heavy drinkers the highest, and abstainers and light drinkers a rate that falls somewhere in between (French and Zavala, 2007). Other epidemiological studies also consistently suggest a protective effect of regular and moderate alcohol consumption on coronary heart disease and ischemic stroke (Costanzo et al. 2011; Costanzo et al., 2006; Mukamal et al., 2001). According to these studies, total mortality is also reduced in middle-aged and older moderate drinkers as compared to abstainers.

The relationship between alcohol intake and the relative risk of developing Type II diabetes is was also found to be U- or J-shaped (Ajani, Hennekens, Spelsberg and Manson, 2000). Additional studies have demonstrated moderate drinking is associated with a reduced incidence of Type 2 diabetes in both men and women (Ajani et al., 2000; Rimm et al., 1995). The risk being lower by about 1/3 in moderate drinkers as compared to abstainers, and the association is stronger for those who drink at levels somewhat beyond the limits of moderation. According to these findings, the risk decreases progressively with up to 6 drinks/day (Meister, Whelan, and Kava, 2000; Wannamethee et al., 2002) in some populations, although that level of drinking is too high (DHHS, USA guidelines on moderate drinking).

In a 10 year follow-up study, Wannamethee et al., (2003) found a progressively decreasing risk for those consuming ½ of a drink, about 20% reduction through 2 drinks (approximately 60% reduction) per day, but 3 or more drinks per day conferred the same level of risk as total abstention. Studies on diabetes seem to go off the US limit of one-to two drinks a day for beneficial effects. Looking at Native American Indian population, Lu et al., (2003) found a similar pattern, but at lower consumption levels: light (3 drinks/week) and moderate (4-12 drinks/week) drinkers had a lower relative risk of developing Type 2 diabetes while heavier drinkers had an increased risk. Ajani (2000) finds a strong negative association between modest alcohol use and diabetes.

Researchers who have found some health benefits to moderate alcohol consumption have disagreed on the whether the beneficial health effects were caused by ethanol or by some specific type of alcoholic drinks. For example, Percival and Sims' study revealed certain type of alcoholic beverages when consume at low levels, specifically alcoholic beverages that contain antioxidants, like red wine, could be protectors against immune cell damage (Percival & Sims, 2000 in Le Dıaz et al., 2002), although antioxidants can be found in fresh fruits and vegetables, and one does not need alcohol alcoholic beverages to get antioxidants.

According to Gigleux and others, the potential benefit of moderate drinking on lipids appears to be more important in patients with a higher risk profile, such as men with metabolic syndrome (Gigleux, Gagnon, St-Pierre et al., 2001). Heavy alcohol consumption, on the other hand, will lead to loss of the beneficial effect with worsening of the metabolic syndrome (Fan et al., 2006; Godsland et al., 1998) and elevation in plasma homocysteine levels (Robinson et al., 2005). Thus, drinking in moderation is

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beneficial to serum lipid levels and decreases risk of cardiovascular mortality. If alcohol

helps reduce plaque buildup and clotting then it ought to reduce both the rate of heart

attacks and the rate of ischemic stroke (Ippolito, 2003). Several studies reported a

negative affiliation between modest alcohol use and stroke incidence (Thun et al., 1997;

Berger et al., 1999). Cheng and colleagues in their study, showed a strong beneficial

effect of modest (but not excessive) alcohol use on the rate of ulcers (.Cheng, Kawachi,

Coakley, Schwartz, and Colditz, 2000).

Other health benefits of moderate alcohol consumption, besides ischemic heart

disease, include reduced mortality. Mukamal (2003) has stated in a paper the following:

"Over a median follow-up of nearly 4 years, we found mortality rates of 6.4 deaths per

100 patient-years among abstainers, 3.4 among light drinkers, and 2.4 among moderate

drinkers (p<0.001). Thus, light and moderate drinkers appear to have a more favorable

prognosis than abstainers following acute MI." In a more recent analysis based on the

follow up of more than 50,000 subjects from "The Health Professionals Follow-up Study

(HPFS)," 1,818 men were confirmed with incident non-fatal myocardial infarction (MI);

among MI survivors, 468 deaths were documented during up to 20 years of follow up

(Pai, Mukamal and Rimm, 2012). In that study, in comparison with no alcohol

consumption, the pre-MI and the post-MI intakes of light (0.1-9.9 g/day) and moderate

(10.0-29.9 g/d) amounts of alcohol were both associated with lower risk of all-cause

mortality and cardiovascular mortality. The significant reductions in all-cause mortality

risk (22% lower for 0.1-9.9 g/day and 34% lower for 10.0 – 29.9 g/day, in comparison

with non-drinkers) were not seen for consumers of $\geq$ 30 g/day; for this highest consumer

group, the adjusted hazard ratio was 0.87 with 95% CI of 0.61-1.25 (Poli et al., 2013).

Cardiovascular diseases risk factors such as diabetes benefits seem to derive from alcohol's effects on insulin secretion, resistance and sensitivity (Davies, Baer, Judd, Brown, Campbell et al., 2002; Rimm, 2000). Regular moderate alcohol consumption i.e. 4.5 to 11.5 drinks per week is associated with decreased insulin resistance (Flanagan et al., 2000). According to Facchini and others, alcohol consumption of 1-2 drinks per day by both men and women was associated with enhanced insulin-mediated glucose uptake, lower plasma glucose and insulin concentrations in response to oral glucose (Facchini, Chen, and Reaven 1994). The exact mechanism underlying the insulin sensitizing action of alcohol remains unresolved (NIAAA, 2003). A proper evaluation of theories recommending health benefits of moderate alcohol intake is helpful for further understanding of the unknown.

Theories Explaining Health Benefits of Moderate Drinking

Among theories explaining the health benefits of moderate drinking, the two dominant are the cause and effect theory and the French Paradox.

Cause and Effect Theory

Proponents of the cause and effect theory established a J-shaped association between moderate drinkers and coronary heart diseases risks reduction. The J-shaped curve association simply means there is an inverse relationship between moderate alcohol consumption and many health and societal outcomes. These include 1) reduced use of expensive or acute healthcare, 2) increased wages, and 3) reduced risk of cardiovascular

disease (CHD and associated myocardial infarction) (French and Zavala, 2007;

Gonzalez-Gross et al., 2000; Di Castelnuovo et al., 2009).

According to this theory, the inverse relationship indicates better health outcomes

for moderate drinkers exhibited by their lowest mortality rates, whereas heavy drinkers

have highest, and abstainers and light drinkers a rate falling somewhere in between

(French and Zavala, 2007; Gonzalez-Gross et al., 2000). Stampfer and others assert the

decrease in total mortality at light-to-moderate levels appears to be due to a reduction in

CVD, without significant increases in other causes of mortality (Stampfer et al., 1998;

Camargo et al., 1997 as cited in Gaziano et al., 2000).

Other explanation of this decrease is illustrated by an inverse or L-Shaped curve,

which is largely demonstrated through a reduction in death from coronary heart disease

(CHD) (Grønbaek, et al., 1984 as cited in Gaziano et al., 2000). The health effects of

ethanol are said to be dependent on the amount of alcohol consumed and the pattern of

drinking. Nevertheless, there appear to be some irregularities with the amount of drinks

each study uses to obtain health benefits of moderate drinking. For example, for 1,450

deaths due to CVD, the relationship between light-to-moderate alcohol consumption and

CVD mortality seems to be inverse or L-shaped with trends toward reduced risk apparent

at one drink per week (Gaziano et al., 2000).

Many other studies reported J-shaped curves, i.e. light to moderate drinkers have

less risk than abstainers, while heavy drinkers are at the highest risk (O'Keefe et al.,

2007; Costanzo et al., 2006). Moreover, results of recent meta-analysis of over 1 million

individuals showed that consumption of one drink daily by women and one or two drinks

daily by men was associated with a reduction in total mortality of 18% (Di Castelnuovo,

et al., 2006). Other causal effects of moderate alcohol consumption are explained in the

U-Shaped curve.

Other scientific studies suggest a U-shaped relation between moderate drinkers

and risks of CVD and total mortality (Gaziano et al., 2000; San Jose. van de, Mheen, van

Oers, Mackenbach, Garretsen, 1999; Murray et al, 2001). The U-shaped curve may

reflect an inverse association for CVD mortality, no association for common site-specific

cancers and a possible positive association for less common cancers (Gaziano et al.,

2000; San José et al., 1999). In their study, San Jose and colleagues found light or

moderate drinkers had not only lower mortality, but other health burdens were lower than

for either abstainers or heavier drinkers. These researchers observed a trend for drinkers

reporting seldom heavy-drinking episodes (once or twice in the previous 6 months).

These drinkers appear to report less health burdens and to have lower mortality rates than

those reporting no heavy drinking episodes (San Jose.et al., 1999).

On the other hand, intakes of greater than two drinks daily in women and three

drinks daily in men were associated with increased mortality in a dose-dependent fashion

(San Jose et al., 1999). The number of drinks link to health benefits of moderate drinking

has been subject to dispute since most studies find benefits with different amount of

drinks and type of alcohol. One general theory of alcohol and health is that if alcohol use

improves the overall functioning of the cardiovascular system, then it can have positive

spillover effects on all organs that depend on its proper functioning (Ippolito, 2003), but

it is not always the case . While many researchers have hypothesized alcohol

consumption leads to better health outcome, assuming it is true, if the causal effect of

alcohol on cardiovascular system is reduced mortality, then the effects on CVD risk

factors like stroke should not be conflicting.

One of the areas where the cause and effect theories disagree much is about

positive effects of moderate drinking on clinical strokes. Whereas the benefit of moderate

alcohol consumption on coronary heart disease is well well-known, the precise

relationship with cerebrovascular disease, primarily clinical stroke, is still debatable

(Costanzo, 2011). Risk factors vary for the two major stroke types (hemorrhagic and

ischemic) and several subtypes of each and alcohol appears to have different associations

with these various types (Costanzo et al., 2011). Rehm and colleagues refer to two most

recent meta-analyses (Corrao et al., 2004; Reynolds, Lewis, Nolen, Kinney, Sathya, He et

al., 2003) to explain the inconsistency with the findings of moderate drinking effects on

stroke. These meta-analyses indicate alcohol use both reduces and increases the risk of

stroke depending on the type of stroke, quantity of alcohol consumed, and drinking

pattern (Rehm et al., 2010). It appears both of these studies found a positive, almost

linear relation between alcohol consumption and logarithmized Risk Ratio (RR) of

hemorrhagic stroke, corresponding to an exponential relationship between consumption

and the RR of hemorrhagic stroke, when not logarithmized, but observed a curvilinear

relationship between alcohol consumption and the logarithmized RR of ischemic stroke.

Therefore, low to moderate alcohol consumption (1-2 drinks per day) seems to

have a protective effect on ischemic stroke, and then the risk curve turned upwards

(Rehm et al., 2010). Although many studies contend light to moderate drinking is

associated with a reduced risk of coronary heart disease (CHD), and total and ischemic

stroke as well as total mortality in middle-aged and elderly men and women (Sacco et al.,

1999; Truelsen et al., 1998; Reynolds et al., 2003; Klatsky et al., 1990; Maclure, 1993; Doll, 1997; Corrao et al., 2004; Zhu et al., 2004), these studies are showing association, that may not necessarily mean cause and effect. To prove the validity of the cause and effect theory will require randomized control trials, which are not ethically possible (For example, giving alcoholic drinks to nondrinkers). Nevertheless, Ronskley and colleagues argue that the causal explanation is evident even though observational studies cannot establish causation. Their explanations are:

> Clearly observational studies cannot establish causation. However, when the present results are coupled with those from our companion review paper summarizing interventional mechanistic studies focusing on biomarkers associated with cardiovascular disease,110 the argument for causation becomes more compelling. Indeed, the mechanistic biomarker review shows biological plausibility for a causal association by showing favorable changes in patho-physiologically relevant molecules.

Theories proposing cause and effect relationship between moderate alcohol consumption and better health outcomes are still debatable. Some scientific studies have added lifestyle as a mediating factor to obtain beneficial effects of moderate drinking. The net beneficial health effects of moderate drinking may thus be achieved in less risky ways by refraining from smoking, eating less dietary fat, and doing regular exercise. This has been the argument made by the French Paradox (de Lorgeril et al., 2002).

The French Paradox

During the past decades, the scientific community reacted to the low number of coronary heart disease among the French. In most western countries high intake of saturated fat is positively related to high mortality from coronary heart disease (CHD) (Rehm, Sempos and Trevisan, 2003; Ferrie`res, 2004). However, few decades ago low

number of CHD mortality in France was perplexing because the French diet included high intake of saturated fat like most western countries. This situation was seen as a paradox, and the possible explanation offered then was high consumption of red wine.

Epidemiological studies indicate daily consumption of alcohol at the level of intake in France (20-30 g per day) can reduce risk of CHD by at least 40% (Renaud and de Lorgeril, 1992; de Lorgeril, et al., 2002). Moderate consumption of red wine therefore is believed to be the causal factor protecting from CHD by preventing atherosclerosis through the action of high-density-lipoprotein cholesterol. But serum concentrations of this factor are no higher in France than in other countries (De Lorgeril et al., 2002). The French Paradox is therefore defined as the lower-than-expected coronary heart disease (CHD) mortality rate in a country where classic CHD risk factors are not less prevalent than in other industrialized countries where the diet has historically always been rich in saturated animal fat (Renaud and de Lorgeril, 1992). Other plausible explanation of the French Paradox is the benefits of the Mediterranean diet, which is dominated by the consumption of olive oil and a high consumption of vegetables and fruits (Trichopoulou and Vasilopoulou, 2000).

According to Trichopoulou and Vasilopoulou (2000), since antioxidants are common in these foods, an antioxidant action may provide a reasonable justification for the apparent benefits of the Mediterranean diet. Another plausible explanation of the benefit of the Mediterranean diet is it is a non-strict vegetarian diet rich in oleic acid, omega-3 fatty acids, fiber, vitamins of the B group and various antioxidants, but low in saturated and polyunsaturated fat (de Lorgeril, 1998). These explanations may be in part the reason for the low rate of CHD in France and not just high consumption of red wine

in particular as proponents of the French Paradox have hypothesized (Costanzo et al., 2006; Renaud and de Lorgeril, 1992).

If it is possible to hypothesize with scientific evidence, based on a huge number of observational studies revealing regular and moderate consumption of alcoholic beverages (red wine or just plain ethanol) will lead to better health outcomes, it is also possible to demonstrate with empirical evidence the opposite. It is certainly reasonable based on the French Paradox to assume there are variables other than alcoholic beverages that lead to the observations made in France, mainly the French diet (de Lorgeril, 1998). Moreover some epidemiological studies have examined the claimed of causal effects of moderate alcohol consumption and found not only detrimental effects, but also irregularities with the design of these studies (Dufour, 1999). Detrimental effects of moderate alcohol consumption are examined in the next section.

Detrimental Health Effects of Moderate Drinking and its Related Theories

Although many epidemiological studies have established the benefits of light to moderate alcohol, this does not mean the problems associated to drinking should be overlooked. In the scientific literature, there is no argument about the detrimental effects of heavy drinking and alcohol dependence, the point of contention exists at moderate levels of drinking and for specific medical conditions. Many researches have established health benefits of moderate drinking to the great extent. However adverse effects have been demonstrated and necessary to assess. Some adverse health effects of moderate alcohol consumption include increased risk of cancers, hypertension, strokes, blood pressure (both systolic and diastolic), intentional and unintentional injuries, motor

vehicles crashes, and more (Boyle and Levin, 2008; Zaridze et al., 2009; McFadden et al., 2005). Some of those adverse effects will be explored in this study in order to have a better sense of how knowledge of both beneficial and detrimental effects can have impact on how PCPs make recommendation to patients. This knowledge can also be helpful for evaluation of alcohol prevention and treatment programs.

Effects on Clinical Strokes

The first adverse effect related to cardiovascular risk factor to be examined here is clinical strokes. Cerebrovascular events (i.e., strokes) are the third leading cause of death and the leading cause of disability in the United States (CDC, 2002). The risk of stroke has been found to increase with age, with only about 25% of strokes occurring in people younger than 65 (eMedicine, 2001). Strokes are an important cause of disability and mortality in industrialized nations. According to the American Heart Association in 1989, approximately 500,000 Americans will have a stroke year and the increasing proportion of elderly persons suggest that stroke will continue to be an important health problem (Carmago, 1989).

In the United States stroke is the third leading cause of death and a major cause of disability (de Gaetano et al., 2002). In addition, the year1999, has recorded 167 366 deaths in the United States as a results of stroke, and approximately 30% of stroke survivors are permanently disabled and 20% require institutionalized care(Costanzo et al., 2010). Additionally, stroke is a huge financial burden for patients, their families, and the health care system. The cost of stroke in the United States in 2002 is estimated to be

$49.4 billion, which includes direct health expenditures and lost productivity resulting from morbidity and mortality (Reynolds et al., 2003).

Although, medical and surgical therapies for stroke have changed greatly over the past decade, their impact on prognosis still remains limited. Consequently, identification of modifiable risk factors has become a major focus of stroke research (Carmago, 1989). According to Sedgwick many centuries ago, alcohol use might have deleterious effects on cerebrovascular circulation (Sedgwick, 1725). However many prospective studies more recently, have provided evidence of protective effects of alcohol consumption on risk of ischemic stroke (IS) (Carmago, 1989; Bazzano, 2007; Emberson, 2005; Elkind, Sciacca, Boden-Albala, Rundek, Paik, 2006; Sacco 2006; Ikehara, 2008; Iso, 2004; Mukamal, 2005), even though others have found inconclusive results (Reynolds et al., 2003; Gill et al., 1991). An example of study providing evidence of protective effects of alcohol consumption on risk of ischemic stroke (IS) is the Northern Manhattan Study. The study found moderate drinking was associated with a reduction in risk, when adjusted for demographic characteristics of most IS subtypes (Elkind et al., 2005). This suggests the researchers examined different types of strokes separately stratified by age, sex, race-ethnicity and smoking status (Elkind et al., 2005).

Even though epidemiological studies have shown, generally, moderate alcohol use appears to reduce the risk of ischemic stroke; other studies have provided opposing evidence. According to these studies, alcohol use at all levels increases risk of hemorrhagic stroke (Ashley et al., 1994; Carmago, 1989; Guerin et al., 2013). Hemorrhagic strokes account for about 10 to 15% of all cases and are more common than ischemic strokes for younger people (eMedicine, 2001). Most recently, Reynolds and

colleagues revealed that the increased risk of hemorrhagic stroke is associated with increasing alcohol consumption in dose-dependent fashion and not alcohol at all levels (Reynolds et al., 2003).

However there seem to be a positive linear relationship between moderate alcohol intake and hemorrhagic stroke, but inverse relationship for IS. Daniel & Bereczki (2004) 's study evaluating alcohol as a risk factor for hemorrhagic stroke concluded moderate drinking may result in an increased risk of hemorrhagic strokes. In a meta-analysis to explore the associations of alcohol intake to selected cardiovascular disease outcome, Ronksley et al. (2011) found an overall association of alcohol with stroke incidence and mortality were close to null, both in minimally adjusted and more highly adjusted models. However, he stated, "this null association seemed to obscure nearly significant, but opposite associations with subtypes of incident stroke." For the 12 studies they examined on incident hemorrhagic stroke, the pooled relative risk for current alcohol drinkers compared with non-drinkers was 1.14 (95% CI 0.97 to 1.34), while eight studies on ischemic stroke showed a moderate reduction in the pooled relative risk of 0.92 (95% CI 0.85 to 1.00) (Ronskley et al., 2011).

Furthermore, only two studies reported relative risks on stroke end points for former drinkers compared with non-drinkers (Ronskley et al., 2011). Donahue and colleagues in the Honolulu Heart Program followed 8,006 men in a prospective study of cardiovascular disease. The summary the findings of the study revealed that among participants who were free of stroke at the time of study entry, 2,916 were categorized as nondrinkers of alcohol and 4,962 as drinkers. In 12 years of follow-up, 197 drinkers and

93 nondrinkers experienced a stroke. No significant relationships were noted between alcohol and thromboembolic stroke.

When compared with nondrinkers, however, the risk of hemorrhagic stroke more than doubled for light drinkers and tripled for heavy drinkers (Donahue, Abbott, Reed, Yano, 1986). Donahue et al. (1986) noted these findings are statistically significant and independent of hypertensive status and other risk factors. These results further show alcohol has a greater effect on hemorrhagic strokes that are subarachnoid in origin, conferring a threefold to fourfold increased risk for moderate and heavy drinkers compared with nondrinkers (Donahue et al., 1986). Furthermore, since blood pressure increases with heavy alcohol consumption, excessive intake levels can be expected to increase the risk of stroke (NIAAA, 2004). At lower levels of consumption, however, alcohol's effects on blood lipoproteins and blood clotting might be expected to reduce the risk of ischemic stroke, although the same anticlotting effects could increase the risk of hemorrhagic stroke (Meister et al., 2000).

Finally, several large epidemiologic studies have examined the effect of alcohol consumption on the risk of stroke and have provided inconsistent findings. In Reynolds and colleagues study, moderate alcohol consumption was associated with a reduced relative risk of total and ischemic stroke, increased risk of hemorrhagic stroke, while heavy alcohol consumption was associated with an increased relative risk of total, ischemic, and hemorrhagic stroke. A meta-analysis of 35 observational studies categorized alcohol consumption as abstention, <1, 1 to 2, >2 to ≤5, or >5 drinks per day (1 drink defined as 12 g of alcohol) (Reynolds, 2003 as cited in AHA, 2006).

According to American Heart Association, the same meta-analysis of 35 studies indicated as compared with abstainers, those who consumed >5 drinks per day had a 69% increased stroke risk with a risk ratio (RR=1.69; 95% CI 1.34 to 2.15). Additionally, consumption of less than one drink per day, but not abstaining, was associated with a reduced risk (RR=0.80, 95% CI 0.67 to 0.96), as was consumption of one to two drinks per day (RR=0.72; 95% CI 0.57 to 0.91) (AHA, 2006). This is all evident the issue will remain a challenge for the general consumer and practitioners, since randomize control trials in which individuals are given different amount of drinks are not ethically possible. Continuing disagreement from one study to another by experts creates more confusion. It is a greater challenge for PCPs with patients who may be interested in understanding how moderate intake of alcohol can help reduce their risk of strokes.

To sum up, the empirical evidence regarding hemorrhagic stroke constantly varies; while some studies have found no statistically significant association, others have found a J-shaped relationship, and still others indicate a linear relationship (Berger et al., 1999; Klatsky, 2002; Reynolds et al., 2003; Rimm, 2000). Although, the evidence supports moderate alcohol intake reduces the risk of stroke in populations in which ischemic stroke predominates (e.g., the middle-aged and elderly), it may increase the risk in populations in which hemorrhagic strokes are more common, such as young adults (Meister et al., 2000). One aspect of the debate with less controversy seems to be the effects of alcohol on blood pressure which will be examined below.

Moderate Drinking Effects on Blood Pressure

The relation between regular alcohol consumption and blood pressure has been described in several epidemiological studies (Xin et al., 2001; Chen et al., 2008). Xin and colleagues conducted a study to examine the effect of alcohol on blood pressure reduction. They concluded consumption of a single alcoholic drink may cause an acute rise in blood pressure, but it resolves within two hours (Xin et al., 2001). However, clinical studies with small sample sizes of subjects have suggested that alcohol consumption over several days may cause a more sustained rise in blood pressure (Xin et al., 2011).

Lewis reported the process used by Chen and colleagues to explain effects of moderate drinking on blood pressure. They investigated the association between genotype (ALDH2) and blood pressure in a meta-analysis of published studies (Chen et al., 2005). They found that men with the heterozygote genotype who tended to be moderate drinkers had significantly higher blood pressure than did those with the *2*2 genotypes (who were, on the whole, teetotallers). In addition, *1*1 homozygotes (who drank on average 2 to 3 units per day) had blood pressure levels that were 7.5 mm Hg greater than those of the *2*2 individuals. Women who tended not to drink regardless of genotype did not show an association between genotype and blood pressure, which confirms that the effect of ALDH2 on blood pressure is mediated through alcohol intake. The effect of alcohol on blood pressure was much greater than had previously been shown in epidemiological studies and was equivalent to the effect of antihypertensive drugs on blood pressure (Chen et al., 2005).

Neuropsychological Impairments

Report from the National Institute on alcohol Abuse and Alcoholism indicates while there is some evidence to suggest low blood alcohol concentrations (BACs) bear little relationship to road crashes, impairment of driving-related skills by alcohol has been found to begin at 0.05 percent BAC or lower, with rapidly progressing deterioration as the BAC rises (NIAAA, 1992). A man weighing 140 pounds might attain a BAC of 0.05 percent after two drinks (NIAAA, 1992). Most recently it has been reported impairment of driving-related skills begins with any departure from zero BAC (Heng et al., 2006).

Heng and colleagues gave examples of driving-related skills as follow: 1) divided attention, visual functions, and tracking were impaired in the 0.01– 0.02 g/dl range, which is the level reached with one drink. 2) Controlled behaviors, i.e. difficult tracking, divided attention tasks, information processing, etc., were impaired at BAC 0.030– 0.049 g/dl in actual traffic. 3) Automatic behaviors which are over-learned tasks and which require little conscious mental activity were impaired beyond 0.05 g/dl (Krueger, 1993 in Heng et al., 2006). Moreover, virtually all subjects tested in the studies reviewed exhibited impairment on some critical driving measure by the time they reached 0.08 g/dl (Moskowitz, Burns and Williams, 1985 as cited in Heng et al., 2006).

Motor Vehicle Crash (MVC) Injuries

Facts from the National Centre for Statistics and Analysis of the National Highway Traffic Safety Administration, indicates serious MVC related to moderate alcohol intake. For example, 40% of all fatal crashes were alcohol related (NHTSA,

2003) and of these, 6% of victims of fatal crashes had BAC 0.01–0.07 g/dl and 34% had

BAC > 0.08 g/dl. Of all the alcohol-related fatal crashes, 13% of drivers had BAC of

0.01–0.07 g/dl. In addition, driving skills deteriorate as BAC levels increase in such a

manner that risk of a fatal crash doubles with each 0.02 increase (Heng et al., 2006).

From the US Fatality Analysis Reporting System (FARS) data, "the BAC range

of 0.020–0.049 g/dl, the risk of a fatal MVC increases three to five times compared to

sober drivers. In the BAC range 0.050–0.079 g/dl, the risk of a fatal MVC increases Six

to 17-fold, with the highest risk associated with the male driver aged between 16 and 20.

Forty per cent of non-fatal MVCs in the United States in 2003 were alcohol-related."

Pories, Gamelli, Vacek et al. (1992) divided admitted MVC patients into three groups

according to their BAC (i.e. = 0, <0.1 but >0, and >0.1 g/dl) and reported higher injury

severity score (ISS) in the middle group compared with patients with no measurable

alcohol (P < 0.0001).

There were also significantly more head injuries in the previous group compared

to the latter group and fewer patients were able to return home with self-care. It was

noted that the relationship between alcohol ingestion and serious injury was more

pronounced in the group with BAC < 0.1 g/dl. Pories and colleagues concluded BAC

levels below the legal limit for intoxication can significantly increase the probability of

severe injury (Pories et al., 1992). Data from the US FARS show one has to be cautious

in letting the public believe moderate alcohol consumption is safe and good for heart

problems. While it may be good for the elderly, who may not operate motor vehicle,

these statistics are indication neuropsychological impairments will occur from very low

doses of alcohol consumption irrespective of the reason for consuming it. The debate

about health effects of moderate alcohol is tied not only to point-counterpoint between claims of positive or negative effects, but also on the flaws with theories explaining causal relationship and methods used to collect data in observational studies. The section below evaluates some of the theoretical and methodological issues.

Section II: Theoretical and Methodological Issues
With Health Effects of Moderate Drinking

Theoretical Issues

There are two sides of the debate on the health effects of moderate alcohol consumption. There are those who argue in favor of the health benefits of moderate alcohol consumption on the one hand, on the other hand others argue against health benefits of moderate alcohol intake. Each side of the debate has theorized rather convincingly about the health effects of moderate drinking. However, there are issues are mostly with the theories used to provide evidence of the protective effects of moderate alcohol consumption. What it apparent in the literature is arguments against causal effects of moderate alcohol consumption are not as disputed; rather what has drawn many disputes has been argument for the causal relationship between moderate alcohol consumption and health. Evaluation of theories claiming health benefits of moderate drinking is thus necessary to better understand the phenomenon understudy.

The evaluation of these theories can provide insight into the depth of the problem, and probably can be of use to help primary care providers in case they make recommendation about health effects of moderate drinking to patients based on findings

of this study. This section will examine the French Paradox, the cause and effect theory and the sick quitter hypothesis.

Issues with the French Paradox

As mentioned previously, the French Paradox was defined as the lower-than-expected coronary heart disease (CHD) mortality rate in a country where classic CHD risk factors are not less prevalent than in other industrialized countries and where the diet has historically always been rich in saturated animal fat (Renaud and de Lorgeril, 1992).The French Paradox explains the low prevalence of cardiovascular diseases of the French people by their regular use of red wine. However, recent evaluation of the French Paradox by de Loregil and colleagues reveals some contradictions with its initial theory. The following explanations are given, 1) the concept of the French Paradox conflicts with the conventional theory on the role of classic risk factors in CHD. Thus, questioning the concept of the French Paradox is not just a pretentious exercise, and understanding it may help clarify some of the mechanisms underlying the development of CHD (de Lorgeril et al., 2002).

In addition, de Lorgeril and colleagues argue, without interventional studies, only hypothetic and unintended opinions can be put forward. However, cross-cultural and geographic comparisons, comparisons of men and women in France and the close examination of local and regional variability and discrepancies in France may help to explain, at least partly, the French Paradox. 2) Another important clinical aspect of the French paradox that is emerging is the observation that French patients suffering from acute coronary syndromes may have better outcomes (death, heart failure, recurrent

infarction) than patients from other countries (Fox et al., 2000). No difference in the use of modern therapeutic procedures during the acute phase of the disease has been evidenced so far to explain this discrepancy (Marques-Vidal, 1997). Again, some unidentified factors may contribute to the different outcome in France (de Lorgeril et al., 2002). While many epidemiological studies attribute the health benefits of moderate drinking to the effects of ethanol in beer, spirit, wine, etc. (Mukamal et al., 2001; Covas et al., 2010), it appears gender must be taken into consideration for plausible explanation of the French Paradox.

A study by Dang and other attributed the low risk of CHD in France to wine consumption, but observed that adult French women drink less than men, with more than 60% of them drinking only one glass or less per day on average in one study (Dang et al., 1998). Another study reported a mean consumption of alcoholic beverages in France of about 30 g of pure ethanol per day for men and only 10 g per day for women (Rigaud, Cassoto & Reiser, 1998), which is about two and half drinks for men and less than one drink for women according to the US standards of measurement. According to Volatier and Verger (1999), alcohol energy intake in France was 8% for men and 3.5% for women. This indicates women drink more moderately than men and do not suffer from the same alcohol related diseases as men. Therefore French women's life expectancy is better than anyone in the world, implying these women life expectancy is due to their level of alcohol consumption.

In contrast, the life expectancy of French men is not better than that of other Europeans (de Lorgil et al., 2002). The gender difference in life expectancy in France is indication moderate alcohol consumption, if it is based on two or more drinks a day does

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not necessarily work as well as less than one drink a day. Thus, in relation to alcohol, one must consider two distinct French paradoxes, depending on the gender and, if one accepts the idea that the difference between French men and women in their way of drinking partially explains the difference between the male and female, then one can say wine drinking may be a factor to explain the French paradox in general (de Lorgeril et al., 2002). The explanation de Lorgeril and his colleagues give as reasonable explanation of the French Paradox fails to take into consideration their own claim about the effect of wine drinking on CHD. Instead, they choose to propose two distinct French Paradoxes.

Contrary to that argument, results of meta-analyses found a J-shaped relationship between alcohol and total mortality when data were analyzed separately for men and women (Costanzo et al., 2006). The dose-response curves were similar for both sexes when alcohol intake was light, but they did differ with heavier intake; in fact the inverse association in women apparently disappeared at doses lower than in men (the protection was apparent up to three drinks per day in men, but only up to two drinks per day in women, whereas the maximal risk reduction was similar (17%; 99% CI 15–19% and18%; 99% CI 13–22%, respectively). This suggests women are more exposed to all causes of death at moderate to high level of alcohol (Costanzo et al., 2006; Di Castelnuovo et al., 2006). If two drinks a day for men and one drink a day for women is used as the standard measurement for better health outcomes, then the issue will be less confusing for primary care physicians and patients. However, the discussion between researchers who claim the cure is in the wine, cannot even agree with the amount of drinks that is beneficial. As a result, the debate remains open, and casts doubts on the likelihood wine drinking or any other alcoholic drink causes the effects observed.

The Cause and Effect Theory

Proponents of the cause and effect theory in observational studies assert health benefits of moderate alcohol consumption (Corrao et al., 1999; Maclure, 1993; Di Castelnuovo et al., 2002; Mukamal et al., 2003; Reynolds et al., 2003), by consistently showing with epidemiological evidence, an inverse association between moderate alcohol consumption and cardiovascular disease, in particular coronary heart disease and ischemic stroke (Di Castelnuovo et al., 2009). It also appears several not primarily vascular diseases are known to occur less frequently in moderate drinkers than in nondrinkers (Corrao et al., 1999; Stampfer et al., 1998; Corella, 2007; La Vecchia, 1995; Renaud et al., 1999; Di Castelnuovo, et al., 2006). While the protective effect of moderate alcohol consumption on atherothrombotic vascular disease is accepted by the scientific community, some concern exists, particularly at monitoring agencies level, on the possibility at any dosage (Costanzo, 2011) the harmful effects of alcohol may overcome its benefits (Jackson, Broad, Connor and Wells, 2005; Gronbaek, Jensen, Johansen, Thorkild, Sorensen and Becker, 2004). This concern is evident with the probability of injury occurring at BAC of 0.030– 0.049, which shows problems with impaired controlled behaviors (Heng et al., 2006).

Nonetheless, observational studies have publicized the relationship between alcohol and cardiovascular risk or total mortality, and have repeatedly depicted this relationship as a J-shaped curve; the risk being lower at light-to-moderate alcohol consumption, but increases at higher doses (Di Castelnuovo, Rotond, Iacoviello et al.

(2002) ; White et al., 2002; Gmel et al., 2002; Di Castelnuovo, Iacoviello, de Gaetano et al., 2002).

These claims have overlooked the possibility of serious injuries that can be caused by low level of alcohol consumption. These findings appear to be credible due to the number of studies and review of meta-analyses. One can hardly argue with this amount of epidemiological studies and the consistent results. Nevertheless, emphasis of these studies were placed on one aspect of the problem, i.e. cardiovascular disease risks, by not conducting the studies using a true experiment, they have overlooked important facts about observational studies, i.e. observational studies are subject to residual confounding (AU Yeung, 2013). As a result, there is hardly any proof; the effects observed are caused by alcohol itself.

Furthermore, there is no consensus with regard to what type of alcoholic beverage leads to reduced CHD diseases risks. For examples, some studies claim the benefits are more evident if red wine is consumed than spirits, beer and other (de Gaetano et al., 2002; Costanzo, 2011), while others claim the health benefits are from consumption of red wine accompany by the Mediterranean diet, e.g. the case of the French Paradox (Renaud and de Lorgeril, 1992; de Lorgeril et al., 2002; Costanzo et al., 2011). Still others claim the health benefits are caused by alcohol regardless of the type (Mukamal et al., 2003). It is debatable whether any type of alcoholic drinks has the ability to relax heart muscle like antioxidants from food would produce. Some studies found vasodilation effect of alcohol on heart muscle, but on a short term basis. This is evident when effect of ethanol on blood pressure is being examined (Kodavali & Townsend, 2006).

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This complexity adds to the challenge for practitioners and the general population. It is difficult to say what a primary care provider will recommend to patients regarding alcohol use. If low alcohol intake is inversely related to CHD, even though one can barely make the claim with certitude, on the other hand it shows an increased risk of certain cancers, cirrhosis and death from accidents associated with or without increase alcohol consumption (Corrao et al., 2004). Au Yeung et al. (2013) explain the possible causal effect of alcohol on health and disease with the help of the Mendelian Randomization, which is as close to an experimental approach as possible.

The Mendelian Randomization

Observational studies of moderate alcohol intake usually have a U or J shaped association with health, such that moderate alcohol use (1–2 drinks per day) is negatively associated with ischemic heart disease (IHD) (Ronksley et al., 2011) ischemic stroke (Reynolds et al., 2003) and diabetes (Carlsson, Hammar and Grill, 2005). Similarly, some public health advice implies moderate alcohol use is protective against cardiovascular disease (CVD) and diabetes (Center for Nutrition Policy and Promotion (2010). However, Naimi and others argue observational studies are vulnerable to biases from residual confounding, due to unmeasured systemic differences between moderate alcohol users and other alcohol users (Naimi et al., 2005), and from over-adjustment due to an imperfect understanding of the underlying causal pathways and from reverse causality. Thus such studies may not provide a sound basis for causal inference (Au Yeung et al., 2012). The benefits of moderate alcohol use are not always evident in studies from the majority of the global population outside western settings (Sun, 2009;

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Schooling et al., 2009; Roy et al., 2009) where moderate alcohol use is less commonly used as a social lubricant (Au Yeung et al., 2012).

The use of the gold standard in moderate alcohol research i.e. randomized control trials (RCTs), is needed, to help with the burden of proof in this issue. There have been no large-scale RCTs of moderate alcohol use and cardiovascular disease most likely due to ethical and practical issues. For example, it will not be ethical to assign any amount of alcoholic beverage to nondrinkers. To solve the impractical problem of RCTs, others researchers have used the Mendelian randomization, which was apparently used initially to describe a brilliant method for evaluating the effectiveness of allogeneic sibling bone marrow transplantation in the treatment of acute myeloid leukemia (AML), through comparing outcomes in patients with and without human leukocyte antigen (HLA)-compatible siblings (Gray & Wheatley, 1991).

According to Au Yeung and colleagues, a Mendelian randomization study, therefore, provides an alternative approach to establish the causal role of moderate alcohol use in a suitable population where a genetic variant affects alcohol metabolism and thereby alcohol use. Genetic variants in the aldehyde dehydrogenase 2 (ALDH2) gene affect alcohol metabolism (Harada et al., 1982 as cited in Au Yeung et al., 2013) and have been proposed as suitable predictors of alcohol use in Mendelian randomization studies (Smith & Ebrahim, 2004).

From Smith and Ebrahim description of Mendelian randomization, these studies can be thought of in three ways. First, the genotypes can serve as proxies of the exposure (Smith & Ebrahim, 2004), which is particularly useful if the relevant exposure has not been or cannot be measured. Second, Mendelian randomization can be thought of as

triangulation of genotype, exposure and outcome, akin to mediation, which is an intuitive way of thinking of instrumental variable analysis. Third, Mendelian randomization can be thought of as instrumental variable analysis with genetic instruments, which they used in their study (Lawlor et al., 2008; Didelez & Sheehan, 2007), because instrumental variable analysis is a well-established statistical technique with known statistical assumptions and properties.

Accordingly, ALDH2 alleles are randomly allocated to at conception. People with inactive ALDH2 alleles flush and feel discomfort following alcohol use because of acetaldehyde exposure (Harada, Agarwal & Goedde, 1981 as cited in Yeung et al., 2013). Smith & Ebrahim explain genetically determined alcohol use resembles random allocation in RCTs, and provides a potentially less biased way to assess the effect of moderate alcohol use on health (Smith & Ebrahim, 2004). People, with inactive ALDH2 alleles, and correspondingly lower alcohol consumption, have been observed to have lower blood pressure (Chen et al., 2004) and lower HDL-cholesterol, and this is consistent with evidence from RCTs (Hao et al., 2010).

However, these studies lacked information on alcohol use and used ALDH2 genotypes as proxies of alcohol consumption, rather than using instrumental variable analysis to estimate the effect of alcohol use on CVD risk factors. Although this method seems perfect, there is however variation in interpretation of the results from the Mendelian randomization. While Smith & Ebrahim, after using this method, did not appear to be convinced that it will only work for persons with a particular genotype (Smith & Ebrahim, 2005), Au Yeung (2012) was rather convinced the lack of proof of causal effect using the Mendelian randomization was proof the observed effect were due

to confounding and not alcohol. This is one example among others of the complexity of research on health effects moderate alcohol consumption. Other major complexity is found in the discrepancy with the definition of moderate drinking.

Issues with Definition

According to Dufour (1999), to discuss effectively the likely benefits and risks associated with moderate drinking, one must first answer the question, what is moderate drinking? Dufour, believe the meaning of the term "moderate" to be highly subjective (Dufour, 1999)). It is also evident there is variability in the meaning based on the context. For example, alcohol content of a drink varies around the world, and from one study to another despite attempts to provide the general population with guidelines (ICAP, 2003; HHS/USDA, 2005). A drink is the alcohol content of a12 ounces of beer, 5 ounces of wine, or 1.5 ounces of 80-proof distilled spirits. Each of these drinks contains roughly the same amount of absolute alcohol approximately 0.5 ounce or 12 grams (NIAAA, 1995; HHS/USDA, 2005).

In the United States and Canada and around the world the content of a drink varies. For example, it is 12 to 14 grams for North America, 8grams in the United Kingdom, 8grams for wine and12 grams for beer in France, one unit (one glass or a pint) in Hong Kong, 19.7 grams in Japan, 12 grams in South Africa etc., (International Center for Alcohol Policies Reports (ICAP), 2003). Looking at the international guidelines, what one person considers being moderate drinking, another person may view as heavy drinking (e.g. Japan with 19.7 grams). This variability makes it difficult to compare or interpret study findings to determine the exact effects of moderate drinking.

From a public health perspective, this is serious challenge for practitioners, mainly for primary care providers in case patients need to make informed decision about amount to drink for health. For now, defining moderate drinking remains an existing problem, rather difficult to solve especially as it relates to coming to a consensus with the observed benefits of moderate alcohol intake. Until the existing discrepancy with the definition of moderate drinking is solved, the debate about the health effects of moderate drinking continues, creating uneasiness to recommend moderate drinking as a means to prevent cardiovascular disease or reduced mortality.

Other issues with defining moderate drinking is seen in the freedom researchers as they are engaged in when determining causal relationship between moderate drinking and better health outcome. In many studies, the term "moderate drinking" refers to less than one drink per day, while in others it means three or four drinks per day (Dufour, 1997; Kloner and Rezkalla, 2007;   Zakary, 1997). Precisely what is called "a drink" is also equally fluid. In fact, even among alcohol researchers, there's no universally accepted standard drink definition (Kloner and Rezkalla, 2007).

The Harvard science daily says, "The definition of moderate drinking is something of a balancing act. Moderate drinking sits at the point at which the health benefits of alcohol clearly outweigh the risks." The latest consensus places this point at no more than one to two drinks per day for men, and no more than one drink per day for women (USDA/DHHS Dietary Guidelines, 2000). This is the definition used by the U.S. Department of Agriculture and the Dietary Guidelines for Americans, and is widely used in the United States. However the existing problem with the definition is because alcohol

is not used according to the USDA/DHHS guidelines as stated, making interpretation of studies' findings difficult.

Another problem with the interpretation of the studies' findings is semantic. Some researchers use the terms "light", or even "light-to moderate" without stating the exact what light stands for or what light to moderate stands for. For example Grønbaek et al. (2004) described a U-shaped curve for stable alcohol intake and total mortality (continue). One report says, "Compared with light drinkers (1 to 6 drinks per week), nondrinkers (<1 drink per week) had a relative risk of dying of 1.29 (95% CI, 1.13 to 1.48), and heavy drinkers (>13 drinks per week) had a relative risk of 1.32 (95% CI, 1.15 to 1.53) (Kloner and Rezkalla, 2007). Again Kloner and Reskalla's study can be deemed excessive or less depending on context. The problem with Kloner & Rezkalla definition of moderate drinking is they consider nondrinkers those who drink alcohol (<1 drink a week). Nondrinkers should be people who abstain from alcohol altogether and not occasional drinkers. This types of inconsistency in the actual levels of alcohol that are considered "safe "or "low-risk" is seen in different countries of the world as mentioned previously (ICAP, 2003).

In addition, confounding factors are possible reasons behind this discrepancy. These factors are important and are discussed in details in another section of this study. Another point of contention with defining moderate drinking is to some extent a result of individual differences. According to Bondy et al. (2001), the amount a person can drink without intoxication may vary according to drinking experience and tolerance. Moreover, individual metabolic differences can lead to a wide range of blood alcohol content (BAC) levels for the same consumption (Ramchandani et al., 2001).

Also important is the time over which the alcohol is consumed: 3 drinks in one hour will produce a much higher BAC than three drinks over the course of three hours, and therefore different effects. Thus, definitions solely based on the number of drinks are not the best approach (NIAAA, 2003). Other complications are inherent in interpreting the literature on moderate drinking. For example, the claims of health benefits of moderate drink are based on the following statement, "Moderate drinking is the only level of drinking that has been shown to have potential health benefits" (NIAAA, 2003). Yet the levels of drinking classified as "moderate" and "heavy" again have not been defined consistently across studies (Gaziano et al., 2000; Klatsky, 2002; NIAAA, 1992). In addition, the lack of consistent definition of moderate drinking can be because alcohol researcher do not stick to the guidelines set by the USDA/DHHS Dietary Guidelines (2005; i.e., no more than one drink per day for women and no more than two drinks per day for men), in participants self-report of alcohol consumption.

Further, the amount considered moderate in some situations may be excessive under other circumstances (e.g., pregnancy; intent to drive) (ICAP, 2003). Similarly, it is important to note many "moderate drinkers" have occasions of high-risk drinking, including heavy episodic drinking and acute intoxication leading to injuries and violence (Gutjahr, Gmel and Rehm, 2001; Maguire and Pastore, 2006 pp. 269–272). Understanding of the risks and benefits supposedly associated with alcohol consumption is an important public health tool for preventing harm. Evaluation of the existing epidemiological evidence on the health effects of moderate alcohol consumption reveals not only definitional issues, but also many methodological problems.

Methodological Issues

A considerable amount of observational studies have documented the intricate

relationship of alcohol consumption, health preservation and mortality. The U-shaped or

J-Shaped relationship between alcohol and death from ischemic heart diseases, strokes,

diabetes, and some cognitive problems, shows moderate alcohol consumption is

associated with lower mortality than complete abstention or heavy alcohol use (Rehm et

al., 2003; 2009; Mukamal, 2002; Mukamal et al., 2005; Di Castelnuovo et al., 2002;

Costanzo et al., 2006 and more). This relationship between moderate alcohol

consumption and health preservation and mortality was first described by Pearl in 1923.

Although many studies since then have continually found moderate drinkers to

have a survival advantage compared with abstainers and heavy drinkers, controversies

have emerged regarding the importance of confounding factors and the validity of such

results if these are taken into consideration (Nova et al., 2012; Au Yeung, 2012). A major

methodological weakness of past studies is the bias attributable to the "sick quitter"

hypothesis: "persons who are experiencing preclinical symptoms of disease may decrease

their usual alcohol consumption" (Carmago, 1996; Shaper et al., 1998; Fillmore et al.,

2007). A fair look at some of the challenges of observational studies, which include,

confounding factors, the problem of the sick-quitter hypothesis or misclassification error

can give some insight into this controversy.

Challenges of Observational Studies

Although observational studies are scientifically sound, they are, however, susceptible to many biases including and most importantly residual confounding (Au Yeung, 2012). One study investigated the prevalence of cardiovascular disease risk factors and potential confounding factors among never and moderate users in United States (Naimi, et al., 2005).

The findings of that study indicated after adjusting for sex and age, of the 30 risk/protective factors and confounders included, 27 of them were more prevalent in never users. Also, while investigating US workers and wages, a study showed among US workers, there was an inverted U shaped relationship between average drinks per day and wages, which coincided with the U shaped relationship of alcohol use and health (French & Zarkin, 1995). Other studies exploring the characteristics among different drinkers also revealed abstainers had lower socioeconomic status (Fillmore et al., 1998; Cummins et al., 1981; Bennett et al., 1996; Marmot, 1997), but contrary to these findings, Crowley found high frequency of drinking among lower socioeconomic groups (Crowley, 1991).

In addition, Green & Polen, say moderate drinkers are found to monitor their health (e.g., blood pressure, preventive dental care) more often than abstainers and heavy drinkers, and female drinkers over age 50 report significantly higher mammography rates than nondrinkers (Green and Polen, 2001).

Since confounders present such challenges to observational studies, for trustworthiness of results, some researchers have attempted to control for confounders in observational studies. According to Davey-Smith & Phillips (1992) to control for effect

of confounding in observational studies, statistical methods are used but required the confounder to be measured precisely and comprehensively identified; which is difficult, particularly when the study was not originally designed to investigate that particular research question (Davey-Smith & Phillips, 1992 as cited in AU Yeung et al., 2012). A simulation study showed residual and/or unmeasured confounding could generate the magnitude of effect commonly reported in observational epidemiologic studies (Fewell, Davey-Smith & Sterne, 2007).

Lewis found problems with observational studies are they are often unable to measure exposures accurately, and this measurement error may lead to false claims of associations between exposure and disease. An Example is noise. Noise in the measurement of exposure in cases and controls is more likely to lead to attenuation of exposure-disease associations, which could mean risk factors are not identified (Lewis, 2009).

Confounding in Observational Studies

Lawlor and colleagues illustrated an example of common problem of confounding by the discrepancies between observational studies and randomized controlled trials (RCTs) concerning the association of vitamin supplements with Cardiovascular diseases and all-cause mortality rate. In these instances observational studies suggested benefit, but RCTs showed harm (Lawlor et al., 2004). In addition, an analysis of women from the British Women's Heart and Health study, the researchers found life course socioeconomic factors, adult behavioral factors, and markers of childhood development were more favorable among participants who took vitamin supplements (Lawlor et al.,

2004). Also, Au Yeung (2012) argues, given the flaws of observational studies, it is

unclear whether the cardioprotective effect of moderate alcohol use is real or is driven by

the systematic differences between moderate users and abstainers, i.e. lack of

exchangeability (Emberson and Bennett, 2004; Fuchs and Chambless, 2007). Using

Greenland and Robin's exchangeability model, Au Yeung (2012) explains how

confounding affects the results of observational studies below:

> Greenland and Robin think, exchangeability originates from the thinking that in
> an ideal scenario, one can obtain the average outcome of drinking moderately (A
> moderate) and the average outcome of abstaining from alcohol (A abstain) from
> the same group of people (A). Hence we could obtain the overall unbiased
> average effect of moderate drinking on health by the differences between A
> moderate and A abstain (Greenland and Robins, 2009).

Au Yeung states that scenario, unfortunately, will not be ideal in the real world.

He explains that in real world situations, it is impossible to have people drinking both

moderately and abstaining from alcohol, therefore, a group (A moderate) and (A Abstain)

is not retrievable. As such, he continues, "we substitute the average outcome of real

abstainers (B abstain) with those of the ideal abstainers (A abstain) to estimate the

average effect of moderate drinking on health. In this case, he says, "it is assumed that B

abstain equals to A abstain," "again," as Au Yeung asserts, "this is likely to be wrong

because moderate users are different from abstainers." Therefore, the lack of

exchangeability between A and B lead to biased estimates, confounded by the baseline

differences between abstainers and moderate users (Greenland and Robins, 2009 as cited

in Au Yeung, 2012).

According to Lipssitch and colleagues, negative control outcomes such as

accidents, could be used to detect any biases in studies (Lipsitch, Tchetgen and Cohen,

2010) concerning moderate alcohol use, but these are rarely used (Au Yeung et al., 2012). Greenland and Robins, further think, adjustments are often used to control for confounding. However, any association found in an observational study needs to be evaluated in the light of a acceptably stated directed acyclic graph (DAG) which evades adjusting for mediators (factors that lies along the causal pathway between the exposure and the outcome) or colliders (factors 15 directly affected by the exposure and the outcome). This has been problematic, especially in cardiovascular research (Greenland and Robins, 2009). For example, alcohol studies sometimes evaluate the effect of alcohol after adjusting for blood pressure and hypertension, when these are most likely mediators on the causal pathway (Mukamal, Chiuve and Rimm, 2010; Mukamal et al., 2003).

Other studies have indicated alcohol use increases both HDL cholesterol and blood pressure, which have entirely opposite effects on cardiovascular health. Therefore, adjusting for blood pressure or hypertension generates estimates that may remove the harmful effect of alcohol and only capture the health effects of alcohol. This may be etiologically revealing but does not give the overall effect of alcohol use on the relevant outcome because the estimate only reflects a partial effect of alcohol on the body (Au Yeung, 2012). Some authors (Jackson et al., 2005; Naimi et al., 2005; Costanzo et al., 2006;) investigated the hypothesis that any coronary protection from moderate alcohol drinking is unlikely to outweigh the known harms, mainly because of uncontrolled confounding by associated lifestyle factors; the hypothesis is "drinkers may have many healthier characteristics than non-drinkers and thus may have lower ischaemic heart disease risk" (Nova et al., 2007). Mukamal and other recently addressed this important

question in a large USA population, and found moderate drinking is only modestly

associated with healthier lifestyle characteristics, the association being lower after

adjustment for race and education (Mukamal et al., 2006). Another Challenge of

observational studies is misclassification error, identified by Shaper et al. (1988) and then

by Fillmore and colleagues in 1998. These authors contended there must be an error in

assuming that people who abstain from alcohol have a greater risk of CHD and mortality

than moderate drinkers.

Misclassification Error

Proponents of this theory claim a systematic error might exist in observational

studies which erroneously show protective effects of moderate drinking, since

uncontrolled, unknown and or unavoidable confounding factors may not have been taken

into account leading to misinterpretation (Emberson & Bennett, 2006; Fillmore et al.,

2007). For example, Marmot says most of the studies used mortality data but not

incidence of disease; therefore, no actual estimation of association of alcohol

consumption with overall cardiovascular disease can be made (Marmot, 2001). Also,

associations between alcohol intake and mortality are usually established for total alcohol

consumption without taking into account drinking patterns (e.g., drinking during or

outside meals, binge drinking) that would also have an influence on the risks (Marmot,

2001).

Furthermore, observational studies normally rely on participants' self-report of

alcohol consumption, raising doubts about the ability of respondents to accurately recall

their own alcohol intakes, especially when they are asked to report drinking frequency for

the previous year (NIAAA, 2003). Additionally, very few individuals maintain one single drinking pattern throughout life (Chikritzhs et al., 2009). Besides misclassification error, observational studies are known to include in the reference group formers drinkers, hence the expression "Sick quitter bias."

The Sick Quitter Hypothesis

This refers to group of non-drinking people, ex-drinkers who have given up or have decreased alcohol intake because of cardiovascular-related illness (Klatsky et al., 1990) and/or aged. In other words, people may abstain from alcohol as they become ill, get older or/and increase the use of medication (Shaper et al., 1988; 2000; Cryer et al., 2001; Gronbaek et al., 2000; Graham & Schmidt, 1988) Shaper and colleagues suggested the error of including persons terminating or decreasing their alcohol consumption to very occasional drinking in the abstainers' category, biased the findings toward making drinkers seem less vulnerable to CHD, and abstainers more vulnerable in prospective studies (Shaper et al., 1988 in Fillmore et al., 2007). The results of such studies would inevitably raise the coronary risk in non-drinkers group (Fillmore et al., 2007).

Assessment of recent alcohol exposure may thus undervalue true lifetime alcohol exposure and lead to misclassification of exposure status. Fillmore and colleagues examined many studies to identify which one has made the error of including former drinkers in their reference group. They observed the studies judged to be error free found no significant all-cause or cardiac protection, suggesting the cardiac protection afforded by alcohol may have been overestimated (Fillmore et al., 2007). To explain how studies made misclassification error, Fillmore and colleagues evaluated two errors they found

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were common. When studies indicated moderate drinkers have reduced IHD and less

mortality rate than abstainers, the two errors they observed were the inclusion of former

drinkers and occasional drinkers in the abstainer category.

Fillmore et al. discovered two aspects to their investigation. The first aspect of

their findings shows abstainers not to be at higher risk of all-cause mortality when

studies did not make inclusion error (N=7 studies) and CHD mortality (N= 2 studies)

than were 'light ' or 'moderate 'drinkers (Fillmore et al., 2007). The second aspect was

when studies made both errors (N=26 all-cause mortality studies; N=25 CHD mortality

studies), the results showed what had been repeatedly reported in the literature: a J-

Shaped curve for all-cause mortality and a negative linear shape for CHD (Costanzo,

2012; De Gaetano et al., 2006). Studies with only the former drinker misclassification

error N=26 all-cause mortality studies) and N=8 CHD mortality studies), the results

indicated a J-shaped curve for all-cause mortality and a non-significant negative linear

association for CHD mortality (Fillmore et al., 2007). It is important to note Fillmore and

colleagues indicated their results do not prove the error, but suggest the protective effect

of alcohol for CHD may have been exaggerated in most epidemiological studies to date

and hoped their analysis may reopen the debate in this area of alcohol research (Fillmore

et al., 2007).

It therefore appears lifetime abstainers are usually the reference group when

investigating the effect of alcohol use on health (Klatsky, 2008). Because non-users may

include former users, who are likely to be former heavy users, possibly made ill by

alcohol, as noted by others when the U shape curve between moderate alcohol use and

mortality rate was observed in 1980s (Shaper et al., 1988). Lawn et al. (2007) found 52%

of lifetime drinkers now abstaining who reported prior loss of control of drinking i.e.,
alcohol dependence; indicated health harms categorized as involving "internal organs"
versus only 2.5% of current abstainers who never had loss-of-control symptoms (P <
0.0001), an indication of the inclusion, among quitters, of many with serious health
conditions (Rehm et al., 2008).

A meta- analysis revealed former users had higher risk of IHD mortality rate but
not morbidity (Roerecke & Rehm, 2011); on the other hand, former users do not
necessarily have poor health, which depends on their reason for quitting drinking and
previous drinking pattern (ill health, age or even family relationship). This in turn is
influenced by the social norm towards drinking in the particular setting. As such, former
alcohol users might have lower IHD risk than never users if they drink moderately;
assuming that it is protective and probably similar to never users if they drank only
occasionally (Roerecke & Rehm, 2011; Rehm et al., 2008). However, if people quit
drinking (at any level because of ill health), then with age, moderate alcohol users will
become more and more heavily self-selected healthy users (AU Yeung, 2012). This
problem of reverse causality (Lewis, 2009) is more problematic in studies where the
assessment of alcohol use is at older ages. Notably the apparent protective effect of
alcohol is higher with increasing age (Blocker, 2006 in Au Yeung, 2012).

Problems with Self-report Data

The utmost problem facing alcohol research is the lack of a reference standard
with which to validate self-reported drinking. The reliability of self-reported alcohol
consumption is good (NIAAA, 2003), but this is of little consolation if the collected data

are not valid. At a societal level independent criteria are available to validate sample survey estimates, and the findings are disturbing: consumption estimates based on self-reported data consistently account for only 40-60% of alcohol purchases. Most alcohol researchers attribute this "coverage problem" to response error (i.e., forgotten or deliberately concealed drinking) and reluctantly conclude that survey research will have to live with it until new measurement techniques are found (de Lorgeril et al., 2002). Fillmore and others argues that, the implied assumption of most investigators is that response error affects all respondents alike, yet there is practically no empirical evidence to test this theory (Fillmore et al., 2008). Moreover, Au Yeung states, if all respondents miscalculate their alcohol consumption regularly, RR estimates for any presumed level of alcohol use would be "mislabeled" but would have rank-order validity (Au Yeung et al., 2012). If that were the case, the hypothesized association between alcohol intake and stroke would be found, but safe levels of drinking could not be established since true drinking habits were not known. Alternatively, Au Yeung continues, if miscalculation in participants' response is not equal, RR could be miscalculated, inflated, or completely false (Au Yeung et al., 2012). Consequently, the relationship between the actual number of drinks consumed and the number of drinks reported becomes a considerable problem; this in turn creates uncertainty whether one can accept the causal link between moderate alcohol consumption and all-causes of mortality. Additionally, previous research indicates there may be sizable conflict in self-reports of lifetime abstention.

An analysis considering two measurements 10 years apart in the First National Health and Nutrition Examination Survey found 45% of men and 33% of women who reported never having at least 12 drinks in 1 year at time 2 had reported drinking at time

1(Fillmore, Keer & Bostrom, 2003), although 68% of these subjects reported very light

drinking consistent with the question asked (Fillmore et al., 2003). In a British

longitudinal study with 5 measurements over the ages of 16–45 years, more than half of

those reporting never drinking at age 45 years had reported at least some drinking in the

past (Caldwell et al., 2006). The same study also found many of those who reported being

occasional-only drinkers had reported drinking more regularly in previous assessments

(Rehm et al., 2008).

The alcohol–CAD reports have been exceedingly scrutinized for methodological

flaws (Rehm et al., 2008; Fillmore et al., 2006; Shaper et al., 1988). Reasonable fear of

problems consequent to encouragement of moderate drinking contributes to reluctance to

accept any benefit from alcohol. Similarly, uncertainty is fueled because some studies

failed to separate ex-drinkers, including "sick quitters," from lifelong abstainers in the

referent group, hence exaggerating apparent benefits of lighter drinking (Fillmore et al.,

2007; Shaper et al., 1988). Although studies using lifelong abstainers or infrequent

drinkers as referents confirmed apparent protection (Klaktsy, 2009), the absence of

prospective RCTs with CVD/CHD events as the outcome allows residual uncertainty

about CHD protection by alcohol. Consequently there has been a point-counterpoint

debate in the published medical reports (Klatsky, 2007; 2008; Rehm et al., 2008; Fillmore

et al., 2006). Also, the divergent explanation of the mechanisms of action of moderate

alcohol consumption on CVD events, as well as on all-cause of mortality has not help the

skeptics. The next section will attempt to examine the mechanisms of action of moderate

drinking on CVD/CHD for more insights.

Explained Mechanisms of Action of Moderate Drinking on Diseases

Explained Beneficial Effects on CVD

As stated previously, results of observational studies have indicated alcohol consumption was inversely related to myocardial infarction. These findings were confirmed by meta-analysis of short-term trials of alcohol administration, which indicated alcohol consumption has important effects on factors involved in atherosclerosis, inflammation, and thrombosis (Di Castelnuovo, Costanzo, di Giuseppe, de Gaetano and Iacoviello., 2009). The known beneficial effects of moderate alcohol consumption are explained by its effects on several vascular and biochemical factors. Some of the mechanisms of action are 1)an increase in HDL cholesterol (HDL-C) levels, 2) a decrease in platelet aggregation via inhibition of prostaglandin synthesis and 3) changes in fibrinogen, tissue-plasminogen activator (t-PA), and plasminogen-activator inhibitor (PAI)-1 levels, which are thought to represent major mechanisms to reduce the risk for CVD events (Rimm et al., 1999; Zakary, 1999). Moderate alcohol is also said to inhibit the development of atherosclerotic lesions in a dose-dependent fashion in animal and human studies (Renaud & de Lorgeril, 1992; de Gaetano et al., 2002; Rimm et al., 1999; Haskel et al., 1984; Linn et al., 1993 as cited in Di Castenuevo et al., 2009).

One of the dominant theories explaining mechanisms of action of alcohol on CVD is the oxidative modification hypothesis (Steinberg, 2002). Oxidized lipids, especially, phospholipids, generated during low density lipoprotein (LDL) oxidation or within oxidatively stressed cells, are the triggers for many of the events seen in developing lesions (Steinberg, 2002). According to the theories explaining mechanisms of action of

alcohol on CVD and mortality risks, the most important of these action is on high-density lipoprotein cholesterol (HDL-C, "good" cholesterol) levels (Di Castelnuevo et al., 2009; Zakary, 1999).

In a meta-analysis, Rimm and colleagues (1999) estimated consumption of 30 grams of alcohol, or approximately two standard drinks, per day increases HDL-C levels by 4.0 milligrams per deciliter (mg/dL). This increase in HDL-C levels is greater than that produced by gemfibrozil, a medication used to treat people with low HDL-C levels and translates into a 16.8 percent decrease in the risk of coronary heart disease (Stampfer et al., 1991). Other mechanisms explaining effects of alcohol on CVD revealed moderate alcohol consumption is independently associated with less coronary atherosclerosis in humans (Saremi & Arora, 2008). Femia and colleagues in a study on 1676 men and 465 women undergoing coronary angiography, results of multivariate analyses demonstrated alcohol was associated with a lower percentage of lumen narrowing in the main coronary vessels, suggesting moderate alcohol consumption is independently associated with reduced coronary atherosclerosis (Femia et al., 2006).

Stampfer and colleagues found some mixed effect of alcohol in the cardioprotective mechanisms. While alcohol consumption raises the levels of good cholesterol (HDL), it raises the levels of another type of fat in the blood at the same time; the triglycerides, which are associated with an increased risk of coronary heart disease (Stampfer et al, 1996 as cited in Di Castelnuevo et al., 2009). In the randomized trials, consumption of 30 grams of alcohol raised triglyceride levels by an estimated 5.7 percent, which translates into a 4.6 percent increase in coronary heart disease (Stampfer et al., 1996). Accordingly, alcohol has a mixed effect on coronary risk factors by

increasing both HDL-C and triglyceride levels. Even so these, studies argued that the balance of these effects appears to favor prevention of coronary heart disease (Stampfer et al., 1996).

Other effects of alcohol on blood clotting (coagulatory) factors and the best studied of these factors is fibrinogen, which is converted to fibrin during blood clot formation (Klatsky, 2010; Brien et al., 2011). As plaque builds up within the wall of an artery, the deposit begins to bulge into the vessel's interior, obstructing blood flow, and eventually may rupture into the vessel. When a rupture occurs, platelets coming in contact with collagen and other exposed subendothelial compounds become activated and operate in conjunction with other clotting (i.e., coagulation) factors to form a blood clot and seal off damage. Platelet function is a key factor in the initiation and progression of blood clot formation (i.e., thrombosis).

It is said that moderate alcohol consumption may ameliorate all of these processes, which would help explain the antithrombotic effects of alcohol reported by several researchers (Lacoste, Hung, and Lam, 2001). At moderate consumption levels, McKenzie and Eisenberg (1996) found that alcohol did not impair the normal synthesis of coagulation factors. Instead, alcohol's antithrombotic effects appear to be related to platelet granule secretion and inhibition of thromboxane A2 productions (Zakhary, 1997). Another randomized short-term trials of alcohol administration by Meade and colleagues, indicated consumption of 30 grams of alcohol lowered fibrinogen levels by an estimated 7.5 mg/dl. Thus, this degree of reduction in fibrinogen concentration would be expected to reduce the risk of heart disease by 12.5 percent (Meade et al., 1986). It also necessary

to note, consumption of 30 grams of alcohol is greater than the stated guidelines by the guidelines established in the here in the US and internationally.

Other theories have attempted to explain how alcohol itself (Mukamal & Rimm, 2003) might lower risk for CHD. For example, alcohol may protect the heart by 1) preventing the constriction of the coronary arteries, 2) inhibiting clot formation, and 3)enhancing recovery following a heart attack. Most of the evidence supporting these potential mechanisms is derived from experiments using animals or cells isolated from artery walls and grown in the laboratory. Hui and colleagues suggest adiponectin to be one of the factors which can explain the mechanism by which alcohol protects against IHD Hui et al., 2012).

According to Brien and colleagues, alcohol use is associated with an increase in adiponectin (Brien et al, 2011) which has anti-atherosclerotic and anti-inflammatory properties, possibly driven by the promotion of endothelial repair and inhibition of neointimal formation (Hui et al., 2012). A previous study showed higher adiponectin is associated with lower risk of myocardial infarction (Pischon et al., 2004). Though, it is not known whether adiponectin is a risk (protective) factor or causal factor for IHD. Some genetic studies, however, have shown an association of adiponectin gene with CVD (Chung et al., 2011; Katakami et al., 2012). Argwaval (2002) suggests lipoprotein is lowered by alcohol use and is a risk factor for cardiovascular diseases. Erquo and colleagues describe these mechanisms in their study examining. They said the reduction in lipoprotein increases plasminogen level and subsequent fibrinolysis, which in turn reduces atherosclerosis and others researchers have supported this proposition in a meta-analysis, which suggested lipoprotein predicts IHD (Erqou et al., 2009).

The underlying mechanism of how lipoprotein affects cardiovascular health remains imprecise and it is unclear whether lipoprotein is a causal factor (Dube, Boffa, Hegele and Koschinsky, 2012). Alternatively, moderate alcohol use reduces fibrinogen, which then decreases blood platelet aggregability and subsequent risk of CHD (Au Yeung, 2012). It has been speculated the protection through this pathway may be more pronounced in wine which is rich in polyphenolic components (Argawal, 2002; Costanzo et al., 2006), while others argued the cardioprotective effects are not strongly influenced by the type of alcoholic beverages (Ronksley et al., 2011). Still fibrinogen is yet another non-causal predictor of IHD (Keavney et al., 2006).

Finally, Klaktsy's reflections of most recent observational studies (Corrao et al., 2004; Klaktsy, 2009), are there is a decrease risk of CVD among lighter drinkers than abstainers for atherothrombotic vascular disease, most notably coronary artery disease (CAD) (Klaktsy, 2010). In addition, points favoring a causal protective effect of moderate alcohol intake include proper time sequence, consistency in diverse healthy or unhealthy populations, plausible biological mechanisms, relative specificity for atherothrombotic conditions, controlled trial data for surrogate end points, and weakness of data supporting alternative explanations (Zakhari, 1997; Booyse &Parks, 2001; Klaktsy, 2009). In spite of all these explanations, it is important to note, however, other studies' findings have suggested alcohol at any level interfere with medications (antihypertensive, Antiarrhythmic, Inotropic medications) (Ashley et al., 1994). This means, although alcohol is seen as cardioprotective, the other side of alcohol may lead to serious detrimental effects on health outcomes.

Explained Detrimental Effects

While many studies contend that moderate alcohol intake is cardioprotective, others disputed those results. These studies assert changes in the biomarkers explaining beneficial effects of alcohol are less reliably established in intervention studies compared to the positive relation with HDL-cholesterol (Rimm et al., 1999; Brien et al., 2011). Currently, Briel and many others argue that the biological pathway by which alcohol reduces IHD is in doubt. For example, HDL cholesterol has been thought to be the mediator of the cardioprotective effect of moderate alcohol use, but recent trials and genetic studies suggest otherwise (Briel et al., 2009; Voight et al., 2012). Instead, there may yet be an unidentified factor driven by alcohol which raises HDL cholesterol and adiponectin, but reduces lipoprotein and fibrinogen, as well as protecting against IHD (Au Yeung, Jiang, Cheng, Liu, Zhang et al., 2013). So it remains possible moderate alcohol use protects via an unknown mechanism (Au Yeung et al. 2012).

Moreover, observational and intervention studies both show alcohol use increases blood pressure, an established causal risk factor for CVD (Lewis, 2009). Although the rise in blood pressure is more apparent in heavy users (Marmot, 2001; Marmot et al., 1994) meta-analysis of cohort studies from different populations showed alcohol has a dose response relation with hypertension (Taylor et al., 2009). The net effect of alcohol use on cardiovascular disease may vary depending on the relative importance of the different drivers of CVD in any given setting (Marmot, 2001).

Other studies found moderate alcohol use may also influence various aspects of health apart from cardiovascular diseases and cognitive function. Its use is associated with a

lower risk of diabetes in prospective observational studies (Koppes et al., 2005; Carlsson, Hammar and Grill, 2005; Sato et al., 2012; Liu et al., 2010 as cited in AuYeung et al., 2012) perhaps by decreasing insulin resistance and improving insulin sensitivity. However, the experimental evidence concerning these outcomes is very limited (Davies et al., 2002). Nevertheless, a rise in insulin resistance has been suggested as a pathway contributing to the decrease in HDL cholesterol, which in turn is thought to be associated with poorer cardiovascular health (Garg, 1996). Still, some contend this pathway is now in doubt (Au Yeung et al., 2012).

Alcohol use has been confirmed as a type I human carcinogen, with a dose response relation (Boyle and Levin, 2008; Zaridze et al., 2009). In many more studies, alcohol was shown to cause several cancers not confined to sites along the gastrointestinal tract (oral cavity, esophagus and stomach), but also liver and breast even at a moderate level (Bagnardi et al., 2001; Chen et al., 2011). Some of the carcinogenicity of alcohol is due to acetaldehyde, a metabolite of ethanol, which leads to DNA damage (Boyle and Levin, 2008). Chen and His colleagues, found alcohol also increases estrogen and decreases testosterone, therefore, affecting hormone related cancers (Chen et al., 2011).

Finally, alcohol use is an established cause of liver diseases, such as cirrhosis. Although diseases like liver cirrhosis are attributed to chronic and heavy alcohol consumption, moderate alcohol intake has been shown to have detrimental effects on the liver, due to liver fibrosis which compromises liver function (Hart et al., 2010; Corrao et al., 2004). While a few studies show an apparent protective effect of moderate alcohol use on liver cirrhosis morbidity, but not mortality rate (Rehm et al., 2010), the lack of any

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biological plausible pathways explaining this apparent negative association suggests residual confounding in these studies (Stockwell et al., 2012). In terms of total mortality rate, observational studies affirm a U shape association of alcohol with total mortality rate, is mainly attributed to lower cardiovascular diseases (Doll et al., 2005; Thun et al., 1997; Yuan et al., 1997). This may imply there is a limit below which alcohol could be drunk without harm and hence protective effects observed. Nonetheless there are some exceptions (Sun et al., 2009; Strandberg et al., 2004) and the mechanisms are more and more ambiguous (Fuchs & Chambless, 2007), which has underlined the difficulty of making causal inference from observational studies. The same problem applies to the apparent lower risk of cognitive function and diabetes although they are less likely to be captured by all-cause mortality rate (Au Yeung et al, 2012).

Other mechanisms of action of alcohol consumption seen in healthy subjects, result in enhanced flow-mediated vasodilation, which is an accepted measure of endothelial function (Teragawa et al., 2006). More significantly, this benefit may be secondary to components other than alcohol. Karatzi et al. (2004) studied 15 male subjects with angiographically documented coronary artery disease. Subjects ingested 250 mL of either red wine or alcohol-free red wine. The red wine with no alcohol resulted in higher flow-mediated vasodilatation than regular red wine. This is evidence the usual cardioprotective effects observed in moderate drinkers can be reasonably attributable to a secondary component. Another study proposes the benefit on vascular endothelium may be mediated by wine flavonoids and polyphenols rather than alcohol (Leikert et al., 2002).

Additionally, Hines et al. (2001) claimed moderate alcohol drinkers who are homozygous for the alcohol dehydrogenase Type 3 gene have a higher level of HDL and a lower incidence of myocardial infarction. Veenstra et al., (1990) studied the effect of a single dose of moderate alcohol drinking on blood lipids. Individuals received 3 glasses of red wine with dinner and one hour later, increases in HDL of 11.5% and in apolipoprotein A2 of 7.3% were noted (Veenstra et al., 1990). However, the favorable effect was short-lived and was weakened by the following day. If rise in HDL and Apolipoprotein, it is therefore too hasty to attribute the short-term effects to reduced CVD and mortality observed in moderate alcohol intake. Contrary to Veenstra's observation, Gaziano et al. (1990) examined the effect of moderate daily alcohol consumption (1 to 3 drinks per day) on 680 patients with known coronary artery disease compared with healthy subjects.

 An inverse relationship between alcohol consumption and the risk of developing myocardial infarction was observed. This benefit was associated with a statistically significant increase in both HDL2 and HDL3. Apolipoprotein A-I and A-II levels were also positively associated with alcohol consumption (Gaziano et al., 1990. When this relation was examined in 7052 male smokers in Finland, similar findings were seen only with moderate drinking, whereas heavy drinkers exhibited a higher total cardiovascular mortality rate (Paunio et al., 1994).

While Gaziano's study contradicts Veenstra's is unclear. Both studies may have honestly observed the effect they reported. As a result, the constant conflict of opinion for or against the health effects of moderate alcohol intake, which is unsettling. What is obvious from this persistent conflict of opinions are there are two sides of alcohol for the

most part. However, the beneficial side of alcohol is tainted, and most people worry about the dark side of alcohol. For example, the safe level of drinking (0.01–0.02 g/dl range/the level reached with one drink) the DGAC/ICAP have declared cardioprotective, places the drinker at risk for injuries due to neuropsychological impairment, which in turn can cause injury from motor vehicle crashes (MVC) (Taylor et al., 2009; Heng et al., 2005) if that were the only reason.

Still, others believe pattern of drinking can affect health and diseases outcome immediately or long-term (Rehm et al., 2003). Examples of such biochemical effects are the promotion of blood clot dissolution and direct toxic effects on acinar cells triggering pancreatic damage. Intoxication, for example, may lead to chronic social consequences (e.g. when a drunken driver kills somebody and thereafter loses his or her job and social standing). Most of the consequences of intoxication are nonetheless covered by acute health and social consequences (Rehm et al., 2003). If all this evidence is taken together how primary care providers would perceive the two sides of alcohol will likely influence their recommendation is the center of this study. It will be interesting to understand PCPs perceive factors like generally accepted guidelines for moderate drinking, genetic vulnerability, age and gender, overall health status if they make recommendation for or against moderate alcohol consumption for health.

Section III: Perceived Health Effects of Moderate Drinking by Primary Care Providers

To date, there are no studies that have specifically evaluated primary care providers' (PCPs) perceived health effects of moderate alcohol intake and its impact on

disease. Primary care providers was defined in the previous section of this text as health care practitioner who sees people that have common medical problems. This person is usually a doctor, but may be a physician assistant or a nurse practitioner. There have been studies examining physicians' attitude towards alcohol intake, reluctance to discuss alcohol with patients (Arborelius & Takker, 1995). Although a published survey of treatment methods for alcohol problems (Berglund et al., 1995) highlighted the ability of primary care providers to contribute knowledge about the effects of alcohol and to encourage patients to more moderate alcohol drinking habits as much as possible, it should be noted that some primary care providers are reluctant to address alcohol problems with patients. One study in Sweden, found several reasons physicians give, for not discussing alcohol issues in primary care. The reasons included lack of time, fear of spoiling relationships with patients, Patients' integrity, more work if more patients are detected, Physicians didn't think they can affect patients' drinking and patient has given priority to other problems (Arborelius & Takker, 1995). With regard to moderate alcohol consumption, there has been, forum discussions by scientists made up of mostly physicians in attempt to come up with a consensus about cardioprotective effects of moderate alcohol intake. One such forum was held in Italy by Poli et al. (2013) and the purpose of the consensus paper was to review the available evidence on the relationship between moderate alcohol use and health and disease. Most available evidence for those who propose moderate drinking for better health outcome, says the healthy adults may drink moderate amount of wine or alcohol, except for those with increased specific risks, and abstainers and those in specific situations should avoid (Poli et al., 2013; Costanzo et al., 2012).

The consensus document was a way to provide a working document for the scientific and health professional communities, and was signed by 19 separate societies or federations in Italy, including societies in nutrition, cardiology, and general medicine, as well as organizations of scientists dealing with diabetes, hypertension, and obesity (Poli et al., 2013). A note of caution from members of the Forum was the report must not cause people to change their drinking habit without discussing with their personal physician, as age, sex, underlying medical conditions, and other factors should be taken into account. On the other hand, Forum members believe "any advice related to drinking should be evidence-based; and guidelines should not be based on outmoded or paternalistic views that are not supported by current research." (Poli et al., 2013).

Recommendation of the Forum as seen in the consensus document included the following: 1) healthy adults and the elderly, impulsive drinking of wine or other alcoholic beverages within 30 gms ethanol a day for men and 15 gms a day for women is acceptable. They also argue there is no evidence to recommend complete refrain from alcohol drinking by moderate users. 2) Patients with increased risk for specific diseases, like women with familial history of breast cancer, or subjects with familial history of early CVD or patients with that medical condition should discuss their drinking habits with their primary care providers. 3) No matter what the reasons for abstinence are, no teetotaler should be advised to drink wine or alcohol for health reasons. 4) And finally, alcohol use must be discouraged in context like selected age classes, children and adolescents, pregnant and or lactating women, recovery alcoholic and persons who are taking medications that may interact with alcohol (Poli et al., 2013).

Although official guidelines on alcohol consumption are normally produced by governments (e.g. a Ministry of Health or other governmental department responsible for alcohol issues), other guidelines exist which, though not produced by governmental bodies, also have official status (ICAP Reports, 2003). These include recommendations on drinking given by medical associations or other professional NGOs with an authoritative position on alcohol issues (ICAP Reports, 2003), like the group of Italian scientists discussed previously. For these reasons, primary care providers' perception of the point-counterpoint at the local level about moderate alcohol consumption is crucial. PCPs' perception can lead them to make appropriate recommendation for patients and to policy makers for the proper action to take on this public health issue, which in turn can facilitate safe message to the general public, and to practitioners. So far, the literature search reveals there is risk associated with alcohol consumption and these risks exist on a continuum (ICAP, 2003).

While for most people drinking below a certain level is associated with little harm, this level varies among individuals. The threshold, above which risks might increase (Gross, 1983), is referred to interchangeably as the "safe," "low risk," or even "moderate" drinking limit (ICAP, 2003). According to ICAP reports, the point at which alteration occurs is determined by evaluating risks and benefits of alcohol consumption and calculations of risk, conducted at a range of alcohol concentrations, is based on evidence about the influence of alcohol consumption on overall health. This also includes a number of specific conditions, derived from mortality and morbidity data (Edwards et al., 1994.

Hines & Rimm believe, while for some individuals no "safe" level of drinking may exist (Dufour, 1999), for most people the threshold ideally offers a baseline below which risks are few, or at which, as in the case of the cardio-protective effects of alcohol consumption (Hines & Rimm, 2001), there may be distinct benefits associated with drinking. Derived from the results of large study samples, these "optimal" drinking levels represent an average recommendation that can be applied to most populations (ICAP, 2003). Yet even within such averages, there are variations across entire groups. For example, the differences in physiology and ability to metabolize alcohol between men and women (Ronskley et al, 2011) mean that separate recommendations may be required for each group. Consuming even the same amounts of alcohol may lead to quite different outcomes in women than in men (Carmago, 1989; Ronskley et al., 2011).

As a result, lower thresholds may be given for "safe" drinking levels for women. These guidelines indicate the level of difficulty for PCPs if they perceive consumption of alcohol as something useful for health, due to the level of drinking experience and level of tolerance of individuals. Yet PCPs' recommendations must take into consideration all such factors with the hope that patients actually respect the prescribed guidelines. Patients under the care of a PCP are fortunate because their primary care provider can help them to assess the risks associated with drinking moderately and guiding them accordingly. However general consumers rely on the news to inform them about the health effects of alcohol, which is usually not a good way to obtain guidance for such a serious problem, because it all depends on who is the sponsor of the information provided.

The point-counterpoints about health effects of moderate drinking have been ongoing, without reaching consensus. It is urgent that the debate receives Primary care providers' inputs and recommendations. The consensus document discussed previously shows the influence of interest groups and the need to please these interest groups as mentioned by critics of the consensus document. For example, even though forum members claimed to have been balanced in their analysis and presentation of available evidence, they did not make mention of studies that have revealed detrimental effects of moderate alcohol consumption on injury, which may occur due to neurological impairment at very low level of drinking (Heng et al., 2006;Taylor et al., 2010). Nor did the forum discuss what Guerin and others have found in their study and concluded the effects of alcohol are detrimental even at low doses (Guerin et al., 2013).

More importantly it is honorable and useful for this group of scientists to claim well-balanced appraisal of the current literature on alcohol which have caused others to doubt the positive effects of alcohol health and disease. But it doesn't help that they disregard the problems of residual confounding, misclassification errors (Fillmore et al., 2007; Shaper et al., 1988), Mendelian randomization (Lewis, 2005; Au Yeung et al., 2012). Forum reviewer thought although "the forum was well-done and generally well-balanced, several aspects of the forum report appeared to be more political than scientific, perhaps necessary to gain support of all the societies endorsing the report." (Poli et al., 2013). Nevertheless, such forums are necessary to inform policy makers, primary care providers and patients on the course to take in relation to the association of moderate alcohol consumption on health and disease.

PCPs' Perception of the Influence of Age and Gender

While there is no specific piece of literature indicating PCPs' perception of the influence of age and gender with relation to the phenomenon understudy, a considerable amount of epidemiological literature has examined the influence of gender difference on this issue. For example one of the NIAAA reports and other researchers has paid attention to gender difference (NIAAA, 2003; Ronskley et al., 2011; Brien et al., 2011; Mumenthaler et al., 1999).

For all those who have highlighted gender difference, the one unanswered question is whether the relationship of alcohol consumption to heart disease is reliable throughout the general population or varies among certain subgroups (NIAAA, 2003; ICAP, 2003). For example, because men and women differ in how they metabolize alcohol (Mumenthaler et al., 1999) and in their underlying risk of cardiovascular disease, they may also differ in how alcohol consumption relates to their risk of heart disease (Ronskley et al., 2011). Mumenthaler and colleagues indicated women appear to become more impaired than men after drinking equal amounts of alcohol. In addition, they found women achieved higher BCA even when doses were adjusted for body weight.

Even though, men and women seem to eliminate about the same total amount of alcohol per unit body weight per hour, women appear to eliminate meaningfully more alcohol per unit of lean body mass per hour than men (Mumenthaler et al., 1999; Kwo et al., 1998). Dettling et al. (2007) examined gender differences on the pharmacokinetics of ethanol. They used Sixty-eight healthy men and 64 healthy women with normal body mass indexes received to whom they gave between 0.79 and 0.95 g ethanol/kg body

weight in the form of their choice after they had eaten a usual breakfast. The intended

concentration for both genders was a blood alcohol concentration C(0) of 0.104 g/dl.

After 10 to 20 minutes intervals, blood samples in the elimination phase were taken from

beginning and after completion of absorption. They observed maximum BAC of

0.0819+/-0.0184 g/dl for women and 0.0841+/-0.0155 g/dl for men. They calculated the

hourly alcohol elimination rate over a linear function, in blood of 0.0179+/-0.0030 g/dl/h

and it was significantly higher in women than the 0.0159+/-0.0029 g/dl/h for men

(P<.0001).

Dettling and others concluded, "in relation to the liver weight, the hourly

elimination rates were 5.008+/-0.678 g/kg liver/h for women and 4.854+/-0.659 g/kg

liver/h for men, and were not statistically significant. The different liver masses as

calculated in relation to the distribution volume account for the differing ethanol

elimination rates between men and women." (Dettling et al., 2007). This knowledge must

undeniably influence PCPs' perception and careful recommendation of moderate alcohol

consumption for health of men and women, for the simple reason variability among

groups is difficult to assess in randomized trials of alcohol consumption, which have been

too small to allow subgroup comparisons (NIAAA, 2003).

Observational studies have attempted to provide some interesting answers to this

question. For example, the studies of healthy men by (Rimm et al., 1991) and women by

(Stampfer et al., 1988) suggest moderate drinking is associated with lower risk of heart

disease in both sexes, despite the differences in alcohol metabolism and risk of

cardiovascular disease. These studies establish that the level of alcohol consumption

associated with the lowest risk of heart disease is lower among women than among men

(De Lorgeril et al., 2002), consistent with public health recommendations that advise consumption of no more than two drinks per day for men and no more than one drink per day for non-pregnant women. The level of drinking recommended by the public health may not work well for person genetically susceptible to alcohol; consequently, this will remain a challenge for PCPs.

In the US Nurses' Health Study, Stampfer and others found protective effect of moderate alcohol consumption (up to 1.2 drinks daily) on ischemic stroke (IS) among women (Stampfer et al., 1988). In a study using an administrative database, all levels of alcohol consumption appeared to be associated with decreased risk of hospitalization for IS in both men and women, but a stronger protective effect was found in blacks than in whites (Klatsky, Armstrong and Friedman, 1989). Reynolds in other cohort studies of IS has failed to confirm this relationship (Reynolds, 2003). With regard to age, again no study has focused on PCPs' perception of the health effects of moderate alcohol intake.

Nonetheless, PCPs can benefit from data from studies that have examined the health effects of moderate drinking for different age groups. For example, studies have found elderly moderate drinkers showed lower risks of coronary heart disease (Mukamal et al., 2006) and cardiovascular mortality (Perissinotto et al., 2010), and they tended to have lower levels of systemic inflammatory markers and insulin resistance. Elderly moderate drinkers also tender to have higher levels of HDL cholesterol, which might counteract the effect of cardiovascular risk factors like higher blood pressure, thus leading to a net benefit on health (Pontes-Ferreira et al., 2008; Perissinotto et al., 2010).

Light to moderate alcohol consumption was also shown to be associated with a lower risk of type 2 diabetes in large population-based cohort studies among elderly men

and women aged more than 65 years (Djousse, Biggs, Mukamal and Siscovick, 2007).

Peters and others, in a recent meta-analysis have established evidence that small amounts

of alcohol could be protective against incident dementia and Alzheimer's disease in the

elderly (Peters, Peters, Warner, Beckett and Bulpitt, 2008). In other words, the

information to be made public should concern only elderly men and women and not

middle aged or young adults.

However, these studies have been referring to western men and women and have

not paid attention to other racial groups or genetic variation in population consuming

alcohol. Therefore it is reasonable to argue that the protective effects of moderate alcohol

intake do not work for everyone. There are just too many restrictions for PCPs to

consider if at all they believe moderate alcohol consumption is beneficial for health. An

evaluation of the influence of genes can be helpful to understand mechanisms of action in

population and will be discussed in the next section.

How PCPs Perceive the Influence of Genes in Moderate Drinkers

The influence of gene is best illustrated by Hines et al. 2001; Lewis &Davey-

Smith, 2005 and others. These studies have demonstrated the complexity of alcohol and

its effects on genes and thereby casting doubt on the causal effects of moderate alcohol

consumption on CVD risk such as high blood pressure, cancer as demonstrated by

countless observational studies.

According to Hines and colleagues, genetic factors may change the way the

association between moderate drinking and CHD is perceived (Hines et al., 2001). For

example, they say, "the initial breakdown of the alcohol contained in alcoholic

beverages-chemically referred to as ethanol is mediated by an enzyme called alcohol

dehydrogenase (ADH)." They distinguished three different kinds of ADH, 1) ADH1, 2)

ADH2, and 3) ADH3. Of these, ADH3 has two common genetic variants, or alleles, that

break down ethanol at different speeds i.e., fast and slow (Hines et al., 2001; Au Yeung et

al., 2013).

It is said each person carries two copies of the ADH3 gene, one inherited from

the father and one inherited from the mother. Accordingly, a person can carry two fast

alleles, two slow alleles, or one fast and one slow allele of the ADH3 gene (Hines et al.,

2001). Mukamal & Rimm (2003) reported the results of a study using 396 men with

myocardial infarction and 770 control men, the study examined the relationship between

ADH3 alleles and the risk of heart disease (Hines et al., 2001). Results indicated that

compared with men who carried two copies of the fast allele and drank less than once per

week; men who carried two copies of the fast allele and drank daily had 38 percent lower

risk of myocardial infarction Rimm, 2003).

In contrast, they observed, daily drinkers who had two copies of the slow allele

had an 86 percent lower risk of myocardial infarction compared with men with two slow

alleles who drank less than weekly (Mukamal & Rimm, 2003). The authors assert, these

results show that within the range of moderate drinking, greater exposure time to alcohol

on the base of repeated drinking and slower metabolism may reduce one's risk of

myocardial infarction (Hines et al., 2001 in NIAAA, 2003). The researchers also found

among daily drinkers, "good HDL-C cholesterol increased with the number of slow

ADH3 alleles-that is, daily drinkers with two slow ADH3 alleles had higher HDL-C

levels than did daily drinkers with no slow ADH3 allele levels; men with one slow allele

had intermediate HDL-C levels." This finding provides a plausible explanation for the gene-related variation in the relationship between alcohol consumption and risk of myocardial infarction described in the study (NIAAA, 2003; Mukamal &Rimm, 2003).

The Mendelian randomization, discussed previously, is the use of common polymorphisms as surrogates for measuring exposure levels in epidemiological studies (Lewis & Davey-Smith, 2005; Au Yeung et al., 2013; Smith & Ebrahim, 2003), provides one method of assessing the causal nature of some environmental exposures. It is explained by looking at the association between the ALDH2 polymorphism and esophageal cancer (Lewis & Davey-Smith, 2005). Lewis asserts alcohol drinking is a risk factor for esophageal cancer, and exposure to high levels of acetaldehyde, the principal metabolite of alcohol, may be responsible for the increased cancer risk (Lewis, 2005).

According to Lewis, the ability to metabolize acetaldehyde is encoded by the ALDH2 gene, which is polymorphic in some populations (Lewis, 2005; Zakhari, 2006). The ALDH2*2 allele produces an inactive protein subunit, which is unable to metabolize acetaldehyde. An individual's genotype at this locus may influence their esophageal cancer risk through two mechanisms, first through influencing alcohol intake and second through influencing acetaldehyde levels (Lewis, 2005). Zakhari (2006) gives a thorough breakdown of how alcohol is metabolized by persons of different with specific genotype. According to his explanations,

> Genetic variation (i.e., polymorphism) occurs at the ADH1B and ADH1C gene locations (Agarwal, 2001), and these different genes are associated with varying levels of enzymatic activity. The ADH1B variations (i.e., alleles) occur at different frequencies in different populations. For example, the ADH1B*1 form is found predominantly in Caucasian and Black populations, whereas ADH1B*2 frequency is higher in Chinese and Japanese populations and in 25 percent of people with Jewish

ancestry. ADH1C*1 and ADH1C*2 appear with roughly equal frequency in Caucasian populations (Li, 2000). People of Jewish descent carrying the ADH1B*2 allele show only marginally (<15 percent) higher alcohol elimination rates compared with people with ADH1B*1 (Neumark et al., 2001). Also, African Americans (Thomasson et al., 1995) and Native Americans (Wall et al., 1996) with the ADH1B*3 allele metabolize alcohol at a faster rate than those with ADH1B*1.

In Europe, Mukamal & Rimm, describe the case of Danish researchers who reported thought-provoking findings in a study of 3,383 men (Hein et al., 1993) about Lewis blood group type. The researchers compared the risk of cardiovascular mortality among men with different Lewis blood group types. According to these researchers, much like the usual ABO blood group system, a person's Lewis blood type can include just an "a" component (a+b-), just a "b" component (a-b+), both components (a+b+), or neither component (AB). They explain that People with the AB blood type seem to be at higher risk for diabetes and cardiovascular mortality than people with other Lewis blood types.

In the study, however, men with Lewis blood group type AB who consumed 22 or more drinks per week had an 80 percent lower risk of coronary heart disease than did men who consumed 0–10 drinks per week. However, among men with other Lewis blood group types, alcohol consumption was not appreciably related to the risk of heart disease (Mukamal & Rimm, 2003). Interesting facts from the Danish study, which makes it clear in spite of other epidemiological studies attributing cardioprotective effects to moderate alcohol consumption, recommendation of moderate drinking for health is far from being unanimously accepted by primary care providers.

Conversely, based on Zakhari's description of genetic variants, it makes sense studies using the Mendelian randomization reveal higher risks of heart disease in Chinese

men who drink alcohol moderately (Au Yeung et al., 2013; Au Yeung et al., 2012) .

Using a Mendelian randomization design in a suitable low to moderate drinking

population of Southern Chinese men, AU Yeung et al. (2013) found low to moderate

alcohol use led to higher diastolic blood pressure, HDL-cholesterol and triglycerides,

with no protective effect on fasting glucose, self-reported CVD or IHD. The results are

consistent with experimental and non-observational evidence showing alcohol

monotonically increases blood pressure, HDL-cholesterol and triglycerides (Rimm et al.,

1999).

Moreover, Au Yeung (2012) asserts studies on alcohol use and glucose

metabolism are limited where a previous RCT showed no association of alcohol use on

glucose metabolism although it might not powered to detect a small effect (Flanagan et

al., 2002), whereas Shai and colleagues in a larger RCT revealed alcohol only decreased

fasting blood but not 2-h postprandial glucose level (Shai et al., 2007).

Finally, it is evident from these studies that genetic factors in theory can influence

beneficial variables linked to alcohol use (e.g., HDL-C levels) or the baseline risk of

heart disease (e.g., blood type groups) by modifying the link between alcohol

consumption and heart disease in different ways. Again this justifies the controversies

regarding health effects of moderate alcohol intake. That may be the reason, Klaktsy, a

physician, thinks absolute proof persons at CHD risk obtain benefit from light to

moderate drinking will not appear any time soon (Klaktsy, 2010). According to him, "in

the 21st century a universal sensible limit would not accommodate serious public health

issues such as the increased risk of female breast cancer risk associated with even

moderate drinking or the consequences of the mixture of youthful drinking with the motor vehicle."

Because the risks of moderate drinking differ by sex, age, personal history, and family history. Medical practice advice about moderate drinking must be based on something more certain than the volatile information about moderate drinking. According to Klaktsy (2010), there is no substitute for balanced judgment by a well-informed, unbiased health professional. What is required is a synthesis of common sense and the best available scientific facts.

Section IV: Summary of the Literature Review
with the Researcher's Own Evaluation

The Researcher's Own Evaluation of the Theories

The discussion so far is based on health effects of moderate alcohol consumption and how primary care providers perceive those effects. Several researchers have presented what they believe to be credible evidence. Meta-analyses of observational studies have indicated an inverse relationship between moderate alcohol consumption and several health outcomes and low mortality (O'Keefe et al., 2007; Costanzo et al., 2006; Di Castelnuovo et al., 2006).

The relationship between moderate alcohol consumption and cardiovascular health has been summarized as a J-shaped or U-Shaped curve (Gaziano et al., 2000; San José et al., 1999; Murray et al., 2001). This implies moderate consumption of alcohol leads to reduced cardiovascular health in general, which spills over to reduce mortality

rate. These studies have insinuated a cause-effect relationship (Sacco et al., 1999; Truelsen et al., 1998; Reynolds et al., 2003; Klatsky et al., 1990; Maclure, 1993; Doll, 1997; Corrao et al., 2004; Zhu et al., 2004). Therefore proponents of health benefits of moderate alcohol consumption can be classified under the Cause-and- Effect theory and the French Paradox.

Analysis of these two theories indicate proponents differ in their understanding of what type of alcohol causes better health outcomes and CVD events prevention. For example, proponents of the French Paradox assert the observed association between alcohol and CVD exists as a result of red wine consumption, including the Mediterranean diet, and not the ethanol contain in beer or spirit (Renaud & de lorgeril, 1992; Costanzo et al., 2006; De Lorgeril et al., 2002). However, these theories have come about from nonexperimental, but observational studies. From what is known, Observational studies are subject to residual confounding (Lewis, 2005; Chen et al., 2011). Some of the confounding factors are genes, gender, lifestyle, individual differences, referent group, etc.

One very significant problem with these theories has been the incongruity of the definition of moderate drinking (Dufour, 1999). Because of the subjectivity of the term 'moderate' and the amount of alcohol in a drink; and this differs from one context to another (ICAP, 2003) and from one study to another. This variation exists despite the International guidelines (ICAP/USDA). For example, Ippolito (2003) in his study defined moderate drinker as one who is not a problem drinker and consumes no more than four drinks per day per day.

According to the literature consulted, the daily consumption of 10 – 12 g and 20 – 24 g of alcohol for women and men, respectively, is considered to be a moderate intake (Gonzalez-Gross et al., 2000; Fuchs et al., 2001). Still, other posit, fewer than four drinks per day in men and fewer than two drinks per day in women appeared to confer benefit (Kloner, Sheirif & Reskalla, 2007). Bleich and others reported cardioprotective benefits with two drinks of any types per day (Bleich et al., 2001). The variability in the amount of drinks considered moderate comes from the lack of consensus in defining the moderate consumption of alcohol by government agencies. This has made it difficult to compare results in studies around the world. For example, in the UK, moderation is defined as 21 units of alcohol a week for men and 14 units a week for women, a unit being 10 g of alcohol.

While in the USA, the most recent dietary guidelines define moderate drinking as up to 2 drinks a day for men and 1 drink a day for women (Rimm, 2000). To complicate the matter, many have expressed alcohol consumption as average daily intake, based on self-reports. Therefore, people who consume one drink daily are grouped with those who consume seven drinks once a week, even though the consequences of the two patterns are different (Ashley et al., 1994). In addition, when participants are asked to recall their frequency of drinking within the last year, they are more likely to underestimate or overestimate the amount they drank (Ashley et al., 1994). For that reason and in the unfeasibility of RCTs, it is reasonable to think the appropriate course of action, is to examine this phenomenon from the genetic variation such as Mendelian randomization lens (Lewis, 2005; Smith & Ebrahim, 2005; Au Yeung et al., 2013; Zakary, 2006).

Studies which have used the Mendelian randomization have demonstrated there are factors other than alcohol consumption that trigger the effects observed. For example the French paradox conflicts with itself by disagreeing with the way wine consumption benefit French men and women. Results of some studies in France found higher mortality rate from CVD, and reduced mortality risk for French men than French women (De Lorgeril et al., 2002). In addition, the concept of French Paradox differs from the conservative theory on the role of classic risk factors in CHD, due to the addition of lifestyle factor.

Thus, the concept of the French paradox needs more scrutiny to better understand. This may help clarify some of the mechanisms underlying the development of CHD for the French population. In the absence of experimental studies, only hypothetic and indirect arguments can be put forward. According to de Lorgeril and other, cross-cultural and geographic comparisons, comparisons of men and women in France and the close examination of local and regional variability and disparities in France may help to explicate, at least partly, the French paradox (de Lorgeril et al., 2002). Other researchers attribute the French Paradox to the antioxidants found in the Mediterranean diet of the French population (Trichopoulou & Vasilopoulou, 2000). Ferrieres (2004) posits that even if causality is not part of the French paradox, some authors have proposed several hypotheses in order to explain it." Similarly, debates have focused on alcohol consumption and, more specifically, on red wine (Di Gaetano et al., 2006; Costanzo, 2012). The lifestyles of south European countries are characterized by low CHD incidence, confirms wine as one of their common identifying elements (Ferrieres, 2004).

The second major problem, noted in the analysis of previous studies is found in the different studies' design as it relate to participants' selection (Fillmore et al., 2007). This inconsistency has led to the sick quitter hypothesis. The sick quitter as said before refers to the referent group in most observational studies. It refers to former drinkers who have stopped drinking because of health problems, have grown older, may already have had health problems and increased in medications that cannot be mixed with alcohol (Fillmore et al., 2007; Shaper et al., 1988). Shaper, Wannamethee, and Walker in 1988, hypothesized that a systematic misclassification error was present in most prospective studies assessing associations between alcohol use and coronary heart disease (Fillmore et al., 2007; Shaper et al., 1988). However with the lack of RCTs, it is difficult, to prove these theories wrong or right, because when some studies have tried to control for former drinkers, those they chose as abstainers, were people who still drank on occasion (Ronskley et al., 2011).

The third problem has to do with the causal link of alcohol and cardiovascular risk factors, such as blood pressure and stroke. Observational studies which claim causal effects of alcohol were also inconsistent. Effects of blood pressure or stroke varied from one study to another (Carmago, 1989; Ashley et al., 1994; Xin et al., 2001). This is all due to the lack of randomized control trials and the challenge to have true experimental studies in alcohol research. In addition, the cardioprotective effects of moderate alcohol consumption are not the same for the global population. Studies with Chinese and Japanese population found no association between alcohol consumption and CVD risks and mortality (Au Yeung et al., 2013). Subsequently, some researchers have used the Mendelian randomization to examine the effects of moderate alcohol consumption on

health, but did not find positive cardioprotective effects (AU Yeung et al., 2012). The Mendelian randomization offers a more sensible explanation to the effects of alcohol on diseases (Lewis, 2005). Therefore in the absence of RCTs, it is hard to attribute the observed reduced CVD and mortality risk observed in certain population to ethanol. The Mendelian randomization method however seems more credible and can help us get a better understanding of the phenomenon of effects of moderate alcohol on health and diseases thereby reducing this continue conflict of opinion.

Moderate Alcohol Consumption: A Double-Edged Sword

If low alcohol intake is inversely related to coronary heart diseases (CHD), the other side of the coin shows an increased risk for certain cancers, cirrhosis and death from accidents mainly associated with increasing alcohol consumption (Costanzo et al., 2011). To advocate daily moderate drinking for reason of better health outcomes is a slippery slope that many individuals cannot safely navigate. The latest American Heart Association guidelines caution people not to start drinking if they do not already drink alcohol, because it is not possible to predict in which people alcohol abuse will become a problem (Lucas et al., 2005). Until there is more randomized outcome data, and tools for predicting susceptibility to problem drinking, it would seem wise to encourage physicians and patients to focus on more feasible interventions to prevent CHD (O'Keefe et al., 2007).

This illustrates how fragmented evidence and dichotomous messages from public health experts can lead to confusion and troublesome consequences. The challenge is to educate the public that though the cardiovascular benefits of alcohol are compelling, it is

a double-edged sword and beneficial moderate drinking can easily spill over to at-risk

drinking, if mixed with driving. The goal is to strike a balance between the long-term

benefits and the substantial short-term risks. Goldberg (2003) succinctly wrote that "If

alcohol were a newly discovered drug . . . we can be sure that no pharmaceutical

company would develop it to prevent CVD. Nor would many physicians use therapy that

might reduce the rate of myocardial infarction by 25–50%, but that would result in

thousands of additional deaths per year due to cancer, motor vehicle accidents, and liver

disease." Studies are needed to compare projected number of lives saved through

decreased CVD risk and lives lost through alcohol-related MVC (Heng et al., 2006).

Conclusions

Although alcohol exerts great toll to human suffering from injuries, diseases,

socioeconomic problems (Cook, 2006; Rehm et al., 2009; WHO, 2004), alcohol is still a

pleasurable drug and culturally accepted by human societies. In the past decades, the

pleasures elicited by alcohol use are topped by the apparent health benefits. Several

prospective observational studies show alcohol use generally has a U-shaped association

with ischemic heart diseases, strokes and diabetes and cognitive function such that

moderate alcohol users usually have better cardiovascular health and cognitive function

than abstainers (Au Yeung et al., 2012; Costanzo et al., 2011).

Conversely, other observational studies have disputed the claims of apparent

health benefits of moderate alcohol intake, by citing confounding, methodological errors

(Fillmore et al., 2007) and even expressed doubts about the causal effects (Au Yeung et

al., 2012) of alcohol on the diseases. Therefore moderate alcohol consumption and its

related health benefits are complex public health problems and require deeper exploration

with the help of experts like primary care providers, and it is the aim of this study.

CHAPTER III

METHODOLOGY

The Qualitative Paradigm

This study is a constructive evaluation approach which uses the constructivist grounded theory method. The aim of the study was to discover the theory that explains the experiences of (PAs) as they attempt to make sense of the relationship between moderate alcohol consumption (MAC) and health. The researcher was especially interested in developing an understanding of factors that influence PAs perspective on the health effects of moderate drinking, how they define moderate drinking, and whether they will recommend or not recommend moderate drinking to patients. Because participants in this study were asked questions that require thoughtful, in-depth responses based on participants personal experience, the study is ideally suited to be qualitative. A qualitative approach is "a process of understanding based on distinct methodological traditions of inquiry that explore a social or human problem" (Creswell, 1998, p. 15) such as the effects of MAC on health.

Since this study is to fulfill partial requirement of a dissertation in the field of evaluation, a suitable evaluation approach is the constructivist evaluation approach or Fourth Generation Evaluation (FGE) by Lincoln & Guba (1989). FGE is appropriate in this context because as Alkin & Christie define it, "Fourth Generation Evaluation (Guba & Lincoln, 1989) is based upon a constructivist paradigm: That is, in place of the existence of a single reality, individuals "construct" their perceptions of reality." (Alkin

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& Christie, 2004). The idea of multiple realities is evident in the present discussion of the health effects of moderate drinking as seen by the discrepancy in the literature. The findings of the study also confirmed the notion individuals construct their perceptions of reality. Guba and Lincoln (1989) view the Fourth Generation Evaluation as "a marriage of responsive focusing—using the claims, concerns and issues of stakeholders as the organizing elements—and constructivist methodology aiming to develop judgmental consensus among stakeholders who earlier held different, perhaps conflicting, emic constructions" (p. 184). Therefore they use maximum variation sampling in data collection to identify the widest scope of participants who are interviewed sequentially in order to place on the table the great variety of individual constructions (Alkin & Christie, 2004). This variability is reflected among the participants selected for this study. For example participants' specialties varied from obstetrics, pediatric to geriatric and the variability in specialty was reflected on participants' perception of the effects of MAC on the health of their patients.

The method of data collection to achieve variety in individual construction is discussed later in the study. Since the FGE approach uses constructivist grounded theory methodology, it was naturally the appropriate method for this study.

The qualitative approach is rooted in interpretative, and constructivist philosophies, based on contextual, value-laden, and contingent social knowledge. It is built on a post positivist world view and assumes reality is socially constructed through individual or collective definitions of situations (Marshall and Rossman, 2011; Cresswell, 2007). The qualitative approach is largely associated with the works of Stake-Responsive evaluation (1986); Guba and Lincoln- Fourth Generation/ or Constructivist evaluation (1989),

Patton-Utilization focused evaluation (1997), Cresswell (2003; 2007); Marshall and Rossman, (2011) and many other. What constitutes qualitative research involves purposeful use for describing, explaining, and interpreting collected data. According to Leedy and Ormrod (2001) qualitative research is less structured in description because it formulates and builds new theories. Qualitative research can also be described as an effective model that occurs in a natural setting and enables the researcher to develop a level of detail from being highly involved in the actual experiences (Creswell, 2003). Social constructivism is a paradigm often used by social science researchers. Social constructivism has been instrumental in remodeling qualitative approach like grounded theory. In attempting to make sense of the social world, social constructionists (Neuman, 2001; Schwandt, 2000; Lincoln and Guba, 2000; Charmaz, 2006) view knowledge as constructed as opposed to created. The grounded theory approach used in this study is discussed below.

Constructivist Grounded Theory

Schwandt (2000) states, "the basic assumptions guiding the constructivist paradigm are that knowledge is socially constructed by people active in the research process, and that researchers should attempt to understand the complex world of lived experience from the point of view of those who live it" (P. 16). The current research project is an attempt to understand the health effects of moderate alcohol consumption as perceived by Physician Assistants (PAs). PAs are primary care providers (PCPs) who sees people that have common medical problems. Pas may be daily in contact with persons who may think moderate alcohol consumption is beneficial for their health. PAs

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operate in the complex world of the debate on the topic of moderate alcohol consumption and its effects on the health of the drinkers and are sometimes in the position of giving specific recommendations to patients on this issue. PAs are thus best suited to be participants in this study.

To ensure a robust research design, investigators must select a research paradigm that is compatible with their beliefs about the nature of reality. Deliberately subjecting such beliefs to an ontological examination in the first instance will illuminate the epistemological and methodological possibilities that are available (Mills, Bonner & Francis, 2006). This researcher is interested in the interpretive nature of constructivism particularly because of the researcher's fascination with social problems. Therefore appropriate qualitative approach to accomplish this task is the constructivist grounded theory approach.

Grounded theory is a qualitative research approach that was originally developed by Glaser and Strauss in the 1960s (Glaser and Strauss, 1967). The self-defined purpose of grounded theory is to develop theory about phenomena of interest, but this is not just abstract theorizing. Instead the theory needs to be grounded or rooted in observation (Leedy & Ormrod, 2001; Cresswell, 2003). Currently, it is hypothesized from observational studies that people who drink alcohol in moderation have a better chance at longevity than people who do not (Garcia-Valdecasas-Campelo et al., 2007; DGAC, 2010; Poikolainen and Vartiainen, 1999; Armstrong et al., 2001; Ruf et al., 2005; Klatsky, 1999). Though, others studies have disputed that claim and have presented risks related to drinking alcohol in moderation (Bushman and Cooper, 1990; Graham, 2003; Leonard, 2005; Room and Rossow, 2001; Taylor et al., 2008; Shaper et al., 1988), the

majority of the literature favors that hypothesis and finds moderate drinking beneficial for health. The goal of this study is to discover the theory grounded in observation of this phenomenon, especially as it relates to risks/benefits of engaging in moderate alcohol consumption for health as perceived by primary care providers, particularly (PAs). The phenomenon under investigation well illustrates what constructivism stands for.

Constructivism is a research paradigm that asserts realities are social constructions of the mind, and that there exist as many such constructions as there are individuals, even if understandably many constructions will be shared (Guba & Lincoln, 1989, p. 43). According to Mills et al. (2006), epistemologically, constructivism emphasizes the subjective interrelationship between the researcher and participant, and the coconstruction of meaning (Hayes & Oppenheim, 1997; Pidgeon & Henwood, 1997).

In addition, Mills and colleagues assert researchers, in their "humanness," are part of the research effort rather than unbiased observers, and their values must be approved by themselves and by their readers as an unavoidable part of the outcome (Appleton, 1997; de Laine, 1997; Guba & Lincoln, 1989; Stratton, 1997 in Mills et al., 2006). In search of a research methodology that would provide an ontological and epistemological fit with this research's understanding of multiple realities concerning health effects of moderate alcohol consumption, the concept of a constructivist grounded theory approach seemed most appropriate for truth seeking and theory discovery at this point.

Grounded theory is a complex iterative process. It seeks to construct theory about issues of importance in peoples' lives (Glaser, 1978; Glaser & Strauss, 1967; Strauss & Corbin, 1998). In this case the lives of primary care providers as they interact with

patients and help them make informed decision about their health, be it related to moderate drinking or any other health behavior. The process of uncovering theory grounded in the data is done through a systematic procedure of data collection which is often described as inductive in nature (Morse, 2001), because the researcher has no predetermined ideas to substantiate or invalidate. Rather, meaningful concerns to participants emerge from the stories they tell about an area of interest that they have in common with the researcher (health effects of MAC). Data are analyzed by constant comparison, initially of data with data, progressing to comparisons between participants' interpretations transformed into codes and categories and more data. This constant comparison of analysis to the field grounds the researcher's final theorizing in the participants' experiences (Mills et al., 2006).

Trochim posits that the grounded theory research begins with the raising of generative questions which help to guide the research but are not intended to be either static or confining. As the researcher begins to gather data, core theoretical concept(s) are identified. Tentative linkages are developed between the theoretical core concepts and the data (Trochim, 2006). This early phase of the research tends to be very open and can take extended amount of time. Later the researcher is more engaged in verification and summary. The effort tends to evolve toward one core category that is central (Egan, 2002). This process is described later in the data analysis section.

Choosing a Grounded Theory Approach

Creswell (2007) discusses the two most popular approaches to grounded theory; they are the systematic procedures of Strauss and Corbin (1990, 1998) and the constructivist approach advocated by Charmaz (2005; 2006). The Strauss and Corbin approach offers a more systematic analytic procedure to the investigator who seeks to systematically develop a theory that explains process, action, or interaction on a topic; for example, the process of developing a curriculum (Creswell, 2007) or the process of developing knowledge from PAs perception of the health effects of moderate drinking. Strauss and Corbin's method offers a well-structured technique for data collection and analysis.

Charmaz (2005, 2006) social constructivist perspective, which emphasizes diverse local worlds, multiple realities, and the complexities of particular worlds, views, and actions, is a best fit for the issue understudy. The researcher believed PAs who were chosen to participate in this study may perceive the health effects of moderate alcohol consumption from different lenses. Their individual perception of risks or/and benefits of moderate alcohol consumption on health as said in the previous section can be influenced by factors such as their personal beliefs which stems from the culture and the context within which they live. In addition, PAs areas of specialty, practice experience, values, knowledge and also patients' beliefs and values can also play a role on how they respond to the issue presented to them. This is in line with Charmaz's justification of multiple realities. These factors can influence how they explain the health effects of moderate alcohol consumption.

After examining both approaches, it appears Charmaz (2006) constructivist approach, although most appropriate to exploring the experiences of PAs in their daily interactions with patients did not seem to be a good fit for data collection and analysis for a novice grounded theorist like this researcher. Exploring factors that influence PAs decisions to recommend moderate drinking for health is evidence people can have multiple realities about the same phenomenon. This also gives a better comprehension of the realities and complexities of particular worldviews individual can have on a phenomenon, in this case health effects of moderate alcohol consumption. Even though, it appears Charmaz social constructivist approach is the best paradigm for this study, the systematic approach of Strauss and Corbin (1990) was vital for this study's research design. In addition, Creswell (2007) says, "…their systematic approach is helpful to individuals learning about applying grounded theory research." (P. 66).

Methods

Data Collection Procedures, Instrumentation

Data collection for this study consisted of face-to-face (n=7) and telephone interviews (n=2). Data triangulation was facilitated by collecting data from participants of different medical health professional backgrounds (Guion, Diehl & McDonald, 2011). Using multiple sources of information provided the wide array of information needed to provide an in-depth picture (Harling, 2002) of the phenomenon under study. Sources of data included semi-structure interviews, memos and literature. For a detailed description of the literature review including the search engines and key words are described in

chapter 2 of this dissertation. Data collection was done regularly within a time frame permitted by participants' availability and from the time permissions by gate keepers (WMU HSIRB) was granted and continued with less intensity during data analysis, mainly for verification. Data collection and analysis took approximately six months.

Procedures and Human Subjects Consideration

Prior to any recruitment and data collection, this research proposal was approved by the Western Michigan University (WMU) Human Subject Institutional Review Board (HSIRB) (please see Appendix A). The principal investigator, who was the dissertation committee Chair Professor Dennis Simpson, was chief facilitator in the recruitment of participants due to accessibility difficulty to primary care providers in general. Physician assistants (PAs) targeted were practicing (PAs). These PAs were currently full time or part time faculty at the College of Health and Human Services (CHHS) at Western Michigan University (WMU). The principal investigator helped identified a suitable and more accessible group and had a telephone conversation with the gatekeeper, the Chair of the Department of WMU (CHHS). Subsequent meeting was held between the Chairs of the Department of the PA program, the principal investigator and this researcher.

Following the initial meeting, PA program Chair sent e-mail to his faculty members soliciting their participation in this study (Appendix D). Follow-up emails were made by the researcher to the participants and meetings times for interviews were arranged with participants who chose to participate in the study. Participants were given informed consent prior to face-to-face interviews or informed consent was sent by e-mail for telephone interviews prior to the study. The nature and topic of the study were clearly

explained in the informed consent. Participants were told the study was voluntary and individuals could discontinue participation in the study at any time without any repercussion.

One way to address confidentiality is to protect participants' privacy by removing identifiers and to assure anonymity. To address confidentiality, researcher can assign random numbers or give pseudonyms to participants to protect their anonymity during report writing. The informed consent included assurance of confidentiality. As data collection and analysis progressed, the researcher assigned pseudo names to participants to preserve anonymity and to protect their identity during report of findings.

Sampling, Participants, Access, and Setting

Creswell (2007) envisions data collection as "a series of interrelated activities aimed at gathering good information to answer emerging research questions" (p. 118. A qualitative researcher, he argues, engages in a series of activities in the process of collecting data). Some of these activities consist of choosing sampling technique, the population of interest, and access to the site. Each one of these activities requires specific strategy. With regard to the site, Marshall & Rossman (2011) says, "one cannot study the universe - everything, every place, rather the researcher makes selections of sites and samples of times, places, people, and things to study (p. 102)." In keeping with the focus of this study, which is examining the perspective of PAs on the health effects of moderate drinking, including factors that influence whether or not PAs may recommend moderate drinking to their patients, the appropriate action to take is to choose a suitable sampling

technique and site according to the grounded theory method. The site was a department of physician assistants at a University in a Midwestern city of the USA.

Sampling

With regards to sampling techniques, there are various sampling techniques applicable to qualitative studies. Marshall & Rossman (2006; 2011, p. 107) propose sampling plan with description of events, rituals, resources, and interactions that would be observed at each site. For grounded theory study, Creswell (2007) recommends to select and study a homogeneous sample of individuals and then after initially developing the theory, selecting a heterogeneous sample to confirm and disconfirm the conditions, both contextual and intervening, under which the model holds. Miles and Huberman (1994) suggest the use of homogeneous sampling techniques to focus, reduce, simplify and facilitate group interviewing.

Strauss and Corbin (1998) recommendation, is the use of a theoretical sample. It is "The process of sampling individuals that can contribute to building the opening and axial coding of the theory." In this grounded theory study, therefore, a theoretical sample was selected (e.g.). The sample was homogeneous, in that, PAs professions give them the experiences and expertise that will provide information necessary to construct the theory and this is based on their knowledge and understanding of the phenomenon understudy. This homogeneous sampling technique is also selected on the grounds that it helps focus, simplify and facilitate group interviewing as suggested by Miles and Huberman (1994). Group interviewing of PAs was not possible due to challenges of time, although necessary to get their opinion as a group of professionals would have been

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useful to get a better understanding of how they may be experiencing the same phenomenon as a group. The researcher met with nine PAs individually either by phone or face-to-face.

Access

As said earlier sampling selection requires access to the site of study especially permission from the "gatekeepers." Creswell (2007) argues that to gain access to sites and individuals involves steps regardless of the approach to inquiry. Two most important of those steps is seeking permission from the Human Subject Institutional Review Board (HSIRB) of Western Michigan University (WMU) and from the affiliated institutions, the Chair of the department of physician assistants program at the University. This included an Informed Consent, which was presented to the gatekeepers and to the study participants. The desired sample was n=15 participants, however due to challenges of availability of participants, the final sample was n=9 participants.

Although the number of participants desired was not obtained, by the seventh interview, data saturation was obtained and new interviews did not yield any new information. This process of data saturation was satisfactory for the grounded theory method. Thus, data was collected from n=9 participants in their natural setting. This sample size of n=9 is in line with Glaser and Strauss's perspective of the required sample useful to generate the theory. They suggest that when used to generate theory, the comparative analytical method they describe can be applied to social units of any size (Glaser and Strauss, 1967).

Participants

Participants were made up of primary care providers who are primarily physician assistants (PAs). Two of the PAs have obtained respectively, a doctor of philosophy degree and a doctor of medicine, while the remaining seven had Masters of Science in medicine. Inclusion criteria were based on whether individual participant belong to the professional characteristics desired i.e. being a practicing PA, and have daily interactions with patients.

 PAs who participated in the study have practiced medicine for an average of 19.72 years. Eight participants practiced regularly in clinics and were also faculty in the department of physician assistants program at the College of Health and Human Services (CHHS) at WMU the ninth. Participants' practice specialties varied from pediatrics (n=3), internists (n=2), gynecology (n=2), geriatrics (n=1), and Otolaryngology (n=1). Participants were female (n=5) and male (n=4). They were all from the same ethnic group (Caucasian), with age ranging between 25 to 70 years old. As previously stated the sample size of n=9 satisfies the grounded theory requirement of the need to obtain saturation from data (Glaser and Strauss, 1967). The interview process is described thoroughly in the next section.

Dara Collection Techniques

Interviews play a central role in grounded theory study. Patton (2002) groups interviews into three general categories: 1) the informal, conversational interview; 2) the interview guide or topical approach; and 3) the standardized, open-ended interview as

cited in Marshall and Rossman, 2011p. 144), the interview guide or topical approach was used for this study. This approach is more structured than the informal, conversational interview and less structured than the standardized, open ended interview. The topical approach is structured; the interview is arranged and the interviewer comes prepared with a list of questions, which the interviewer may have or may not have shared with the interviewees before the interview takes place (Cresswell, 2007). The researcher used the topical approach and chose to share the list of questions with the participants prior to the meeting, but without the probes. In addition, this approach helped the researcher to explore participants' perspectives (emic perspective), which is the fundamental assumption of qualitative methods (Marshall and Rossman, 2011 p. 144). Interviews length was meant for conversations of 45 to 60 minutes. However, due to other factors such as time or interviewee specialty or ability to provide thorough details to probes, the average length of interview was 42 minutes.

The interview questions explored participants' perspective on the following: 1) What moderate alcohol consumption is, 2) its effects on individual's health, 3) What specific diseases moderate drinking may alleviate or aggravate, 4) how they respond to the conflicting views regarding moderate drinking and health, 5) Whether their personal stance on moderate alcohol consumption influences their recommendation of moderate alcohol consumption for the health of patients, 6) and finally factors that determine whether or not they will recommend moderate drinking for health and diseases. To capture items 1to 4 interviewees were asked to answer the following questions:

> *Please describe what you think is the relationship between moderate alcohol consumption and health.*

> *What do you think about the evidence showing cardioprotective effects of moderate alcohol consumption?*

To explore the meaning participants gave to items 4-6, they were asked the following two questions:

> *How would you use the evidence on health effects of moderate alcohol consumption to inform patients presenting at your practice?*
> *What is your personal belief about moderate alcohol consumption and health and does your personal stand influence how you recommend or don't recommend moderate drinking to patients.*

Participants were first asked questions that explore their understanding of the effects of MAC on health, including what diseases they believe MAC will affect. Subsequent questions explored how PAs informed patients about MAC and finally they were asked to take a stand by making recommendations about MAC that can be useful to practitioners and add knowledge to evaluation and research in the field of alcohol prevention and treatment. A full description of analysis of data generated from these questions is made in the next section entitled data analysis.

Data Analysis

Qualitative data analysis is the process of bringing meaning to raw data or like Patton (2002) states, "Qualitative analysis transforms data into findings." Cited in Morrill et al., 2000 p.321). In grounded theory study, the primary method of analysis is a continuous coding process. The goal is to generate theory that explains how some aspects of the social world works. Not knowing how primary care providers are dealing with the current phenomenon under study, e.g. the health effects moderate alcohol consumption.

Table 1: Interview Questions and Probes

Interview Questions and Probes

1. Please describe what you think is the relationship between moderate alcohol consumption and health.
- Different diseases
- Different theories
- Self-reporting issues
- Evidence of cardioprotective effects

2. What do you think about the evidence showing cardioprotective effects of moderate alcohol consumption?
- Conflicting evidence
- Mechanism of action
- Causation argument
- Confounding factors (age, genes, diet)

3. How would you use the evidence on health effects of moderate alcohol consumption to inform patients presenting at your practice? For example how will the following factors matter?)
- Gender of patients
- Age
- Race of patient/genetic vulnerability
- Patients at-risk of becoming alcohol dependent
- Religion of patient

4. What is your personal belief about moderate alcohol consumption and health and does your personal stand influence how you recommend or don't recommend moderate drinking to patients.

The researcher started data analysis from the first interview and continued analysis as data collection progressed to the end of the last interview. This process is called constant comparison method. The goal is to develop a theory that emerges from the data and is therefore connected to the reality that the theory is developed to explain.

Constant Comparative Method

Open Coding

Data analysis for this study used the constant comparative method in order to develop the grounded theory. Glaser and Strauss (1967) suggest when used to generate theory, the comparative analytical method they describe can be applied to social units of any size (e.g. Physician assistants of size n=9). Analysis began with *open coding*, which is "The process of breaking down, examining, comparing, conceptualizing, and categorizing data." (Strauss and Corbin, 1990 p. 61). In keeping with this view, after each meeting with participants, digital recordings of interviews were transcribed verbatim. Transcripts and field notes were reviewed thoroughly. Memos writing also took place simultaneously. Copies of transcribed interviews were e-mailed to each participant for member checking. This will be discussed further under the section *Trustworthiness*. Some of the researcher's notes consisted of what the researcher has observed during the interview process. For example, nonverbal messages (posture, facial expressions, tone of voice, etc.) observed during the interview process and were conveyed by participants. Data source were the recorded interviews, the memo and the field notes. Field notes contained specific things (tone of voice, postures, silence, etc.) observed during the interview that may not have been captured during transcription of the recordings.

Raw data were examined line by line, sentence by sentence. Researcher looked for and made notes of reoccurring words or expressions, the number of times those expressions, phrases and words occurred. Participants' own words were often used as an inspiration to name the codes also called nvivo coding. Nvivo coding was facilitated by

frequency of several repetitions of certain words, expressions or phrases. This helped the researcher to begin noting patterns in the data that were later compared to other interviews.

This coding process was used to capture or to define actions or events within data. This coding analysis led to "refining and specifying any borrowed extant concepts" (Strauss and Corbin, 1998) in Cresswell, 2007 p. 160. Several concepts were developed, as the researcher continued the coding process and pondered over the meaning participants ascribed to a particular incident or event. Simultaneously memo writing occurred with continued data collection and analysis. To make sure all potentially significant data had been captured, several codes were created during the first review of each interview.

After several reviews of data and many codes were created, researcher examined the codes as they related to the research questions. For example the code "Expressing difficulty" was used to describe feeling of uneasiness or discomfort, participants expressed when asked to describe the relationship between MAC and health. By this interview question was an important part of exploring participants' perceived effects of MAC on health (Research Question 1). Table 2 shows an example of the coding process and it captures the meaning participants expressed when asked to describe the relationship between MAC and health. When multiples codes were generated, the researcher began to examine the relationship between the codes to form themes and categories. This process is the discussion of the next section called *axial coding*.

Table 2: Example of open coding

Open Codes	Properties	Examples of Participants words
Expressing difficulty	- Feeling uneasy - Feeling uncomfortable - Depending on	-It's hard to say -It's difficult -It's a mess -It's depends on the individual overall health -Depends on who you are -It depends on everyone definition of moderate
Doubting the evidence	- Being skeptical - Distrusting the evidence - Being cautious about alcohol use	-Evidence is not clear -Needs more knowledge -Evidence is too soft -Have not seen any health benefits in my years of practice -I just don't believe it's beneficial

Axial Coding

Straus and Corbin' s second step in the data analysis process, following open coding is *axial coding*, "A set of procedures whereby data are put back together in new ways after open coding, by making connections between categories. Axial coding is done, by utilizing a coding paradigm involving conditions, context, action/interactional strategies and consequences." (Straus and Corbin, 1990 p. 96). After all possible codes were created; axial coding began by grouping categories into main and subcategories. The codes were named and became categories from which main categories derived. The researcher explored the relationship between the named categories, and recoded them under different names. With all instances of each category grouped, the number of categories validated by participants was explored and non-representative categories were discarded.

The researcher then regrouped the categories with the research questions in mind attempting to make sense of the participants' perception of the phenomenon under study. Through this process 10 categories representing the experience of majorities of participants emerged. This process was helpful to create richer explanations of the occurrences within the data. Each category had properties and dimensions that furnished more information about the main category. For example, *expressing difficulty*" was later grouped under a main category called *subjectivity*.

Expressing difficulty was a property of the category *indicating subjectivity* and had dimensions like "feeling uneasy," "feeling uncomfortable," "Dependent on." And this provided information to understand the challenge of not only defining what moderate alcohol consumption, but to straight forwardly stating what is its relationship to health. It was then clear that the issue was complex and subjective based the factor *individual*. All the categories were then grouped into four main concepts from which the theory was developed. This process is described in the section called *selective coding*.

Selective Coding

Axial coding is aimed to make conceptual connections between a category and its subcategories. Then, concepts and sub-concepts are further defined by *selective coding*, the third step in Straus and Corbin's data analysis, which consists of integrating and refining the theory, is "an integrative process of selecting the core category, systematically relating it to other categories, validating those relationships by searching for confirming and disconfirming examples, and filling in categories that needed further refinement and development" (Strauss and Corbin, 1998; Cresswell, 2007 p. 160). In

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other word the primary goal of this step of data analysis was to develop an overarching theoretical scheme explaining how each of the categories were linked to one another, and to identify a core category that explained the experiences of majority of participants.

In this step, codes and categories were sorted, compared, and contrasted until all the data were accounted for in the core categories of the grounded theory paradigm model, and no new codes or categories was produced, i.e. saturation (Saumure and Given, 2008) or theoretical saturation according to Dey (1999). Clarke (2005), advises the researcher to write analytic and self-reflective memo or journals to document and enrich the analytical process, to make implicit thoughts explicit during the selective coding process. Analytical memos consist of questions and speculation about the data and the emerging theory (Clarke, 2005).

Main categories were evaluated for similarities and differences. Passages of data representing each of the main categories were reviewed several times to make sure the named category was a good fit for the passage. This resulted in the emergence of four overarching constructs or theoretical categories. The first of the emerging constructs was labeled "Expressing Doubt" and involved the main categories representing PAs skepticisms of the literature which have found health benefits of moderate alcohol consumption (MAC). The category *exercising caution* was included in this construct. That category represented participants' awareness of the effects of alcohol and how uncertain those effects can be on susceptible (due to their genetic makeup) individuals. The second construct "*Indicating vulnerability*" represented participants' expressions of the risk to recommend MAC for health due to unknown factors such genetic makeup. The researcher included the category *unintentional abuse* as part of the construct *Indicating*

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vulnerability, as result of participants (n=9) stating repeatedly that the risks outweigh the benefits or risk of overdrinking (n=4).

An illustration and narrative describing the emergent theory was developed to explain factors involved in PAs (n=6) distrusts of the evidence on health benefits of MAC. Evaluation of this structure assisted to decide on one core category which represented PAs perspective of the effects of moderate alcohol consumption on health. Finally, the story of each participant was reviewed to evaluate its fit to the theory proposed. The specific components of the theory will be fully discussed in the next chapter of this study.

The Role of the Researcher

Marshall and Rossman (2011) contend that in qualitative studies, the researcher is the instrument. The presence of the researcher in the lives of the participants invited to be part of the study is fundamental to the methodology. This is true for various methods of data collection and naturalistic observation is a typical example. Furthermore, qualitative researchers become completely absorbed in the circumstances and the observable facts studied. Here the researcher's role ranges from the more conventional neutral standpoint to an active participatory role, depending on the chosen research approach (MacMillan & Schumacher, 2006). McMillan & Schumacher see the importance of the inquirer's social relationship with participants; and how it necessitates a description of his or her role and status within the group or site (McMillan & Schumacher, 2006).

This researcher physically went to the people, location, setting or site in order to observe and conduct the interviews. The researcher immersed herself in the situation and

did not do anything to manipulate the situation, but rather watched naturally occurring events and not controls them, because qualitative research is naturalistic (Guba, & Lincoln, 1994). For example due to the conflicting nature of the phenomenon under study, it was important for the researcher to appear as neutral as possible by listening to participants' response with an open mind. The researcher's role was to uncover the truth from participants' perspectives to generate information that can be disseminated to add knowledge to evaluation and research and in a way contribute to alcohol treatment and prevention policy.

In this qualitative inquiry as in most others, the researcher was the instrument through which the data was collected. In most qualitative inquiries, a "Person as Instrument Statement" normally provides enough explanation of this issue. In this study, the researcher was both facilitator and evaluator of the research procedure. Accordingly, the researcher took rigorous steps to address the issues related to the role and prevention of the researcher's influence on the participants.

Patton indicates that a more traditional qualitative researcher learns from the participants' lives but maintains a neutral stance of empathic neutrality (Patton, 2002). Other ways this researcher self-monitored was to keep watch over ways the researcher can overly influence the qualitative inquiry by setting questions with the intention to lead participants to certain type of answers. The researcher used as guidelines the four ways Patton suggests controlling the researcher's role. These are: 1) Researcher Presence – the reactions of program participants to the researcher's presence, 2) Instrument Change in a qualitative inquiry, changes in the researcher over the course of the study, this was not applicable in this study, 3) Professional Incompetence either a lack of sufficient training

or preparation. This researcher had experience conducting interview and had done on several occasions. 4) Value Imposition - excessive influence of the values or biases of the researcher. This was not likely, because the participants selected to provide information to explore effects of MAC on health had the expertise needed to generate theory about the phenomenon under study (Patton, 1990). The researcher made sure to maintain neutrality and only allowed conversations about and outside of the topic after the interview with participants was completed.

The researcher maintained awareness that alcohol is a legal drug, socially accepted and is a lucrative business in the political context within which the researcher lives and within which the study was taking place. The researcher was mindful of people's feelings about alcohol use and was not naïve about the fact that most people are quite comfortable with the idea of drinking moderately for health purpose or pleasure. In addition, truth seeking required this researcher to be open minded in order to clearly understand PAs experiences and their perspectives of the debate about health risks/benefits of moderate drinking.

Ethical Consideration / Trustworthiness

The aim of trustworthiness in a qualitative inquiry is to support the argument that the inquiry's findings are "worth paying attention to" (Lincoln & Guba, 1985, p.290). This is quite different from the conventional experimental precedent of attempting to show validity, soundness, and significance. In any qualitative research project, four issues of trustworthiness (Marshall and Rossman, 2011; Cresswell, 2007) demand attention: credibility, transferability, dependability, and confirmability. Credibility is an evaluation

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of whether or not the research findings represent a "credible" conceptual interpretation of the data drawn from the participants' original data (Lincoln & Guba, 1985).

To address credibility this researcher used multiple sources of data. The sources of data were Face-to-face interview, telephone and e-mail messages to strengthen and to verify as well as clarify the information received. Conducting face-to-face and telephone interviews of providers with various specialties provided richer more multidimensional and more credible data. In addition there was a competent debriefer (Lincoln & Guba, 1985 in Marshall and Rossman, 2011) who was knowledgeable of the qualitative research design. A fellow professional colleague served as audit for the researcher. In addition the dissertation committee members and the methodologist in particular served as audit. This was a useful way to control the researcher's personal bias.

To address member checking (Lincoln & Guba, 1985; Cresswell and Miller, 2000), this researcher sent e-mail of transcript to each participants for verification. In the process of member checking, research participants were asked to review a summary of the data analysis and procedures as well as the final results of the inquiry. The researcher had a prolonged engagement in the field (three months). Prolonged engagement is one of the ways qualitative researchers show credibility of their data (Cresswell and Miller, 2000).

Transferability is the degree to which the findings of this inquiry can apply or transfer beyond the bounds of the project. To facilitate transferability, in the appendixes are found individual documents that were used to generate answers to the research questions. By so doing this will facilitate access to this inquiry and allow other researchers the ability to transfer the conclusions of the present study to similar studies.

Exercising transparency will help whoever wishes to repeat this inquiry in another context to be able to follow the steps as closely as possible.

Dependability is an evaluation of the value of the integrated processes of data collection, data analysis, and theory generation. Prior to this section, a step by step description of this process was discussed. Confirmability is a measure of how well the inquiry's findings are supported by the data collected (Lincoln & Guba, 1985). To address the issues of dependability and confirmability, there were an independent audit of the research methods by a competent peer (Lincoln & Guba, 1985; Patton, 1990), and the dissertation committee.

Ethical issues include respect for persons, benevolence and justice, and are usually thought about mainly during the procedure for gaining Informed Consent. Marshall and Rossman (2011) states, "For criteria for trustworthiness and ethics, we argue that reasoning must move beyond the procedural to focus on matters of relationships – with participants, with stakeholders, with peers, and with the larger community of discourse." (p.44). Discussing moderate alcohol consumption can be difficult in itself, because people can think they are being judged. The researcher controlled her personal biases about alcohol consumption and appeared as neutral as possible with participants to provide freedom for participants to openly discuss their views. The researcher's perspective (etic) is not important if the researcher want to understand how this study can impact policy and practice.

Building a trusting and respectful relationship with participants can help the researcher obtain credible data that reflect participants' experiences. This means the researcher respected participants' opinions, and assured them of complete confidentiality.

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On the issue of justice the researcher wished the results of this study will benefits

practitioners; especially and contribute to knowledge and policy change in terms of

drafting clear guidelines to facilitate guidance for health care providers.

Conclusions

The use of Strauss & Corbin (1998) coding paradigm and analysis of data were

used in this constructivist grounded theory. The methods of sampling, data collection

have been described in this chapter. Through the application of the methods expounded,

four categories emerged from the data: s*ubjectivity*, v*ulnerability*, d*oubt* and imparting

knowledge with c*onflict* emerging as core category. The interactions of these four

constructs led to the development of theory discussed in chapter 4. The findings that led

to the determination of the theory are also discussed in chapter 4 of this dissertation.

CHAPTER IV

RESULTS

The purpose of this study was to use a constructive grounded theory approach (Lincoln & Guba, 2001) to generate theory that explains the experiences of (PAs) as they attempt to make sense of the relationship between moderate alcohol consumption (MAC) and health, particularly, factors that influence PAs perspective and whether they find MAC valuable to recommend it for patients' health. The grounded theory methodology was used in this effort to analyze interview data from n=9 health providers who were physician assistants (PAs). The study explored PAs understanding of the relationship between MAC and health, including definition of MAC, how participants inform patients about effects of MAC on health, and whether they found virtue in MAC to recommend it for the health of patients. Researchers also assessed impacting factors that determined their recommendation. As discussed in chapter 3 of this text, each participant are given a pseudonym and quotes are coded with that name. The phrases "majority of" "most" or "many" are used to discussed concepts expressed by at least 7 to 9 participants. The words "some", "several" are used to express endorsement of a category by 4 to 6 participants. Finally, expression as such "a few" was used to indicate endorsement of a category by 3 or fewer participants. In addition as discussed in the first chapter under the section "Definition of Concepts" some expressions are used interchangeably. Those expressions are Moderate alcohol consumption abbreviated as MAC is throughout this text interchangeably with moderate drinking. The expression primary care providers

(PCPs) is used interchangeably with Physician Assistants (PAs) because based on the definition, Physician Assistants (PAs) are primary care providers.

The emergent theory proposes that PAs perceived effects of MAC on health is best understood as a an interaction between the relationship between PAs challenge to define the relation between MAC and health, how PAs understand this relationship, how they explain it, the factors that impact their recommendation of MAC on health and the activities they engage in to inform patient. The analysis resulted in one overarching core category entitled 'Existence of Conflict' which summarizes PAs perception of MAC and health. Under this central category are four main constructs label: "*Subjectivity*," "*Vulnerability*," "*Expressing doubt*" and "*Imparting Knowledge*." Ten more key subcategories were subsumed to these constructs.

The next section of this chapter provides an in-depth evaluation of the five constructs that form the emergent theory.

Subjectivity

'Subjectivity' emerged as a category in response to participants' perception of the relationship between moderate alcohol consumption (MAC) and health. *Subjectivity* was used to describe the obvious difficulty which participants demonstrated when asked to explain the relationship. Most participants used expression such as "it depends" and went on to describe the different variables that came into play. It was apparent participants perceived the relationship to be too subjective to have a definite answer. This subjectivity was demonstrated by the use of expressions such as 'no black and white answer' or 'it's a double-edge sword'. Further analysis indicated that participants perceived MAC to be a

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complex issue difficult to define, and its relationship to health was contingent to overall health, individual definition and interpretation. Subjectivity was sometimes explained by the ambiguity in defining the word '*moderate*'. The following excerpt details one participant's perception of the relationship between MAC and health by revealing the problem with the definition:

> *Well I think it probably depends on what one would say moderate alcohol is. Is it a drink a day or is it more than two drinks a day. In this practice it's probably in the line of light drink. I think in this practice it depends on age, geographic area, and race (Bryan)*

Subjectivity has a number of properties and dimensions and these will now be discussed in the next section. The visual representation of these are presented in figure1 below.

Contingent

Contingent was identified as the property of subjectivity and has dimension of interpretation, health and definition. The notion of subjectivity revealed participants took into consideration individual's interpretation of the definition of moderate. This suggests interpretation of MAC varies from one individual to another, including PAs. That interpretation also influenced how the individual defined MAC. Below are statements made by two participants, on the issue of interpretation and definition, which put emphasis on the variability in the interpretation of the word moderate.

… My definition will probably be one glass of wine a day…….We need to all be in the same page with the definition (Marina).

For me the definition of moderate drinking will be the American dietary guidelines of two to four drinks a day for men and less than three for women. But in the military we tend to accept no more than 14 drinks in a week for a male and not more than 10 for female (Matthew).

Figure 1: Properties and Dimensions of Subjectivity

Participant Fred believed not with certainty:

> *It can be potentially beneficial to cardiac diseases, where male have two drinks and women one drink, it can be beneficial…..*But m*oderate depends on the individual. But it might still affect the person both ways (Fred).*

John, another participant expressed the difficulty that comes with the interpretation and definition of MAC. Following is his view in the excerpt below:

> *I am uneasy about moderate alcohol consumption, because it's hard to define it. Is it one drink, two drinks, it's hard! (John).*

Brenda, another participant expressed the challenge of explaining the relationship between MAC and health by demonstrating from her perspective that the definition of MAC and interpretation of this relationship is problematic because of individual's interpretation. The excerpt below details this participant's perspective:

> *Even around the world the definition of moderate alcohol differs. I think everyone has their own view of MAC. Even the type of alcohol that people choose is different (Brenda).*

John also stresses the facts about variability in the interpretation and definition of moderate drinking. He says the following:

> *It depends on what your definition of moderate alcohol is. Some people (patients) think moderate alcohol consumption is three or four beers a night, some people think it is less; anything in moderation is better (John).*

This perception was also supported by a number of participants. In addition to individual's interpretation, it was apparent that patients' health played an important role to explain the relationship between MAC and health. It was one of those instances where participants appeared to be undecided. It was clear participants perceived MAC as sometimes beneficial when the drinker is healthy and detrimental if the drinker was not. For that reason, most responses were '*it depends on individual's health*'. In other word participants will allow drinking in moderation if they knew the patient's health was not at stake. For example, one of the participants explicates it in the following statement:

> *.....I know… personally believe the health of the person determines what will be moderate for that person…. (Kate)*

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Matthew, one of the participants describes how he perceives moderate drinking and health by emphasizing the importance of the health of the patient because he didn't mind drinking for own pleasure:

> *I would never recommend that people drink for health. But I would not tell the person who drinks already to stop unless; it is harmful to their health*

And so were the views of almost all the participants.

From the findings presented above it is apparent participants struggled to describe the relationship between MAC and health. However, participants justify their struggle to explain that relationship by indicating that the issue is complex and most people have a subjective view of the effects of alcohol on health. Therefore the strategy to ease the discomfort that emanates from being asked to describe what type of relationship exists between MAC and health; participants explain that it is contingent to the individual interpretation. Another interesting thing to note is participants could not clearly define the relationship because they perceived MAC to be good and bad at the same time, mainly because health status of the drinker was a determinant for their ability to define the relationship.

Other Variables

The variables that affected PAs perspective of MAC or confounding factors were genes, gender, age and health. These factors are interwoven with the properties and dimensions of this category and are essentially inter-related with all aspects of health care practice based on the perspective of participants in this study. So much so that all other responses participants gave on other questions they were asked were linked to these

factors. Participants indicated on several occasions that these factors influenced their

perception of the effects of alcohol on health. With regard to the factors genes, genetic

makeup was always implied. Therefore expressions like 'some people', 'not everyone,'

was indication that sometimes moderate drinking may have health benefits, but

biochemical profile of an individual revealed those benefits can't be true for everyone.

Matthew, Fred and Kate related their experience based on the amount of time spent in

practice as providers:

> *... I think that as I said earlier, the genetic component of everyone, the way your body handles alcohol makes it that there is certain group of people who have the genetic component that helps them metabolize alcohol to their benefit (Matthew).*

> *I know, what I have seen in my 35 years of practice, I have seen….that they're people who will drink alcohol moderately and would never have one piece of physiologic events, and there are other people who will drink moderate alcohol and will get cancer of the mouth, breast, throat, fatty liver (Kate).*

> *There may be benefit there, but I still think it's a slippery slope for a lot of people (John).*

There were several occurrences of the importance of genes by how often

participants highlighted during the interview. Participant Marie indicated that it's hard to

know when a patient is susceptible to alcohol a part from family history of alcoholism.

For that reason she rather they don't drink alcohol at all. She said:

> *Risk of becoming dependent is one of the reasons why I don't recommend alcohol to patient. We don't always know who will become dependent a part from family history of alcoholism (Marie).*

Another participant supported the previous statement:

> *…Because everyone has a different genetic makeup and you don't know… (Marina).*

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Participant Brenda also concurred by her statement:

> *Some people are genetically designed to take one drink and desire more and more and more (Brenda).*

Participant Kate pointed out genetic influence on the whole issue of moderate alcohol consumption and how it must be taken into consideration by the statement below:

> *Because I understand that the way alcohol that is consumed orally and that whisky and beer and spirit are metabolized differently by different people. And because it affects neurotransmitters and you have genetic set up for those things. So each person's moderate is going to be different based on their biochemical profile (Kate).*

For the factor gender, most participants view the adverse effects of moderate alcohol consumption on women, especially women who drank alcohol while expecting a baby. Bryan related his practice experience by listing diseases he sees often on children whose mother may have consumed alcohol while pregnant below:

> *Some of the diseases related to alcohol consumption that I see in my practice are fetal alcohol syndrome, fatty infiltration of the liver, developmental delays that require special services like speech therapy, physical therapy and occupational therapy. I see aspects of it that show that mom drank alcohol and did other drugs during her pregnancy.*

Participant Marie and other participants echoed the view above:

> *Women are seen with more liver cirrhosis than men. If a woman has a family history of breast cancer, then she should stay away. And for pregnant women, I will say stay away because of fetal alcohol syndrome. That is one thing that will never be worth trying alcohol (Marie).*

> *My stand for pregnant women is that you are pregnant you cannot have any alcohol (Brenda).*

Participants perceived health as a variable to take into consideration if one has to make recommendation about moderate alcohol consumption. As mentioned earlier, many participants described the relationship between MAC and health as dependent on the

health of the patient. One of those moments is related by participant John in this

statement:

> *It depends on their comorbid conditions, if they have high blood pressure, high cholesterol, and liver issues. If your liver has to metabolize that, it will be harder (John).*

This other participant underlined the possible effects of MAC on health in a stricter note:

> *Even with smaller amount of alcohol consumption it does affect the heart sometimes in a negatively. If the person is prone to heart failure it can worsen it and somebody with cardiac myalgia, you don't realize it and it can worsen it. Lots of my patients do drink alcohol in moderation hoping to see those benefits (she meant the cardioprotective effects of MAC) (Marie).*

For this participant understanding the relationship between MAC and health was closely

related to the person's health and their genetic makeup. She stated:

> *I know… I personally believe that the health of the person determines what will be moderate for that person. So the relationship between MAC and individual health has more to do with their biochemical make-up than it has to do with the quantity of alcohol consumed (Kate).*

From this statement it is obvious participants take into consideration many

variables likely to affect the individual who may engage in moderate alcohol

consumption. And variables such as health and genetic makeup appear most important

from participants' point of view. Variable *age* is not discussed here due to the amount of

participants who worked with a much younger population. Which of course nobody is

holding a debate about health benefits effects of MAC for the young. However there are

significant aspects of the variable age that cannot be discussed in this section of the

paper, but in later part of this paper, relevant issue regarding age will be examined.

Expressing Difficulty

Expressing difficulty was apparent when all participants show a level of difficulty when asked to describe the relationship between MAC and health. Participants expressed difficulty by bringing to light the subjective nature of the issue. This was evident in the use of expressions such as "it depends" meaning participants were unable to state whether MAC had beneficial or detrimental effects on health. In addition it was also evident participants could not be unanimous in defining MAC:

> *…Getting people perception of MAC is going to be very wide. It depends on their personal experience and practice (Kate).*

Another participant added:

> *I will define MAC as probably one glass a day. I think everyone definition of moderate is different (Marina).*

Other ways participants expressed difficulty was by seeming uncomfortable with having to explain their understanding of the relationship between MAC and health. They demonstrated discomfort and uneasiness by using expressions such as 'it's hard' 'it's difficult', and 'it's a mess'. John stated:

> *It's hard to say and it's difficult. It is hard to find a physician who will recommend that his patients drink alcohol in moderation to prevent disease.*

Bryan also stated:

> *I am uneasy about moderate alcohol consumption, because it's hard to define it. Is it one drink, two drinks, it's hard!*

From the quotations above it is obvious participants expressed some level of difficulty when asked to describe what they thought the relationship between MAC and

health was. There is evidence of an internal conflict resulting from cultural belief about alcohol. While participants are very concerned about genetic makeup and the health of the person, as providers, they are also concerned about public perception. Issue of concern for public perception will be discussed in a later part of the paper.

Vulnerability

The category *Vulnerability* emerged as a result of participants expressing serious concerns about the risk involved with providers being called to make recommendation that patients use alcohol to treat or prevent illness. Participants were concerned for the individual, the public and the characteristics of alcohol and issues like genes and susceptibility. Therefore all participants perceived the issue as risky by stating directly that they will never recommend MAC for health purpose. The emergence of this category is graphically represented in the page below. Please see figure 2. A number of properties and dimension of this category is discussed in the next section.

Excessively Risky

The perception of moderate drinking as risky for health was perceptible when seven of the participants decided that it would not be wise to recommend it for health due to genetic makeup and concern about overdrinking. All participants were somewhat familiar with the discussion in the literature about beneficial effects of moderate drinking for health. However from their practice experiences they had no cases examples of patients who have been drinking moderately to improve their health to show.

Figure 2: Properties and Dimension of Vulnerability

When asked to state which diseases MAC can be beneficial for, some of the participants referred to what the literature has claimed and not cases from their practice. Health conditions such as cardiovascular diseases and cardiovascular diseases risks (hypertension, diabetes) were often mentioned. While they recognized that based on some studies alcohol has some beneficial effects, they indicated that those benefits where all contingent to the health of the individual and whether the individual consuming alcohol is susceptible to alcohol was always the unknown factor about the issue. Some participants observed the following:

> *It affects the liver more if the individual has other liver conditions like hepatitis. Moderate will depends on the person's overall health (Fred).*

Another participant declared:

> *If you have one to two drinks a day, it can lower your risk of CAD, but if you already have CAD it may not be cardioprotective, it can be detrimental (Kate).*

Participant Marie reinforces the idea mentioned by participant Kate:

> *I think the risks outweigh the benefits. Even with smaller amount of alcohol consumption it does affect the heart sometimes negatively. If the person is prone to heart failure it can worsen it and somebody with cardiac myalgia, you don't realize it and it can worsen it (Marie).*

Participant Matthew, who mostly had a positive outlook on the effects (Positive effects will be discussed later) of MAC on health, had some reservations when he made this statement:

> *I think there are some dangers of moderate alcohol consumption in certain people, but it's hard to prove (Matthew).*

Participants who work with geriatric population acknowledged there are apparent health benefits to alcohol on a short-term basis; however, the adverse effects were likely to negate those benefits. One participant indicated moderate drinking for elderly had sedative effects on the short-term, but then causes them insomnia. She observed:

> *Another thing with alcohol in older people is that alcohol can cause them to have insomnia. Because if they take one to two drinks a day and they drink it in the evening, and it sedates you, you going to wake up in the middle of the night because you go through withdrawl even with just one or two drinks. So they are more likely to have insomnia, they are more likely to have metabolic effects (Marie).*

She goes on to state*:*

> *I will assume that they can have some form of protection, but the negative effects are very likely. So is it worth to seek for the cardioprotective effects if it will cause more damage to health (Marie).*

Additionally, participants perceived the risks of MAC on health as dangerous to recommend because they believe that there are too many unknown. They based their perception on the unknown amount of individuals who are susceptible to alcohol based

on their genetic makeup. Almost all participants believed alcohol metabolism was a

serious factor that determined whether a person had harmful effects of alcohol after

consumption. This participant's observation captured the views of many who had the

same belief about MAC and genetic vulnerability:

> *The steps that the alcohol molecules go through in the liver are*
> *determined by mitochondria enzymes, and those mitochondria enzymes*
> *are genetically encoded. So how are you going to know if you are someone*
> *who metabolizes alcohol in such a way that it's going to be*
> *cardioprotective or it's going to give you mouth cancer, breast cancer,*
> *fatty liver diseases, hypertension and not someone else (Kate).*

Referring to alcohol metabolism, another participant pointed that our genes determines

whether we are slow or rapid metabolizer and accordingly we experience harmful effects

or don't experience negative effects:

> *Just like with any type of a drug the pharmacokinetic of alcohol some*
> *people are rapid metabolizers and metabolize it fast and some people will*
> *take longer to metabolize it. And if your body keeps it around longer,*
> *that's when it's harmful (Matthew).*

According to the statement above, participants believed MAC was not worth

recommending it for health when considering genetic vulnerability. In addition, it

appeared participants had concern for public perception because of other problems that

may ensue from moderate drinking, such as accident and injury. Referring to accidents

and injuries, participants Marina and Gloria made the following observations to express

their concern for public perception:

> *What bothers me about that is, you never know if they will only have that*
> *one glass or if it's going to lead to other problems. You never know if they*
> *will get in a car and drive. And if they get in an accident, they can say*
> *well, I killed somebody, but I only had that one glass of wine. My provider*
> *told me I can have a glass of wine every night (Marina).*

> *I have a concern for public perception, by not wanting to give people permission to drink Gloria).*

After considering all the factors mentioned in the discussion above it was noticeable participants perceived moderate drinking as something too risky to make recommendation for medical conditions without specific of any given patient. Besides medical conditions of patients these providers were concerned about abuse and risk of becoming dependent.

Unintentional Abuse

Unintentional abuse of moderate alcohol consumption also emerged from the data. Participants perceived unintentional abuse as one of the major reasons to be cautious about moderate drinking for health. Participants pointed out genetic vulnerability as an important variable as well as alcohol characteristics. Alcohol characteristics had to do with the type of alcohol, the taste of alcohol and habit forming nature of alcohol. For example referring to taste of alcohol one participant who evoked vulnerability to alcohol said the taste of red wine for example can lead someone to want to drink even though the person intended to only have the recommended one glass:

> *I think one can take a glass of wine with the intention of just drinking that one glass of wine and ends up drinking more because the person felt that it tasted good and wanted more (Gloria).*

And she when on to add*:*

> *I believe there is a fine line between moderate drinking and heavy drinking (Gloria).*

Another participant declared:

> *Some people are genetically designed to take one drink and desire more and more and more. Sometimes one drink may lead to another (Brenda).*

Participant Marie and Marina worried about the habit forming nature of alcohol and the

risk of becoming dependent:

> *Risk of becoming dependent, is one of the reasons why I don't recommend alcohol to patient… is that we don't always know who will become dependent a part from family history of alcoholism (Marie).*

> *There is a risk of becoming dependent for some people if it is prescribed by providers to patients (Marina).*

Participant John perceived the issue of moderate alcohol consumption and health as:

> *It's a slippery slope for lots of patient. But I think there is relaxation benefit, it is a mind altering drug, it's no different than smoking marijuana.*

Discussing to the taste and type of alcohol one participant said:

> *I think the issue with wine is that what comes into play is that it is for most people when they drink one glass of wine with dinner or after dinner, most people tend to limit themselves. It's easy for them to stop, while for mixed drink with ethanol, it's harder to stop. Because the ethanol hits the brain faster, and they will have much of an impact, and in that case it's harder for some people to limit themselves to one drink, and they may drink up to three drinks in one setting (Matthew).*

Some participants perceived recommending alcohol for health as a risk that may

encourage people to drink in excess. In this case unintentional abuse would be indirectly

caused by providers' endorsement of moderate drinking to alleviate a medical ailment.

Consequently, expression like *'I will never recommend it for health'* was a closing

statement all participants made. There were several statements made by participants to

describe foreseen scenarios of overindulging, binge drinking, because providers may

have mentioned potential benefits of moderate drinking on health. The following

statements described some of the participants' views:

> *I am concerned about giving people permission to overindulge. I don't want to give people permission to binge drink (Gloria).*

> *I think you don't want to help those who are looking for an excuse to drink, the opportunity to drink more. They may say yeah the doctor told me I can drink. It's hard for us as providers, because some patients are looking for permission to go ahead and drink. Sometimes they look for excuses to go out and do maybe what they thought they shouldn't more than they should. Sometimes I am afraid to give too much free reign to the patients (John).*

> *I will not recommend MAC to patients because it will lead them to drink in excess (Marina)*

Clearly acclaiming MAC for health purpose is not the intention of these providers. Participants perceive the relationship between MAC and health as controversial and difficult to handle. Because while some participants pointed to some benefits of MAC on health, after analysis, almost all of them came to the conclusion that the risks outweigh any potential benefits because of confounding factors like genes. Another reason why they will not recommend MAC for health was that many of participants (n=6) didn't believe the findings in the literature. Their skepticism of the literature will be discussed in the next section.

Expressing Doubt

The category '*Expressing Doubt*' emerged from the data in response to the volume of commentary that was evident with respect to participants conveying lack of confidence in the current literature. It appeared there was a gap between what the literature proclaims about health benefits of MAC and participants' practice experiences. Some participants (n=5) stated they will be inclined to trust the existing studies if they were randomized control trial studies as opposed to population based studies.

Based on their general knowledge of the effects of alcohol on the body, some

participants believed MAC may have some cardioprotective effects, but they were not

really certain as it is evident in the words of participant John:

> *There may be benefit there, but I still think it's a slippery slope for a lot of people. I rather outweigh the benefit of encouraging minimal use vs. use. There are a lot of things that come into play (John).*

He also added:

> *There are a lot flaws in observational studies, hormone replacement therapy for women later showed some flaws that were not considered at first. There are other negative effects of MAC on the body, like liver impairment, weight gained, just like with any other medication, you have to weigh the risks and benefits (John).*

Participants thought when it comes to alcohol, it's better to exercise caution

because of the unknown variables to take into consideration. Some participants (n=2) said

they would have preferred to have clinical guidelines as oppose to simple guidelines from

the American Dietary Guidelines. The properties and dimensions of this category are

represented visually and are discussed below. Please see figure 3 for visual

representation.

Needing Credible Information

While most participants were somewhat familiar with the current discussion about

the health effects of moderate drinking, factors such as genetic vulnerability, risk of

becoming dependent, unintentional abuse due to alcohol characteristics and overall health

of the individual, led to participants (n=7) manifestation of doubt. For example one

participant declared about the guidelines for what is to be considered 'm*oderate':*

> *The guidelines are defined on the alcohol perspective. The guidelines address it from the alcohol perspective. So I can't say the research is evidence based, and it is exactly what we should do. So there can never be one answer for everyone, in my mind, these there are just guidelines. So the clinical guidelines may not be looking at a person definition of health… (Kate).*

Whereas some of the participants (n=6) were skeptical or uncertain about the

beneficial effects of MAC on health, others (n=3) completely expressed disbelief.

Participants Bryan and Brenda respectively demonstrated that perception as they stated:

> *Whether it decreases effects of coronary heart diseases, it's hard to say. I think more research need to be done (Bryan).*

> *I believe that the studies are not… I am not convinced that alcohol drunk in moderation will improve health. Even around the world the definition of moderate alcohol differs. I think everyone has their own view of MAC. Even the type of alcohol that people choose is different. I don't believe the studies that say drinking alcohol in moderation is beneficial for health. I don't just believe it! (Brenda).*

Another participant stated the current evidence was not convincing enough for making

such recommendation to patients. The disease that alcohol use affects in his line of

practice is Vertigo and according to him, the usual recommendation to patient is to stop

any alcohol intake. This participant observed:

> *I have not seen evidence of cardioprotective effects of alcohol. All I have seen are negative effects because of the amount they drink. I think if the data make sense, then I will consider it and use it for my practice…. I don't think moderate alcohol consumption has any value. If any, I give it a negative value (Fred).*

Participant Marie perceived the evidence as not strong enough while Gloria believed it

was a mess. They both respectively observed:

> *My opinion personally is that I think the evidence is soft enough and population based for me to recommend it to patients as a lifestyle to prevent diseases (Marie).*

> *We do need more information, it's a mess..Sigh (Gloria).*

The statement made by participant Gloria was echoed by many other participants (n=6) who felt there was a lack of credible information. In addition practice experiences and personal beliefs about alcohol led to participants' reluctance to find health value of MAC; consequently only one participant said he will advise his patients if there was no known risk to their health.

Exercising Caution

Based on the previous discussion about participants' skeptical attitude about current evidence, it was perceptible that participants were cautious about trusting the evidence because they trusted their clinical experience. *Exercising caution* emerged from the data as a result of evidence revealing participants were wary of some effects of MAC on some of the illnesses MAC is said to provide benefits for. For example some participants believed some type alcohol to be too high in sodium and carbohydrate, therefore that type of alcohol will harm the drinker if the drinker was hoping to get protection or cure for diabetes or hypertension:

> *I do not think recommending MAC is beneficial for health. Certain alcohol has high sodium contain, which will retain fluids and which will raise blood pressure (Brenda).*

> *Alcohol has so much free carbs and I don't think it is good for diabetes. In fact I will tell the diabetic to stay away from alcohol because it will increase your glucose (Marie).*

She went on to add*:*

I don't believe that the evidence is trustworthy. Do I think that alcohol can lower blood pressure? Yes because alcohol works as a vasodilator. But I feel there are other things that can negate that effect, like bad genes, or diabetes, etc. I don't think it's beneficial. People who are at risk for stroke also have other risks factors, like diabetes, bad genes. I do not think to recommend it is beneficial (Marie).

Again another participant felt the need to exercise caution:

I can't say that it is beneficial based on the studies, that will not be very helpful, the studies are epidemiological studies (Kate).

It is hard to find a physician who will recommend that his patients drink alcohol in moderation to prevent disease (John & Bryan).

When a participant not very sure about the evidence but felt conflicted it will

appear in the way they perceived effects of MAC on health:

I feel that there may be some benefits to alcohol consumption, but when recommending to patients, I have a theory about recommending to all patients because of the potential for negative effects as well that might outweigh the benefits (John).

Again this participant insisted that risks outweigh the benefits and it will be prudent not

to recommend it to patients without considering other factors:

I think they may be some cardiac benefits, there may benefit to the lowering of blood pressure, cholesterol. But I think the relaxation benefit, it is a mind altering drug, it's no different than smoking marijuana. So you have to outweigh the benefit of preventing their future cardiac problems, consuming alcohol regularly will it affect them economically, socially? Will it affect their liver negatively? (John).

Other participants felt the effects on cardiovascular risks like stroke were too

problematic. For example participants Marie, Kate and Brenda felt the evidence on

effects on stroke are misleading:

....because alcohol has antiplatelet activity and it is also somewhat of an anticoagulant. So it will decrease your risk of ischemic strokes, but by the same token, because of the effect on platelet and coagulation it will increase your risk of bleeding into your brain and having hemorrhagic stroke. If they are looking for stroke protection, I will say it's a sticky wicket. Don't drink alcohol for that reason.

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What participant perceived as beneficial was drinking alcohol for personal pleasure, which some of them thought it is good for tension reduction, psychological benefits. Although they also mentioned that because it is possible to develop tolerance and addiction depending on who is drinking and whether the person is naturally susceptible. Majority of participants perceived the evidence especially with regards to effects on physical health not trustworthy.

Figure 3: Properties and Dimensions of Expressing Doubt

What participant perceived as beneficial was drinking alcohol for personal pleasure, which some of them thought it is good for tension reduction, psychological benefits. Although they also mentioned that because it is possible to develop tolerance and addiction depending on who is drinking and whether the person is naturally susceptible. Majority of participants perceived the evidence especially with regards to effects on physical health not trustworthy.

Figure 3: Properties and Dimensions of Expressing Doubt

Many felt the need to have randomized control trial studies, which are studies with

maximum amount of control on confounders. Such studies can be helpful to determine

the true effects of MAC on health. Participants knew such studies were not feasible for

ethical reasons. Although participants would not recommend MAC or prescribed for any

medical condition, often times they had no problem with patients drinking just for

personal pleasure. This was then considered psychological benefit of moderate drinking,

unless the patients' medical condition required cessation of all alcohol consumption

(Vertigo, Blood pressure). Participants felt the best way to exercise caution resulting from

their distrust of the literature, was to engage in education of patients on health effects of

MAC.

Imparting Knowledge

The category *imparting knowledge* emerged from the data as a result of

participants demonstrating awareness of the conflicting theories concerning MAC and

health. Participants were asked how they inform patients based on the current evidence in

the literature on the issue understudy. Participants felt raising patients' awareness

required again discussing potential risks/benefits with patients during screening and

assessment, as well as emphasizing the importance of genes and overall health. Please see

below a graphical representation of this category (Figure 4 below). Examination of the

properties and dimensions of '*imparting knowledge'* follows next.

Figure 4: Properties and Dimension of Imparting Knowledge

Risks vs. Benefits

The presence of the opposing sides of moderate drinking was a constant in the data. Participants perceived risks as being fundamentally related to the effects of MAC on health and benefits as the psychological benefits derived from drinking leisurely. Because of the simultaneous presence of risks and benefits of MAC, participants felt the need to present the issue as it appears in the literature and the media with a word of caution about physical and mental health risks. Most participants perceived alcohol as intrinsically bad if the individual had risk factors that may predispose them to unintentionally abuse and risk of becoming dependent. They believed it was their role to warn patients who wanted to engage in moderate drinking, to be aware of physical and mental health risks. For example one participant said that instead of just telling patients not to drink, she

counselled them and helped them discover the reasons why they drank. She stated the

following:

> *If it is someone whom I think is at risk, I will ask them what they want to do with their life. I can't say that it is beneficial based on the studies, that will not be very helpful, the studies are epidemiological studies. I think my personal opinion impacts how I help people make choices that are helpful for them. I will personally recommend that people don't drink alcohol, but I can never tell them directly not to drink moderately. Rather I will help them to figure out why they are drinking, and how do they think it's affecting their lives. My personal experience plays a huge role on how approach alcohol consumption (Kate).*

She went on to add:

> *They have to think about how alcohol makes them feel, whether getting angry at family members etc. I tell them, you need to know what is good for you." I educate them in the quantity, I teach them about the difference of alcohol content of each alcoholic drink (Kate).*

Participants who felt there were benefits to drinking informed the patients by saying:

> *I am not going to tell patients to drink more certainly... my take is that if you drink moderately and something happens, I am not going to ask you to give it all up. It is Ok to have one or two drinks every now and then. Because as I said when we start to impose restrictions to how much someone can consume, they become less compliant. I think we have to be honest with them and tell them drinking in excess can be damaging with the interaction you going to get with other drugs; you don't know how they are going to react. But the biggest thing is to tell them that "It's Ok if you are out for dinner that you have a couple drinks, that is ok (Matthew).*

According to this participant it wasn't necessary for patients to be restricted if

drinking moderately provided them with some pleasurable benefits. Other participants on

the other hand preferred to give words of caution about risks based on what they discover

during screening and assessment of the patient. For example referring to gender

difference Marie stated:

> *I will tell women to approach alcohol with caution, because women do have smaller body and smaller liver, and slower metabolism. I will tell them to stick to the guidelines if they choose to drink and I will give them*

that caviar of caution. Women are seen with more liver cirrhosis than men. If a woman has a family history of breast cancer, then she should stay away. And for pregnant women, I will say stay away because of fetal alcohol syndrome. That is one thing that will never be worth trying alcohol (Marie).

In relation to age risk and working with older population she stated:

*It depends on their medical condition. There are 45 years old who medically may seem like they are 65 than 75 years old does. Be aware because it doesn't take too much to cause you damage. I think if they ask about the benefit, it is not really clear, because the data is too soft (**participant means she cannot tell the patient about benefits**). If they choose to drink then I will tell them to stick to the guidelines and be cautious (Marie).*

Awareness of Own Risks

Participants felt it was important to help patient be aware of their own possible vulnerability to alcohol consumption. The phrase '*know who you are'*, and '*know your family history'* was repeated on several occasions. This participant in some way summarizes what other felt about helping the patient understand their risk factor based on their genes, their health and their family history. She cited:

If I am counselling patient on moderate alcohol use, I will tell them about the conflicting theories, about what their peers will say to them, I will ask them to examine their family history. People will tell you all kind of things, but that's their perspective, but you need to go by your family history to determine what is right for you....They have to think about how alcohol makes them feel, whether getting angry at family members etc. I tell them, you need to know what is good for you (Kate).

What transpired from the data is most participants pretty much left the decision to drink or not to drink to patients' choice regardless of their condition although part of the activities was to tell them to know who they are and how MAC may affect them. For example Brenda, Marina, Gloria and others all revealed:

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You can present to them the information and let them make their own informed decision. I don't think anyone can make that decision (Marina).

We give them as much information and the patient will still make the decision. A lot of the preventative medicine is about negotiation with the patients. If you do this there are risks or if you do that there are benefits and the patients still needs to choose (Gloria).

If I feel that the patient does not have high risk from other factors, I will leave it up to the patient to choose (John).

The Basic Social Process

Although participants perceived moderate use of alcohol for health as excessively risky (*based on how often participants said risks outweigh the benefits*), they however felt it was up to the patients to choose what is appropriate for their health. Participants' attitude led the researcher to further review the data to understand what the social process behind participants' attitude was. Data further revealed two variables that were not directly present in the data, but indirectly guided and determined participants' responses, which most of the time indicated conflict or contradiction. These hidden variables were '*cultural beliefs*' and '*context*'.

Cultural Beliefs

Cultural beliefs indirectly emerged from data as analysis of participants' experiences as participants revealed contradictions on how they perceived moderate alcohol effects on health. Incidences of such contradiction were apparent in participants' responses concerning recommendation of MAC for the health of patients. Only two participants responded that they rather people don't drink alcohol. The statement below

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shows attitude of a participant who appears to be caught between her knowledge of the

risk of drinking alcohol and the cultural beliefs that allows freedom to consume alcohol

regardless of health problems.

> *I will personally recommend that people don't drink alcohol, but I can never tell them directly not to drink moderately (Kate).*

Another way contradiction was perceived was when participants again on the issue of

whether they would recommend MAC for health, participants said:

> *I think personally alcohol in moderation is OK….. But I can't recommend it to my patients because they are underage. But I think I can recommend it to an adult if there is no history of alcoholism or other risk factors. I am uneasy about moderate alcohol consumption, because it's hard to define it. Is it one drink, two drinks, it's hard! I believe that moderate alcohol consumption can be good for health. It has antioxidants effects. It can be OK without risk factors… it's a double edge sword. I will recommend it for me, but not for my patient (Bryan).*

Yet another participant said:

> *I think someone can drink moderately and if they haven't done something stupid, I am fine. I can't recommend it for health. I cannot recommend that someone drinks to prevent any disease (Fred).*

There were many similar responses that indicated conflict in what is participants'

perception of MAC. The way participants responded indicates the reality about cultural

norms about alcohol consumption. Cultural belief about MAC was perceived by

participants as drinking for *relaxation*, for *tension reduction*, *personal pleasure and*

choice.

Context

The social and political context within which participants live has positioned

alcohol to be intrinsically acceptable to members of society apart from minority groups in

the population. Members of a democratic society are free to make choices of their own with regard to what they eat or drink. Whether those choices are appropriate for their wellbeing was perceived in participants' responses. Although participants perceived MAC as risky for both mental and physical health of the individual depending of individual differences, it was apparent restrictions from the social and political context could have been the reason for their apparent internal conflict.

Through the use of grounded theory the basic social process that resulted from interactions of the two variables (contextual conditions) and the categories identified and discussed earlier in this chapter emerged. Data analysis revealed that the basic social process participants experienced was that of *'conflict'* as participant struggled in their role as primary care providers to determine the appropriate way to explain the relationship between MAC and health to patients. As a category '*conflict* was central to all of the other categories and as such met the criteria to be considered a core category within this study (Strauss & Corbin 1998)*.* The central category, '*conflict'* appeared frequently in the data and provided structure to the process of what was happening.

Whereas the classic grounded theory texts place the discovery of the basic social process as central to grounded theory method (Glaser & Strauss 1967; Glaser 1978; Strauss & Corbin 1998), Glaser (2002) argues that the search of the basic social process forces the data. In reality, the basic social process in this study essentially emerged from the data. In addition, the conceptualization of the central idea in this study is grounded in the data and the use of quotations from the data assists in grounding the core category.

The Grounded Theory: Primary Care Providers' Perceived Effects of Moderate Alcohol Consumption on Health

The preceding discussion has reported on the findings of this constructivist grounded theory evaluation of the experiences of primary care providers as they attempted to describe their understanding of the effects of moderate alcohol consumption on health. In accordance with the grounded theory methods, raw data were analyzed and emerging concepts were gradually and inductively grouped into codes, subcategories and then categories. Categories were graphically represented and representation showed hierarchical order between categories, their properties and dimensions. The relationships between the categories were emphasized. This approach was useful and led to the development of the substantive theory of the experiences of primary care providers faced with the task of providing meaning to the complex relationship between moderate alcohol consumption and health. Figure 5 on the next page provides a visual representation of the developed substantive theory.

Subjectivity, Vulnerability, Doubts and *Imparting knowledge* interacts to form the contextual conditions which explain how PAs perceive effects of MAC on health. This perception of effects of MAC on health and the reality of the cultural context within which PAs live and work resulted in a state of conflict PAs experienced. The state of conflict was unequivocally related to participants' subjective answers with regard to explaining and defining what MAC is and its effects on health.

Participants' perception of vulnerability to alcohol was due to genetically susceptible individual and other unknown factors, which led to their doubtful attitude towards the literature, which they perceive as conflicting with their practice experience.

PAs subsequent strategy was the decision to inform (impart knowledge) patients about risks/benefits of MAC on health when needed. While PAs indicated there were potential health benefits of MAC, they stated that risks to health were too great for some population; therefore endorsing MAC as beneficial for health was a greater risk to take. As a result each interview ended with the PAs declaring: "the risks outweigh the benefits or I will never recommend it for health or lifestyle."

Figure 5: The Grounded Theory of Primary Care Providers' Experience of the Health Effects of Moderate Alcohol Consumption

The theory is dynamic in nature and represents the experiences of nine physician assistants who are faculty in a program at Western Michigan University. The substantive theory detailed above accounts for and explains the variation in the experience of PAs. The theory also accounts for and explains the different conditions that influence PAs perception of MAC. A detailed discussion of the theory and the overarching categories will be discussed in chapter 5 of this text.

CHAPTER V

DISCUSSIONS

Introduction

The purpose of this study was to develop a substantive theory that explains the

experiences of a group of physician assistants (PAs) as they make sense of the

relationship between moderate alcohol consumption (MAC) and health. The previous

chapter has presented the data that allowed the theory of PAs perceived effects of MAC

on health to emerge. This chapter draws on the relevant literature to discuss this theory.

Appropriate literature is used to situate the study and the problem understudy from PAs

perspective. The contextual issues will precede discussion of the social process that

explains how participants reacted to the problem understudy.

Situating the Study

Moderate Alcohol Consumption (MAC) and Health:
Ambivalence of the Theories

Alcohol consumption has been part of human existence for centuries. Alcohol is

at the center of most societies' gatherings and most people drink to relax, socialize, and

celebrate important events (Guen and Ren, 2010). Yet alcohol drunk for relaxation,

celebration and socialization often lead to tragedies in societies. Nevertheless there are

many who now believe that the amount of alcohol consumed, that is, light to moderate

use of alcohol can save society from death caused by lifestyle diseases. A report from the

National Institute on Alcohol Abuse and Alcoholism says "Alcohol often has a strong effect on people and throughout history; we've struggled to understand and manage alcohol's power. Why does alcohol cause us to act and feel differently? (NIAAA, 2014). Furthermore, the report says, "expanding our understanding of the relationship between moderate alcohol consumption and potential health benefits remains a challenge, and although there are positive effects, alcohol may not benefit everyone who drinks moderately. How much is too much? Why do some people become addicted while others do not?" (NIAAA, 2014). This report of the NIAAA is a perfect reflection of the burden of this researcher i.e. understanding why in spite of the negative effects of alcohol; some researchers suggest it can help reduce all-cause mortality (Mukamal, Phillips & Mittleman, 2008; Ronksley et al., 2011).

In an attempt to understand the relationship between MAC and health, this researcher interviewed a group of physician assistants (PAs) who interact daily with patients presenting at their practice with illnesses possibly caused by alcohol consumption. The challenge to understand the effects of MAC on health is caused by opposing views in the scientific literature. While the vast majority of epidemiological literature argue in favor of beneficial effects of MAC on health (French and Zavala, 2007; Gonzalez-Gross et al., 2000; Di Castelnuovo et al., 2009), others argue that the methods used to demonstrate those benefits are questionable and risky (Fuchs and Chambless, 2007; Winstanley et al., 2011; Filmore et al., 2007). This disagreement in the scientific literature can be confusing to the general public, patients, policy makers and health care providers. The divergence of point of views can be attributed to the perceived duality of alcohol i.e., alcohol, unlike any other commodity, is harmful and beneficial.

Moreover, the sociocultural and political context within which most of the
scientific literature are conducted favor beneficial effects and choose to present alcohol as
a tonic, medicinally useful to treat and prevent illness. These contextual conditions are
likely to influence health care providers' stance on the health effects of moderate
drinking. This was evident in the state of conflict perceived in the responses of the
participants in the present study. The influence of culture and context is what drives the
current discussion on the effects of moderate drinking on health.

The Influence of Culture and Context

This section discusses the basic social problem of the influence of culture and
context within which participants live and practice medicine. Two categories were
identified as impacting directly upon the PAs ability to take a firm stand against or for
moderate drinking for health. Cultural beliefs and context in relation to alcohol usage
were found to impact PAs ability to determine what the effects of MAC on health were.
These two variables also affected how PAs informed patients on the effects of MAC on
health.

Cultural Beliefs and PAs Perceived Health Effects of MAC

*Research Question # 1: How do primary care providers (PCPs) perceived the
effects of moderate alcohol consumption (MAC) on health?*
*Research Question # 2: What factors influence PCPs' perception of the effects of
moderate alcohol consumption on health and disease?*

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Participants' perception of the effects of MAC on health was examined based on the research questions that guided the study. The central questions that guided this study explored how PAs perceived the effects of MAC on health. It sought to explore how PAs explain the relationship between MAC and health; whether PAs perceived the effects as beneficial or detrimental to the health of the individual and finally what they thought about cardioprotective effects of MAC presented in scientific literature. Analysis of the data revealed participants perceived effects of MAC as both detrimental and beneficial, but mostly detrimental for health, in that they would not recommend that patients drink alcohol moderately to improve their health. Perceived benefits were mainly psychosocial, such as tension reduction, relaxation or socialization.

Saunders (1998) contends benefits from drinking alcohol can be conceptualized and classified on several levels, (1) the nature of the benefit, i.e. the area of life in which the benefit occurs; (2) its predictability, or the degree to which the benefit (or harm) derived from drinking is inevitable or uncertain; and (3) whether the benefit was intended by the drinker and alcohol was consumed for a particular purpose. Two aspects of Saunders argument are applicable on the perceived health benefits of MAC in this study.

Expanding on Saunders conceptualization of drinking benefits, data revealed participants were aware of the pleasurable effects people derived from drinking alcohol. This pleasurable effect was explicitly understood and accepted; and whether the pursuit of pleasurable effect will harm the drinker was not issue of concern. Cultural beliefs in most societies permit 'sensible' use of alcohol and the democratic context permits freedom of choice to its citizens. It was unmistakable by the attitude of participants that although alcohol effects led the person to unintended consequences, the political context

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does not prevent individuals from choosing what to drink or eat. Participant expressed that reality in words like:

> *I think someone can drink moderately and if they haven't done something stupid, I am fine… (Fred)*

By something stupid, he meant drinking excessively to the point of causing injury to self or others. Another unmistakable fact about cultural beliefs and context was participants unanimously thought if someone chooses to drink, then he or she must stick to the Dietary Guidelines for Americans (DGA) or the American Heart association (AHA) guidelines. These guidelines are also approved by the National Institute of Alcohol Abuse and Alcoholism (NIAAA, 2014; 2005; 2003).This was indication that drinking at the level recommended by the DGA or AHA is socially acceptable.

Perceived benefits of MAC were therefore listed as relaxation or tension reduction to the drinker. On some occasions, there was perceived conflict of opinions among the participants. Whereas some participants perceived effects of MAC as dangerous in situations where an individual has a cardiac event, other believed effects of MAC were profitable especially in times of cardiac events. One of the participants believed it was acceptable for a patient to continue to have a drink with meals despite a cardiac event.

Although, the participant's perspective in this context was a means to avoid restrictions that may cause tension in the mind of a person who considers him/herself morally free to choose. In addition, alcohol industries have sought to promote scientific research showing the benefits of MAC for health under the umbrella of the First Amendment Right. This is particularly true of wine makers who request that their right to

advertise those benefits be granted (Bierbauer, 1999). Bierbauer argues that "wine

makers and other alcohol producers have the First Amendment Right to market the health

benefits of moderate drinking as long as they do so accurately and include with certain

limited disclaimers in their promotional materials." (Bierbauer,1999). Such advertisement

can give people a false sense of security about alcohol despite risk factors related to their

genetic make-up and overall health. Therefore primary care providers must inform

patients about risks/ benefits of alcohol consumption, using the evidence that presents

possible damage and benefits to their health and hoping each patient will make drinking

or non-drinking choices based on guidance received.

  While it is culturally acceptable to consume one two drinks a day for personal

pleasure (NIAAA, 1992), Saunders argue that the predictability or degree to which the

benefit (or harm) derived from drinking is inevitable or uncertain (Saunders, 1998). This

could be an important factor to understanding participants' reluctance to accept health

benefits of drinking at moderate level even though the individual finds drinking

pleasurable (Peele and Brodsky, 2000).

  Peele and Brodsky (2000) argue that most people report consuming alcohol to

achieve subjective health, rather than physiological health benefits, therefore

psychological benefits of MAC such as (1) stress reduction, (2) mood enhancement, (3)

cognitive performance, (4) reduced clinical symptoms, primarily of depression, (5)

improved functioning in the elderly established several decades ago by Baum-Baicker,

are difficult to measure for the simple reason psychological research is not well

established as is medical research on the health benefits of MAC. Although participants

felt obligated not to prevent patients from drinking if they so choose, participants

suggested in such cases that it would be wise if patients abide by the Dietary Guidelines for Americans (DGA) and the NIAAA. They believed those guidelines were safer for one who drank for personal pleasure. But, participants perceived the same amount of alcohol drank for pleasure to be detrimental for health and subsequently said they will not recommend MAC for health.

Cultural beliefs about alcohol consumption propel a casual use of the word 'moderate' to imply drinking at an acceptable level or drinking that provides health benefits. However, one of the sources of conflict in the current discussion regarding MAC has been the multiple ways researchers have defined the concept of 'moderate drinking'. Although most participants in the present study appeared to be aware of the DGA definition of moderate drinking, and found it acceptable, when asked to describe what they thought was the relationship between MAC and health, they responded that it was contingent to everyone's definition of MAC, probably suggesting the complexity and subjective interpretation of the word 'moderate'. The category *subjectivity* emerged from the data at that point indicating participants perceived the relationship between MAC and health as dependent on many factors (e.g. interpretation, health, individual, etc.). It may be safe to add that some of the factors, especially, interpretation, mentioned by participants are undeniably related to the internal conflict participants experienced due to perception of alcohol as a socially accepted commodity, better stated in a recent study by Guo and Ren. "Over centuries, alcohol has become the most socially-accepted addictive drug worldwide. Alcohol beverages have long been known for their rather important role in social activities. Drinking alcoholic beverages is a common feature of social gatherings." (Guo and Ren, 2010).

Understanding effects of MAC is as complex as the individuals who drink it. Information provided by participants led to understanding of the different realities surrounding MAC and its effects on health. The ambiguity with which participants responded to the questions indicated the issue is complex. It became apparent throughout the analysis of the data that cultural belief about alcohol consumption in general was issue of concern especially, with regard to health. However the participants based their decision not to endorse MAC for health in spite of their being aware that patients may or may not abide by the guidelines they provide. This is due to patients' freedom to choose what they perceive as acceptable use of alcohol and any subjective perceived health benefits. Hence the perceive conflict in their response even as they stated the risks outweigh the benefits.

Factors influencing their decision not to recommend MAC for health were due to genetic vulnerability, unintentional abuse, public perception, and giving people permission to drink or to overindulge. This conflict was evident in participants (n=8) perception of drinking for own pleasure as beneficial and normal. Few participants (n=3) thought control drinking with dinner or during holiday's celebrations was normal and did not negatively affect the person's health. Endorsing or allowing drinking for own pleasure or with dinner /celebrations while refusing to endorse drinking for health because drinking for health is detrimental, is an example of the paradox in this discussion.

Analysis of data revealed implicitly that participants were comfortable with drinking for personal pleasure because drinking is a social act culturally accepted and that it provided psychological benefits. Cultural beliefs about the so-call 'safe drinking' are

commonly accepted in most countries of the world societies apart from countries of

Islamic cultures where alcohol consumption is forbidden. However, the Royal College of

physicians stated in the past (1987) There is no such thing as a 'safe level' of drinking.

Context and culture therefore play an important role on how health care providers

perceive and guide patients on the issue of alcohol use for their well-being.

Conditions Affecting the Basic Social Problem

Analysis of the data revealed four contextual issues which are labelled

Subjectivity, Vulnerability, *Doubt* and *Imparting Knowledge.* These conditions could be

causal in that they influence the problem, intervening in that they altered the impact of

the problem, or contextual in that a specific sets of conditions namely *cultural beliefs* and

context intersect at a specific time and place to influence the problem. Each of these

conditions and what their effects had on these providers as they responded to the issue

understudy will be discussed in the subsequent pages. Based on the findings of the

present study, participants perceived the effects of MAC as more detrimental for health

than beneficial. This is clearly expressed in the following statements participants declared

at the end of interviews: "the risks outweigh the benefits," "It's too risky," "I need more

information," "It's a toxin," "It's a double edge sword," "I will never recommend it for

health." Relevant literature is integrated where necessary to place these statements within

current knowledge of the effects of MAC on health. Revisiting the theories discussed in

chapter two of this text is useful for clarification and evaluation to support the theory that

has emerged from the data.

In order to move the current discussion beyond points and counter points on the issue of health effects of moderate alcohol consumption (MAC), Heng and his colleagues evaluated the conflict between health advantage of MAC and at-risk use (Heng et al., 2006) with the purpose of extending the boundaries of the debate to a fair analysis that can help policy makers. Their evaluation outlines two important points of concern that must be of interest to public health. 1) Moderate alcohol consumption (MAC) is a risk factor for injuries from motor vehicles crashes (MVC) and 2) The moderate alcohol risks/benefits dilemma. These two points are unequivocally related to some of the concerns participants in the present study expressed when they said risks of using MAC for health outweigh the benefits. This is because demonstrating causal relationship between MAC and health remains a challenge due to confounding factors. After evaluating health risk/benefits of moderate drinking on health, the National Institute of Health is still unable to clearly provide satisfying advice about Mac. This is evident in the following statement: "Expanding our understanding of the relationship between moderate alcohol consumption and potential health benefits remains a challenge, and although there are positive effects, alcohol may not benefit everyone who drinks moderately." (NIAAA, 2014). The previous statement seems to be in line with these PAs perception of MAC effects on health, it is therefore reasonable to understand their reluctance to recommend MAC for health.

The relationship between MAC and motor vehicle crashes (MVC) was often a point of concern for participants who indicated that even small amount of alcohol consumed can impaired the drinker's memory, which can lead to injury from MVC. Injuries from MVC occur when blood alcohol concentration (BAC) increases. A report

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from the National Highway Traffic Safety Administration (NHTSA) reveals that in 2003

in the United States, 40% of all fatal crashes were alcohol related (NHTSA, 2003). And

of these crashes, six percent of victims of fatal crashes had BAC 0.01–0.07 g/dl and 34%

had BAC > 0.08 g/dl. These BAC 0.01-0.07 g/dl of alcohol fall within the legal range for

a moderate drinker who may be consume for health benefits as indicated by many

epidemiological studies (WHO report, 2007). In addition, of all alcohol-related fatal

crashes, 13% of drivers had BAC of 0.01–0.07 g/dl. Driving skills deteriorate as BAC

levels increase in such a manner that risk of a fatal crash doubles with each 0.02 increase

(Heng et al., 2006).

From the US Fatality Analysis Reporting System (FARS) data, in the BAC range

0.020–0.049 g/dl, the risk of a fatal MVC increases 3–5 times compared to sober drivers.

In the BAC range 0.050–0.079 g/dl, the risk of a fatal MVC increases 6- to 17-fold.

Moderate alcohol intake gives rise to BAC of <0.08 g/dl and many moderate drinkers

believe that they can safely operate their vehicles as long as they are within the legal

BAC limit. The category *Vulnerability* operates at this level as the physician assistants

(PAs) thought MAC was too risky to recommend to patients because of the likelihood of

a MVC happening. Participants who expressed that concern also referred to the

seriousness of that eventuality in conjunction with the fact that the drinker may have been

encouraged to drink moderately by their provider.

The second point of concern found by Heng and colleagues is the moderate

alcohol risks/benefits dilemma. The overall experiences of participants in the present

study on the health effects of MAC revealed existence of conflict for the following

reasons. 1) Participants experienced a degree of difficulty to define and to establish the

relationship between MAC and health despite the vast amount of literatures that proclaim health benefits of MAC. At this point one can attribute their discomfort to the lack of case studies from their personal practice experience.

While many epidemiological literature report health benefits of MAC, participants in this study were skeptical of those findings, the category *Doubt* emerged from the data and was a determinant of the apparent conflict participants experienced. Doubt interacted with conflict stemming from factor indicating vulnerability to alcohol, finding from the epidemiological literature that contrary to real life practice experiences of participants and statistics revealing risks of injuries from MVC for a person with BAC within the legal limit. In addition, Chikritzhs and colleagues found about four discrepancies with the literature that have favored health benefits of MAC.

The first discrepancy was the misclassification error, which is the argument that systematic misclassification of ex-drinkers and occasional drinkers to 'abstainer' categories among epidemiological studies, might explain apparent protective effects of moderate alcohol consumption on CHD. This has recently been supported by new meta-analyses and independent research (Fuchs and Chambless, 2007; Winstanley et al., 2011). The influence of uncontrolled or unknown factors on the relationship between alcohol and disease cannot be ruled out. Exclusion of participants on the basis of ill-health severely reduces study sample size and new analyses suggest that doing so might artificially create the appearance of protective effects (Au Yeung, 2012; Davey Smith and Lewis, 2005). The ability of respondents to accurately recall their own alcohol consumption is in serious doubt and very few individuals maintain one single drinking level or style throughout life. The relationship between alcohol and some of the health

issues mentioned throughout this text might be a function of drinking patterns but few studies have addressed the issue (Chikritzhs et al., 2009).

Subjectivity

Although, the theories which find beneficial health effects of moderate alcohol consumption have presented a simple reality of the effects of MAC on health (MAC is a beneficial for all-cause mortality and morbidity), data from the present study revealed a more complex reality. Although participants perceive some form of benefits, they however stated those were too subjective and not worth to risk inviting much bigger problems. Subjectivity is encompassed within the theory discovered in this study. That theory reveals the complexity of the relationship between MAC and health to the extent, participants struggled to give a simple explanation.

 Consequently, participants perceived effects of MAC as closely related to the definition of moderate drinking. Defining MAC stands as a central aspect of the divergent point of views perceived in the interpretation. In many studies, the term "moderate drinking" refers to less than one drink per day, while in others it means three or four drinks per day (Dufour, 1997; Kloner and Rezkalla, 2007; Zakary, 1997). Precisely what is called "a drink" is also equally fluid. In fact, even among alcohol researchers, there's no universally accepted standard drink definition (Kloner and Rezkalla, 2007).

According to the Dietary Guidelines for Americans, moderate drinking is up to 1 drink per day for women and up to 2 drinks per day for men (DGA, 2005). This definition is referring to the amount consumed on any single day and is not intended as an average over several days (NIAAA, 2005). While some participants (n=4) were aware of

and stood by the DGA or AHA definition of moderate, there was variability of interpretation of the word 'moderate' among them. For example one participant said in the context of his practice (this in relation to population), three to four drinks in one setting for men was perfectly acceptable; while another thought it was hard for him to say how many drinks were considered moderate and still another thought everyone's definition will be different.

Moreover factors like health status, cultural beliefs and sociopolitical context hindered participants' ability in their capacity of health care providers to say upfront how they perceived the relationship between MAC and health. As discussed previously alcohol is a legal drug readily available and used for socialization, relaxation and celebration. The context within which these providers practice medicine, allow individuals freedom to choose to drink or not to drink. Adverse health effects of alcohol, cultural beliefs, context and genetic susceptibility appear to be what cause the providers to be conflicted when asked to explain the relationship between Mac and health.

It is important to note the conflict driving the debate regarding MAC health risk/benefits is perceived even among trusted entities like the Dietary Guidelines for Americans and others like the Center for Diseases Control (CDC) or the National Institute for Health. The DGA state that "it is not recommended that anyone begin drinking or drink more frequently on the basis of potential health benefits because moderate alcohol intake also is associated with increased risk of breast cancer, violence, drowning, and injuries from falls and motor vehicle crashes." (cdc.gov, 2010).

Perceived health effects of MAC is undeniably complex and subjective. The subjectivity of this phenomenon places primary care providers in a state of constant

conflict, particularly, if one takes into account the statistics which reveal tragedies from consumption of one drink (Heng et al., 2006). This could be because policy makers have overlooked the effects of alcohol use on society before the emergence of health benefits of alcohol use and the subjective interpretation of the word 'moderate'. The extent to which alcohol causes harm to society is unmeasurable. The cultural beliefs about alcohol and the political context which provides its citizens freedom to market goods, the place of alcohol industries in the economy explain the focus on health benefits more than focus on adverse effects. This makes the phenomenon understudy very complex for health care providers and may create confusion for the general public.

Vulnerability

By vulnerability, participants meant moderate drinking presents sufficient risks for them not to consider endorsing it for health. Indicating vulnerability as a category referred to the level of risks participants perceived, including accidental abuse which in some people will lead to risk of becoming dependent. Participants perceived the effects of MAC on the health of the individuals as sometimes beneficial and detrimental. Beneficial effects of MAC on physical health were viewed as reducing tension or stress. Mental health benefits were described as the psychological benefits derived from alcohol consumption. It was established earlier in this text that participants understood and from factors like culture and context that people are entitled to the choices they make regarding drinking habits. Therefore participants did not place much emphasis on the mental health benefits of MAC, nor did they find any cognitive benefits of consuming alcohol in moderation. It was apparent and explicitly understood participants agreed the health

benefits of MAC on mental health were a normal as long as the drinker did not lose

control. Moderate drinkers have been portrayed as individuals who have a certain degree

of control over their lives (Green and Polen, 2001). If that is the case then drinking for

tension reduction is not necessary for moderate drinkers or else it negates the previous

point established by Green and Polen, and thus places the moderate drinker to risks of

excessive drinking.

A study by Dawson and colleagues assessing the association between stress and

drinking found the following: 1) a consistent positive relationship between number of

past-year stressors experienced and all measures of heavy drinking. 2) Frequency of

heavy (5+ drinks for men; 4+ drinks for women) drinking increased by 24% with each

additional stressor reported by men and by 13% with each additional stressor reported by

women. However, the same study found a reduced level of drinking among moderate

drinker with increase stressors (<5 drinks for men; <4 drinks for women) (Dawson, Grant

and Ruan, 2005).

The problem with Dawson and colleagues' findings is, while it confirms the

notion that moderate drinkers are people in control of their lives, it contradicts the facts

about drinking for stress reduction. In addition based on the DGA, NIAAA, AHA and

CDC guidelines for drinking, the amount of drinks considers moderate in the Dawson

study (<5drinks) is classified as heavy drinking and therefore makes participants

vulnerable to excessive drinking and risk of becoming dependent.

Unintentional abuse was a dimension of the category *vulnerability* as participants

perceived alcoholic beverage as 'sneaky' because of its taste, its strength or simply by its

habit-forming nature. Discrepancy was found in some participants' perception of taste of

alcohol and wine in particular. To describe the risk of overindulgence, participant Gloria

said:

> *I think one can take a glass of wine with the intention of just drinking that one glass of wine and ends up drinking more because the person felt that it tasted good and wanted more.*

Participant Matthew thought drinking wine was easy to control than drinking spirit for

example. He stated the following:

> *I think the issue with wine is that what comes into play is that for most people when they drink one glass of wine with dinner or after dinner, most people tend to limit themselves. It's easy for them to stop, while for mixed drink with ethanol, it's harder to stop (**Because as he later stated**). It hits the brain faster (**referring to spirit**) and you will have much of an impact.*

One other aspect of vulnerability to alcohol as described by participants was the

influence of genes. This came into play when referring to unintentional abuse:

> *I think… that everyone genetic makeup is different. Some people are genetically designed to take one drink and desire more and more and more. Sometimes one drink may lead to another (Brenda).*

One participant said MAC is beneficial if the individual had what he referred to as

'good genes.' According to this participant individuals with good genes metabolizes

alcohol rapidly likewise individual with 'bad genes' experience adverse effect of alcohol

consumption, mainly liver damage.

Guo and Ren (2010) contend that ethanol metabolites and oxidative stress which

happens through accumulation of reactive oxygen species (ROS) are thought to be the

main causes of alcohol-induced organ damage. A majority of ethanol is metabolized in

the cytoplasm of the liver by the enzyme ADH to produce acetaldehyde, which is then

further metabolized to another less active byproduct, acetate, by ALDH (Edenberg,

2007). The physician assistants in this study were concerned about effects of alcohol on

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the liver, how drinking alcohol regardless of the amount may adversely affect those individuals with liver problems such as hepatitis. Research on the effects of excessive drinking on the liver is well established. However, effects of moderate drinking on the liver are conflicting. Szabo (2007) argued that while inflammation is one mechanism by which alcohol causes liver damage, growing evidence suggests in contrast to the pro-inflammatory activation by chronic excessive alcohol consumption, acute moderate alcohol administration has anti-inflammatory effects.

One of the health benefits of MAC revealed in this study was its inflammatory effects. Participants Matthew said MAC was beneficial because it shuts off the inflammatory process, which according to Szabo's study the anti-inflammatory effects is a good thing, because diseases are caused by inflammation. However, the same study concludes by saying no evidence for a beneficial role of the anti-inflammatory effect of acute moderate alcohol consumption on the liver has been demonstrated, but this may contribute to the effect of alcohol on other organ systems (Szabo, 2007).

Other studies revealed moderate alcohol consumption may potentiate the carcinogenic potency of other hepatotoxins. For example, daily consumption of 1 ½ to 2 drinks per day increased by 35-fold the risk of developing hepatocellular carcinoma induced by dietary aflatoxin B1 (Bulatao-Jayme et al., 1982; NIAAA, 2005). These studies and report from participants of the present study indicate the degree to which beneficial effects of moderate alcohol consumption are hard to determine.

However, it is uncertain how many individuals are susceptible to MAC based on their comorbid conditions or just by genetic vulnerability. Research on genetic vulnerability says the genetic makeup of individuals and, or groups of individuals, is

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largely responsible for their vulnerability to alcohol. In addition, genetic differences may trigger difference in how alcohol is metabolized, how the brain and its neurotransmitter systems respond to alcohol, or the effects of alcohol on specific organs or conditions (icap report, 2001). The groups of individual often taken as example of genetically susceptible to alcohol are people from Asian descent.

Yamada and colleagues found that a large number of Oriental people including Japanese have unique alleles of ethanol-metabolizing enzyme genes, such as *2 allele of alcohol dehydrogenase-2 (ADH2*2), *2 allele of aldehyde dehydrogenase-2 (ALDH2*2), and c2 allele of cytochrome P450-2E1 (CYP2E1) (Yamada et al., 2002). It can be assumed therefore that ALDH2 genotypes may associate with individual differences in sensitivity to alcohol toxicity including the pressor effect. The Mendelian randomization discussed earlier in chapter 2 of this text, appeared to be a more trusted tool to isolate individuals with genetic makeup that determines whether one is susceptible to alcohol consumption, which will be a very difficult task to undertake.

Consequently, advertising beneficial effects of MAC on health without the ability to distinguish those in the general population for whom that message is dangerous is simply irresponsible and indicates the pursuit of personal gain as oppose to the pursuit of public good. This explains the conflict experienced by this group of physician assistants and their inability to take a direct stand against MAC. By vulnerability, participants meant MAC was detrimental for health meaning it is too risky for patients' health and the public in general due to possible misunderstanding that can follow from uncontrolled drinking or overindulgence if they were to health value of MAC. Participants cited

factors such as genetic susceptibility, unintended consequences (as risk of abuse and dependence, toxic effects of alcohol and health status).

While participants indicated other factors such as public perception, age, gender, and susceptibility to alcohol, they appeared not to say too much about factor age. This is probably because of the general agreement concerning the specific age group (middle age and older population) this debate has targeted. However, with regard to age, discrepancy was apparent in participants' perspective as well. For example one participant perceived the benefits of MAC as more advantageous to older people while another perceived it as seriously detrimental. Effects of MAC on older people have been discussed in some studies as being able to increase cognitive functions in the elderly.

Britton and colleagues in a study found that people aged 46-68, who drank alcohol in moderation had better cognitive function than those who did not (Britton, Singh-Marnoux, and Marmot, 2004). But at the conclusion of their study, Britton and colleague didn't think their results should be used as an example of maintaining cognitive function for older people. It is probable that the effects they found were not consistent or robust enough to recommend to people. One participant in the present study who worked with geriatric population stated that consuming alcohol even moderate amount gave the elderly a false beneficial effect, mainly relaxation, but short lived and therefore she perceived it as detrimental for the elderly, because it causes them insomnia:

> *Another thing with alcohol in older people is that alcohol can cause them to have insomnia. Because if they take one to two drinks a day and they drink it in the evening, and it sedates you, you are going to wake up in the middle of the night because you go through withdrawl even with just one or two drinks. So they are more likely to have insomnia, they are more*

likely to have metabolic effects. I will assume that they can have some form of protection, but the negative effects are very likely (Marie).

Almost all participants (n=8) perceived gender difference as a factor with regard to women being more susceptible to alcohol than men because of their body weight, the high risk of breast cancer, and a slower metabolic rate which is consistent with the evidence in the scientific literature. While discussing the effects of alcohol consumption on risk of developing alcohol liver diseases (ALD), studies indicated the 'threshold' of alcohol consumption associated with ALD depends on the daily amount and the duration of alcohol intake. Moreover, gender difference is a major factor in ALD. In males, a daily intake of 40 to 80 g of alcohol over a period of 10 to 12 years can lead to ALD, while in females only 10 to 30 g of daily alcohol can lead to liver disease (Szabo, 2007; NIAAA, 2005). Although studies in favor of health benefits of moderate alcohol consumption appeared to dominate research literature on this issue, a risk/benefits analysis (NIAAA, 2003) of its cardioprotective effects on health raises eyebrows to how those published medicinal effects of alcohol can disregard all adverse effects especial cancer, liver damage and injuries (NIAAA, 2003; 2005). It is thus not surprising why healthcare providers in this study have expressed doubt about the evidence establishing beneficial health effects of moderate drinking.

Expressing Doubt

Physician assistants (PAs) perceived the evidence favoring beneficial effects of moderate alcohol consumption (MAC) as questionable. From their personal practice experience they had no case examples of patients using MAC for health. In addition, PAs

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believed alcohol interacts with other medications their patients are prescribed. Therefore the general rule was for patients to stay away from alcohol while on medication. The most important factors that were of concerns to theses physicians assistants were: 1) the need to exercise caution due to the risks of physical and mental health, 2) the lack of credible evidence on MAC and health, which participants perceived as lacking randomized control trial studies, as well as a uniformed guidelines that took into consideration genetic vulnerability and patients' overall health status.

An example of physical health risks many researchers have explored is the effects of alcohol use on blood pressure. A number of participants (n=4) in the present study were in accord with the literature on the vasodilation effects of alcohol, which therefore would reduce blood pressure, which they also thought the effects were short-term. These participants perceived the short-term decreased in blood pressure as not a good enough reason to recommend it because of the other adverse effects on other organs in the body. Participants Brenda and Marie and Kate and others expressed their point of views in the statement below:

> *I know that alcohol can reduce blood pressure because it is a vasodilator. I feel like other consequences can negate that benefit of reducing blood pressure. I do not think recommending alcohol consumption for health is beneficial.*

Research on the effects of MAC and blood pressure health is conflicting and this conflict could be due to the short-term decreased in blood pressure these Physician Assistants have evoked or simply because of some researchers chose disregard the contradictions discussed previously about clinical strokes. (Ischemic vs. hemorrhagic

strokes) and chose to portray alcohol as beneficial regardless of the adverse effects on the population health.

Xin and colleagues conducted a study to examine the effect of alcohol on blood pressure reduction and concluded consumption of a single alcoholic drink may cause an acute rise in blood pressure, but it resolves within two hours (Xin et al., 2001). Nevertheless, clinical studies with small sample sizes of subjects have suggested that alcohol consumption over several days may cause a more sustained rise in blood pressure (Xin et al., 2001). These findings seem to confirm the Physician Assistants concern about effects of MAC on blood pressure even as the effects are not identical. The bottom line is to analyze what is riskier; temporary reduction of blood pressure with increased risk of damage to other organs, or choosing an alternative to control blood pressure. This was usually questions participants raised.

Similar to blood pressure were the perceived adverse effects of alcohol on cancer. Participants' hesitation about health benefits of moderate drinking was due to common knowledge of the risks of contracting certain types of cancer from alcohol consumption such as mouth, throat, esophageal cancer etc. For example the International Agency for Research on Cancer has recognized alcohol as a group 1 carcinogen (the highest rating for cancer causing substances (IARC, 1998; 2007). In addition, the most recent major report by the World Cancer Research Fund established there was convincing evidence that alcohol causes cancer of the mouth, pharynx, larynx, oesophagus, colorectum (in men) and breast. It also found alcohol probably causes colorectal cancer in women and liver cancer (IARC, 2007).

Other issues participants saw as concern about health benefits of moderate drinking were the effects on mental health. By this participants were alluding to the risk of becoming dependent or addiction. Issues of genetic vulnerability came into play as well as family history of alcoholism. A person is at risk of becoming dependent to alcohol when he or she develops tolerance and may continue to increase their consumption without realizing it. A number of factors come into play in considering the risk for development of alcohol dependence or abuse, including genetic makeup, environmental contributions, and the interaction of the two. A low estimate might be that 5 to 7% of current abstainers and/or infrequent drinkers could develop diagnosable alcohol problems upon beginning usage; a percentage similar to that in the overall population (Gunzerath et al., 2004).

Participants perceived the current literature that have established health benefits of moderate drinking as not trustworthy, lacking clinical guidelines and ignoring the individual difference and genetic makeup. They also didn't think there was a true correlation between MAC and health benefits. The statement below shows how most participants (n=8) perceived the current literature:

> *I think more research is needed to show a true correlation. Would I implement it if it does improve it; I think other factors play a role…. I think you don't want to help those who are looking for an excuse to drink, the opportunity to drink more.*

While participants did not show much concern about those who drink occasionally or regularly with their meals, they appeared to be very critical of the scientific literature for proclaiming health benefits of moderate drinking. Participants perceived health effects of MAC as subjective, due to variation in interpretation,

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contingent to age, gender, health status and genetic makeup. They perceived the word 'moderate' also to be very subjective and again dependent on everyone's definition, hard to explain, difficult to define, in spite of the guidelines, which they said "they are just guidelines" because clinical guidelines offer a more uniform way to go by.

Consequently, they concluded that suggesting health benefits of MAC was not worth the risks. They perceived the risks as outweighing the benefits with high possibilities of unintended consequences such as injuries from motor vehicle crashes, risks of dependence, public perception that health care providers have sanctioned moderate alcohol consumption as beneficial. They feared this could give some people excuse to overindulge. Accordingly, this group of Physicians Assistants concluded that they will never recommend moderate alcohol consumption for health of their patients.

These PAs doubt and recommendation are in line with the recommendations from the Royal College of physicians who wrote a report stating that the evidence on the risks of alcohol consumption is complex. The RCP indicated that most systems in the body can be damaged by alcohol consumption, but the rate at which harm increases in relation to the amount of alcohol consumed varies. The RCP's report emphasized the idea of unknown factors which affect the mechanism of action of alcohol in the body. In addition different statements by the NIAAA also convey the complexity of MAC, especially since risks/benefits analysis appear to make it difficult for the NIAAA to give specific recommendations. As a result, NIAAA uses expressions such as "may be beneficial" "potential benefits" and consistently admonishes nondrinkers not to start drinking because of potential health benefits (NIAAA, 2003; 2005; 2014). Some of these unknown factors influence the effects of alcohol on the liver discussed previously.

They argued liver disease has an exponential relationship with alcohol consumption, whereas the risk of cancers shows a dose dependent relationship. Moreover, the risk to which an individual is exposed to is also related to a number of factors, including both the amount and the frequency of drinking, but also genetics, and age (RCP report, 2011). In addition the report states: "the report concluded that advising on 'safe' levels of alcohol consumption is difficult and that there was 'insufficient evidence to make completely confident statements about how much alcohol is 'safe'.'' (RCP report, 2011). Furthermore, the RCP report encourages action, because not being able to determine 'safe' levels of alcohol must not be an excuse for inaction as doctors and the public need guidance. The physician assistants in this study proposed to educate patients on risks of MAC and perceived benefits as stated in the literature and based on their clinical practice experience.

Imparting Knowledge

Imparting knowledge was activity PAs said they will engage in to inform patient about 1) the health risks/benefits of moderate drinking from their clinical perspective, while not discounting the different theories discussed in the literature. This suggests PAs planned to discuss physical and mental health risk with patients. 2) And actively engage patient in discussing awareness of their own risks factors which, includes genetic vulnerability and patients' personal choice.

PAs perceived health effects of moderate drinking as risky to patients and the general public. They perceived the relationship between MAC and health as subjective and too dangerous for genetically vulnerable individual.

Moreover, PAs believed there were unintended consequences to drinking alcohol with the hope of obtaining health benefits. As established before, some of the health risks were liver diseases, elderly insomnia, cardiovascular diseases risks factors such as stroke, hypertension and diabetes. PAs were surprised some researchers considered diabetes as one of the diseases moderate drinking helps. PAs thought the high caloric content from carbohydrate in some alcoholic beverages are very detrimental for diabetes.

Although the literature show contradiction with regard to strokes e.g., MAC decreases risks of ischemic strokes, but increases risks of hemorrhagic strokes, participants believed it to be true physiologically, but didn't think it is worth the risks. They said there are less dangerous means to control the likelihood of getting ischemic strokes with baby aspirin. PAs believed it was important to present the facts to patients as they are clinically while carefully presenting to patients the theories found in the literature.

Physical health benefits according to the scientific literature include cardiovascular health benefits with reduced mortality, but with increased risk of cancer and other problems. It is also important to note that the cardioprotective effects were questionable due to misclassification errors in the choice of the referent group as discussed by Fillmore et al., 2007; Chikritzhs et al., 2009) . In addition PAs expressed doubt about cardioprotective effects based on their clinical practice experience. The average length of time these PAs have practiced medicine was 19.78 years and during their years of practice, they never used alcohol as alternative to treatment or prevention of diseases or never had patients who have claimed to use it and exhibited benefits.

PAs perceived awareness of own risk factors as very important. One way for them

to know who was at risk was through family history of the patients which they obtained

during screening and assessment. Screening in primary care for alcohol disorders can

vary from one simple question to an extensive assessment using a standardized

questionnaire. One PA in this study stated that he uses the Alcohol Use Identification

Test (AUDIT-C).

While the remaining PAs did not specify which screening tool they used, all PAs

said screening was the appropriate method they used to identify at risk drinkers based on

their family history or based on the medical ailments the patients presented. And during

screening they were able to identify patients' alcohol use including quantity and

frequency. One PA indicated that self-reporting of amount of alcohol consumed and

frequency are not necessarily accurate. The statement below indicates how this particular

PA who works with patients with heart diseases could tell when patients will not reveal

the exact amount they drank:

> *I ask my patients all the time how much they drink. They say they drink some, what does some mean? One to two according to the AHA?* (**American Heart Association**) *What type of alcoholic do you drink, maybe beer? Then I tell them so is it's about 14 beers a week. Does that sound about right? Oh that's too much. They don't want to give the impression that I disapprove (John).*

Self-reporting was issues were discussed in chapter 2 of this text as one of the

reasons findings from longitudinal studies which found moderate drinkers to have better

health outcomes over time than abstainer to be inaccurate. The level of screening used by

a clinician typically depends on the patient's characteristics, whether he or she has other

medical or psychiatric problems, the physician's skills and interest, and the amount of time available.

In Primary Care, screening for alcohol disorders in primary care can vary from one simple question to an extensive assessment using a standardized questionnaire. The level of screening used by a clinician typically depends on the patient's characteristics, whether he or she has other medical or psychiatric problems, the physician's skills and interest, and the amount of time available. Clinicians under strict time constraints may have time to ask a patient only one screening question about his or her alcohol consumption (NIAAA, 2005).

PAs believed in educating the patients and calling their awareness of in knowing who they are as individuals, to help control the harm of taking health benefits of moderate drinking as face value. They often used expressions such as 'know who you are as a person', 'understand your family history.' Inviting patients to be aware of their own risks factor is useful to help them understand that alcohol is not just pleasurable; it can become harmful if one is genetically susceptible to it. One PA called it a 'double-edged sword' and another said:

> *There may be benefit there, but I still think it's a slippery slope for a lot of people. I rather outweigh the benefit of encouraging minimal use vs. use. There are a lot of things that come into play (John).*

This was also an indication that although as providers, PAs can give warnings about alcohol use and its effects on health, but the patient is responsible for their own health. Personal choice emerged as PAs indicated they had limited control over whether patients choose to drink in moderation or not. This is probably because patients have the right as discussed previously the freedom to make choices as they see fit. Both patients

and PAs operate and lived in a context that gives freedom of choice especially with

regard to alcohol, a desirable commodity, a legal drug but socially accepted.

Conclusions and Recommendations

This chapter has discussed the findings presented in chapter 4 of this study. The

literature has been used to substantiate the theory discovered. This study has highlighted

the theory that these Physician Assistants (PAs) perceive health effects of moderate

alcohol consumption as beneficial for personal pleasure, yet detrimental for health to the

extent they refuse to endorse it for health. The theory also reveals while PAs perceive the

relationship between MAC and health as subjective due to individual interpretation,

health, PAs equally perceive many issues with effects of MAC that can harm patients in

particular and the general population, namely those who may be vulnerable to MAC.

Those issues can be one of the factors which explain their refusal to endorse health

benefits of MAC. PAs attitude towards the scientific literature reveals expression of

doubt and thus their subsequent desire to engage more actively in education of patients on

the effects of MAC on health. PAs indicate they are opened to discuss what the literature

reveals with patients while presenting to them the risks for their health.

Conflict is noticeable in the PAs attitude because they are influenced by cultural

beliefs of society about alcohol use, which translates in their acceptance of alcohol as

good for personal pleasure, but bad for health indicating the duality of alcohol. In

addition the political context within which PAs practice medicine also influences how

much they can tell the patient about alcohol consumption and its effects on health. Thus,

PAs often concluded that it all comes down to freedom of choice, leaving it up to the

patients, because that is just the way a democratic society works; its citizens have freedom of choice. This chapter further developed the argument of the central tenets which founded the emergent theory and the same argument has helped to advance this theory. A summary of that argument is found below in the form of the researcher's personal evaluation of the argument.

Evaluation of the Central Tenets:
The Researcher's Perspective

The discussion so far establishes significant number of the scientific literature has found beneficial effects of moderate alcohol consumption on cardiovascular diseases (Murray et al., 2002; Rehm, Greenfield and Rogers, 2001), and cardiovascular diseases risk factors (Ajani et al., 2000; Lu et al., 2003), which in turn translate to reduced mortality and morbidity (Poli et al., 2013; Costanzo, 2012; Brien et al, 2011; Mukamal & Rimm, 2003).

The discussion does not stop there because all alcohol consumption carries a level of risk. Nevertheless, given the fact alcohol consumption is widespread and relished by many in the world communities, and given the perceived contribution of alcohol industries to the world economies, beneficial effects of alcohol advertised by alcohol industries through these researchers, makes the discussion to tilt more towards the health benefits of moderate drinking. But an in-depth evaluation of the argument in favor of health benefits of moderate drinking shows it falls short. This is evident by the work of few and the contribution of physician assistants who participated in this study.

The researchers who have taken upon themselves to examine the claims which present moderate alcohol consumption as inversely correlated with better health outcomes, found several discrepancies the previous studies as discussed earlier in this text: 1) discrepancies with the methodology (Shaper et al., 1998; Filmore et al., 2007), 2) disregard of confounding factors (AuYeung, 2012; Au Yeung et al., 2013), 3) self-reporting data (Dufour, 1999), 4) discrepancies with the definition (Dufour, 1999), 5) problems with other diseases such as cancer (Boyle and Levin, 2008; Zaridze et al., 2009; Karatzi et al., 2004), 6) issues with biomarkers (Briel et al., 2009; Voight et al., 2012) and 7) injuries from motor vehicle crashes (Heng et al., 2006). Therefore, the debate continues because on the one hand there are residual confounding factors which prevent inference of causal relationship between MAC and health, thus giving ground to dispute the accuracy of findings of these observational studies even though the epidemiological literature continues to presents findings that consistently show health benefits of MAC on health.

The present study has used a grounded theory method to explore the experiences of a group of Physician Assistants as they explain how they perceive the relationship between moderate alcohol consumption and health. Participants in the present study have found that the argument proclaiming better health outcomes of moderate drinkers falls short based on their practice experiences and the lack of randomized control trials to prove causal effects of MAC on health. Conflict exists nevertheless because of the influence of cultural beliefs about alcohol. The theory developed indicates existence of 'conflict'. It is thus important to understand the implications of these findings for evaluation research/theory and practice, practice and policy.

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Implications for Evaluation Theory and Practice

This study is significant for evaluation theory in that it adds to the scarcely used Fourth Generation Evaluation (FGE) approach coined by Lincoln and Guba (1989). The FGE evaluation approach uses constructivist method, which blends well with the constructivist grounded theory approach this study utilized. Moreover not only is the FGE approach hardly used in evaluation practice, no alcohol prevention and treatment evaluators have embraced that approach to evaluation exploring the effects of MAC on health. Therefore this study will serve as a model for those evaluators interested in the grounded theory approach, but found it difficult to combine their evaluation design with a fitting evaluation approach.

The nature of the phenomenon understudy calls for an input of cost-effectiveness evaluation. Cost effectiveness evaluation is a full form of economic evaluation where both the relative cost and outcomes (effects) of two or more courses of action are compared (Drummond, O'Brien, Stoddard and Torrance, 1998 in Winters et al., 2010). To make better alcohol policies an analysis of the health benefits of moderate drinking (years of life gained) or its cost to society based on years of life lost, including the estimates of disability-adjusted life years. Granted that alcohol industries provides numerous jobs to citizens of countries where they operate (Institute of Alcohol Studies, 2013), it is also true an accrue production of alcoholic beverages accompanied by a message of hope for better health outcomes to those who consume these products is very appealing. In addition, culture and context discussed earlier facilitate things to alcohol

industries. The cost to society will never be fully known, unless a cost-effectiveness evaluation of years of life gained or lost to alcohol consumption is undertaken.

Implications and Recommendations for Policy

Various guidelines to moderate alcohol consumption have been drafted by many governments with the hope to minimize alcohol misuse. In spite of these guidelines, there is still problem with interpretations of the jargon such as 'moderate drinking' , 'light drinking', 'safe', or 'sensible drinking'. Findings from this study revealed viable alcohol policies will have implications on the message alcohol consumers understand. It appears the jargon used to this point has failed.

There is a need to design a more effective approach to handle this complex commodity including taking into consideration the complexity of people who consume it. In addition the results of this study indicate the urgency of this public health issue and require a fair discussion by group of people who will examine the scientific research findings with fairness in order to create feasible guidelines for health care providers and the public. Guidelines that will consider foremost, the subjectivity of the issue, vulnerability to alcohol, credible evidence and the importance of alcohol education not tainted by mixed messages can lead to better solution to this problem.

In the United States and around the world, there have been attempts to present to the public the concept of 'responsible drinking', which is supposed to be less dangerous and mostly beneficial for health. The Royal College of physicians calls it a "judgment call about what is an acceptable level of risk." This suggests that alcohol policy makers must remember alcoholic beverages, though socially accepted and cherished by many

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carries with it great 'risk' to society. Alcohol is a very complex commodity. This complexity is perceptible in the efforts made by the royal college of physicians in Great Britain and in Canada North America from the forums held in these parts of the world to find a consensus about health benefits of moderate drinking, yet without success. According to the Royal College of Physicians who has drafted guidelines for sensible alcohol consumption:

> "These guidelines were not 'plucked out of thin air', but were the result of this very difficult judgement (RCP, 2011). There is no such thing as a 'safe level' and the RCP weekly guidelines of 1987 were the result of a balanced judgement of health experts taking into account two of the key parameters of risk: frequency of consumption and amount consumed on drinking occasion. The report recommended 'sensible limits of drinking' of not more than 21 units a week for men, and not more than 14 units a week for women, including two or three days without any alcohol, and provided that the total amount was not drunk in one or two bouts. These sensible limits of drinking were quickly adopted by the government and remained the government's guidance." (RCP, 2011).

Unfortunately even those guidelines have not prevented researcher to add to these recommended guidelines as seen in the variation in the definition of that 'sensible dinking' in the literature.

Recommendations for Future Research

The perceptible conflict highlighted in this study calls for more effective ways to handle the complexity of the phenomenon understudy. In the RCP reports and the faulty dietary guidelines for Americans (DGA), there are indications an attempt to solve this public health issue will be of no avail without a cost-effectiveness evaluation of the effects of moderate alcohol consumption on health. This form of evaluation appears to be to this point what is lacking as researchers exchange point and counter points in the literature. Proponents of the health benefits of MAC are many, but the large number does not mean what is being offered is for public good. There is a need for more researchers and evaluators to assess carefully what is being presented as a method to control lifestyle diseases.

Limitations of the Study

The limitations of this study are mainly its scope, its methodological approach and the time. The scope of this study limits it to a small region of a vast country, a small Midwestern town in the United States. The study is also limited to a small group of primary care providers namely, physicians assistants. Therefore the findings cannot be generalized to the entire population of physician assistants (PAs).

It is certain as the constructivist approach argues, that reality is socially constructed (Charmaz, 2006). This is also true because of the place where the study takes place. It is not strange knowledge that in this country, every State makes its own laws and policies. Therefore, if the study were done in another State with different perception of

moderate alcohol consumption, results will probably differ. However, this does not negate the significance of these findings especially since these findings somewhat mirror the findings in the scientific literature. This is a reflection of the fact that public health issues such as health risks/benefits of MAC on health, concerns everyone.

The methodological limitations of the qualitative approach have been an issue of concern to those who look for large sample sizes with representativeness, generalizability, validity in a study. Nonetheless the qualitative methods without utilizing sample sizes large enough to represent the entire population, uses rigors that provides the readers with the validity of the study results. The rigors (credibility, transferability, dependability and confirmability) of the qualitative methods are what give this approach its trustworthiness. Rigors were discussed under the section entitled trustworthiness and ethical consideration in chapter 3 of this study. In addition in qualitative methods representativeness is not as important as understanding the meaning participants attribute to the phenomenon understudy.

Finally, time was a limitation in this context because this is a doctoral dissertation and as such the researcher is limited by the amount of time allocated to the completion of the study due to financial constrain. Participants who took part in this study have time constrain as well, due to the nature of their profession. Time spent collecting and analyzing the data for this study was three to six months, but with the researcher experiencing some difficulties to receive feedback from participants at times. Fortunately saturation was obtained early in the study, although the researcher would have preferred to have many more conversations with participants.

REFERENCES

REFERENCES

Abrams, M., Nuzum, R., Mika, S., and Lawlor, G. (2011). Realizing Health Reform's
Potential How the Affordable Care Act Will Strengthen Primary Care and Benefit
Patients, Providers, and Payers. *The Commonwealth Fund*. Retrieved April 17,
2014 from http://www.commonwealthfund.org/~/media

Agarwal, D.P. (2002). Cardioprotective effects of light-moderate consumption of alcohol:
a review of putative mechanisms. *Alcohol and Alcohol; 37:409–415*.

Aira, M., Kauhanen, J., Larivaara, P., Rautio, P. (2003). Factors influencing inquiry about
patients' alcohol consumption by primary health care physicians: qualitative
semi-structured interview study. *Family Practice,20:270–275*

Ajani, U.A., Hennekens, C.H., Spelsberg, A., and Manson, J.E. (2000). Alcohol
consumption and risk of type 2 diabetes mellitus among US male physicians.
Archives of Internal Medicine; 160(7):1025-1030.

Alkin, M. C., & Christie, C. A. (2004). An evaluation theory tree revisited. In M. C.
Alkin (Ed.), *Evaluation roots*. Thousand Oaks: Sage.

Altura, B.M., Altura, B.T. (1990). Alcohol, stroke and the cerebral circulation. *Alcohol
Health Res World; 14:322-31*.

Arborelius, E., Damstrom-Takker, K. (1995). Why is it so difficult for general
practitioners to discuss alcohol with patients? *Family Practice; 12: 419–22*.

Armstrong, M., Klatsky, A. Friedman, G., Sidney, S. (2001). Alcohol drinking and risk of
hospitalization for ischemic stroke. *American Journal of Cardiology. 88:703-
706*.

Appleton, J. (1997). Constructivism: A naturalistic methodology for nursing inquiry. Advances in Nursing Science, 20 (2), 13-22.

Ashley MJ, Ferrence R, Room R, Rankin J, Single E (1994). Moderate drinking and health: report of an international symposium. *Canadian Medical Association 151:809–828.*

Ashley, M.J., Rehm. J., Bondy. S., Single, E, Rankin, J. (2000). Beyond ischemic heart disease: are there other health benefits from drinking alcohol? *Contemporary Drug Problems, 27:735–777*.

Au Yeung SL, Jiang CQ, Cheng KK, Liu B, Zhang WS, et al. (2012) Evaluation of Moderate Alcohol Use and Cognitive Function Among Men Using a Mendelian Randomization Design in the Guangzhou Biobank Cohort Study. *American Journal of Epidemiology, 175: 1021–1028*

Au Yeung, S.L, Jiang, C., Cheng, K.K., Liu, B., Zhang, W., et al. (2013). Is aldehyde dehydrogenase 2 a credible genetic instrument for alcohol use in Mendelian randomization analysis in Southern Chinese men? *International Journal Epidemiology, 42: 318–328.*

Bacchiocchi, S. (2002). Wine in the Bible: A Biblical Study on the Use of Alcoholic Beverages Berrien Springs, MI. Biblical Perspectives.

Bagnardi, V., Blangiardo, M., La Vecchia, C., Corrao, G. (2001) Alcohol consumption and the risk of cancer. *Alcohol Research and Health, 25:236–270.*

Baum-Baiker, C. (1985). The psychological benefits of moderate alcohol consumption: a review of the literature. *Drug Alcohol Dependence.15 (4):305-22.*

Bazzano, L.A., Gu, D., Reynolds, K., Wu, X., Chen, C.S., Duan, X., Chen, J., Wildman, R.P., Klag, M.J., He, J. (2007). Alcohol consumption and risk for stroke among Chinese men*. Ann Neurol.; 62(6):569-78.*

Benedetti, A., Parent, M.E., Siemiatycki, J. (2009).Lifetime consumption of alcoholic beverages and risk of 13 types of cancer in men: results from a case-control study in Montreal. *Cancer Detection and Prevention; 32: 352–362.*

Berger, K., Ajani, U.A., Kase, C.S., et al. (1999). Light-to-moderate alcohol consumption and risk of stroke among U.S. male physicians. *New England Journal of Medicine; 341:1557–64.*

Bierbaur, E. (1999). Liquid Honesty: The First Amendment Right to Market the Health Benefits of Moderate Alcohol Consumption. Retrieved from http://www.nyulawreview.org February 11, 2015.

Bleich S, Bleich K, Kropp S, et al. (2001). Moderate alcohol consumption in social drinkers raises plasma homocysteine levels: a contradiction to the "French paradox"? *Alcohol Alcohol; 36:189–92.*

Blocker, J.S., Jr (2006). Did prohibition really work? Alcohol prohibition as a public health innovation. *American Journal of Public Health; 96(2):233-43.*

Boffetta, P. and Hashibe, M. (2006). Alcohol and cancer. *Lancet Oncolology. Feb; 7(2):149-56.*

Booyse, F.M., Parks, D.A., 2001. Moderate wine and alcohol consumption:beneficial effects on cardiovascular disease. *Thromb. Haemost.86, 517–528.*

Bondy, S.J., Rehm, J., Ashley, M.J., Walsh, G., Single, E., Room, R. (1999). Low-risk drinking guidelines: the scientific evidence. *Canadian Journal of Public Health, 90; 264-270.*

Boyle, P., Levin, B. (eds.) World Cancer Report 2008, Lyon: *International Agency for Research on Cancer.*

Briel, M., Ferreira-Gonzalez, I., You, JJ., Karanicolas, PJ., Akl, EA., Wu P, Blechacz, B., Bassler, D., Wei, X., Sharman, A., Whitt, I., da Silva, SA., Khalid, Z., Nordmann, AJ. Et al. (2009). Association between change in high density lipoprotein cholesterol and cardiovascular disease morbidity and mortality: systematic review and meta-regression analysis. *British Medical Journal. 338:b92.*

Brien, S.E., Ronksley, P.E., Turner, B.J., Mukamal, K.J., Ghali, W.A. (2011). Effect of alcohol consumption on biological markers associated with risk of coronary heart disease: systematic review and meta-analysis of interventional studies. *British Medical Journal; 342:d636.*

Britton, A., Singh-Manoux, A., and Marmot, M. (2004). Alcohol Consumption and Cognitive Function in the Whitehall II Study. *American Journal of Epidemiology 160 (3): 240-247.*

Brooks, P.J., Enoch, M.A., Goldman, D., Li, T.K. and Yokoyama, A. (2009). The Alcohol Flushing Response: An Unrecognized Risk Factor for Esophageal Cancer from Alcohol Consumption. *PLOS Medicine. DOI: 10.1371*. Retrieved March 10, 2015 from

http://journals.plos.org/plosmedicine/article?id=10.1371/journal.pmed.1000050

Bulatao-Jayme, J., Almero, E.M., Castro, C.A., Jardeleza, T.R., and Salamant, L.A. (1982). A case–control dietary study of primary liver cancer risk from aflatoxin exposure. *International Journal of Epidemiology 11:112–119.*

Bushman, B.J., and Cooper, H.M. (1990). Effects of alcohol on human aggression: An integrative research review. *Psychological Bulletin 107:341–354.*

Camargo, C.A., Stampfer, M.J., Gaziano, J.M., Manson, J.E., Goldhaber, S.Z., Hennekens, C.H. (1995). Prospective study of moderate alcohol consumption, smoking and risk of peripheral arterial disease. *American Journal of Epidemiology;141:S57.*

Camargo, C.A., Jr.; Hennekens, C.H.; Gaziano, J.M.; et al. (1997). Prospective study of moderate alcohol consumption and mortality in US male physicians. Arch Intern Med 157(1):79-85.

Carmago, C.A. Jr. (1989). Moderate alcohol consumption and stroke. The epidemiologic evidence. *Journal of the American Heart Association. 20:1611-1626*

Carlsson, S., Hammar, N., Grill, V. (2005). Alcohol consumption and type 2 diabetes Meta‐analysis of epidemiological studies indicates a U‐shaped relationship. *Diabetologia ;48(6):1051‐4.*

Charmaz, K. (2000). Grounded Theory: Objectivist and Constructivist Methods, in Denzin N.K. and Y. S. Lincoln (eds) Handbook of Qualitative Research, second edition, London, Sage.

Charmaz, K. (2006). Constructing Grounded Theory. A Practical Guide through Qualitative Analysis. SAGE Publications LTD London.

Cheng,Y., Kawachi, I., Coakley, E.H., Schwartz, J., Colditz, G. (2000). Association between psychosocial work characteristics and health functioning in American women: prospective study. *BMJ,320:1432.*

Chen J, Gammon MD, Chan W, et al. (2005). One-carbon metabolism, MTHFR polymorphisms, and risk of breast cancer. *Cancer Research; 65: 1606-14*

Chen, L., Davey-Smith, G., Harbord, R.M. and Lewis, S.J. (2008) Alcohol intake and blood pressure: a systematic review implementing a Mendelian randomization approach. *PLOS Med 5: e52*.

Chen, W.Y., Rosner, B., Hankinson, S.E., Colditz, G.A., Willett, W.C. (2011). Moderate alcohol consumption during adult life, drinking patterns, and breast cancer risk. *JAMA;306(17):1884-90.*

Chikritzhs, T., Fillmore, K., and Stockwell, T. (2009). A healthy dose of skepticism: four good reasons to think again about protective effects of alcohol on coronary heart disease. *Drug Alcohol Review.28 (4):441-4.*

Chung, C.M., Lin, T.H, Chen, J.W. et al. (2011). A genome-wide association study reveals a quantitative trait locus of adiponectin on CDH13 that predicts cardiometabolic outcomes. *Diabetes.;60:2417–2423*.

Clark, A. E. (2005). Situational analysis: Grounded theory after the postmodern turn. Thousand Oaks, CA. Sage.

Cook, Christopher C.H. (2006). Alcohol, Addiction and Christian Ethics (1st ed). London, UK. Cambridge University Press.

Corella, D. (2007). Gene-alcohol interactions in the metabolic syndrome. Nutr Metab Cardiovasc Disease,17(2):140-7. Retrieved March 24, 2014 from http://www.ncbi.nlm.nih.gov/pubmed

Corrao, G., Bagnardi, V., Zambon, A. et al. (2004). A meta-analysis of alcohol consumption and the risk of 15 diseases. Preventive Medicine 38, 613–619.

Corrao, G., Rubbiati, L., Bagnardi, V., Zambon, A., Poikolainen, K. (2000). Alcohol and coronary heart disease: a meta-analysis. *Addiction*. 95(10):1505-23.

Costanzo, S., Di Castelnuovo, D., Donati, M.B. Iacoviello, L., De Gaetano, G. (2006). Moderate alcohol consumption and cardiovascular risk reduction: open issues. *Italian Journal of Public Health. 4, Volume 3, Number 2.*

Costanzo, S., Di Castelnuovo, A., Donati, M.B., Iacoviello, L., de Gaetano, G. (2010). Alcohol consumption and mortality in patients with cardiovascular disease: a meta-analysis. *Journal of American College of Cardioliologist.;55:1339–1347.*

Costanzo, S., Di Castelnuovo, A., Donati, M.B, Iacoviello, L., de Gaetano, G. (2011). Wine, beer or spirit drinking in relation to fatal and non-fatal cardiovascular events: a meta-analysis. *Eur. J. Epid, 26:833–850.*

Covas, M.I, Gambert, P., Fitó, M. et al. (2010) Wine and oxidative stress: up-to-date evidence of the effects of moderate wine consumption on oxidative damage in humans. *Atherosclerosis 208:297–304*.

Creswell, J. W. (1998). Qualitative inquiry and research design: Choosing among five traditions. Thousand Oaks, CA: Sage.

Creswell, J. (2003). Research design: Qualitative, quantitative and mixed methods approaches (2nd ed.). Thousand Oaks, CA: SAGE Publications.

Cresswell, J. (2007). Qualitative Inquiry and Research Design: Choosing among Five

    Approaches. Sage Publications, Thousand Oaks, CA.

Creswell, J. W. & Miller, D. L. (2000). Determining validity in qualitative inquiry.

    Theory into Practice, 39(3), 124-131.

Crowley, J. A. (1991). Educational Status and Drinking Patterns: How Representative

    Are College Students? *Journal of Studies on Alcohol, Vol. 52, No. 1,*

Cryer, P.C., Saunders, J., Jenkins, L.M., Neale, H., Cook, A.C., Peters, T.J. (2001).

    Clusters within a general population of alcohol abstainers. *International Journal*

    of Epidemiology, 30:756–765.

Dang, T. P., Leclerc, A., Chastang, J.F., Goldberg, M. (1998). Regional disparities in

    cardiovascular risk factors in France: a five-year analysis of the GAZEL cohort.

    Eur J Epidemiol,14:535–543.

Daniel, S., Bereczki, D. (2004). Alcohol as a risk factor for hemorrhagic stroke.

    Ideggyogy Sz 20,57(7-8):247-56.

Davey-Smith, G., Phillips, A.N. (1992). Confounding in epidemiological studies: why

    "Independent" effects may not be all they seem. *British Medical Journal,*

    305(6856):757-9.

Davey-Smith, G., Ebrahim, S. (2004) Mendelian randomization: prospects, potentials,

    and limitations. *International Journal of Epidemiology, 33: 30–42.*

Davies, M.J., Baer, D.J, Judd, J.T., Brown, E.D., Campbell, W.S., et al. (2002) Effects of

    moderate alcohol intake on fasting insulin and glucose concentrations and insulin

    sensitivity in postmenopausal women: a randomized controlled trial. JAMA 287:

    2559–2562.

Dawson, D.A., Grant, B.F., and Ruan, W.J. (2005). The association between stress and drinking: modifying effects of gender and vulnerability. *Alcohol and Alcoholism. 40(5):453-60.*

Denzin, N. K., & Lincoln, Y. S. (1994). (Eds). Handbook of Qualitative Research. Thousand Oaks, CA: Sage Publications, Inc.

de Gaetano G, De Curtis A, Di Castelnuovo A, Donati MB, Iacoviello L, Rotondo S. Antithrombotic effect of polyphenols in experimental models: a mechanism of reduced vascular risk by moderate wine consumption. *Ann N Y Acad Sci.; 957: 174–188.*

De Laine, M. (1997). Ethnography: Theory and applications in health research. Sydney, Australia: Maclennan and Petty.

de Lorgeril, M. (1998): Mediterranean diet in the prevention of coronary heart disease. *Nutrition 14, 55 ± 57.*

de Lorgeril, M., Salen, P., Martin, J.L.; Boucher, F., Paillard, F., de Leiris, J. (2002). Wine Drinking and Risks of Cardiovascular Complications. After Recent Acute Myocardial Infarction. *Circulation.106:1465-1469*

Dettling, A., Fischer, F., Bohler, S….. et al. (2007). Ethanol elimination rates in men and women in consideration of the calculated liver weight. Alcohol 41(6):415–420.

Dey, I. (1999). Grounding Grounded Theory: Guidelines for Qualitative Inquiry. San Diego, USA: Academic Press.

Dıaz, L.E.,Montero, A., Gonzalez-Gross, M., Vallejo, Al., Romeo, J., Marcos, A.(2002). Influence of alcohol consumption on immunological status: a review. *European Journal of Clinical Nutrition 56, Suppl 3, S50–S53*

199

Di Castelnuovo A, Rotondo S, Iacoviello, L. et al. (2002) Meta-analysis of wine and beer

    consumption in relation to vascular risk. Circulation 105:2836–44.

Di Castelnuovo, A., Costanzo, S., Bagnardi, V., Donati, M.B., Iacoviello, L., de Gaetano,

    G. (2006). Alcohol dosing and total mortality in men and women: an updated

    meta-analysis of 34 prospective studies. *Arch Intern Med. 166:2437–45*.

Di Castelnuovo, A., Costanzo, S., di Giuseppe, R., de Gaetano, G., Iacoviello, L. (2009).

    Alcohol consumption and cardiovascular risk: mechanisms of action and

    epidemiologic perspectives. *Future Cardiol. Sep5(5):467-477*.

Dick, B. (2002). God and Alcoholism. Retrieved June 25, 2013, from

    http://www.religion-online.org/showchapter.asp

Dickinson, H.O., Mason, J.M., Nicolson, D.J., Campbell, F., Beyer, F.R., et al. (2006)

    Lifestyle interventions to reduce raised blood pressure: a systematic review of

    randomized controlled trials. *Journal Hypertension 24: 215–233*.

Didelez, V., Sheehan, N. (2007) Mendelian randomization as an instrumental variable

    approach to causal inference. Stat Methods Med Res 16: 309–330.

Djousse, L., Myers, R. H., Province, M. A., Hunt, S. C., Eckfeldt, J. H., Evans, G., et al.

    (2002). Influence of apolipoprotein E, smoking, and alcohol intake on carotid

    atherosclerosis: national heart, lung, and blood institute family heart study. *Stroke*

    33, 1357–1361.

Djoussé, L., Biggs, M.L., Mukamal, K.J., Siscovick, D.S. (2007). Alcohol consumption

    and type 2 diabetes among older adults: the cardiovascular health study. *Obesity*

    15, 1758–1765.

Doll, R. (1997). One for the heart. *British Medical Journal* 315, 1664–1668.

Donahue, R.P., Abbott, R.D., Reed, D.M., Yano, K. (1986). Alcohol and hemorrhagic

    stroke. The Honolulu Heart Study. *JAMA, 225:2311-2314*.

Dubé, J.B., Boffa, M.B., Hegele, R.A., Koschinsky, M. (2012). Lipoprotein(a): more

    interesting than ever after 50 years. *Curr Opin Lipidol, 23:133–140*

Dufour, M.C. (1994). Are there net health benefits from moderate alcohol consumption?

    Morbidity and other parameters of health. *Contemporary Drug Problems*

    21(1):163–183.

Dufour, M. C. (1999). What is moderate drinking? Defining 'drinks' and drinking levels.

    Alcohol Research and Health 23, 5–14.

Dunn, J. (1965). God Is For The Alcoholic. The Moody Press. Chicago. IL.

Edenberg, H.J. (2007). The genetics of alcohol metabolism: Role of alcohol

    dehydrogenase and aldehyde dehydrogenase variants. *Alcohol Research & Health*

    30(1):5–13.

Edwards, G., Anderson, P. Babor, T.F., Casswell, S., Ferrence, R., Giesbrecht, N.,

    Godfrey, C., Holder, H.D., Lemmens, P., Mäkelä, K., Midanik, L.T., Noström, T.,

    et al. (1994). Alcohol policy and the public good. Oxford, UK: Oxford University

    Press.

Egan, M. T. (2002). Grounded Theory Research and Theory Building. *Advances in*

    Developing Human Resources Vol. 4, No. 3, 277-295.

Elkind, M.S., Sciacca, R., Boden-Albala, B., Rundek, T., Paik, M.C., Sacco, R.L. (2006).

    Moderate alcohol consumption reduces risk of ischemic stroke: the Northern

    Manhattan Study. *Stroke; 37:13-9*.

Emberson, J.R, Bennett, D.A.(2006). Effect of alcohol on risk of coronary heart disease and stroke: causality, bias, or a bit of both? *Vasc Health Risk Manag 2006;2(3):239-49.*

eMedicine (2001). Retrieved from http://www.emedicine.com/EMERG/topic558.htm

Erqou, S., Kaptoge, S., Perry, P.L., Di Angelantonio. E, Thompson, A., White, I.R., et al. (2009). Lipoprotein(a) Concentration and the Risk of Coronary Heart Disease, Stroke, and Nonvascular Mortality. *JAMA;302(4):412-23.*

Espeland, M.A., Gu, L., Masaki, K.H. et al. (2005). "Association between reported alcohol intake and cognition: Results from the women's health initiative memory study". *American Journal of Epidemiology, 161: 228- 238.*

Facchini, F., Chen, Y.D., Reaven, G.M. (1994) Light-to-moderate alcohol intake is associated with enhanced insulin sensitivity. *Diabetes Care, 17:115–119.*

Fan, A.Z., Russell, M., Dorn, J., Freudenheim, J.L., Nochajski, T., Hovey, K et al. (2006). Lifetime alcohol drinking pattern is related to the prevalence of metabolic syndrome. The Western New York Health Study (WNYHS). *European Journal of Epidemiology, 21, 129–138.*

Femia, R., Natali, A., L'Abbate, A., Ferrannini, E. (2006). Coronary atherosclerosis and alcohol consumption: angiographic and mortality data. *Arteriosclerosis, Thrombosis, and Vascular Biology.;26(7):1607–1612.*

Ferrières, Jean. (2004) The French paradox: lessons for other countries. *Heart. 90:107–111.*

Fillmore KM, Kerr WC, Bostrom A. Changes in drinking status, serious illness and mortality. *J Stud Alcohol, 64:278–85.*

Fillmore, K.M., Kerr, W.C., Stockwell, T., Chikritzhs, T., Bostrom, A. (2006) Moderate
alcohol use and reduced mortality risk: Systematic error in prospective studies.
Addiction Research Theory. 14:101–132.

Fillmore, K.M., Stockwell, T., Chikritzhs, T., Bostrom, A., Kerr, W. (2007). Moderate
alcohol use and reduced mortality risk: Systematic error in prospective studies
and new hypotheses. *Ann Epidemiology;17(5):S16-S23*.

Flanagan, D.E, Pratt, E., Murphy, J., Vaile, J.C., Petley, G.W. et al. (2002) Alcohol
consumption alters insulin secretion and cardiac autonomic activity. *European
Journal of Clin Invest 32: 187–192.*

Fox. K.A., Goodman, S., Bigonzi, F., LeLouer, V., Cohen, M. (Fox). Interregional
differences and outcome in unstable angina. Analysis of the International
ESSENCE trial. *Eur Heart J,21:1433–1439.*

French, M.T., Zarkin, G.A. (1995). Is Moderate Alcohol-Use Related to Wages -
Evidence from 4 Worksites. *Journal of Health Economics., 14(3):319-44.*

French, M. T., Zavala, S. (2007). The Health Benefits of Moderate Drinking Revisited:
Alcohol Use and Self-reported Health Status. *American Journal of Health
Promotion. 21:484–491*

Friedman, L.A., and Kimball, A.W. (1986) Coronary heart disease mortality and alcohol
consumption in Framingham. *American Journal of epidemiology.124(3):481-489.*

Fuchs, F.D., Chambless, L.E., Whelton, P.K., et al. (2001). Alcohol consumption and the
incidence of hypertension: The Atherosclerosis Risk in Communities Study.
Hypertension 37(5): 1242–1250

Fuchs, F.D., Chambless, L.E., Folsom, A.R., Eigenbrodt, M.L., Duncan, B.B., Gilbert, A. et al. (2004). Association between alcoholic beverage consumption and incidence of coronary heart disease in whites and blacks - The Atherosclerosis Risk in Communities Study. *American Journal of Epidemiology;160(5):466-74.*

Fuchs, F.D., Chambless, L.E. (2007). Is the cardioprotective effect of alcohol real? *Alcohol .Sep; 41(6):399-402.*

Garg, A. (1996). Insulin resistance in the pathogenesis of dyslipidemia. *Diabetes Care; 19(4):387-9.*

Gaziano, J.M., Gaziano, T.A., Glynn, R.J., Sesso, H.D., Ajani, U.A., Stampfer, M.J., Manson, J.E., Hennekens, C.H., Buring, J.E. (2000). Light-to-moderate alcohol consumption and mortality in the Physicians' Health Study enrollment cohort. *Journal of American College of Cardiology. 35: 96–105.*

Gill, J.S., Shipley, M.J., Tsementzis, S.A., Hornby, R.S., Gill, S.K., Hitchcock, E.R., Beevers, D.G. (1991). Alcohol consumption–a risk factor for hemorrhagic and non-hemorrhagic stroke. *American Journal of Medicine.;90:489-497.*

Glaser, B. (1978). Theoretical sensitivity. Mill Valley, CA: Sociology Press.

Glaser, B. G., & Strauss, A. (1967). The Discovery of Grounded Theory. Hawthorne, New York: Aldinede Gruyter.

Gmel, G, Klingemann, S, Müller, R. et al. (2001) Revising the preventive paradox: the Swiss case. *Addiction 96: S273-84.*

Godsland, I.F., Leyva, F., Walton, C., Worthinton, M., and Stevenson, J.C. (1998). Associations of smoking, alcohol and physical activity with risk factors for coronary heart disease and diabetes in the first follow-up cohort of the Heart

204

Disease and Diabetes Risk Indicators in a Screened Cohort study. *Journal of Internal Medicine Volume 243, Issue 7.*

Goldberg, I. J. (2003) To drink or not to drink? New England Journal of Medicine 348, 163–164.

González-Reimers E., GarcÍa-Valdecasas-Campelo E., Santolaria-Fernández, F. et al., (2007). Pro-inflammatory cytokines in stable chronic alcoholics: relationship with fat and lean mass. Food and Chemical Toxicology; 45:904-909.

Gonzalez-Gross, M., Lebron, M. & Marcos, A. (2000): Revisio´n Bibliogra´fica sobre los Efectos del Consumo Moderado de Cerveza sobre la Salud. Madrid: Centro de informacio´n cerveza y salud in Dıaz et al. 2002 Influence of alcohol consumption on immunological status: a review. European Journal of Clinical Nutrition 56, Suppl 3, S50–S53.

Graham, K. (2003). Social drinking and aggression. In: Mattson, M., Ed. Neurobiology of Aggression: Understanding and Preventing Violence. Totowa, NJ: Humana Press.

Graham K, Schmidt G. (1988).The effects of drinking on health of older adults. *American Journal of Drug Alcohol Abuse, 24:465–481.*

Green, C. A., Polen, M. R. (2001). The Health and Health Behaviors of People who do not Drink Alcohol. *American Journal of Preventative Medicine. 21, 298–305.*

Greenland, S., Robins, J.M. (2009). Identifiability, exchangeability and confounding revisited. *Epidemiol Perspect Innov;6:4.*

Gronbaek,M., Deis, A., Sorensen, T.I, Becker, U., Schnohr, P., Jensen, G. (1995). Mortality Associated with Moderate Intakes of Wine, Weer, or Spirits. British Medical Journal, 310:1165-9

Gronbaek, M., Jensen, M.K., Johansen, D., Thorkild, I. A., Sorensen. and Becker, U. (2004). Intake of Beer, Wine and Spirits and Risk of Heavy. Drinking and Alcoholic Cirrhosis. Biol Res 37: 195-200.

Guba, E., & Lincoln, Y. (1989). Fourth generation evaluation. Newbury Park, CA: Sage Publications.

Guba, E.G., and Lincoln, Y.S. (2001). Fourth Generation Evaluation, Newbury Park, CA: Sage Publications.

Guérin, S., Laplanche, A., Dunant, A., Hill, C. (2013). Alcohol-attributable mortality in France. *European Journal of Public Health*. Retrieved March 23, 2015 from http://eurpub.oxfordjournals.org/content/early/2013/03/04/eurpub.ckt015

Guion, L.A., Diehl, D.C., and McDonald, D. (2011). Triangulation: Establishing the Validity of Qualitative Studies. Retrieved June 25 2013 from https://edis.ifas.ufl.edu/fy394

Gunzerath, L., Faden, V., Zakhari, S., Warren, K., (2004).National Institute on Alcohol Abuse and Alcoholism report on moderate drinking. *Alcoholism, Clinical and Experimental Research.28:829–847.*

Guo, R. and Ren, J. (2010). Alcohol and Acetaldehyde in Public Health: From Marvel to Menace. *International Journal of Environmental Research and Public Health. 7(4): 1285–1301.*

Gutjahr, E., Gmel, G., Rehm, J. (2001).The relation between average alcohol consumption and disease: an overview. Eur Addict Res. 2001; 7:117–27.

Harada, S., Agarwal, D.P, Goedde, H.W. (1981) Aldehyde Dehydrogenase-Deficiency as Cause of Facial Flushing Reaction to Alcohol in Japanese. *Lancet 2: 982–982.*

Harada S, Agarwal DP, Goedde HW, Tagaki S, Ishikawa B (1982) Possible protective

    role against alcoholism for aldehyde dehydrogenase isozyme deficiency in Japan.

    Lancet 2: 827.

Harling, K. (2002). An Overview of Case Study. Retrieved, from

    http://www.farmfoundation.org/news/articlefiles/1028-1_harling.pdf

    June 25, 2013.

Harrison, P. (1998). Royal College debates whether MDs should promote moderate

    consumption of alcohol. Canadian Medical Association Journal, 159:1289-90

    Retrieved March 26, 2015 from

http://www.collectionscanada.gc.ca/eppp-archive/100/201/300/cdn_medical_association

Hart, C.L., Morrison, D.S., Batty, G.D., Mitchell, R.J., Davey-Smith, G. (2010). Effect of

    body mass index and alcohol consumption on liver disease: analysis of data from

    two prospective cohort studies. *British Medical Journal, 340:c1240.*

Hayes, R., & Oppenheim, R. (1997). Constructivism: Reality is what you make it. In T.

    Sexton & B. Griffin (Eds.), Constructivist thinking in counseling practice,

    research and training (pp. 19-41). New York: Teachers College Press.

Heng, K., Hargaten, S., Layde, P., Craven, A., and Zhu, S. (2006). Moderate Alcohol

    Intake and Motor Vehicles Crashes: The Conflict between Health Advantage and

    At-Risk Use. *Alcohol & Alcoholism Vol. 41, No. 4, pp. 451–454.*

Hines, L. M., Rimm, E. B. (2001). Moderate alcohol consumption and coronary heart disease:

    A review. *Postgraduate Medical Journal, 77, 747–752*

Hoepfl, M. C. (1997). Choosing qualitative research: A primer for technology education researchers. Journal of Technology Education, 9(1), 47-63. Retrieved February 25, 2015. http://www.nova.edu/ssss/QR/QR8-4/golafshani.pdf

Hui, X., Lam, SL.K., Vanhoutte,P.V., and Xu, A. (2012). Adiponectin and cardiovascular health: an update. *British Journal of Pharmacology.165(3): 574–590.*

Ikehara, S., Iso, H., Toyoshima, H., Date, C., Yamamoto, A., Kikuchi, S., et al. (2008). Alcohol consumption and mortality from stroke and coronary heart disease among Japanese men and women: The Japan Collaborative Cohort Study. *Stroke, 39:2936–2942*.

International Agency for Cancer Research (2007). Drinking and Cancer. Retrieved February 10, 2015 From http://www.icap.org/.

International Center for Alcohol Policies (ICAP). Retrieved January 8, 2015 from http://www.icap.org.

Ippolito, R.A. (2003). The Health Effects of Alcohol: Do Controls for Demographics and other Risky Habits Affect the Conclusions? *Laws and Economics Paper Series.*

Iso, H., Baba, S., Mannami, T., Sasaki, S., Okada, K., Konishi, M., Tsugane, S. (2004). Alcohol consumption and risk of stroke among middle-aged men: JPHC Study Group. *Stroke. May; 35(5):1124-9.*

Jackson, R., Broad, J., Connor, J., Wells, S. (2005). Alcohol and ischaemic heart disease: probably no free lunch. *Lancet. ;366:1911–1912*.

Kannel, W.B., and Ellison, R.C. Alcohol and coronary heart disease: The evidence for a protective effect. *Clinica Chimica Acta 246(1-2):59-76, 1996*.

Karatzi, K., Papamichael, C., Aznaouridis, K., et al. (2004). Constituents of red wine other than alcohol improve endothelial function in patients with coronary artery disease. *Coronary Artery Disease. 15:485–490.*

Katakami, N., Kaneto, H., Matsuoka, T.A., Takahara, M., et al. (2012). Adiponectin G276T gene polymorphism is associated with cardiovascular disease in Japanese patients with type 2 diabetes. *Atherosclerosis 220: 437-442.*

Klatsky, A.L., Armstrong, M.A., Friedman, G.D. (1990). Risk of cardiovascular mortality in alcohol drinkers, ex-drinkers and nondrinkers. *American Journal of Cardiology, 66:1237-1242.*

Klatsky, A.L. (2002). Alcohol and cardiovascular diseases. Ann NY Academy Science 957: 7-15.

Klatsky A.L., Friedman, G.D., Armstrong, M.A., Kipp, H. (2003). Wine, liquor, beer, and mortality. *American Journal of Epidemiology.158(6):585-595.*

Klatsky, A.L. (2010) Alcohol and cardiovascular health. *Physiol Behav 100, 76–81.*

Keavney B, Danesh J, Parish S et al. (2006). Fibrinogen and coronary heart disease: test of causality by "Mendelian randomisation". *International Journal of Epidemiology ;35:935–43.*

Kloner, R.A. and Rezkalla, S.H. (2007). To drink or not to drink? That is the question. *Circulation. 11; 116(11):1306-17.* Retrieved from http://www.ncbi.nlm.nih.gov/pubmed February 13, 2015.

Kodavali, L., Townsend, R.R. (2006). Alcohol and its relationship to blood pressure. Curr *Hypertens Rep, 8(4):338-44.* Retrieved March 27, 2015 from http://www.ncbi.nlm.nih.gov/pubmed/16884666

Koppes, L.L., Dekker, J.M., Hendriks, H.F., Bouter, L.M., Heine, R.J. (2005). Moderate alcohol consumption lowers the risk of type 2 diabetes: a meta-analysis of prospective observational studies. *Diabetes Care, 28(3):719-25.*

Kwo, P.Y., Ramchandani, V.A., O'Connor, S., Amann, D., Carr, L.G., Sandrasegaran, K., Kopecky, K.K.and Li, T.K. (1998). Gender differences in alcohol metabolism: Relationship to liver volume and effect of adjusting for body mass. *Gastroenterology, 115(6):1552–1557.*

Lacoste, L., Hung, J., Lam, J.Y. (2001). Acute and delayed antithrombotic effects of alcohol in humans. *American Journal Cardiology, 1; 87(1):82-5.* Retrieved February 10, 2015 from http://www.ncbi.nlm.nih.gov/pubmed/11137839

Lawlor, D.A., Harbord, R.M., Sterne, J.A.C., Timpson, N.J., Davey Smith, G. (2008). Mendelian randomization: using genes as instruments for making causal inferences in epidemiology. *Stat. Med, 27:1133–1163.*

Lawlor, D.A., Davey-Smith, G., Bruckdorfer, K.R., Kundu, D., Ebrahim, S (2004). Those confounded vitamins: what can we learn from the differences between observational versus randomized trial evidence? *Lancet 363(9422):1724-27.*

Leedy, P. & Ormrod, J. (2001). Practical research: Planning and design (7th ed.). Upper Saddle River, NJ: Merrill Prentice Hall. Thousand Oaks: SAGE Publications.

Leikert, J.F., Rathel, T.R.,Wohlfart, P., Cheynier, V., Vollmar, A.M., Dirsch, V.M. (2002). Red wine polyphenols enhance endothelial nitric oxide synthase expression and subsequent nitric oxide release from endothelial cells. *Circulation, 106, 1614-1617.*

Leonard, K.E. (2005). Alcohol and intimate partner violence: When can we say that heavy drinking is a contributing cause of violence? *Addiction 100(4)*: 422–425.

Lewis, S.J., Smith, G.D. (2005). Alcohol, ALDH2, and esophageal cancer: A meta-analysis which illustrates the potentials and limitations of a Mendelian randomization approach. *Cancer Epidemiology Biomarkers Preview 14: 1967–1971.*

Lewis, S. J., (2009). Mendelian Randomization as Applied to Coronary Heart Disease, Including Recent Advances Incorporating New Technology. *Circulation: Cardiovascular Genetics, 32 (3), pp.109-117*

Lincoln, Y.S. and E.G. Guba (1985). *Naturalistic inquiry*, Beverly Hills CA: Sage.

Lincoln, Y.S. and Guba, E.G. (2000). "Paradigmatic controversies, contradictions, and emerging Confluences." Handbook of Qualitative Research. Denzin, N.K. and Lincoln, Y.S. (Eds.). Thousand Oaks, California, Sage Publications: 163-188.

Lipsitch, M., Tchetgen, Tchetgen, E., Cohen, T. (2010). Negative controls: a tool for detecting confounding and bias in observational studies. *Epidemiology; 21(3):3838.*

Liu, C., Yu, Z., Li, H., Wang, J., Sun, L., Qi, Q., et al. (2010) Associations of alcohol consumption with diabetes mellitus and impaired fasting glycemia among middle-aged and elderly Chinese. *Public Health, 10:713.*

Lu, M., Ye, W., Adami, H.O., Weiderpass, E. (2008). Stroke incidence in women under 60 years of age related to alcohol intake and smoking habit. *Cerebrovasc Dis; 25(6):517-25.*

Lucas, D.L., Brown, R.A., Wassef, M., Giles, T.D. (2005). Alcohol and the
cardiovascular system research challenges and opportunities. *Journal of the
American College of Cardiology, 45(12):1916–1924*

MacDonald, Z., and Shields, M. (2001). The impact of alcohol consumption on
occupational attainment in England, *Economica. 58: 427-453.*

Maclure, M. (1993). Demonstration of deductive meta-analysis: ethanol intake and risk of
myocardial infarction. *Epidemiological Review; 15:328-51.*

Marlatt, G.A., Witkiewitz, K. (2002).Harm reduction approaches to alcohol use: health
promotion, prevention, and treatment. *Addictive Behavior; 27(6):867-86.*

Marmot, M. (1997). "Income, deprivation, and alcohol use," *Addiction 92, Suppl 1:
S13–S20.*

Marmot, M.G. (2001). Alcohol and coronary heart disease. *International Journal of
Epidemiology, 30(4):724-9.*

Marques-Vidal, P., Ferrieres, J., Metzger, M.H. et al. (1997). Trends in coronary debate
heart disease morbidity and mortality and acute coronary care and fatality from
1985–1989 in southern Germany and south-western France. *Eur Heart J,18:816–
821.*

Marshall, C., Rossman, G. (2011). Designing Qualitative Reseach. Sage Publications,
Thousand Oaks, CA.

McFadden, C.B., Brensinger, C.M., Berlin, J.A., and Townsend, R.R. (2005). Systematic
review of the effect of daily alcohol intake on blood pressure. *American Journal
of Hypertension 18:276–286.*

McKenzie, C.R., and Eisenberg, P.R. Alcohol, coagulation, and arterial thrombosis. In: Zakhari, S., and Wassef, M., eds. Alcohol and the Cardiovascular System. NIAAA Monograph No. 31. NIH Pub. No. 96-4133. Washington, DC: U.S. Govt. Print. Off. pp. 413 439.

McMillan, J. H., & Schumacher, S. (2006). Research in Education: Evidence –Based Inquiry. Pearson Education, Inc.

Meister, K.A., Whelan, E.M. and Kava, R. (2000). "The health effects of moderate alcohol intake in humans: An epidemiologic review". *Critical Reviews in Clinical Laboratory Sciences, 37(3):261-296.*

Moskowitz, H., Burns, M. M., and Williams, A. F. (1985). Skills performance at low blood alcohol levels. *Journal of Studies on Alcohol 46, 482–485.*

Mukamal, K.J. Jadhav, P. P., D'Agostino, R. B. et al. (2001). Alcohol Consumption and Hemostatic Factors Analysis of the Framingham Offspring Cohort. *Circulation. 104: 1367-1373.*

Mukamal, K.J., Conigrave, K.M., Mittleman, M.A., Camargo, C.A., Stampfer, M.J., Willett, W.C., et al. (2003). Roles of drinking pattern and type of alcohol consumed in coronary heart disease in men. *New England Journal of Medicine.* 348:109–118.

Mukamal, K.J., Ascherio, A., Mittleman, M. A., Conigrave, K.M., Camargo Jr, A. C., Kawachi, I. et al. (2005). Alcohol and Risk for Ischemic Stroke in Men: The Role of Drinking Patterns and Usual Beverage. Ann Intern Med.; 142(1):11-19.

Mukamal, K.J., Chung, H., Jenny, N.S., Kuller, L.H., Longstreth, W.T. Jr, Mittleman, M.A., et al. (2006). Alcohol consumption and risk of coronary heart disease in

older adults: the Cardiovascular Health Study. *Journal of American Geriatric Soc; 54:30-7.*

Mukamal, K., J. and Rimm, E.B. (2008). Alcohol consumption: Risks and benefits. *Current Atherosclerosis Reports. Volume 10, Issue 6, pp 536-543.*

Mumenthaler, M.S., Joy L. Taylor,J.L., O'Hara, R., and Yesavage, J.A. (1999). Gender Differences in Moderate Drinking Effects. *Alcohol Research & Health. Vol. 23, No.1.*

Murray, C.J.L., Lopez, A. eds (1996) The global burden of disease: a comprehensive assessment of mortality and disability from diseases, injuries and risk factors in 1990 and projected to 2020. Global Burden of Disease and Injury, Vol. I. Harvard School of Public Health on behalf of WHO, Cambridge, MA.

Murray, R.P., Connett, J.E., Tyas, S.L., et al. (2002). Alcohol volume, drinking pattern, and cardiovascular disease morbidity and mortality: is there a U-shaped function? *American Journal of Epidemiology,;155:242–8.*

Naimi, T.S., Brown, D.W., Brewer, R.D. et al. (2005). Cardiovascular risk factors and confounders among nondrinking and moderate-drinking U.S. adults. Am J Prev Med 28, 369–373.

National Centre for Statistics and Analysis of the National Highway Traffic Safety Administration. NHTSA (2003). Traffic Safety facts.

Neuman, W.L. (2000). 'Social Research Methods - Qualitative and Quantitative Approaches' 4th ed., Allyn and Bacon.

NIAAA (1992). Alcohol Alert. No.16PH 315.

NIAAA (1997). Ninth Special Report to the U.S. Congress on Alcohol and Health. NIH

   Pub. No. 97-4017.

NIAAA (2005. Alcohol Alert.

NIAAA (2003). State of the Science Report on the Effects of Moderate Drinking.

   Retrieved May, 30 2013 from

   http://pubs.niaaa.nih.gov/publications/ModerateDrinking

NIAAA (2014). Alcohol Facts and Statistics. Retrieved from
   http://pubs.niaaa.nih.gov/publications/AlcoholFacts&Stats February 10, 2015.

Nova, E., Baccan, G., Veses, A., Zapatera, B., Marcos, A. (2012). Potential health

   benefits of moderate alcohol consumption: current perspectives in research. *The*

   Proceedings of the Nutrition Society.;71(2):307–315

Pai, J.K., Mukamal, K.J., and Rimm, E.B. (2012). Long-term alcohol consumption in

   relation to all-cause and cardiovascular mortality among survivors of myocardial

   infarction: the Health Professionals Follow-up Study. *European Heart Journal,*

   doi 10.1093.

Patton, M. Q. (1990). Qualitative Evaluation and Research Methods (2nd ed.). Newbury

   Park, CA: Sage.

Patton, M.Q. (2002). Qualitative Research and Evaluation Methods. Thousand Oaks, CA:

   Sage.

Pastore, A.L., & Maguire, K., eds. (2006). Sourcebook of Criminal Justice Statistics,

   Table 4.28.2005. Retrieved online June 14, 2013, from

   http://tn.gov/mental/A&D/A_D_docs/ADAT-06-07.pdf

Paunio, M., Olli, P., Heinonen, O.P., Virtamo, J., Klag, M.J., Manninen, V., Albanes, D., Comstock, W. (1994). HDL Cholesterol and Mortalit in Finnish Men With Special Reference to Alcohol Intake. *Circulation, Vol 90, No 6.* Retrieved March 26, 2015 from http://circ.ahajournals.org

Pearl R (1923) Alcohol and mortality. In The Action of Alcohol on Man, pp. 213–286. London: Longmans, Green and Co.

Peele, S., & A. Brodsky (2000), Exploring psychological benefits associated with moderate alcohol use: A necessary corrective to assessments of drinking outcomes? *Drug and Alcohol Dependence, 60, 221-247.*

Percival, S.S., & Sims, C.A. (2000): Wine modifies the effects of alcohol on immune cells of mice. *Journal of Nutrition,130, 1091 – 1094*.

Perissinotto, E., Buja, A., Maggi, S., Enzi, G., Manzato, E., Scafato, E., Mastrangelo, G., Frigo, A.C., Coin, A., Crepaldi, G., Sergi, G. (2010). Alcohol consumption and cardiovascular risk factors in older lifelong wine drinkers: The Italian Longitudinal Study on Aging. *Nutr. Metab. Cardiov. Dis., 20, 647-655*.

Peters, R., Peters, J., Warner, J., Beckett, N., Bulpitt, C. (2008). Alcohol, dementia and cognitive decline in the elderly: a systematic review. Age and Ageing. 37 (5): 505-512.

Pidgeon, N., & Henwood, K. (1997). Using grounded theory in psychological research. In N. Hayes (Ed.), Doing qualitative analysis in psychology (pp. 245-273). Hove, UK: Psychology Press.

Pischon, T., Girman, C.J, Hotamisligil, G.S, Rifai, N., Hu, F.B., Rimm, E.B. (2004).

    Plasma adiponectin levels and risk of myocardial infarction in men. *JAMA, 14;*

    291(14):1730-7

Poikolainen K. and Vartiainen E. (1999). Wine and good subjective health. American

    Journal of Epidemiology 150, 47–50.

Poli, A., Marangoni, F., Avogaro, A. et al. (2013). Moderate alcohol use and health: a

    consensus document. *Nutr Metab Cardiovasc. Dis. ;23:487–504.*

Pontes-Ferreira, M., Weems, M.K.Z. (2008). Alcohol consumption by aging adults in the

    United States: health benefits and detriments. *Journal. American. Diet*

    Association, 108, 1668-1676.

Pories, S. E., Gamelli, R. L., Vacek, P. et al. (1992). Intoxication and injury. *Journal of*

    Trauma 32, 60–64.

Ramchandani, V.A., Bosron, W.F., Li, T.K. (2001). Research advances in ethanol metabolism.

    Pathol. *Biol. 49: 676-682.*

Rehm, J., Mathers, C., Popova, S., Thavorncharoensap, M., Teerawattananon, Y., Patra,

    J. (2009). Global burden of disease and injury and economic cost attributable to

    alcohol use and alcohol-use disorders. *Lancet*; 373:2223–2233.

Rehm, J., Baliunas, D., Borges, G. L.G., Graham, K., Irving, H., Kehoe, T., Parry, C.D.,

    M., Room, R. et al. (2010). The relation between different dimensions of alcohol

    consumption and burden of disease: an overview. *Addiction. v(105);5, pages 817–*

    843.

Rehm, J., Sempos, C.T., Trevisan, M., (2003). Average volume of alcohol consumption, patterns of drinking and risk of coronary heart disease – a review. *Journal of Cardiovascular Risk1;10: 15-20.*

Renaud, S. and de Lorgeril, M. (1992). Wine, alcohol, platelets, and the French paradox for coronary heart disease. *Lancet;339(8808):1523-6*

Renaud, S., and Guegen, R., (1998). The French paradox and wine drinking. 216:208-17217-22, 152-8 Retrieved February 25, 2015 from http://www.ncbi.nlm.nih.gov/pubmed/9949795.

Reynolds, K., Lewis, B., Nolen, J.D., Kinney, G.L., Sathya, B., He, J. (2003). Alcohol consumption and risk of stroke: a meta-analysis. *JAMA, 289, 579-88.*

Rigaud, D., Cassauto, D., Reiser, P. (1998). Les apports energetiques des Francais. Gastroenterologie 1998;12:271–278.

Rimm, E.B., Giovanucci, E.L., Willett, W.C., et al. (1991). Prospective study of alcohol consumption and risk of coronary disease in men. Lancet. 1991; 338:464–468.

Rimm, E.B., Williams, P., Fosher, K., Criqui, M., Stampfer, M.J. (1999). Moderate alcohol intake and lower risk of coronary heart disease: meta-analysis of effects on lipids and haemostatic factors. *BMJ 319: 1523–1528D.*

Rimm, E.B. (2000). "Alcohol and cardiovascular disease". Nutrition: *Current Atherosclerosis reports, 2:529-535.*

Roerecke, M., Rehm, J. (2012).The cardioprotective association of average alcohol consumption and ischaemic heart disease: a systematic review and meta-analysis. *Addiction. 107(7):1246-60.*

Roerecke, M., Rehm, J. (2011). Ischemic heart disease mortality and morbidity in former

drinkers: a meta-analysis. *American Journal of Epidemiology; 173:245–258*

Ronksley, P.E., Brien, S.E., Turner, B.J., Mukamal, K.J. and Ghali, W.A. (2011).

Association of alcohol consumption with selected cardiovascular disease

outcomes: a systematic review and meta-analysis. *British Medical Journal 342:*

d671.

Room, R., & Rossow, I. (2001). The share of violence attributable to drinking. *Journal of*

Substance Use, 6, 218-28.

Roy, A., Prabhakaran, D., Jeemon, P., Thankappan, K.R., Mohan, V., Ramakrishnan, L.,

et al. (2010). Impact of alcohol on coronary heart disease in Indian men.

Atherosclerosis 210(2):531-35.

Royal College of Physicians (1987). The medical consequences of alcohol abuse, a great

and growing evil, Tavistock Publications Ltd.

Royal College of Physicians (2011). Royal College of Physicians' written evidence

Science and Technology Select Committee Inquiry on alcohol guidelines.

Ruf, T., Nagel, G. & Altenburg, H. (2005). Food and nutrient intake, anthropometric

measurements and smoking according to alcohol consumption in the EPIC

Heidelberg study. *Annals of Nutrition & Metabolism 49: 16–25.*

Sacco, R.L., Elkind, M., Boden-Albala, B. et al. (1999). The protective effect of moderate

alcohol consumption in ischemic stroke. *Journal of the American Medical*

Association, 281:53–60.

San José, B., van de Mheen, H., van Oers, J. A. M., Mackenbach, J. P., Garretsen, H. F. L. (1999). The U-shaped curve: Various health measures and alcohol drinking patterns. *J. Stud. Alcohol 60, 725-731.*

Sanchez-Craig, M., Wilkinson, D.A., Davila, R. (1995). Empirically based guidelines for moderate drinking: 1-year results of three studies with problem drinkers. *American Journal of Public Health; 85:823-8.*

Santos-Buelga, C. and González-Manzano, S. (2011). Wine And Health Relationships. A Question of Moderation? *Ciência e Técnica Vitiviní colaversão impressa ISSN 0254-0223*

Saremi, A., Arora, R. (2008). The cardiovascular implications of alcohol and red wine. *Am J Ther. ;15(3):265-77.*

Sato, K.K., Hayashi, T., Harita, N., Koh, H., Maeda, I., Endo, G., et al. (2012). Relationship between drinking patterns and the risk of type 2 diabetes: the Kansai Healthcare Study. *Journal of Epidemiol Commun, 66:507-11.*

Saumure, K., & Given, L. M. (2008). Data saturation. In L. M. Given (Ed.), The Sage encyclopedia of qualitative methods (Vol. 1, pp. 195–196). Thousand Oaks, CA: Sage.

Saunders, T.B. (1998) Defining Beneficial Patterns of Alcohol Consumption: A Survey of Clinicians. *International Center for Alcohol Policies.* Retrieved February 10 2015 from http://www.icap.org/portals.

Schooling, C.M., Lam, T.H., Li, Z.B., Ho, S.Y., Chan, W.M., Ho, K.S., et al. (2006). Obesity, physical activity, and mortality in a prospective Chinese elderly cohort. *Arch Intern Med 166(14):1498-504.*

Schwandt, T.A. (2000). "Three Epistemological Stances for Qualitative Inquiry:
Interpretivism, Hermeneutics and Social Constructionism." Handbook of
Qualitative Research. Denzin, N.K. and Lincoln, Y.S. (Eds.). Thousand Oaks,
California, Sage Publications: 189-214.

Sedgwick J: A New Treatise on Liquors Wherein the Use and Abuse of Wine, Malt
Drinks, Water, etc are Particularly Considered in Many Diseases, Institutions and
Ages With Proper Manner of Using Them Hot or Cold Either as Physik, Diet or
Both. London, Rivington.

Shadish, W. R., Cook, T. D., & Leviton, L. C. (1991). Foundations of program
evaluation: theories of practice. Newbury Park, CA: Sage.

Shai, I., Wainstein, J., Harman-Boehm, I., Raz, I., Fraser, D., Rudich, A., et al. (2007).
Glycemic effects of moderate alcohol intake among patients with type 2 diabetes.
Diabetes Care;30(12):3011-16.

Shaper, A.G., Wannamethee, G., Walker, M. (1988). Alcohol and mortality in British
men: Explaining the U-shaped curve. *Lancet.;2:1267–1273.*

Shaper, A.G., Wannamethee, G., Walker, M. (1998). Alcohol and mortality in British
men: Explaining the U-shaped curve. *Lancet.* 2:1267–1273.

Sierksma, A., Sarkola, T., Eriksson, C.J., van der Gaag, M.S., Grobbee, D.E., Hendriks,
H.F. (2004). Effect of moderate alcohol consumption on plasma
dehydroepiandrosterone sulfate,testosterone, and estradiol levels in middle-aged
men and postmenopausal women: a diet-controlled intervention study. *Alcohol
Clin Exp Res.28(5):780-5.*

Stampfer, M.J., Colditz, G.A., Willett, W.C., et al. (1988). A prospective study of
moderate alcohol consumption and the risk of coronary heart disease and stroke in
women. *New England Journal of Medicine, 319:267–273.*

Steinberg, D. (2002). Atherogenesis in perspective: hypercholesterolemia and
inflammation as partners in crime. *Nat Med, 8:1211–7.*

Stockwell, T., Greer, A., Fillmore, K., Chikritzhs, T., Zeisser, C. (2012). How good is the
science? *British Medical Journal, 344:e2276.*

Strandberg, A.Y., Strandberg, T.E., Salomaa, V.V. et al. (2004). Alcohol consumption,
29-y total mortality, and quality of life in men. American. *Journal of Clinical
Nutrition,80(5):1366–1371.*

Strauss, A., & Corbin, J. (1998). Basics of qualitative research: Techniques and
procedures for developing grounded theory. Thousand Oaks, CA: Sage.

Strauss, A., & Corbin, J. (1990). Basics of Qualitative Research: Grounded Theory
Procedures and Techniques. Newbury Park, CA: Sage Publications.

Sun, W., Schooling, C.M., Chan, W.M. et al. (2009) Moderate alcohol use, health status,
and mortality in a prospective Chinese elderly cohort. *Ann Epidemiology 19, 396–
403*.

Szabo G. (2007). Moderate drinking, inflammation, and liver disease. *Ann Epidemiology.
17:S49–S54.*

Taylor, B., Irving, H.M., Baliunas, D. et al (2009). Alcohol and hypertension: Gender
differences in dose-response relationships determined through systematic review
and meta-analysis. *Addiction 104(12):1981–1990. PMID: 19804464*

Taylor, B., Irving, H.M., Kanteres, F., et al. (2010). The more you drink, the harder you

    fall: A systematic review and meta-analysis of how acute alcohol consumption

    and injury or collision risk increase together. *Drug and Alcohol Dependence*

    110(1–2):108–116.

Teragawa, H., Higashi, Y., Kihara, Y. (2008) Effect of isoflavone supplement on

    endothelial function: does efficacy vary with atherosclerotic burden? *Eur Heart J*

    29: 2710–2712

Testino, G. (2011).The Burden of Cancer Attributable to Alcohol Consumption. *Journal*

    of Clinical Medicine. 6(4): 313–320

Thun, M.J., Peto, R., Lopez, A. et al. (1997). "Alcohol consumption and mortality among

    middle-aged and elderly US adults". *New England Journal of Medicine, 337(24):1705-*

    1714.

Trichopoulou, A., and Vasilopoulou, E. (2000). Mediterranean diet and longevity.

    British Journal of Nutrition;84 Suppl 2:S205-9

Trochim, W.M. K. (2006). The Research Methods Knowledge Base.

Truelsen, T., Gronbaek, M., Schnohr, P. et al. (1998) Intake of beer, wine, and spirits and

    risk of stroke: the Copenhagen city heart study. *Stroke 29, 2467–72.*

US Government. Alcoholic beverages: dietary guidelines for Americans (2005). US

    Government Printing Office.

Veenstra, J., Ockhuizen, T., van de Pol, H., et al. (1990). Effects of a moderate dose of

    alcohol on blood lipids and lipoproteins postprandially and in the fasting state.

    Alcohol Alcohol ;25:371–7.

Voight, B.F., Kang, H.M., Ding, J., Palmer, C.D., Sidore, C., Chines, P.S., et al. (2012). The metabochip, a custom genotyping array for genetic studies of metabolic, cardiovascular, and anthropometric traits. *PLoS Gen,8:e1002793.*

Volatier, J.L., Verger, P. (1999). Recent national French food and nutrient intake data. Br *Journal of Nutrition. 81:S57–S59.*

Wannamethee, S.G., Shaper, A.G. (2002). Taking up regular drinking in middle age: effect on major coronary heart disease events and mortality. *Heart, 87: 32-26.*

Wannamethee, S.G., Camargo, C.A. Jr., Manson, J.E., Willett, W.C., Rimm, E.B. (2003) Alcohol drinking patterns and risk of type 2 diabetes mellitus among younger women. *Arch Intern Med 163:1329–1336.*

White, S.L., Polkinghorne, K.R., Cass, A., Shaw, J.E., Atkins, R.C., Chadban, S.J. (2005). Alcohol consumption and 5-year onset of chronic kidney disease: the Australian Diabetes study. *Nephrol Dial Transplant;24(8):2464-72.*

Whitlock, E.P., Polen, M.R., Green, C.A. et al. (2004) Behavioral counseling interventions in primary care to reduce risky/harmful alcohol use by adults: a summary of the evidence for the U.S. Preventive Services Task Force. *Annals of Internal Medicine 140:557–68.*

WHO (2004). Global status report on alcohol 2004. Geneva: World Health Organization, 2004.

WHO (2002) World Health Report 2002: reducing risks, promoting healthy life. World Health Organization, Geneva.

Winters, L., Armitage, M., Stansfield, J., Scott-Samuel, A., and Farrar, A. (2010). Wellness Services – Evidence based Review and examples of good practice.

Observatory Report Series No. Retrieved from

http://www.liv.ac.uk/media/livacuk/ March 3, 2015.

Wouters, S., Marshall, R., Yee, R.L. and Jackson, R. (2000). Is the apparent
cardioprotective effect of recent alcohol consumption due to confounding by
prodromal symptoms? *American Journal of Epidemiology. 15;151(12):1189-93.*

Xin, X., He, J., Frontini, M.G., Ogden, L.G., Motsamai, O.I. and Whelton, P.K. (2001).
Effects of alcohol reduction on blood pressure: a meta-analysis of randomized
controlled trials. *Hypertension. 38(5):1112-7.*

Yamada, Y., Sun, F., Tsuritani, I.; and Honda, R. (2002). Genetic differences in ethanol
metabolizing enzymes and blood pressure in Japanese alcohol consumers. *Journal
of Human Hypertension 16:479–486.*

Yuan, J.M., Ross, R.K,, Gao, Y.T., Henderson, B.E., Yu, M.C. (1997). Follow up study
of moderate alcohol intake and mortality among middle aged men in Shanghai,
China. *British Medical Journal, 314:18-23.*

Zakhari, S. (1994). Alcohol and the cardiovascular system: molecular mechanisms for
beneficial and harmful action. *Alcohol Health and Research World, 21:21–29.*

Zakhari, S. (1997). Alcohol and the cardiovascular system: Molecular mechanisms for
beneficial and harmful action. *Alcohol Health & Research World 21:21–29*

Zakhari, S. (2006). Overview: How is alcohol metabolized by the body?Alcohol
Research & Health 29(4):245–254, 2006.

Zaridze, D., Brennan, P., Boreham, J. et al. (2009) Alcohol and cause specific mortality in Russia: a retrospective case–control study of 48,557 adult deaths. *Lancet 373:2201–14.*

Zhu, S., St-Onge, M. P., Heshka, S. and Heymsfield, S. B. (2004). Lifestyle behaviours associated with lower risk of having the metabolic syndrome. Metabolism: *Clinical and Experimental 53, 503–1511.*

A- Interview Protocol Form

Study's Title: An Evaluation of the Primary Care Providers' Perspective of the Effects of Moderate Alcohol Consumption on Health and Diseases: A Grounded Theory.

Date _____

Time _____

Location _____

Interviewer _____

Interviewee _____

Release form signed? _____

Notes to interviewee:
Welcome and thank you for your participation today. My name is Gisele Tchamba and I am a doctoral student at western Michigan University conducting this study in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Evaluation. Thank you for your willingness to participate in this study. The interview will take about 45-60 minutes. We will be discussing your perception of the health effects of moderate alcohol consumption as it relates to your daily interaction with your patients.
I would like your permission to tape record our conversation, so I may perfectly document the information you convey. If at any time during the interview you wish to withdraw the use of the recorder or the interview itself, please feel free to let me know. All of your responses are confidential. Your responses will remain confidential and will be used to develop a better understanding of how you provide guidance to your patients/clients on the issue of moderate alcohol consumption and health. The purpose of this study is to examine the experiences of prevention specialists, counselors, and physicians in the field when confronted with the discrepancy in the definition of moderate drinking and to identify what sets of guidelines you use to counsel your patients/clients.
        At this time I would like to remind you of your written consent to participate in this study. I am the responsible investigator, specifying your participation in the research project: An Evaluation of Primary Care Providers' Perspective of the Effects of Moderate Alcohol Consumption on Health and Diseases. You and I have both signed and dated each copy, certifying that we agree to continue this interview. You will receive one copy

and I will keep the other under lock and key, separate from your reported responses. Thank you.

       Your participation in this interview is completely voluntary. If at any time you need to stop, take a break, or return a page, please let me know. You may also withdraw your participation at any time without consequence. Do you have any questions or concerns before we begin? Then with your permission we will begin the interview.

B- Instruments

Sample Interview Questions

1. Please describe what you think is the relationship between moderate alcohol consumption and health. Probe will be:
- Different diseases
- Different theories
- Self-reporting issues
- Evidence of cardioprotective effects

2. What do you think about the evidence showing cardioprotective effects of moderate alcohol consumption? Probe on:
- Conflicting evidence
- Mechanism of action
- Causation argument
- Confounding factors (age, genes, diet)

3. How would you use the evidence on health effects of moderate alcohol consumption to inform patients presenting at your practice? For example how will the following factors matter?)
- Gender of patients
- Age
- Race of patient/genetic vulnerability
- Patients at-risk of becoming alcohol dependent
- Religion of patient

4. What is your personal belief about moderate alcohol consumption and health and does your personal stand influence how you recommend or don't recommend moderate drinking to patients.

C - HSIRB Approval Letter

Date: August 22, 2014

To: C. Dennis Simpson, Principal Investigator
        Gisele Tchamba, Student Investigator for dissertation

From: Amy Naugle, Ph.D., Chair

Re: HSIRB Project Number 14-05-15

This letter will serve as confirmation that the change to your research project titled "An Evaluation of Primary Care Providers' Perspective of the Effects of Moderate Alcohol Consumption on Health and Diseases" requested in your memo received August 20, 2014 (to change subject population pool from "primary care MDs/DOs "to " primary care PAs; recruitment process, informed consent process, location of data collection, recruitment letter and consent document revised to reflect this change) has been approved by the Human Subjects Institutional Review Board.

The conditions and the duration of this approval are specified in the Policies of Western Michigan University.

Please note that you may **only** conduct this research exactly in the form it was approved. You must seek specific board approval for any changes in this project. You must also seek reapproval if the project extends beyond the termination date noted below. In addition if there are any unanticipated adverse reactions or unanticipated events associated with the conduct of this research, you should immediately suspend the project and contact the Chair of the HSIRB for consultation.

The Board wishes you success in the pursuit of your research goals.

Approval Termination: June 3, 2015

Table 3**:** Axial Codes and Selective Code Based on Open

Codes

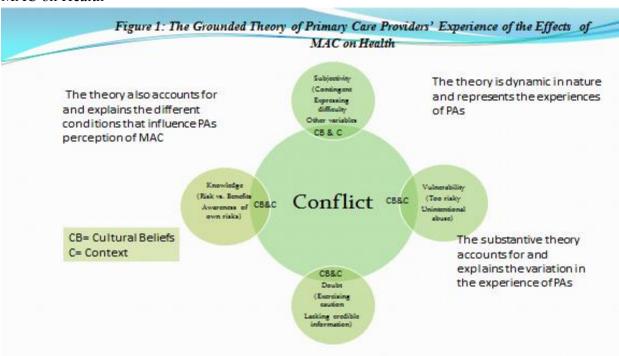| Open Codes	Axial Codes	Selective Code
Inability to explain objectively the relationship between MAC and health	Conveying subjectivism	Existence of conflict
Risk of abuse and dependence	Indicating vulnerability	
No strong evidence to recommend it for health Risks outweigh benefits	Expressing doubt	
Stressing Patients' self-knowledge and awareness of health risks of MAC	Educating patient	

Table 4:

Coding process: Questions exploring PCPs understanding of relationship between MAC and health, MAC's effects on diseases, evidence of cardioprotective effects, and factors that will influence their recommendations
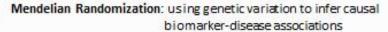
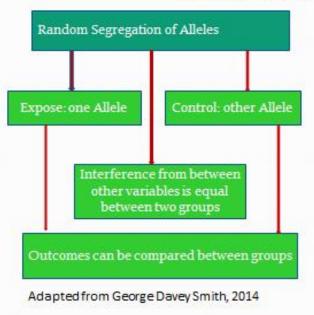| Open Codes	Properties	Examples of Participants words
Conveying the complexity of the issue	Showing uneasiness about the definition of MAC Considering factors that come into play Demonstrating uncertainty	Depends on the definition of moderate Depends on the individual Depends on person's overall health
Indicating subjectivity	Noticeably subjective	Depends on patient definition Depends on everyone definition of moderate
Conflicted /No black and white answer	Being uneasy because of the complexity of the issue Hesitant Unable to give a clear answer	I am uneasy about it Unsure It's hard to say/It's difficult
Expressing difficulty	Feeling uneasy Feeling uncomfortable Seeking to explain alcohol metabolism	May affect the person both ways It's hard to say Depends on the individual overall health Know who you are Genetic make up liver metabolism/rapid slow Depends on who you are Alcohol metabolizes differently for each person
Seeking to explain alcohol effects on genes	Wanting people to understand how effects of alcohol differ for each individual Seeking to clarify genetic vulnerability to alcohol	How are you going to know if you are someone who metabolizes alcohol so it benefits you or causes you illness Know your family history

		Because the ethanol hits the brain faster, and they will have much of an impact, and in that case it's harder for some people to limit themselves to one drink, and they may drink up to three drinks in one setting.
Doubting the evidence	Feeling skeptical beneficial effects of alcohol Not certain Being cautious about alcohol use Needing more information	Evidence is not clear Needs more knowledge Evidence is too soft Have not seen any health benefits in my years of practice It's a double edge sword
Doubting health benefits of MAC (not real in practice experience)	Cautious about claimed benefits of MAC	Don't recall seeing any benefits in practice Never recommended it to patients No randomized control trial
Demonstrating health risks	Finding it mostly Detrimental for CVD Finding it mostly detrimental for overall health Always detrimental if cardiac events Can't always know who will be affected	Impaired the liver and other organs Trickles the brain Can cause various cancers Increases & decreases blood pressure Can cause vertigo Can cause cancers Can lead to alcoholism or mental health, neurological diseases, ie. Alcoholic dementia Causes FAS CVD risks factors (hypertension, diabetes) Alcohol hits the brain too fast
Emphasizing awareness of risk of abuse and dependence	Wanting to prevent excessive drinking Not wanting to give people permission to drink Alcohol is sneaky Feeling concern about public perception	Individual difference Genetic make up Overdrinking Overindulging Fine line between MAC and heavy drinking Drinking in excess Wine taste good Driving after a drink Public perception Alcohol is a toxin

		It's a slippery slope
No good evidence to recommend it for health	Doubting evidence of beneficial effects of MAC Not wanting to give inaccurate information to the patient and public about alcohol	I don't believe it's beneficial I won't recommend it for health It will lead them to drink more Evidence is too soft Cannot recommend that someone drinks to prevent diseases Will personally recommend that people don't drink alcohol
Informing patients about risks of MAC on health	Helping patient make informed decision Helping patients understand the effects of alcohol on their body Helping patient to know who they are, gender difference, age Helping patients understand effects of alcohol on their health Discussing risk and benefits of drinking with patients	Alcohol is sneaky Know your family history There are conflicting theories Will empower them to know what is good for them Will tell them to know who they are Not certainly going to tell patients to drink more Patient education Drinking is risky I would never recommend MAC for health

D - The Grounded Theory of Primary Care Providers' Experience of the Effect of MAC on Health

Figure 1: The Grounded Theory of Primary Care Providers' Experience of the Effects of MAC on Health