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The Power of Empowerment: An ICF-Based Model to Improve Self-Efficacy and Upper Extremity Function of Survivors of Breast Cancer

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ABSTRACT

Breast cancer is one of the most frequently diagnosed cancers among women. Breast cancer treatments often negatively impact the function of the arm, and quality of life and upper extremity function does not always return to a prediagnosis level. Survivors of breast cancer may also experience feelings of diminished self-efficacy related to functional deficits resulting from their physical limitations. The International Classification of Functioning (ICF) provides a framework for rehabilitation practitioners to address physical and psychological impairments, activity limitations, and participation restrictions. Patient outcomes may be improved by fostering self-efficacy through empowerment. This paper explores how the ICF model and theories of self-efficacy and empowerment can interact to promote improved rehabilitation outcomes for women who have survived breast cancer. A model for the role of rehabilitation practitioners to enhance self-efficacy through empowerment in order to minimize participation restrictions resulting from upper extremity morbidities is proposed.

INTRODUCTION

Breast cancer is the second most often diagnosed cancer in women, with an estimated 207,000 new cases diagnosed in the United States in 2010, and an annual mortality rate of nearly 40,000.¹ The aggressive treatment of breast cancer has resulted in survival rates increasing by nearly 15% over the last 25 years, with rates now approaching 90%.² With more women living longer after breast cancer treatment, rehabilitation practitioners, such as physical and occupational therapists, have turned their attention to the long-term problems these women face and their effect on quality of life. Breast cancer treatments often negatively impact the function of the shoulder and arm. Physical problems that can persist beyond the postoperative recovery period include deficits in upper extremity range of motion, strength, and function,³⁻⁶ as well as lymphedema,^{7,8} pain,⁴ and overall fatigue.⁹ Additionally, women post breast cancer treatment may experience feelings of loss, lack of control, and diminished self-efficacy related to functional deficits resulting from their physical limitations. These physical and psychological deficits have been reported to affect the quality of life among survivors of breast cancer,¹⁰⁻¹³ defined here as women who are living after treatment for breast cancer.

To maximize quality of life outcomes, rehabilitation practitioners must do more than merely address musculoskeletal deficits of women who have survived breast cancer. The World

Health Organization's International Classification of Functioning, Disability, and Health (ICF) provides a framework for rehabilitation practitioners to address not only physical and psychological impairments, but also subsequent activity limitations and participation restrictions resulting from long-term post breast cancer treatment problems that impact an individual's ability to participate in life activities. Within the ICF model, personal factors unique to an individual may serve to support or hinder recovery. One such personal factor is self-efficacy, the ability to manage one's situation.^{14,15} Empowerment, the support given to another which can positively affect self-efficacy, is one way in which rehabilitation practitioners may intervene at the personal factor level of the ICF. Using the ICF, in combination with the application of the theories of self-efficacy and empowerment to support emotional needs, may help improve upper extremity function and quality of life. The aim of this paper is to explore how the ICF model and theories of self-efficacy and empowerment can interact to promote improved rehabilitation outcomes for women who have survived breast cancer. A model for the role of rehabilitation practitioners is proposed.

THE IMPACT OF UPPER EXTREMITY DEFICITS ON FUNCTION

Full use of the upper extremity is an essential component for the successful execution of activities of daily living (ADLs), as well as most household chores and occupational demands. Upper extremity function may be compromised through surgical procedures or the development of lymphedema following breast cancer treatment, with resulting pain and impairments in range of motion or strength, which are likely to limit function. Several studies have established that there is a correlation between adequate arm and shoulder range of motion and functional tasks.¹⁶⁻²⁰ In a study of 125 participants with shoulder symptoms, available shoulder elevation motion correlated with functional activities such as combing the hair or washing the back.²¹ Bostrom, in a study examining 32 females with rheumatoid arthritis, found moderate to good correlations between shoulder-arm motion and strength with disability.²² These studies demonstrate that impaired upper extremity function, brought on by either motion or strength deficits whatever the cause, can result in activity limitations and subsequent participation restrictions.

Impairments in upper extremity function among women who have been treated for breast cancer may persist in the short term (up to one year) following breast cancer diagnosis,^{3,6,23} to as long as 10 years after surgical intervention.²⁴⁻²⁷ Researchers

have reported that up to 35% of women who have been treated with mastectomy, axillary lymph node dissection, or radiation to the axilla have upper extremity or activities of daily living deficits greater than one year following treatment.^{4,28,29} The prevalence of motion limitations has been reported to be as high as 51%.³⁰ A systematic review by Lee et al³¹ reports rates of shoulder weakness, lymphedema, and motion restriction and pain as high as 25%, 30%, and 60%, respectively, among women who underwent both surgery and radiation therapy. Levangie et al³² analyzed 22 studies to examine the magnitude of these deficits, and determined most studies concluded that not only did deficits persist beyond one year following treatment, but that the magnitude of these deficits was moderate to large (effect sizes as high as 0.8). Specifically investigating the impact of shoulder impairments on disability and quality of life, other researchers concluded that pain with shoulder motion, restricted motion, and decreased grip strength, all impacted levels of disability and quality of life.^{33,34} Hayes et al³⁵ examined task burden, the product of the frequency of a task weighted by the perceived difficulty of performance, of daily task activities which require upper extremity function in women who had undergone breast cancer treatment. Participants' time since diagnosis ranged from 3 to 45 years. The researchers concluded that those with upper extremity limitations, especially lymphedema, had more difficulty with upper body tasks, again showing that such problems can persist beyond the initial post-operative recovery stage. Rehabilitation practitioners can use the ICF model as a guide to address these ongoing concerns.

THE INTERNATIONAL CLASSIFICATION OF FUNCTIONING, DISABILITY, AND HEALTH

The ICF model combines aspects of medical diagnoses with levels of functioning and disability in order to predict service needs for individuals.³⁶ The goal of the ICF is to shift the focus from cause, or diagnosis, to impact, or function. The model integrates the diagnosis and subsequent impairments of overall function within the context of environmental and personal factor constraints (see Figure 1). It is important to understand the terms used in this model. Body functions are the physiological functions of the body, while structures are the anatomical parts involved. Activity limitation is defined as difficulty executing

a task, while participation restrictions are problems regarding involvement in a life situation. The environment is that place, physical as well as social and attitudinal, in which the individual interacts.³⁶ This includes access to medical care as well as accommodations necessary to function at optimal levels. Personal factors encompass what is in the venue of the individual's control, such as the level of self-efficacy.

The ICF model explains how deficits at the body function and structure level can adversely affect activity level and ultimately result in participation restrictions. Participation restrictions can include difficulty completing normal household activities, work-related responsibilities, and engaging in social or physical activities. For example, upper extremity range of motion or strength deficits may limit the ability of a survivor of breast cancer to complete self-care activities, reach, or lift. These limitations can in turn result in a participation restriction such as an inability to perform a recreational activity like swimming. Environmental factors, including being unable to obtain adequate rehabilitation services, or personal factors such as low self-efficacy, may also impact her ability to participate in leisure activities. This relationship between impairments, activity limitations, and subsequent participation restrictions for women who have survived breast cancer is shown in Figure 2.

Researchers have examined how shoulder function impairments among survivors of breast cancer affect disability levels and quality of life and found that motion limitations were correlated with scores on disability and quality of life scales.³³ Swisher and colleagues⁵ surveyed 76 participants 1 month to 30 years following breast cancer treatment and concluded that the impairments suffered by participants (arm weakness, lymphedema, pain, and stiffness) resulted in both activity limitations and participation restrictions, as measured by a researcher-created questionnaire and the Disabilities of the Arm, Shoulder and Hand (DASH) questionnaire. Rehabilitation practitioners possess the skills and training to address functional deficits and as such, can address all aspects within the ICF model that impact function.

REHABILITATION THEORIES

Self-Efficacy

Self-efficacy, the ability to manage one's situation,^{14,15} is an important psychological construct impacting women who have

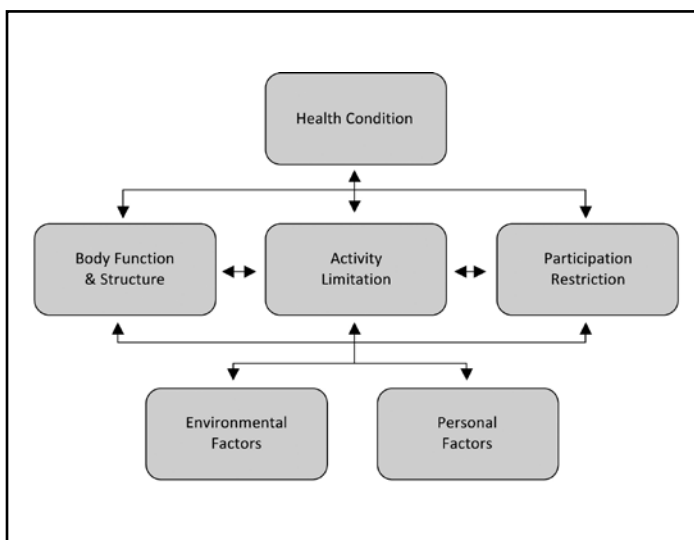


Figure 1. The ICF Model.

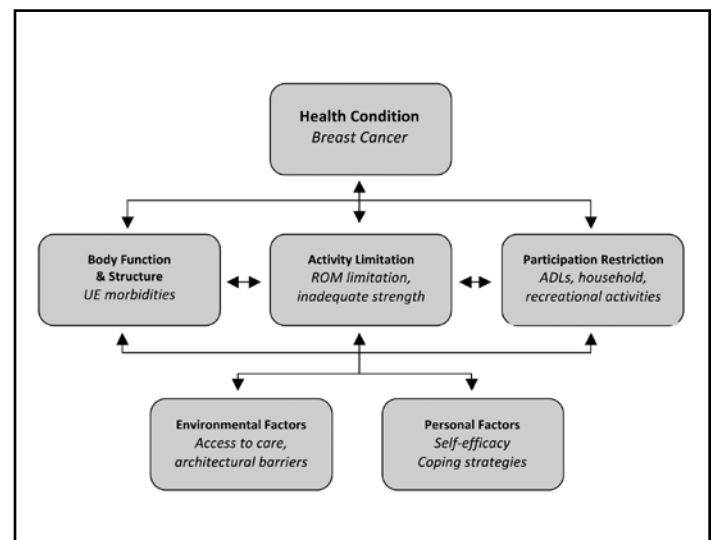


Figure 2. Breast cancer within the ICF Model.

survived breast cancer. Within the ICF model, self-efficacy is a personal factor that is unique to an individual and may have a positive or negative impact on the woman's overall health. For instance, a survivor of breast cancer with low self-efficacy may have greater difficulty seeking out and accessing rehabilitation services, whereas a survivor with higher levels of self-efficacy may have strong expectations for recovery.

Self-efficacy is a component of Social Cognitive Theory, authored by Albert Bandura. The primary tenet of the Social Cognitive Theory is that individuals use a self-reflective cognitive process to manage and adapt to change in the environment, while the environment and personal factors (cognition) in turn affect the behavior of the individual.¹⁴ The three constructs—behavior, personal factors, and environmental factors—interact with one another in a fluid fashion. Similarly, the ICF model adopts and incorporates both personal and environmental factors into the interplay between the disease process and its effect on activity and performance. In understanding Social Cognitive Theory, the ability of a survivor of breast cancer to manage the effects of the diagnosis and subsequent surgery and treatment process supports how personal and environmental factors can affect functional outcomes within the ICF model.

Bandura defines self-efficacy as an organizing construct that translates thought into action to manage life situations. Specifically, it is the belief in one's own abilities to exercise influence over the events that affect one's life.¹⁴ Higher levels of self-efficacy, Bandura argues, enhance human accomplishment and personal well-being, while those with lower levels of self-efficacy find challenges threatening, and often give up in the face of such challenges.¹⁴ Bandura further argues that those with low levels of self-efficacy are subject to stress and depression, whereas those with higher levels feel they can exercise control over threatening situations and are subsequently less prone to stress and depression.¹⁴

Self-efficacy can be developed and enhanced through several methods. The first method is mastery of challenges. Challenges are presented to an individual at a level that is attainable in order to build confidence and mastery.¹⁴ This is similar to the basis of physical rehabilitation, where mastery is accomplished through a progression of gradually increasingly difficult tasks until the final objective is accomplished. Vicarious modeling, a second method to foster self-efficacy, can show a like individual proof that a goal can be reached,¹⁴ that is, that someone with a similar problem can achieve a similar goal. Social persuasion is another way to build levels of self-efficacy.¹⁴ Social persuasion can be likened to positive peer pressure, or having others provide positive verbal encouragement and feedback to accomplish a task. Improving levels of self-efficacy among women with breast cancer can give survivors the ability to exercise greater control over a situation that can be difficult to control.

Empowerment

Empowerment theory may be used by rehabilitation practitioners to help improve the self-efficacy of survivors of breast cancer. Empowerment theory is the structure and application of processes that enhance participation and control over life situations for goal achievement. Psychological empowerment is the provision of knowledge, skills, and resources in order to increase control over an individual's social and environmental factors in

one's life.³⁷ Empowerment requires an analytical understanding of the social context in which a situation occurs, and the individual and collective resources to take action.³⁷ This differs from self-efficacy as empowerment arises from an external source that affects internal beliefs. Psychological empowerment requires an analytical understanding of the social context in which a situation occurs, and the individual and collective resources to take action.³⁷ Empowerment, then, is a combination of self-efficacy, a sense of control and process of participation, in order to exert control through choice.³⁷ In turn, by providing knowledge and fostering abilities to enhance personal control, self-efficacy is enhanced.

The current trend toward patient-centered care has its basis in empowerment. Taylor suggests multiple methods to empower patients, based on an examination of several case studies of individuals in a chronic fatigue syndrome empowerment project who demonstrated an improved ability to meet self-determined goals after participation in the program.³⁸ In a qualitative study examining patient influences and participation in rehabilitation, Wikman and Fältholm³⁹ propose a model of rehabilitation to enhance therapeutic outcomes. This model suggests that a traditional medical model, during which a patient is subordinate to a medical care provider, is enhanced when an 'individual' model, during which a patient takes control over his or her situation, is implemented. By giving the patient control over the direction of care, patient coping skills and outcomes of care may be improved.^{38,39}

Self-Efficacy and Empowerment in Rehabilitation

Self-efficacy has been studied in the rehabilitation literature by several authors. Hu et al⁴⁰ examined self-efficacy in college-aged women and found that those women with intrinsic motivation for physical activity possessed confidence in their own abilities and control over their own behaviors. These women were able to execute a necessary course of action while those with lower self-efficacy scores were found to have lower enjoyment of physical activity.⁴⁰ More importantly, the researchers attempted to manipulate the levels of self-efficacy, and found that the manipulation was successful in modifying levels of self-efficacy within the participants.⁴⁰ This suggests that levels of self-efficacy are not static, and provides further evidence for health care practitioners to play a greater role in enhancing self-efficacy by directly addressing it.

In older women, the influence of self-efficacy was examined in terms of physical functioning, and Umstadd et al⁴¹ concluded that lower levels of self-efficacy, with pessimism as a component cognitive attitude, resulted in lower levels of physical functioning. The authors also found that although age and disease status were significantly correlated to physical functioning, when self-efficacy was higher, disease status was no longer significantly associated with physical functioning.⁴¹ That is, higher levels of self-efficacy mediated the effects of a disease on physical functioning. The authors suggest that these influences on physical activity are modifiable and need to be addressed in order to improve physical functioning in older women.⁴¹ This may have implications for survivors of breast cancer, particularly older women.

There is emerging empirical support for the relationship between self-efficacy and positive outcomes among survivors of breast cancer. In a study by Rogers et al,⁴² researchers examined barriers to physical activity among survivors of breast cancer on

the premise that such barriers would be significantly associated with levels of self-efficacy.⁴² Specific barriers such as fatigue, prediagnosis levels of activity, social support, perceived barriers to activity, and enjoyment were examined for direct effects on levels of self-efficacy, and conversely the affect of the levels of self-efficacy on physical activity were examined. The authors concluded that those survivors with lower reported fatigue, more social support, lower perceived barriers to activity, and higher levels of enjoyment were more effective in overcoming barriers to activity, with a direct positive correlation between levels of social support and levels of physical activity, demonstrating higher levels of self-efficacy.⁴² Another study examined women receiving chemotherapy for breast cancer who were randomized to either an efficacy-enhancing intervention group or usual care.⁴³ Findings at 4 and 8 months supported the intervention in terms of higher quality of life as measured by the FACT-B, and lower distress as measured by the Symptom Distress Scale. Finally, Weihs and colleagues⁴⁴ examined coping mechanisms and levels of support among women who had undergone breast cancer treatment. Those women with stronger support systems had more effective coping mechanisms and were found to manage their disease process more effectively, with an overall outcome of lower morbidity and mortality rates.⁴⁴ The ability to cope and manage the disease process is an example of positive levels of self-efficacy, with a significant effect on survival outcomes.

The empowerment model has not been specifically researched among survivors of breast cancer, but it has been examined in the rehabilitation setting. Researchers aiming to determine how empowerment took place among individuals with disabilities, applied an empowerment model to a vocational and community rehabilitation program.^{45,46} The results showed that the process of empowerment is multidirectional between the individual and the community, and that empowerment ultimately improved quality of life.^{45,46} This understanding helps rehabilitation practitioners recognize how the application of empowerment is a multidimensional construct, that the environment plays a role in the quality of life, and that empowerment can have a positive effect on quality of life. This multidimensional construct can be manipulated to enhance levels of self-efficacy among the female survivors of breast cancer.

Application of the Empowerment Theory to Increase Self-Efficacy in Survivors of Breast Cancer

Rehabilitation practitioners can use the empowerment theory as a tool to increase self-efficacy in survivors of breast cancer. In a study by Larsson et al,⁴⁷ physical activity experiences among breast cancer survivors were examined, and the investigators categorized and described the experiences in terms similar to self-efficacy and empowerment. Descriptions of the experience included participants taking control of their situation by using new strategies, which is a behavior that is seen with higher levels of self-efficacy. Experience descriptions also included the need for support and instruction to gain skills to take such control; that is, empowerment.⁴⁷ The authors stressed that physical therapists must understand these needs on the part of the survivor of breast cancer for information and support in order to prevent limitations to physical activity.⁴⁷ This study provides direct support for the role of physical and occupational therapists to empower patients through guiding the goal-setting process to provision of educa-

tion to attain goals and enhance self-efficacy. Further evidence of the role of empowerment in increasing self-efficacy can be seen in a study involving 18 women receiving chemotherapy for breast cancer who received an intervention aimed at increasing self-efficacy levels.⁴³ The intervention used instruction in specific strategies for the participants to master independence in self-management of their situation and resulted in improved quality of life and decreased symptom distress.

Research in empowerment and self-efficacy in rehabilitation support the theory that higher levels of both constructs result in higher activity levels, fewer perceived functional barriers and higher levels of quality of life. Furthermore, research supports the need for rehabilitation practitioners to understand the multi-dimensional nature of disease and health on overall function, and how these professionals can have a positive effect on outcomes through empowerment to improve self-efficacy. A model for rehabilitation empowerment can guide the practitioner in facilitating this growth.

A MODEL FOR REHABILITATION EMPOWERMENT

Rehabilitation practitioners' application of the empowerment theory makes its entrance into the ICF model at the personal factor level, and flows upwards to affect other personal factors, activity limitations, and participation restrictions. Self-efficacy levels may be enhanced through empowerment of the survivor of breast cancer across the continuum of care, resulting in improved outcomes in both upper extremity function and overall quality of life (see Figure 3). The interrelatedness of the theories of self-efficacy and empowerment require back and forth interplay for a positive ultimate outcome. Rehabilitation practitioners have the skills and opportunities to capitalize on empowerment techniques to nurture self-efficacy through the multiple methods advocated by Bandura, which may ultimately improve overall treatment outcomes. See Table 1.

One common aspect between the process of rehabilitation and enhancing self-efficacy is mastery of challenges. In rehabilitation, rehabilitation practitioners skillfully guide the client through progressively more challenging activities in order to reach goals, that is to master a particular problem. By empowering the survivor of breast cancer through her involvement in

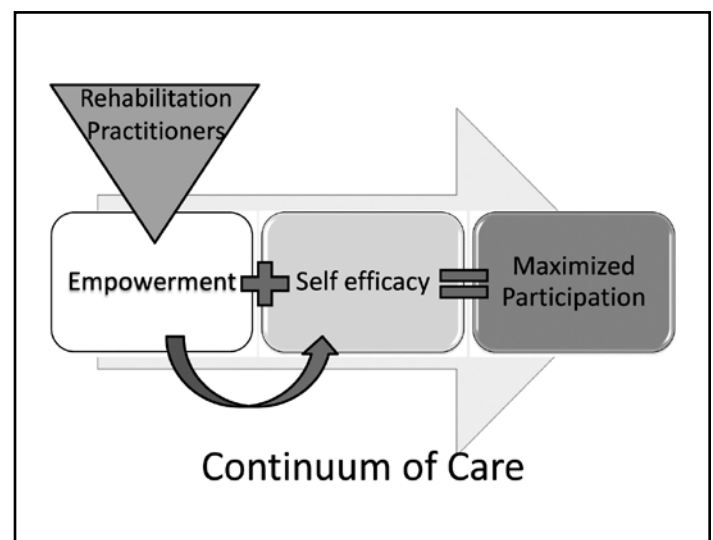


Figure 3. A model for rehabilitation empowerment.

Table 1. Methods to Empower Survivors of Breast Cancer to Improve Upper Extremity Function

Method	Rehabilitation Practitioner Role	Example
Mastery of Challenges ¹⁴	Education Goal setting Short term attainable goals Long term functional goals	Inability to raise arm above head <ul style="list-style-type: none"> Reach greater than 90° elevation Reach above head to take light item out of a cabinet Be able to return to sport activity (swim, tennis)
Vicarious Modeling ¹⁴	Education via individual counseling Stories/vignettes of others who have had similar problems	Preoperatively: <ul style="list-style-type: none"> Basic information regarding proposed surgical procedure and implications on upper extremity function Methods to prevent post-operative upper extremity morbidities Postoperatively: <ul style="list-style-type: none"> Explanation for morbidities present postsurgically Physical rehabilitation intervention aimed at body structure or function involved, to prevent or reverse activity limitations and participation restrictions Self-care methods to foster independence, greater self-efficacy for independent management of condition Internet or video interviews of previous patients
Social Persuasion ¹⁴	Resource Education	Cancer Pals Support groups Internet resources

the goal-setting process, she gains a measure of control over her care. An example of this can be seen when both shoulder range of motion and strength are limited. More than merely writing a goal to regain full motion and strength, the rehabilitation practitioner needs to identify, through the client, exactly what tasks cannot be completed because of these deficits, such as styling her hair. The goal, then, is written to achieve the functional task, and may initially be that of achieving the range and strength necessary to reach above her head, and then progress to the ability to complete the task of styling her hair. This involvement in goal-setting, empowering clients with control over the direction of rehabilitation, plus setting progressively more difficult but attainable goals, enhances self-efficacy as one develops a sense of self-control over her situation, and develops mastery. This in turn can allow the survivor of breast cancer to progress to achieving more challenging activity goals, such as being able to return to swimming, thereby overcoming a participation restriction.

When the rehabilitation practitioner assesses the client and determines a direction for care, the rehabilitation practitioner can educate that person on the physical deficits and how the breast cancer treatment she has undergone may have resulted in these deficits, and provide the best evidence based options for overcoming them. Rehabilitation practitioners are natural teachers; they already teach patients about their problem and how to manage it. They spend a higher level of one-on-one time with individuals than many other health care practitioners, possess the skills to provide education to clients regarding their health condition and the impact on daily life skills, and therefore are uniquely poised to contribute more to the rehabilitation process than merely improving the strength and range of motion of a shoulder joint injured through breast cancer treatment.

Specific educational information can be provided to survivors of breast cancer by multiple means. Individual counseling about her current situation may be provided; that is, the potential physi-

cal and activity limitations and participation restrictions resulting from the surgical procedures, chemotherapy treatment, or radiation that the survivor of breast cancer may have undergone. The rehabilitation practitioner can provide information on the best methods to address the effects of treatment. Additionally, other successful methods to address effects of treatment can be presented through vicarious modeling. By seeing how other survivors of breast cancer have effectively worked through the rehabilitation process, the client can see that success is possible. This educational counseling and vicarious modeling can positively impact levels of self-efficacy, which in turn, can improve ultimate outcomes of the rehabilitation process.

In empowering women through mastery of skills and modeling, additional support can come from social persuasion. By actively engaging a survivor of breast cancer in support groups, others like peers can positively enhance self-efficacy of the survivor of breast cancer in ways augmenting rehabilitation. Support groups often have educational components to their meetings; this education further empowers survivors with new information on how to manage their care. Support groups have women who have successfully moved through the rehabilitation process, and can provide insight into their experiences, supplementing vicarious modeling. These benefits of social persuasion can further empower women by positively enhancing self-efficacy, and in turn, have positive effects on outcomes of intervention and function with the ultimate goal of eliminating or minimizing participation restrictions to improve quality of life.

CONCLUSION

Higher levels of self-efficacy among survivors of breast cancer may translate to improved function and quality of life, as these women take control over the course of their care. This combination of empowering and increasing self-efficacy impacts the survivor of breast cancer at the personal factors level in the

ICF model. By following the flow of the model, improvements at this level impact activity limitations and participation restrictions for a positive overall outcome of care. This gain in quality of life is the goal to which survivors of breast cancer strive, and what rehabilitation practitioners can help them attain. Rehabilitation practitioners have the unique opportunity to empower survivors of breast cancer through the frequent interaction with these women, and the skills to address functional deficits that influence quality of life. By providing survivors of breast cancer with knowledge about their diagnosis, potential side effects of treatment, especially information regarding to potential long-term deficits in upper extremity function (impacting overall quality of life), and methods to manage their impairments, rehabilitation practitioners may affect levels of self-efficacy through empowerment.

Research is needed to examine self-efficacy and empowerment among women with breast cancer. Alone, both empowerment and self-efficacy show promise to improve outcomes among survivors. The proposed model, which combines the two constructs, applied across the continuum of care, should be examined to make decisions about the amount of information, and when that information is delivered, to produce the best outcomes.

REFERENCES

1. National Cancer Institute. Cancer Topics: Breast Cancer. 2010; <http://www.cancer.gov/cancertopics/types/breast>. Accessed August 8, 2010.
2. SEER Cancer Statistics Review, 1975-2006. 2010; based on November 2008 SEER data submission. Available at: http://seer.cancer.gov/csr/1975_2006/. Accessed August 8, 2010.
3. Hayes SC, Battistutta D, Newman B. Objective and subjective upper body function six months following diagnosis of breast cancer. *Breast Cancer Res Treat.* 2005;94:1-10.
4. Lauridsen MC, Overgaard M, Overgaard J, Hessov IB, Christiansen P. Shoulder disability and late symptoms following surgery for early breast cancer. *Acta Oncol.* 2008;47(4):569-575.
5. Swisher AK, Davison C, Aranda R, Eye D, Erickson M. Frequency and severity of self-reported upper extremity impairments, activity limitations, and participation restrictions following breast cancer treatment. *Rehabil Oncol.* 2010;28(1):3-9.
6. Rietman JS, Dijkstra PU, Geertzen JHB, et al. Short-term morbidity of the upper limb after sentinel lymph node biopsy or axillary lymph node dissection for Stage I or II breast carcinoma. *Cancer.* 2003;98(4):690-696.
7. Norman SA, Localio AR, Potashnik SL, et al. Lymphedema in breast cancer survivors: incidence, degree, time course, treatment, and symptoms. *J Clin Oncol.* 2009;27(3):390-397.
8. Hayes SC, Janda M, Cornish B, Battistutta D, Newman B. Lymphedema after breast cancer: incidence, risk factors, and effect on upper body function. *J Clin Oncol.* 2008;26(21):3536-3542.
9. Minton O, Stone P. How common is fatigue in disease-free breast cancer survivors? A systematic review of the literature. *Breast Cancer Res Treat.* 2008;112:5-13.
10. Peintinger F, Reitsamer R, Stranzl H, Ralph G. Comparison of quality of life and arm complaints after axillary lymph node dissection vs. sentinel lymph node biopsy in breast cancer patients. *Br J Cancer.* 2003;89:648-652.
11. Ganz PA, Guadagnoli E, Landrum MB, Lash TL, Rakowski W, Silliman RA. Breast cancer in older women: quality of life and psychosocial adjustment in the 15 months after diagnosis. *J Clin Oncol.* 2003;21(21):4027-4033.
12. Kootstra J, Hoekstra-Weebers JEHM, Rietman H, et al. Quality of life after sentinel lymph node biopsy or axillary lymph node dissection in stage I/II breast cancer patients: a prospective longitudinal study. *Ann Surg Oncol.* 2008;15(9):2533-2541.
13. Peintinger F, Reitsamer R, Stranzl H, Ralph G. Comparison of quality of life and arm complaints after axillary lymph node dissection vs sentinel lymph node biopsy in breast cancer patients. *Br J Cancer.* 2003;89(4):648.
14. Bandura A. Self-efficacy. In: Ramachandran VS, ed. *Encyclopedia of Human Behavior.* Vol 4. New York, NY: Academic Press; 1994:71-81.
15. Bandura A. Self-efficacy. *Harv Ment Health Lett.* 1997;13(9):4.
16. Doorenbosch CAM, Harlaar J, Veeger D. The globe system: An unambiguous description of shoulder positions in daily life movements. *J Rehabil Res Dev.* 2003;40(2):147.
17. John EB, Wen L, Gregory RW. Biomechanics of Muscular Effort: Age-Related Changes. *Med Sci Sports Exerc.* 2009;41(2):418-425.
18. Magermans DJ, Chadwick EK, Veeger HE, van der Helm FC. Requirements for upper extremity motions during activities of daily living. *Clin Biomech (Bristol, Avon).* 2005;20(6):591-599.
19. McCrea PH, Eng JJ, Hodgson AJ. Biomechanics of reaching: clinical implications for individuals with acquired brain injury. *Disabil Rehabil.* Jul 10 2002;24(10):534-541.
20. Rundquist PJ, Obrecht C, Woodruff L. Three-dimensional shoulder kinematics to complete activities of daily living. *Am J Phys Med Rehabil.* 2009;88(8):623-629.
21. Triffitt PD. The relationship between motion of the shoulder and the stated ability to perform activities of daily living. *J Bone Joint Surg Am.* 1998;80(1):41-46.
22. Bostrom C, Harms-Ringdahl K, Nordemar R. Shoulder, elbow and wrist movement impairment--predictors of disability in female patients with rheumatoid arthritis. *Scand J Rehabil Med.* 1997;29(4):223-232.
23. Rietman JS, Dijkstra PU, Geertzen JH, et al. Treatment-related upper limb morbidity 1 year after sentinel lymph node biopsy or axillary lymph node dissection for stage I or II breast cancer. *Ann Surg Oncol.* 2004;11(11):1018-1024.
24. Ghazinouri R. Shoulder impairments in patients with breast cancer: A retrospective review. *Rehabil Oncol.* 2005;25(2):5-8.
25. Bosompra K, Shikaga T, O'Brien P, Nelson L, Skelly J. Swelling, numbness, pain and their relationship to arm function among breast cancer survivors: A disablement process model perspective. *Breast J.* 2002;8(6):338-348.
26. Rietman JS, Geertzen JH, Hoekstra HJ, et al. Long term treatment related upper limb morbidity and quality of life after sentinel lymph node biopsy for stage I or II breast cancer. *Eur J Surg Oncol.* 2006;32(2):148-152.
27. Sweeney C, Schmitz KH, Lazovich D, Virnig BA, Wallace RB, Folsom AR. Functional limitations in elderly female cancer survivors. *J Natl Cancer Inst.* 2006;98(8):521-529.

28. Blomqvist L, Stark B, Engler N, Malm M. Evaluation of arm and shoulder mobility and strength after modified radical mastectomy and radiotherapy. *Acta Oncol.* 2004;43(3):280-283.
29. Nesvold I-L, Dahl AA, Løkkevik E, Mengshoel AM, Fosså SD. Arm and shoulder morbidity in breast cancer patients after breast-conserving therapy versus mastectomy. *Acta Oncol.* 2008;47(5):835-842.
30. Gomide LB, Matheus JP, Candido dos Reis FJ. Morbidity after breast cancer treatment and physiotherapeutic performance. *Int J Clin Pract.* 2007;61(6):972-982.
31. Lee TS, Kilbreath SL, Refshauge KM, Herbert RD, Beith JM. Prognosis of the upper limb following surgery and radiation for breast cancer. *Breast Cancer Res Treat.* 2008;110(1):19-37.
32. Levangie PK, Drouin J. Magnitude of late effects of breast cancer treatments on shoulder function: a systematic review. *Breast Cancer Res Treat.* Nov 25 2008.
33. Kaya T, Karatepe AG, Günaydn R, Yetiş H, Uslu A. Disability and health-related quality of life after breast cancer surgery: relation to impairments. *South Med J.* 2010;103(1):37-41.
34. Rietman JS, Dijkstra PU, Debreczeni R, Geertzen JH, Robinson DP, De Vries J. Impairments, disabilities and health related quality of life after treatment for breast cancer: a follow-up study 2.7 years after surgery. *Disabil Rehabil.* 2004;26(2):78-84.
35. Hayes SC, Battistutta D, Parker AW, Hirst C, Newman B. Assessing task "burden" of daily activities requiring upper body function among women following breast cancer treatment. *Support Care Cancer.* 2005;13(4):255-265.
36. *Towards a common language for functioning, disability and health: ICF.* Geneva: World Health Organization; 2002.
37. Israel BA, Checkoway B, Schulz A, Zimmerman MA. Health education and community empowerment: Conceptualizing and measuring perceptions of individual, organizational, and community control. *Health Educ Behav.* 1994;21(2):149-170.
38. Taylor RR. Extending client-centered practice: The use of participatory methods to empower clients. *Occup Ther Ment Health.* 2003;19(2):57-73.
39. Wikman AM, Faeltholm Y. Patient empowerment in rehabilitation: "Somebody told me to get rehabilitated". *Adv Physiother.* 2006;8:23-32.
40. Hu L, Motl RW, McAuley E, Konopack JF. Effects of self-efficacy on physical activity enjoyment in college-aged women. *Int J Behav Med.* 2007;14(2):92-96.
41. Umstadd MR, McAuley E, Motl RW, Rosengren KS. Pessimism and physical function in older women: Influence of self-efficacy. *J Behav Med.* 2007;30(2):107-114.
42. Rogers LQ, McAuley E, Courneya KS, Verhulst S. Correlates of physical activity self-efficacy among breast cancer survivors. *Am J Health Behav.* 2008;32(6):594-603.
43. Lev EL, Owen SV. Counseling women with breast cancer using principles developed by Albert Bandura. *Perspect Psychiatr Care.* 2000;36(4):131-138.
44. Weihs KL, Enright TM, Simmens SJ. Close relationships and emotional processing predict decreased mortality in women with breast cancer: Preliminary evidence. *Psychosom Med.* 2008;70(1):117-134.
45. Kosciulek JF. Structural equation model of the consumer-directed theory of empowerment in a vocational rehabilitation context. *Rehabil Couns Bull.* 2005;49(1):40-49.
46. Kosciulek JF, Merz M. Structural analysis of the consumer-directed theory of empowerment. *Rehabil Couns Bull.* 2001;44(4):209-216.
47. Larsson IL, Jonsson C, Olsson AC, Gard G, Johansson K. Women's experience of physical activity following breast cancer treatment. *Scand J Caring Sci.* 2007;22:422-429.

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