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The Biopsychosocial Model: Application to Occupational Therapy Practice

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Abstract

Despite the call for the profession to embrace a more integrated and holistic approach to practice, therapists may be faced with practical challenges, including issues relating to client caseloads, productivity demands, scheduling, entrenched practices, limitations on service imposed by payer sources, and staffing and budgetary restraints, to name but a few. Due to these limitations, current occupational therapy practice may be predisposed to adopt a more reductive approach to the evaluation and treatment of symptoms, underlying biological pathologies, and resulting impairments and disabilities. Therefore, psychological and social factors may be neglected, resulting in an unbalanced, fragmented, and incomplete approach to patient care. This paper examines a more holistic and integrated biopsychosocial approach in current occupational therapy practice. Furthermore, an exploration of the Biopsychosocial Model, its relevance to the profession of occupational therapy, and the proposed methods of application toward a more holistic, evidence-based, and client-centered approach to clinical practice is addressed.

Comments

The authors report no conflicts of interest to disclose.

Keywords

biopsychosocial model, occupational therapy, psychosocial, holistic, model, frame of reference

Credentials Display

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Despite the call for the occupational therapy (OT) profession to embrace a more integrated and holistic approach to practice (American Occupational Therapy Association [AOTA], 2011, 2016), therapists may be faced with practical challenges to that ideal, including issues relating to client caseloads, productivity demands, scheduling, entrenched practices, limitations on service imposed by payer sources, and staffing and budgetary restraints, to name but a few. Furthermore, while the prevailing medical model of care favors a reductive and prescriptive approach to interventions addressing pathology, dysfunction, and disability, no single, unified approach is widely taken toward a more holistic, client-centered approach that integrates social and psychological factors alongside biological. The Biopsychosocial Model (Brewer, Anderson, & Van Raalte, 2002) offers therapists a practical framework with which to bridge this divide and advance toward a more inclusive, complete, and client-focused approach to care.

This article will examine the application of the Biopsychosocial Model to OT practice and provide model-based recommendations for guiding interventions, as well as directions for future research. Given its holistic approach and its ties to evidence-based practice, this model may have direct relevance and practical applications to multiple diverse client populations and diagnostic groups across both the life span and the continuum of care.

Literature Review

Indications for Occupational Therapy

Beyond consideration of biological factors and their impact on function, occupational therapists should be prepared to address the psychosocial deficits that may stem from both acute and chronic conditions impacting their clients' level of engagement and function in valued roles, tasks, and activities ('occupations'). Therapists have a variety of models and theories at their disposal to operationalize these processes; however, when considering social and psychological factors in generalist practice, no single, unifying theory, model, or approach has been adopted in the profession of OT to guide screening, evaluation, or intervention. OT-specific models, such as the *Model of Human Occupation* (MOHO) or the *Person-Environment-Occupational Performance Model* (PEO), are useful in explaining some aspects and contexts relevant to evaluation and intervention and may be paired with theories relating to emotional and psychological function. However, despite training received in OT degree programs relating to the use of theory, diverse frames of reference, and holistic approaches to client care (AOTA, 2017a), a disparity exists between the occupational therapists' training and subsequent application to practice, as evidenced by the predominant use of biomechanical approaches in clinical care (Ahn, 2016; Colaizzi & Provident, 2010).

The Gap: Introduction of the Biopsychosocial Model in Occupational Therapy

OT has, since its origins in psychiatry and mental health, used engagement in meaningful occupations as a therapeutic medium to address physical, cognitive, psychological, and social barriers to function (AOTA, 2017b). With the advent of the world wars, OT practice marked a transition toward a medical model approach, as therapists began tending to the needs of returning soldiers. This shift was further solidified as de-institutionalization, and it marked a decline in facility-based mental health OT. This expansion into physical rehabilitation, concurrent with a gradual shift away from institutional mental health services, resulted in a diversification of the profession into generalists and specialists, treating clients across the life span and across the continuum of care, largely in the prevailing medical model health care system. While client populations and treatment settings may have evolved, the philosophy of the profession remains holistic (AOTA, 2011). AOTA states that "today, OT remains a

holistic profession, committed to supporting clients' health, well-being, and participation through addressing the constellation of contextual, environmental, physical, psychological, and social factors that support engagement in desired occupation" (AOTA, 2016, p. 3). Further, several AOTA official documents, including the *Scope of Practice* (AOTA, 2014) and the *Occupational Therapy Practice Framework: Domain & Process* (OTPF; AOTA, 2017c), speak to a holistic approach to client-centered care.

How is it possible that OT may need a model promoting a biopsychosocial approach to care given the profession's origins, its professional identity of incorporating a holistic and client-centered approach to care, and its national accreditation standards requiring training in biological, cognitive, psychological, and social factors? The answer to this question may be found in both the history and the demographics of the profession. First, one must bear in mind the historical and contextual shift of the profession's primary practice setting from mental health to physical rehabilitation, as well as the significant proportion of the profession's development and history that occurred under the auspices of the medical model. Current workforce statistics indicate a majority of occupational therapists employed in settings that may be considered predominantly medical model in nature, including hospitals, outpatient clinics, home health services, sub-acute rehab facilities, and long-term care (AOTA, 2015). By extension, occupational therapists have adopted models consistent with the prevailing system(s).

In reporting its findings on a survey of the profession, the National Board for Certification in Occupational Therapy (NBCOT) cited that the three most frequently used frames of reference in 2004 included (a) biomechanical, (b) neurodevelopmental, and (c) sensory integration and O'Neal, Dickerson, and Holbert (2007) reported a similar combination. Colaianni and Provident (2010) also reported a higher percentage of bottom-up biomechanical interventions (81-90%) than top-down occupation-based interventions (41-50%). More recently, Ahn (2016) reported the most frequently used intervention approach to be biomechanical, at 31.6% (compared with use of a MOHO-based approach at 5.1%). The findings from Ahn (2016), Colaianni and Provident (2010), and O'Neal et al. (2007) represent a tendency toward a reductive, bottom-up approach to intervention addressing the component parts of the underlying systems. Under this view, the individual is made up of the sum of the parts; by remediating specific faulty component parts, the whole will be restored (Brown & Chien, 2010; Fisher, 1998; Ivey & Mew, 2010). Conversely, approaches such as MOHO and the PEO, among others, represent a more adaptive, top-down approach to the delivery of care. Under these models the emphasis is on adaptation and compensation (vs. remediation) to facilitate engagement and occupational performance (Brown & Chien, 2010; Fisher, 1998; Ivey & Mew, 2010).

In sum, while the reductive, bottom-up approaches favor the remediation of underlying systems and components, the top-down approaches favor an adaptive or compensatory approach to enhancing function (Weinstock-Zlotnick & Hinojosa, 2004). Taken together, these two disparate approaches cover a broad spectrum of approaches to intervention; however, in taking diametrically opposing views, they lack a more integrated and inclusive approach. We propose that the Biopsychosocial Model, which will be introduced in the following section, provides therapists with the means to bridge this divide by moving toward a more integrated approach to client care. Consideration will be given to its central tenets, its features of critical importance to rehabilitative therapies, its ties to evidence-based practice, and a sampling of its potential applications to OT practice.

The terms biopsychosocial model and biopsychosocial approach have been widely used in the larger body of literature with varying degrees of specificity and consistency. At times, these terms have

been used in a scoping and broadly defined conceptual manner, while at other times these terms have been used to reference the unique features of a specific biopsychosocial model. Further, in the field of OT, it bears clarification that the Biopsychosocial Model being introduced in the scope of this article represents a distinct and separate approach than that proposed in Mosey's (1974) model of the same name, which espoused, in more general terms, (a) a humanistic view of the client and (b) the role of the occupational therapist in employing a teaching-learning approach in educating and engaging the client in the therapeutic process to promote participation in meaningful activity. In contrast, the adapted Biopsychosocial Model that we propose represents an adaptation of the Brewer et al. (2002) model, which identifies critical areas of impact, including biological, psychological, and social-contextual factors that bear direct relation to each other as well to therapeutic outcomes. By directly addressing these identified factors, or areas of impact, clinicians can adopt an evidenced-based approach that can enhance client outcomes (Granquist, Hamson-Utley, Kenow, & Stiller-Ostrowski, 2014). Further, in addition to critical conceptual differences, this current adapted model draws from an expanded and updated evidence base and incorporates language consistent with the OTPF (AOTA, 2017c).

The Biopsychosocial Model

When considering the transition from a more singular emphasis on the bottom-up approaches of the prevailing medical model toward a more holistic and inclusive approach to evaluation and intervention, the therapist must consider not only the physical dysfunction but also psychological and social factors. Given the complex and interrelated processes that can occur between factors, as well as subsequent intermediate and long-term outcomes, it may be of benefit to the therapist to incorporate the use of an established model to inform and guide a holistic approach to intervention.

Born from the field of sports medicine, the Biopsychosocial Model (Brewer et al., 2002) represents a departure from the medical model to incorporate consideration not only of the biological factors (tissues affected, immune response, sleep, nutritional status) and nature of the injury (injury characteristics, including type, location, severity, history, and course of injury), but also the role that other factors play, including socio-demographic variables (socio-economic status, age, gender, race, and ethnicity), psychological factors (personality and emotional, behavioral, and cognitive responses), and social-contextual factors (situational and environmental characteristics, stressors, and supports and resources) (Granquist et al., 2014). This more diversified approach allows the therapist to move beyond a narrowly defined focus on biological factors, to consider and address a much broader range of factors that may exert significant impact on client outcomes. To that end, this model provides an accounting for the dynamic interactions between psychological factors and outcomes; specifically, how they reciprocally effect, and are affected by, intermediate and ultimate rehabilitation outcomes (Wiese-Bjornstal, Smith, Shaffer, & Morrey, 1998). Further, this model explains the effect of personal and situational (social-contextual) factors on the cognitive appraisal (client's perceptions and beliefs) and resulting recovery outcomes in parallel with the effect of behavioral and emotional responses on cognitive appraisal and the resulting recovery outcome.

The Biopsychosocial Model (Brewer et al., 2002) includes seven factors: (a) injury characteristics, (b) sociodemographic characteristics, (c) biological factors, (d) psychological factors, (e) social-contextual factors, (f) intermediate biopsychosocial outcomes, and (g) rehabilitation outcomes. As depicted in Figure 1, injury characteristics and sociodemographic factors directly influence biological, psychological, and social-contextual factors, which in turn effect intermediate biopsychosocial outcomes, and subsequently, rehabilitation outcomes. The relationship between the

psychological factors remains central to the model, impacting biological factors and social factors, as well as the intermediate and final rehabilitation outcomes. Of special note, the Biopsychosocial Model suggests a direct line of reciprocal influence between intrinsic psychological, biological, and social-contextual factors, as well as intermediate and long-term rehabilitation outcomes.

Figure 1. Adapted from “A Biopsychosocial Model of Sport Injury Rehabilitation,” by B. W. Brewer, M. B. Andersen, and J. L. Van Raalte, 2002, in D. L. Mostofsky and L. D. Zaichowsky (Eds.), *Medical and Psychological Aspects of Sport and Exercise*, p. 48. Copyright 2002 by Fitness Information Technology.

The Biopsychosocial Model highlights multiple areas of impact in which therapists can influence recovery by intervening on factors in the model (Brewer et al., 2002). Injury characteristics and sociodemographic factors are considered stable factors that the client brings to the model; while they are important to consider in developing an effective care plan, they may not be an area of direct intervention for the therapist (Brewer et al., 2002). This combined consideration for specific areas of impact in which therapists can most effectively intervene across a diverse field of factors (biological, psychological, and sociological) (a) represents the unique hallmark of this model, (b) allows for the integration of both top-down and bottom-up approaches, and (c) keeps with a holistic and client-centered approach to care.

Areas of Impact

Rehabilitation therapists can influence the recovery process by implementing interventions in areas of impact across the Biopsychosocial Model. For the client, rehabilitation outcomes are paramount for continued (or return to) participation in desired roles and activities. Biological, psychological, and sociological dimensions of the model have a direct impact on intermediate and ultimate rehabilitation outcomes. While each client brings a unique combination of injury and sociodemographic characteristics, biological predispositions, and comorbidities to the rehabilitation setting, the therapist can impact recovery by providing targeted evaluation and intervention based on the combination of dimensions. Clinical application of these areas will be explored further in the section: Introduction of an Adapted Model for Clinical Occupational Therapy Practice.

While this model was born from the domains of sports psychology and sports medicine, it bears direct relevance for application to the OT client population discussed in this article. The Biopsychosocial Model (Brewer et al., 2002) is theoretically robust in application due to sociodemographic characteristics. Further, the model includes the effect of the client's social network (or lack thereof), life stressors, and situational characteristics inclusive of home, work, and rehabilitation environments, as well as accounts for the effect of biological changes related to aging and client injury characteristics. As a result, application of an adapted Biopsychosocial Model to clients served by occupational therapists seems both plausible and promising. Further, and perhaps most relevant to current practice, this model offers therapists a tangible and accessible means by which to integrate the traditionally dichotomous approaches of top-down and bottom-up, toward a more inclusive, holistic, and client-centered approach to care.

Introduction of an Adapted Model for Clinical Occupational Therapy Practice

While a stark contrast exists between the use of the Biopsychosocial Model in sports medicine and its application by occupational therapists in addressing the needs of diverse client populations, this model represents a dynamic, inclusive, integrated, and holistic approach to client care. As such, this model is both relevant and applicable to diverse populations and is in keeping with the philosophical approach of the profession of OT. We have proposed an adaptation of the Biopsychosocial Model (see Figure 2) for use in OT practice in addressing the needs of varied client populations across settings and across the continuum of care.

As illustrated, this adapted model maintains the seven key elements of the original model, including (a) characteristics of the condition (previously termed injury characteristics), (b) sociodemographic variables that impact (c) biological variables, (d) psychological variables, and (e) social-contextual variables (which reciprocally interact with each other), to impact (f) intermediate, and (g) rehabilitative outcomes (see Figure 2).

To incorporate tenets of OT, this model integrates the language of the OTPF (AOTA, 2017c), as well as considerations of environment and task variables. While this model remains person-first, the inclusion of environment and task variables was relevant and in keeping with existing approaches that consider the fit between the person, the environment, and the task in facilitating optimal function in valued tasks, roles, and routines.

Implications for Using the Proposed Adapted Biopsychosocial Model in Occupational Therapy Practice

While the body of literature is too expansive to allow for an exhaustive analysis and synthesis of all clinically relevant applications of this model, the following discussion of the proposed adapted Biopsychosocial Model represents a careful sampling of relevant means by which the evidence base can be used with clients receiving OT services. The biological, psychological, and social-contextual implications are further described so that therapists may gain a greater understanding of how the model influences therapeutic assessments and interventions.

Biological factors. The biological dimension of the model includes physiological dispositions that may influence rehabilitation. While factors relating to characteristics of the condition and socio-demographics are relatively fixed and objective, OT interventions (rehabilitative and/or compensatory) addressing biological factors have traditionally focused on potentially modifiable variables (areas of impact). These modifiable variables include range of motion, strength, balance, coordination and motor control, modulation of sensory systems, activity tolerance, pain, and edema, as well as their subsequent impact on level of function in daily tasks, including activities of daily living (ADLs), instrumental activities of daily living (IADLs), mobility, transfers, and other valued occupations, roles, and routines. These modifiable variables are commonly the focus of treatment in many rehabilitative settings to influence indirectly the level of function in daily tasks.

In addition, education may be incorporated regarding the role of the preceding biological factors and interventions on rehabilitation, including the impact of sleep and nutrition on healing and wellness. Beyond education for informed decision-making, therapists can foster active client participation in identifying and prioritizing perceived deficits, goal areas, and preferred approaches to intervention, as well as participation in the selection of treatment modalities and activities (as appropriate) to enhance self-efficacy, perceived utility, and motivation.

While further exploration of the role of biological factors and related areas of impact could be undertaken, this section has been truncated as biological areas of impact are more commonly addressed (Ahn, 2016; Colaianni & Provident, 2010; O’Neal et al., 2007) in the provision of rehabilitative services and, therefore, may require minimal introduction. Further, while psychological and social-contextual factors exist in the OTPF (AOTA, 2014), exploring areas of impact relating to these factors may warrant greater consideration in relation to the application of this model in the following sections.

Figure 2. Adapted from “A Biopsychosocial Model of Sport Injury Rehabilitation,” by B. W. Brewer, M. B. Andersen, and J. L. Van Raalte, 2002, in D. L. Mostofsky and L. D. Zaichowsky (Eds.), *Medical and Psychological Aspects of Sport and Exercise*, p. 48. Copyright 2002 by Fitness Information Technology. Adapted from *The Occupational Therapy Practice Framework: Domain and Process* (3rd ed.), by The American Occupational Therapy Association, 2017, *American Journal of Occupational Therapy*, 68. Copyright 2017 by The American Occupational Therapy Association.

Psychological factors. In conjunction with the biological areas of impact, the psychological dimension of this proposed adapted Biopsychosocial Model includes consideration of factors including the role(s) of sleep and nutrition in healing, cognitive appraisals, and psychological strategies for behavior modification. One example of a common area of impact in the category of psychological factors is how anxiety and depression influence the rehabilitation process. While the incidence of anxiety and depression in the general population has been reported to be 18.1% and 6.7%, respectively (Center for Behavioral Health Statistics and Quality, 2016), the incidence of mood disorders in the acute rehabilitation setting is reported to be much higher, ranging from 20-64% (Minniti & Tawadrous, 2015), as clients attempt to cope with changes in health, function, and independence. Further, the presence of these conditions has been correlated with diminished outcomes in diverse client populations, including older adults (Leibold, Holm, Raina, Reynolds, & Rogers, 2014; Shabab, Nicolici, Tang, Katz, & Mah, 2017); and those with stroke (Linder et al., 2015), traumatic brain injury (Bombardier et al., 2010; Browne et al., 2013), spinal cord injury (Kennedy & Rogers, 2000; Murray, Zebracki, Chlan, Moss, & Vogel, 2017), and cancer (Rost, Wilson, Buchanan, Hildebrandt, & Mutch, 2012); and clients with orthopedic (Flanigan, Everhart, & Glassman, 2015; Lenze et al., 2004), low vision (Fitzgerald & Fitzgerald, 2015), cardiac (Januzzi, Stern, Pasternak, & DeSanctis, 2000) pulmonary (Leupoldt, Taube, Lehmann, Fritzsche, & Magnussen, 2011; Luk, Gorelik, Irving, & Kahn, 2017) or inflammatory arthritic conditions (Geenen, Newman, Bossema, Vriezolk, & Boelen, 2012; Hornikx et al., 2013), among others. Given the demonstrated incidence of psychological disorders (including anxiety and depression), proactively addressing psychological factors may well be considered requisite in (a) addressing a holistic approach to evidence-based and client-centered care and (b) optimizing outcomes through addressing factors that have been demonstrated to directly impact therapeutic outcomes (Leibold et al., 2014) and quality of life (Luk et al., 2017). This further supports the connection between psychological factors and rehabilitation outcomes as illustrated by the original Biopsychosocial Model (see Figure 1) (Brewer et al., 2002), as well as the proposed adapted Biopsychosocial Model introduced in Figure 2.

While impairments of sleep and nutrition may be addressed as biological factors (Brewer et al., 2002), they have also been shown to correlate with psychological factors, including mood (depression and anxiety) and, ultimately, diminished rehabilitative outcomes (Granquist et al., 2014). Addressing these critical areas of impact may include client education regarding the role of nutrition in depression and anxiety (Rao, Asha, Ramesh, & Rao, 2008). Education may involve healthy eating, dietary restrictions and precautions, potential dietary contributions to risk factors, and recommendations for a clinical dietary consult as needed. Likewise, client education may be indicated regarding the role of sleep in managing depression and anxiety (Anxiety and Depression Association of American, n.d.). Education may include strategies revolving around restful sleep, such as using a sleep journal, modifying light and noise, using environmental strategies, following a consistent sleep schedule, and limiting use of electronic devices and the consumption of alcohol prior to bedtime (Mayo Clinic, 2017; National Institutes of Health, 2017).

Personality and personal factors also warrant consideration as components of the larger category of psychological factors in this model. Use of clinical and/or standardized measures (Granquist et al., 2014; Kamphoff, Thomae, & Hamson-Utley, 2013) for clinical profiling may help to assess areas such as motivation, focus, anxiety, worry, expectations, emotions, identity, understanding, and pain tolerance that may impact the plan of care. In addition, using a clinical profiling approach, one in which the client is actively engaged, may aide to increase the client's own self-awareness, understanding, and

motivation. This may occur through the collaborative development of a plan of care that is tailored to suit the unique interests and needs of the individual, which may further facilitate adherence to a plan of care (Granquist et al., 2014).

The occupational therapist should also consider emotional responses to injury, impairment, disability, and intervention as psychological factors. Use of clinical and standardized measures of depression and/or anxiety may help to facilitate a discussion to increase the client's awareness of potential problems and the impact of depression and/or anxiety on outcomes. In addition, the occupational therapist can raise a client's awareness through education regarding current and alternate positive coping strategies and through further discussion with the physician regarding client report and clinical presentation in therapy.

Another area of impact in the psychological domain of OT interventions includes modifying the client's behavior through rehabilitative and/or compensatory interventions. Affected cognitive skill sets (including sustained attention, alternating attention, divided attention/dual task demands, orientation, recall/memory, problem-solving, sequencing, insight and judgment, information processing, and perceptual skills) may influence the client's level of understanding and ability to participate in, carry over, and generalize treatment recommendations. Screening and provision of educational interventions may address cognitive factors relating to psychological considerations, such as past and current maladaptive coping strategies, available coping resources and supports, knowledge of stressors, and adaptive-positive coping strategies. Evidence-based cognitive coping strategies may include imagery, relaxation techniques (breathing, progressive muscle relaxation), positive self-talk, and goal-setting (Covassin, Beidler, Ostrowski, & Wallace, 2015; Granquist et al., 2014; Kersten, McCambridge, Kayes, Theadom, & McPherson, 2015).

In addition, the occupational therapist may consider the client's cognitive appraisals, which may be described as the client's beliefs regarding his or her condition, the situation, ability to impact change, or benefit from interventions. Client education (and identifying and correcting faulty or inaccurate perceptions or beliefs) may play a role in reframing these appraisals for improved motivation and outcomes. As a point of distinction, cognitive appraisals, as a component of the Biopsychosocial Model (Brewer et al., 2002; Brewer, 2007, 2009), are different from the more traditional view of cognition represented in the larger body of OT literature, which typically represents cognition as skill sets and operations, including orientation, attention, memory, perceptual skills, sequencing, and problem-solving.

The preceding section addressed psychological factors and areas of impact and represents not only areas for evaluation, but also for directed intervention. In addition, recommendations may be made for community support groups, and referrals to and collaborations with primary care and referring physicians may be made regarding client report and clinical presentation in therapy with consideration of other potentially beneficial referrals, including psychological support services. As noted with biological factors, engaging the client in identifying and prioritizing perceived deficits, goal areas, and preferred approaches to intervention as part of a collaborative approach may aide in increasing motivation and adherence to the client's OT plan of care. This may further facilitate motivation by providing education regarding diagnoses, interventions, treatment plans, and anticipated outcomes, and by establishing expectations of adherence to a plan of care (Granquist et al., 2014). Use of the Canadian Occupational Performance Measure and other similar outcome measures that incorporate client-identified goals may also be beneficial.

Behavioral techniques to facilitate goal setting, management of stress and anxiety, and positive self-talk are evidence-based interventions shown to impact therapeutic outcomes (Granquist et al., 2014). Use of these techniques, along with calibrating the client's cognitive appraisals of his or her situation, allows therapists to examine the indicated areas of impact when applying the proposed adapted Biopsychosocial Model for rehabilitative care.

Social-contextual factors. The social-contextual dimension of the proposed adapted Biopsychosocial Model includes consideration of factors such as social supports, life stressors, situational characteristics, and the rehabilitation environment. Occupational therapists may have a vital role to play in one of the primary areas of impact in the social-contextual factor of the Biopsychosocial Model by providing screening and educational interventions that address stress as part of a holistic and integrated plan of care. Occupational therapists should consider and discuss potential sources of stress that extend beyond the primary diagnosis and related impairments, including personal, relational, family, vocational, financial, or environmental influences.

In addressing social supports, occupational therapists may work with clients to identify potential support resources, including family, friends, physical and virtual support groups, and religious and volunteer organizations (Mohler, Neufeld, & Perlmutter, 2015; Polito & Golden, 2017; Watts, Henke, Chambers, Tran, & Clarke, 2015). In addition, therapists may work to identify and educate clients about appropriate professional resources, including medical providers (primary care and specialists), rehabilitative and therapy service providers, and psychological and counseling services, among others.

Moreover, occupational therapists may explore situational characteristics that may influence the rehabilitation process. This may include working in partnership with clients to identify perceived barriers to accessing needed supports and/or participating fully in care or other situation-specific concerns that the client might have. Following identification of client concerns, a collaborative approach to problem-solving may be implemented to identify appropriate strategies to address concerns. Addressing these concerns may take the form of reframing the client's cognitive appraisals regarding social-contextual factors, education using available resources, diagnosis and plan of care, expectations for participation, and expectations for recovery (Granquist et al., 2014).

Furthermore, considering the rehabilitation environment, occupational therapists may work to reduce the psychosocial sequelae of identified deficits and facilitate adherence to the plan of care by addressing social-contextual factors. First, the therapist may work to ensure convenience in scheduling, as well as the accessibility and comfort of the treatment environment. Second, the therapist may provide education about the rehabilitative process and establish an expectation of adherence to the mutually agreed upon schedule and plan of care. Third, the therapist may work to encourage client autonomy in the treatment process by providing education for informed decision-making and collaboration regarding client identified and prioritized goals, thus allowing greater independence with selection and completion of recommended treatment tasks as able. Finally, the therapist may structure sessions to include additional supports, including the support of other clients or other staff members, and family by incorporating family training to provide education regarding diagnosis, the role of therapy, plan of care, progress, and recommendations for beneficial supports (Granquist et al., 2014).

Additional elements, including characteristics of the environment and task, have been added to this revised model and serve as contextual features and elements that may have reciprocal effects on biological and psychological factors. However, these additional environmental and task-related factors

are not further explored here, as they are widely represented in the larger body of OT literature with regard to consideration of facilitating fit between person-environment-task variables.

Case Vignette: Application of Revised Model to Practice

To facilitate a clearer and more detailed understanding of how OT can provide therapeutic services to address areas of impact in the biological, psychological, and social-contextual factors, a vignette overviewing selected areas of impact for a client who experienced a cerebral vascular accident (CVA) has been presented as a sequential series of five images. Appendix A includes the vignette along with the first tier of the model, including characteristics of the condition and sociodemographic factors. The next tier of the model explores inter-related elements of the biological (see Appendix B), psychological (see Appendix C), and social-contextual factors (see Appendix D). Lastly, the resulting intermediate biopsychosocial outcomes and subsequent rehabilitative outcomes are considered in the final tiers of the proposed adapted model (see Appendix E).

Discussion

The proposed adapted Biopsychosocial Model provides a framework for a holistic approach to client care that will enable the occupational therapist to consider and address psychological and social-contextual factors in addition to the nature of the condition, client demographics, and biological factors. This more integrated approach offers the occupational therapist the opportunity to move beyond singular reliance on remedial bottom-up or adaptive and compensatory top-down approaches toward a more inclusive and individualized approach to evidence-based, client-centered care in addressing a broader range of factors impacting therapeutic outcomes. In addition, given the inclusive nature of this model, the potential exists for the integration of other appropriate interventions, approaches, models, and theories in the biopsychosocial framework to address the needs of the individual client.

Future Research

This skilled clinical integration of multiple approaches toward an individualized and hybridized model of evidence-based and client-centered care represents both the art and the science of OT in client care. Further research is needed to advance evidence-based practice through (a) continued model development and revision, (b) theory design and validation, (c) design and testing of evaluation and screening measures to address core biological factors alongside psychological and social factors, and (d) efficacy studies of available approaches to intervention. In addition, and more specifically relevant to the ongoing development of this model, further study may be warranted to explore the nature of relationships between biological and social-contextual factors and rehabilitation outcomes. Under the current model, biological, psychological, and social-contextual factors each influence intermediate outcomes, as well as each other. While the Biopsychosocial Model (Brewer et al., 2002; Brewer 2007, 2009) proposes that biological and social-contextual factors affect rehabilitation outcomes by way of intermediate outcomes, it may be relevant to determine whether these factors exert direct and independent influence on rehabilitation outcomes. Further, exploration regarding the nature and direction of the relationships may be of benefit in the development of a more dynamic and integrated model.

Conclusion

Beyond consideration of fit between factors relating to person-environment-task and occupation, the proposed adapted Biopsychosocial Model offers an integrated, holistic, and evidence-based approach to addressing the person at the center of the model. Inclusive of both top-down and bottom-up approaches, this person-first approach is not achieved through the exclusion of factors, but rather

through the inclusion of multiple related factors as important contextual variables that may have a reciprocal impact on the individual and, ultimately, on rehabilitation outcomes. In sum, awareness, identification, and inclusion of biopsychosocial factors in the plan of care may provide therapists with a broader base from which to effect real and meaningful improvements in clients' outcomes, including level of function, satisfaction, and quality of life.

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Appendix A

Vignette, Characteristics of the Condition, and Sociodemographic Factors

Biopsychosocial Model Intervention Map for Case Vignette: Mary Smith Vignette, Characteristics of the Condition and Sociodemographic Factors

Mary Smith, a 78-year-old widowed retiree, is being evaluated for occupational therapy services following a recent left hemisphere stroke that has resulted in mild aphasia and right hemiparesis; both of which are now resolving. Mrs. Smith has comorbidities including type-2 diabetes (DM-II), hypertension (HTN), hyperlipidemia (HLD), and history of depression and anxiety. Overall, Mrs. Smith currently requires minimal assistance for transfers, mobility, and self-care due to her right hemiparesis. Mrs. Smith was fully independent in all areas prior to her stroke, and she was actively involved in her church, gardening, and home-making activities. Mrs. Smith has become tearful and has expressed concern regarding her ability to care for herself and her ability to return to the activities and roles that she values.

In addition to traditional interventions addressing 1) physical function (as part of 'biological factors') including neuromuscular reeducation of the left hemi-body, balance, transfer and mobility training, and ADL and IADL training, 2) cognitive factors (as part of 'psychological factors') including attention, recall, sequencing, problem-solving, etc., consider how the intervention in the following sections may address modifiable elements of biological, psychological, and social/contextual factors as part of a more holistic and evidence-based approach to client-centered care.

Appendix B

Biological Factors

Biopsychosocial Model Intervention Map for Case Vignette: Mary Smith

Biological Factors: A Sampling of Possible Interventions to Address Areas of Impact

Appendix C

Psychological Factors

Biopsychosocial Model Intervention Map for Case Vignette: Mary Smith

Psychological Factors: A Sampling of Possible Interventions to Address Areas of Impact

Appendix D

Social-Contextual Factors

Biopsychosocial Model Intervention Map for Case Vignette: Mary Smith
Social & Contextual Factors: A Sampling of Possible Interventions to Address Areas of Impact

Appendix E

Immediate Biopsychosocial and Rehabilitation Outcomes

Biopsychosocial Model Intervention Map for Case Vignette: Mary Smith Outcomes