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Patient Knowledge of Family History of Cardiac Events and Risk Factors: Potential for Increase in Preventative Care of Cardiovascular Diseases

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Patient Knowledge of Family History of Cardiac Events and Risk Factors:

Potential For Increase in Preventative Care of Cardiovascular Diseases

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Abbreviations Page

CVD: Cardiovascular Disease

CAD: Coronary Artery Disease

PAD: Peripheral Artery Disease

RHD: Rheumatic Hear Disease

CHD: Congenital Heart Disease

VTE: Venous Thromboembolism

WHO: World Health Organization

HTN: Hypertension

DM: Diabetes Mellitus

HLD: Hyperlipidemia

MI: Myocardial Infarction

CDC: Centers for Disease Control

COPD: Chronic Obstructive Pulmonary Disease

Abstract

The following literature review regards the preventative care of cardiovascular disease (CVD) patients with the knowledge of familial cardiac events and personal cardiac risk factors, particularly in younger populations ranging from ages 18 to 39, and develop potential preventative care measures. CVD is preventable with early reduction of risk factors. People can lower the impact of cardiac risk factors through the modification of their current lifestyle and behavioral habits. However, this is limited to the education and motivation of the person. Primary emphasis must be placed on community education and physician-patient interactions regarding CVD and cardiac risk factors. Physicians need to shift focus towards the behavioral changes of their patients and proper counseling. Concerning current studies, more information on physician-patient interaction needs to be discussed. More efficient forms of communication need to be created to relay pertinent information to the public concerning CVD and its prevention. The literature can be condensed into accessible and readable brochures or programs to mitigate the lack of awareness of CVD in populations. Overall, the current health system and education on preventative care for CVD and its risk factors is inadequate and requires remodeling.

Background

Cardiovascular disease (CVD) is the leading cause of death globally, resulting in 32% of deaths.[1] This number is greatly accentuated in developed countries where infectious diseases are less pernicious. As seen in European countries, the percentage of death rises to more than half of the total deaths.[2] A blanket term, CVD, concerns pathologies defined as Coronary Artery Disease (CAD), Peripheral Arterial Disease (PAD), Rheumatic Heart Disease (RHD), Congenital Heart Disease (CHD), and Venous Thromboembolism (VTE).[1]

The World Health Organization (WHO) estimates that around 80% of premature heart disease and stroke are preventable.[2] CVD has numerous modifiable risk factors, especially in early life. The major risk factors for CVD include high blood pressure or hypertension (HTN), diabetes mellitus (DM), smoking, abdominal obesity, and elevated lipid levels or hyperlipidemia (HLD). Each risk factor is highly affected by behavioral factors such as exercise, diet, stress management, smoking cessation, alcohol cessation, and weight management.[3] Nonmodifiable risk factors, including male gender, genetic predisposition, and increasing age, underscore CVD. Together, these risk factors are associated with a 90% risk of myocardial infarction (MI) consistently across varying groups worldwide, regardless of sex, ethnicity, or geographic location.[4]

CVDs are slow, progressive diseases that occur over an extended period, meaning there is a greater likelihood of developing the disease in older populations. Even though CVD is more prevalent in aging populations, the development of the disease is not inevitably proportional to age. Therefore, prevention and risk reduction in adolescents are imperative in the subdual of CVDs.[5] Samples from several studies demonstrated that around 25% of children and adolescents presented with one or more modifiable risk factors.[6] This number was increased to one-third when discussing adolescents aged 17 years with two or more risk factors.[7] (From here on out, the risk factor will replace modifiable risk factors as the modifiable risk factors of increasing age and male sex are not significant determinants in younger populations. Furthermore, genetic predisposition is too variable and challenging to test for in experiments, including a survey.) A 1994 study illustrated that 10% of 10–14-year-old children had atherosclerotic lesions. Children had diets consisting of excessive amounts of fat, sodium, and carbohydrates with low doses of potassium and vegetables. The same study illustrated that one out of 5 high school graduates was addicted to nicotine, mainly smoking cigarettes.[8] Recent years, smoking in America has lessened from 20.9% in 2005 to 12.5% in 2020.[9] However, the use of e-cigarettes is replacing a percentage of the Americans that stopped smoking tobacco products. As of 2020, 3.7% of Americans used e-cigarettes, and 39.7% of this population were former cigarette smokers.[10] These numbers are more staggering at younger ages. The CDC (Centers for Disease Control) noted that 11.3% of high school students and 2.8% of middle school students used e-cigarettes in 2021.[10] The use of vaporizers has similar effects, yet not wholly studied, on the cardiovascular system. For ease of demonstration will be considered in the same category as smoking cigarettes. Elevated lipid levels and smoking are the two most critical risk factors determined to cause CVDs, apparent in younger populations but seem to worsen exponentially with age.

Modifiable risk factors are well known among nonprofessionals, detailed in the medical literature. However, the effect on individual behaviors is less prevalent. Personal initiative is a crucial factor in preventing CVDs, which includes adherence to medications and behavioral and lifestyle changes. Physician-patient interaction significantly influences patient adherence and the overall scope of repetitive exposure to preventative measures.[11]

The U.S. Preventative Services Task Force provides evidence-based recommendations about clinical preventative care for medical professionals to follow.[12] They emphasize the importance of clinical behavioral counseling interventions. The counseling combines smoking cessation (if applicable) and healthy dietary, physical activity, and weight loss advice.[12] The care spans over months of contact with numerous interventionalists, specialists, physical therapists, dieticians, and therapists, with the overall goal of reducing the risk of CVDs by diminishing modifiable risk factors.[12] The majority of counseling occurs in primary care settings with a primary care physician who is the first contact for care management. Barring the primary care physician alone, this reduces the necessity of hospitalizations and the use of specialists.[13] The use of primary care with lifestyle counseling is a valuable tool in reducing the overall austerity of the effects of CVD.

Method

This literature review aims to analyze whether young populations seek preventative care for CVDs with the knowledge of family history and cardiac risk factors and condense the relevant data into one publication. Numerous publications on cardiac risk factors were collected aptly to discuss the basis of the worldwide burden from CVDs. The knowledge of cardiac risk factors is then compared to the importance of preventative care for CVDs and appropriate steps of interventional actions taken by younger populations. The discussion of programs and healthcare organizations that support healthy behaviors that mitigate CVD fulfills the review. The condensation of the literature concerning preventative care of CVDs assists healthcare educators, providers, and community leaders in advancements towards greater awareness of CVD and its possible prevention.

Results and Discussion

Preventative Care for Cardiovascular Diseases and Importance for Care

Vale (2000) surveyed a convenience sample of 63 diverse adolescents and young adults (50 men, 13 women). The ages of participants ranged from 18 to 21 years of age. The participants were given a questionnaire with the following questions submitted within 20 minutes to answer:

1. Identify risk factors that have been linked to the development of heart disease.

2. Is prevention of heart disease important to you?

3. What can someone do to prevent heart disease?

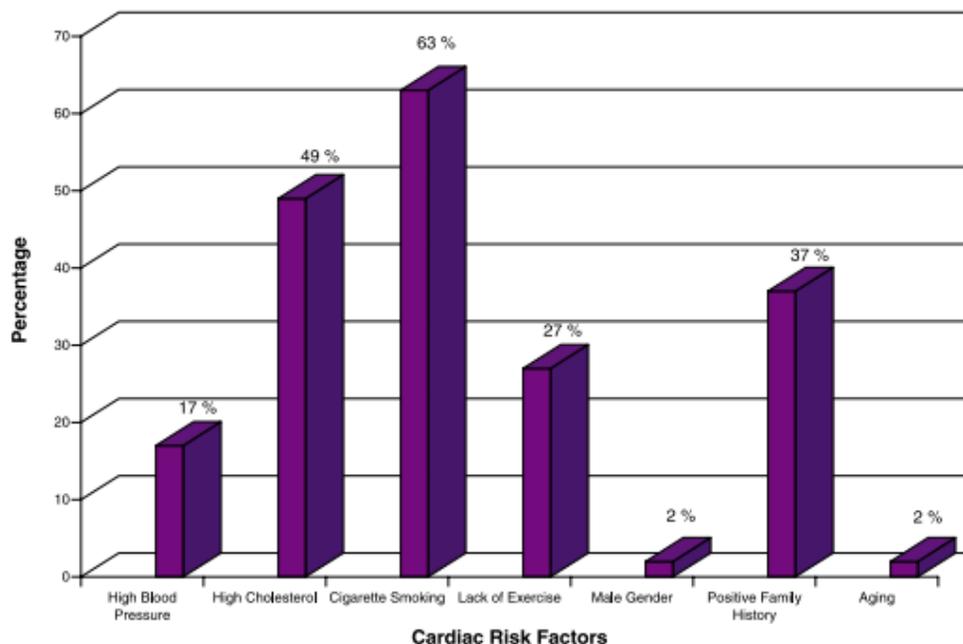4. Would you like more information on the prevention of heart disease?

FIGURE 1   Identification of cardiac risk factors ($N = 63$).

Vale, RN, MSN, A. (2000). Heart Disease and Young Adults: Is Prevention Important?. *Journal Of Community Health Nursing*, *17*(4), 225-233. doi: 10.1207/15327650051037294

Question 1 demonstrated moderate knowledge of cardiac risk factors in younger populations. Participants were able to identify seven cardiac risk factors attributing to the overall burden of heart disease. The seven identified risk factors included high blood pressure (17%), high cholesterol (49%), smoking (63%), lack of exercise (27%), male gender (2%), positive family history (37%), and aging (2%). The participants identified smoking, high cholesterol, and positive family history as the most contributable risk factors to CVD.
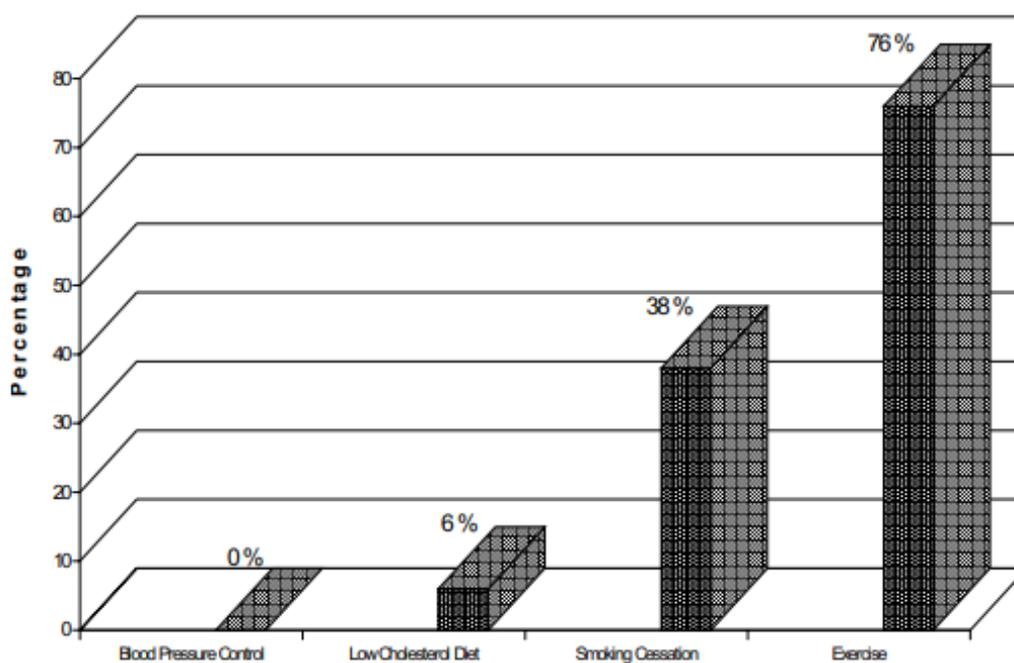
FIGURE 2   Identification of preventive measures ($N = 63$).

Question 3 demonstrated a vague and misguided understanding of preventative measures for CVD. The participants were able to identify three preventative measures, which included exercise (76%), smoking cessation (38%), and a low cholesterol diet (6%). Participants failed to identify blood pressure control as a preventative measure even though 17% of participants identified high blood pressure as a cardiac risk factor. Smoking has a similar trend of preventative measures. 38% identified smoking cessation as preventative, but 63% of participants had smoking as the most significant contributor to CVD.

Conversely, 76% identified exercise as the most critical prevention of CVDs, whereas only 27% of the participants included lack of exercise as a cardiac risk factor. 76% of the participants included a healthy diet as a preventative measure but were not specific with the diet's parameters. Thus, the results could not be categorized into a low cholesterol diet.

Question 2 and 4 were questions that went hand in hand. For question 2, 87% of participants stated that preventative care for heart disease was important. For question 4, 48% of the participants wanted more information on preventative care for heart disease. Chi-square testing was conducted to determine if there is a relationship between sex and the necessity of preventative care. Calculations showed no significant relationship between sex and the importance of preventative care for CVD.

Discussion

Young adults identified major cardiac risk factors with a moderate understanding of them. Seven risk factors identified were smoking, high cholesterol, positive family history, high cholesterol, lack of exercise, high blood pressure, male gender, and aging. The participants identified smoking, high cholesterol, and positive family history as the significant cardiac risk factors. Coincidingly, the participants identified exercise, smoking cessation, and a low cholesterol diet as preventative measures for CVD. However, none of the participants included blood pressure control as a preventative measure, which is significant as blood pressure is a severe risk factor for CVD. Further, the participants failed to clarify what constitutes a healthy diet; this demonstrates a nominal link between CVD and diet. Most of the participants included exercise as significant prevention for CVD. There seems to be a rudimentary understanding of cardiac risk factors and preventative measures in younger populations. The limited knowledge is exacerbated by the inclusion of healthy diets and exercise as the two most important preventative measures, the former being excluded for non-specificity, as previously mentioned. These statistics coincide with the importance of diet and exercise advocated by the U.S. government and programs such as Eat Healthy- Let's Move!, where the focus is to reduce adolescent obesity and instill healthier lifestyles in adolescents.[16]

Most of the participants stated that CVD prevention is important; however, only half of the participants wanted more information on the topic. The lack of pursuit of more knowledge implies adolescents believed they had sufficient knowledge.[14] This is an extremely significant factor in the prevention of CVD. Therefore, more in-depth education on CVD and the prevention of the diseases must be adopted in educational systems to impede the rise of risk factors in adolescents. The focus needs to be greater than exercise and a healthy diet. Health educators must emphasize decreasing high blood pressure with blood pressure management, decreasing high cholesterol with low-fat diets, decreasing smoking with smoking cessation, and understanding positive family history with screening for risk of CVD in adolescents.

Lifestyle Questioning in Primary Care

Behavioral counseling is conducted with routine checkups per the U.S. Preventive Services Task Force, which recommends routine screening of patients with every checkup. Nawaz et al. (2000) surveyed to determine how physicians adhere to these guidelines in practice. Four hundred thirty-three respondents reported a routine checkup within the past year with receptiveness to the inquiry into their health-related life.

The survey included the following inquiries:

1. During the last routine checkup, their physician had asked them about their diet, physical activity, and smoking.
2. Whether the patient lost weight, increased exercise, or modified fat or fiber intake in the past year.

The study contained a few definitions. Overweight status was determined from self-reported weight and height to calculate the body mass index or BMI by dividing the weight in kilograms by height in meters squared. Further, never smokers were considered respondents who smoked fewer than 100 cigarettes in their lifetime. In contrast, current smokers have smoked 100 cigarettes with the continuation of smoking. Former smokers have smoked 100 cigarettes but no longer smoke.

TABLE 2

Physician's Inquiries of Respondents Who Had a Checkup in the Past Year

| | Total (433) | Number and percentage asked about each topic | | |
		Diet n (%)	Exercise n (%)	Smoking n (%)
Gender				
Male	202	106 (53%)	104 (56)	156 (78)
Female	231	109 (48)	124 (55)	177 (77)
Age (years)				
18–39	188	88 (47)	104 (56)	142 (76)
40–64	159	86 (50)	94 (60)	128 (81)
65+	82	38 (47)	41 (51)	60 (74)
Race				
White	364	179 (49)	209 (57)	287 (79)*
Non-white	29	36 (52)	32 (47)	46 (66)
Education				
<High school	25	15 (62)	14 (55)	20 (80)
High school	151	72 (48)	77 (52)	120 (79)
>High school	257	128 (52)	151 (60)	192 (76)
Income (per year)				
<$25,000	146	80 (55)*	87 (61)*	107 (74)*
$25,000–50,000	88	34 (39)	42 (48)	63 (73)
>$50,000	137	76 (56)	87 (64)	115 (85)
Overweight status				
Overweight	94	51 (54)	53 (56)	72 (76)
Not overweight	339	164 (49)	187 (55)	261 (77)
Exercise				
Active	325	163 (50)	189 (58)	252 (77)
Inactive	103	52 (51)	51 (50)	81 (78)
Smoking Status				
Current	92	45 (49)	46 (50)	78 (85)*
Former	136	79 (58)	84 (62)	109 (80)
Never	198	90 (46)	110 (56)	144 (72)
All respondents	433	215 (50)	241 (56)	333 (77)

Note. Patients who either did not know or refused to answer were excluded from analysis. Total of 433 had checkup in the past year. Categories do not add to totals because of missing values. Asterisk denotes significant correlation by chi-square ($P = <0.05$).

Nawaz, H., Adams, M., & Katz, D. (2000). Physician—Patient Interactions Regarding Diet, Exercise, and Smoking. *Preventive Medicine*, *31*(6), 652-657. doi: 10.1006/pmed.2000.0760

Concerning the first inquiry, on average, 50% of the respondents reported questions about diet during their last evaluation. There was no significant difference in sex, race, educational level, weight, age, or physical activity. Equivalent results occurred for the inquiry about exercise, as 56% of the respondents reported questions about exercise during their last evaluation. There were no discrepancies in the previously mentioned variables, as well. However, these two inquiries had a significant increase in inquiry with income per year. For diet and exercise, the

range of <$25,000 was 55% and 61%, respectively, compared to the median income of $25,000-50,000 at 39% and 48%, respectively. For diet and exercise, the range of >$50,000 was 56% and 64%, respectively. The inquiry about smoking had an average of 77% of respondents being questioned about their current smoking status and habits, regardless of the physician's previous knowledge of whether the patient smoked. The inquiries were affected by income and smoking status but unaffected by the other variables. Respondents with an income >$50,000 were significantly more likely to be asked about their current smoking status, with an 85% likelihood of being asked. 16% of the respondents had no inquiries about the three topics. Their physician asked 28% of respondents about at least one issue, 15% were asked about two of the problems, and 41% were asked about all three health concerns.

TABLE 3

Behavior Changes Made by the Respondents Who Had a Checkup

| | | Changes | | |
	Total (433)	Lost weight n (%)	Increased exercise n (%)	Changed fat/fiber n (%)
Gender				
Male	202	75 (37)	88 (44)	93 (46)*
Female	231	104 (45)	123 (53)	148 (64)
Age (years)				
18–39	188	70 (37)	109 (58)*	93 (49)*
40–64	159	80 (50)	72 (45)	107 (67)
65+	82	30 (33)	27 (33)	38 (46)
Race				
White	364	150 (41)	169 (46)	203 (56)
Non-white	69	29 (42)	42 (61)	38 (55)
Education				
<High school	25	12 (48)*	9 (36)	14 (58)*
High school	151	50 (33)	73 (48)	70 (46)
>High school	257	117 (45)	129 (50)	156 (61)
Income (per year)				
<$25,000	146	53 (36)	70 (48)	67 (46)*
$25,000–50,000	88	39 (45)	48 (54)	48 (54)
>$50,000	137	64 (47)	71 (52)	92 (67)
Overweight status				
Overweight	94	53 (56)*	45 (48)	59 (62)
Not overweight	339	126 (37)	165 (49)	182 (54)
Exercise				
Active	325	143 (44)	175 (54)*	174 (53)
Inactive	103	36 (34)	35 (34)	66 (63)
Smoking Status				
Current	92	45 (49)	46 (50)	42 (45)
Former	136	61 (44)	67 (49)	83 (60)
Never	198	72 (36)	96 (48)	114 (57)
All respondents	433	179 (41)	211 (49)	240 (55)

Note. Patients who either did not know or refused to answer were excluded from analysis. Total of 433 had checkup in the past year. Categories do not add to totals because of missing values. Asterisk denotes significant correlation by chi-square (P = <0.05).

Nawaz, H., Adams, M., & Katz, D. (2000). Physician—Patient Interactions Regarding Diet, Exercise, and Smoking. *Preventive Medicine*, *31*(6), 652-657. doi: 10.1006/pmed.2000.0760

The second inquiry regards the behavioral changes made by the patients post behavioral questioning in clinics. In total, 41% of the respondents had a decrease in their weight, while 49%

had an increase in their exercise regimen. The average percentage for change in fat or fiber content in the respondents' diet was 55%. This value included an increase in fiber for 5.5% of the respondents, while 20% had a decrease in fat content. Furthermore, 51% of respondents who reported dietary changes experienced weight loss compared to 30% who did not experience weight loss. Decreasing fat intake further emphasized the percentage of 54% of nutritional changes occurring with weight loss. There seemed to be some association between respondents questioned about diet and weight loss, with 46% compared to 37% not being asked.

Similarly, overweight respondents reported a greater frequency of weight loss of 67% compared to 47% of overweight respondents that were not asked. Furthermore, overweight respondents lost weight more frequently than non-overweight respondents at 56% compared to 37%. The effect of the inquiry by physicians was unremarkable on the other two topics. There was no association between being questioned about exercise, losing weight, and increasing exercise. Similarly, smokers who were asked about their habits did not report any cessation or willingness to cease their routines within the following six months.

Discussion

Lifestyle questioning regarding major behavioral factors of dieting, exercising, and smoking was not discussed during every physician-patient interaction. There was no significant increase in motivation for behavioral change when the examination occurred, except for dieting. There was an effective weight reduction when patients were asked about their diets, regardless of their current weight. Further, there was a decrease in fat and increased fiber intake when physicians questioned dietary habits. Concerning nutritional habits, the equivalence between the percentage of overweight and non-overweight patients being questioned by physicians is of concern. Overweight patients lack sufficient attention to the means of reducing their weight and increasing healthy lifestyle changes.

The study lacked the understanding of whether physicians proceeded with counseling post inquiries or stopped after the questions. Additionally, there is no evidence that patients questioned their weight gain or unhealthy dietary habits. Nonetheless, it is most likely that there is no counseling succeeding a consultation without inquiry into the topics. Physicians may have omitted lifestyle questioning due to time constraints and lack of priority in most cases. The physicians have limited time with patients, averaging 10 to 20 minutes.[18] Physicians have a limited time prioritizing specific needs or the chief complaints over behavioral changes.[18,19] From the evidence of the study, there needs to be further discussion of behavioral change consideration in physician-patient interactions. Physicians need to address behavioral changes as a priority with routine consultations and practice adequate preventative techniques.

Health Behaviors with Structured Cardiovascular Risk Counseling and Supplementation

As discussed previously, cardiovascular risk counseling is effective at preventing CVD.[3] However, there is an extreme difficulty for patients to maintain healthy behaviors, even after

counseling. They lack the motivation to start the change to lower the risk of CVD.[19] Cardiovascular risk counseling is insufficient to benefit the affected populations if adherence is not attained with patients.

A German group, Tinsel et al. (2018), analyzed the supplementation of cardiovascular risk counseling with a brochure to improve patients' overall health and self-management. The plan involved specific goals for each follow-up between patients and their physicians. The included brochure was labeled "DECADE" or "decision aid, action planning, and follow-up support for patients to reduce the 10-year risk of cardiovascular diseases."[19] The brochure consisted of modules consistent with each follow-up discussion based on the Arriba cardiovascular risk calculator and the German Society of General Practice Family Medicine guidelines.

TABLE 1

DECADE: structured follow-up consultations

Start	+ 1 week	+ 4 weeks	+ 4 weeks (if needed)	+ 7 weeks
Arriba consultation: CVR score, treatment options DECADE brochures	Goal agreements and plans for changing behaviors	Follow-up consultation: Successes/lack of success/ changing goals and plans if needed	Follow-up consultation: Successes/lack of success/ changing goals and plans if needed	Arriba consultation: CVR score, treatment options + follow-up consultation

CVR score, cardiovascular risk score; DECADE, decision aid, action planning, and follow-up support for patients to reduce the 10-year risk of cardiovascular diseases

Tinsel I, Siegel A, Schmoor C, Poguntke I, Maun A, Niebling W: Encouraging self-management in cardiovascular disease prevention—a randomized controlled study of a structured advice and patient activation intervention in primary care. Dtsch Arztebl Int 2018; 115: 469–76. DOI: 10.3238/arztebl.2018.0469

Tinsel et al. (2018) created a plan for patients to abide by while the physician would continue to counsel and support the patient. They would discuss any successes or failures with their current projects and adjust if needed. The brochure was intended to refer to evidence-based plans of action that would coincide with their current follow-up plans. The study was split into two groups. Both groups received behavioral counseling, while only one group received the DECADE brochure supplemental support, the A group, and A+D group, respectively.

TABLE 2b

Changes in health behaviors[*1]

Reduction in risk factors between T0 and T1[*2]	A group		A+D group	
	Valid n	% (n)	Valid n	% (n)
Smoking	40	10.0 (4)	37	10.8 (4)
Overweight	39	20.5 (8)	36	16.7 (6)
Poor diet	40	32.5 (13)	38	36.8 (14)
Lack of exercise	39	25.6 (9)	37	40.5 (15)
Stress and hecticness	40	12.5 (5)	37	40.5 (15)
Alcohol consumption	40	22.5 (9)	38	13.1 (5)
General comment (T1)	N	%	N	%
"Overall I now live …"				
"…more healthily."	16	43.2	19	55.9
"…just like before [no change]."	21	56.8	14	41.2
"…less healthily."	0	0	1	2.9

n, number; T0, time point of inclusion in the study (baseline); T1, time point after four months (follow-up)
[*1] descriptive analyses according to study protocol (15)

Tinsel I, Siegel A, Schmoor C, Poguntke I, Maun A, Niebling W: Encouraging self-management in cardiovascular disease prevention—a randomized controlled study of a structured advice and patient activation intervention in primary care. Dtsch Arztebl Int 2018; 115: 469–76. DOI: 10.3238/arztebl.2018.0469

Similar to other studies, there was a significant increase in the patients' overall health with lifestyle counseling. With the use of the brochure, there was a noticeable positive effect on patient activation throughout the study. In contrast, a decrease in activation for patients without the brochure was noted. There was a moderate reduction in changes in risk factors in both groups. Exercise and stress/hecticness saw a significant improvement of 40.5% for the supplemented group, while there was an improvement of 25.6% and 12.5%, respectively. After the study, 55.9% of the supplemented group stated their lives have improved to more healthy habits, while only 43.2% of the A group agreed with the statement.

Discussion

Implementation of a structured and modulated brochure shows promise of feasible positive health behaviors and adherence behaviors with lifestyle counseling. The study indicated improvement in cardiovascular risk factors with the brochure. Patients were significantly more satisfied with every follow-up with their physician. Overall, the study suggests support for supplementation lifestyle counseling with additional materials.

Conclusion

Cardiovascular disease is preventable with proper education and intervention, especially at the adolescent ages of life (10-19).[3] Young populations, especially adolescents, can identify the main cardiovascular risk factors of smoking, high cholesterol, positive family history, lack of exercise, high blood pressure, male gender, and aging.[6,14] Also, they identified preventative measures for CVD, including exercise, smoking cessation, and a low cholesterol diet.[14] The adolescents had a rudimentary understanding of CVD and its prevention. Further, they lacked the understanding of the prevention of hypertension and clarification of their definition of diet. The statistics highlighted that this population wants to learn more about CVD and ways to mitigate the long-term effects of current unhealthy habits.[14,15]

The U.S. Preventative Services Task Force emphasized lifestyle counseling as the most effective form of limiting CVD.[12] The organization designs and recommends guidelines for physicians to abide by during every patient follow-up.[12] Nonetheless, physicians fail to discuss screening questions regarding the significant behavioral factors of dieting, exercising, and smoking.[18] The physicians overlook lifestyle counseling due to lack of priority and time constraints.[18] For the physicians who follow the guidelines, some physicians ask questions about the behaviors without providing counseling. The questioning does not have significant effects on maintaining behavioral habits in the patients.[18,19]

Patients require extra motivation from a professional in healthcare to break past barriers with patient activation.[20] The patients can be motivated with consistent and frequent follow-ups with their physicians.[21] The motivation is to entice patients to modify their diets and exercise.[22] Current healthcare is partially believed by patients to only occur in physician consultation rooms.[20] Most patients only seek care when necessary or when they deem it necessary.[20,23] Customized care with the endorsement of a physician is essential for a patient to establish preventative care for CVD. As shown in chronic diseases, such as DM and Chronic Obstructive Pulmonary Disease (COPD), patients who receive external resources and physician support for chronic disease self-management have increased healthy actions.[20,24] Further, they have better adherence to preventative care measures with interventional changes from professionals.[20] The lack of initiative by patients can be attributed to a lack of perceived self-efficacy in patients that results in the need for encouragement from professionals.[23] Patient self-efficacy is a learned attribute.[23,25] They can build the feature from continuous reassurance, persuasion, and interpretation from interactions with physicians.[23] They would form a good relationship with their physician and care team to enhance their activation of care further.[26]

Personally customized programs ease the angst of starting interventions without patient knowledge of where they will lead the patient.[23,26] The start of the programs would be tailored more towards adolescents with indications of cardiac risk factors. They would be personalized to each patient's need concerning their specific prevention stage, even reaching later stages of life with varying degrees of risk factors. For example, a patient with moderate risk factors in their

late 30s would receive more vigorous preventative steps than an 18-year-old female with no known CVD risk factors. The younger populations would focus on earlier changes to behavior to reduce the risk of CVD with specific dietary and exercise changes at the forefront. They would focus on a reduced-sodium and fat diet with increased aerobic exercise as primary preventions for hyperlipidemia and hypertension in the future.[2,5] Not only this, but they would also emphasize stress reduction to focus on mental and psychological states. Physicians would include smoking cessation to mitigate the effects of smoking on the body and, subsequently, the heart.[7] A program would consist of a similar brochure or take-home supplementation as the DECADE brochure.[19] A brochure would provide additional information on the prevention of risk factors and the necessary material to benefit the patient during the specific step of their progress to keep the patient accountable during the period between physician consultations.[20] A simple brochure would not be burdensome to already time-constrictive patients, as they would be easily followed by the patients.[27] Simple screening and counseling of the preventative care would exceed expected follow-up timing but is necessary to reduce risk factors for adolescents.

The change in preventative care would bring numerous benefits to the overall health of all populations. It would be generated from the increase in patient self-efficacy and activation, leading to a reduction in complications from CVD.[23] Not only would it reduce the overall rate of death from CVD, but it would also reduce the overall necessity of outpatient care.[11] Patients would be in good contact with their physician and care team. They would have the ability to communicate their current life status with their physician.

Future studies are required to develop a proper program and supplementation brochures similar to the DECADE brochure that would encapsulate the totality of CVD and its prevention. The studies must focus on the excitement of younger populations concerning preventative care of CVD and tailor it towards feasible achievements with adolescents. School systems must work with hospitals and physicians to create in-school programs to reinforce the early prevention of modifiable risk factors of CVD. The program would be a continuous course over the semesters and years of students in elementary school up to high school, in contrast to a sexual education course that only occurs once in a student's educational career. The programs would start kids off on an early prevention journey into their later years of life. In addition, there are standardized programs developed to manage patients with chronic diseases, but there are none to prevent them. Furthermore, as of now, there are only screening questionnaires detailing risk factors in adolescence. An increase in awareness of nonmodifiable risk factors would help expose people to the necessity of CVD preventative care. A fitting prevention program would be rapidly adapted into healthcare to reduce the need for physicians to take substantial time discussing behavioral changes in a clinical setting when there would be literature detailing the essential guide for prevention. Nonetheless, it would not substitute for clinical lifestyle counseling; rather, it would be a necessary supplement for current procedures.

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