



Metacognition as an educational technology in self-care learning: the case of prevention of post-surgical lymphedema of breast cancer^a

Metacognição como tecnologia educacional na aprendizagem do autocuidado: o caso da prevenção do linfedema pós-cirúrgico de câncer de mama

Metacognición como tecnología educativa en el aprendizaje del autocuidado: el caso de la prevención del linfedema post quirúrgico de cáncer de mama

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ABSTRACT

Aim: To introduce metacognition as an educational technology for learning self-care. In order to achieve this goal, it discusses the prevention of lymphedema after breast cancer surgery. **Method:** Reflexion paper based on philosophical and theoretical reasoning in addition of empirical evidence to support the use of metacognition for self care learning. It states that using metacognitive resources as educational technology may promote more effective both teaching-learning process, stimulates critical and reflexive thinking, increasing conscious and autonomous decision-making. **Results:** The characteristics of metacognition and self-care interpenetrate. In addition metacognition has been beneficial in other disorders and diseases. **Final considerations and implications for practice:** It was concluded that the metacognitive approach, used as technology, opens wide possibilities for nursing in its teaching-learning actions for self-care, making them more effective, resulting in the empowerment of women, specifically enabling clients to make decisions, making the process more conscious, deliberate and autonomous.

Keywords: Metacognition; Self-Care; Learning; Lymphedema; Breast Neoplasms.

RESUMO

Objetivo: Introduzir a metacognição como uma tecnologia educacional para aprender o autocuidado. Para atingir esse objetivo, discute-se a prevenção do linfedema após cirurgia de câncer de mama. **Método:** Artigo de reflexão baseado no raciocínio filosófico e teórico, em adição de evidências empíricas para apoiar o uso da metacognição para o autocuidado. Afirma que o uso de recursos metacognitivos como tecnologia educacional pode promover um processo de ensino-aprendizagem mais eficaz, estimula o pensamento crítico e reflexivo, aumentando a tomada de decisão consciente e autônoma. **Resultados:** As características da metacognição e do autocuidado se interpenetram. Além disso, a metacognição tem sido benéfica em outros transtornos e doenças. **Considerações finais/implicações para a prática:** Concluiu-se que a abordagem metacognitiva, como tecnologia, abre amplas possibilidades para a enfermagem em suas ações de ensino-aprendizagem para o autocuidado, tornando-as mais efetivas, resultando no empoderamento das mulheres, especificamente permitindo uma decisão das clientes, tornando o processo mais consciente, deliberado e autônomo.

Palavras-chave: Metacognição; Autocuidado; Aprendizagem; Linfedema; Neoplasias da mama.

RESUMEN

Objetivo: Introducir la metacognición como tecnología educativa del autocuidado. Para alcanzar este objetivo, se discute la prevención del linfedema después de la cirugía de cáncer de mama. **Método:** Artículo de reflexión basado en el raciocinio filosófico y teórico, además de evidencias empíricas para apoyar el uso de la metacognición para el autocuidado. El uso de recursos metacognitivos como tecnología educativa puede promover un proceso de enseñanza-aprendizaje más eficaz, estimula el pensamiento crítico y reflexivo, aumentando la toma de decisión consciente y autónoma. **Resultados:** Las características de la metacognición y del autocuidado se interpenetran. La metacognición ha sido benéfica en otros trastornos y enfermedades.

Consideraciones finales e implicaciones para la práctica: El enfoque metacognitivo abre amplias posibilidades para la enfermería en sus acciones de enseñanza-aprendizaje para el autocuidado, haciéndolas más efectivas, resultando en el empoderamiento de las mujeres, específicamente permitiendo una decisión de la cliente, haciendo el proceso más consciente, deliberado y autónomo.

Palabras clave: Metacognición; Autocuidado; Aprendizaje; Linfedema; Neoplasias de la Mama.

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Submitted on 12/30/2017.

Accepted on 05/19/2018.

DOI: 10.1590/2177-9465-EAN-2017-0440

INTRODUCTION

Breast cancer affects, currently, about 56,20 cases for a hundred thousand of women in Brazil.¹ Of these, almost all will suffer some kind of surgical intervention and important part of these women will face issues associated to lymphedema, immediately after surgery or on following years. It is one of the most incapacitating collateral effects that may occur after breast cancer surgery. Increase of volume of the arm can lead to restriction of functional capacity and social participation of the woman. It is an estigmatizing condition and can impact the women's lives in a meaningful way, being physical, emotional and socially.²

The development of the lymphedema can compromise execution of daily life tasks requiring physical and more refined skills. This can generate suffering for the woman who experience it, and also physical order problems such as weight sensation on the arm; altering the skin texture and decreasing movement extension. From the social point of view, lymphedema brings important consequences on difficulting development of activities from daily and professional life, such as diverse manipulation, caring for people, cleaningness, organization, driving and cooking. All of this implicates on removal of women's work in economically active age, generating social impacts and additional financing for them, their families and society.

Considering such framework it would reasonable to expect important attention to the theme, translated by extense academic production; however it wasn't observed. Revision done in databases returned only five references in the last 20 years³. Therefore, it was observed a discrepancy between the production with focus on self-care to prevention and learning and relevance of the theme. In fact, most part of published studies versed about the treatment, that is, stage which the lymphedema is already installed and producing consequences on the lives of women and their families.

Lymphedema prevention requires a series of care that should be initiated immediately after surgical treatment, indicating early teaching, but also, needs to be effective, because self-care should be kept regular and continuous until the end of life. This teaching is done usually through educational lectures and booklets that present preventive measures to he child, that even simple, implicate changes on daily life routines that were learned and practiced for a long time. It is observed meaningful frequency on these women's return with lymphedema in various stages of development. It's emphasized that the lymphedema effective prevention involves attitude, habit and lifestyle change. That is, of conditions and factors that difficultly can be modified just through educational booklets. In good part of the process, the woman need to take responsibility for her self-care, meaning that lymphedema prevention is inserted in a context that integrates teaching, learning this self-care and, mainly, the woman's awareness and motivation to put into practice what she learned, in a solitary way and through all her life.

It is not about "blaming the victim", for the reasons are inserted in a multicausal context that goes away from this essay's scope. However, women's partial responsibility to adopt lymphedema prevention strategies, developing regularly and continuously what was taught her. But little can happen if learning doesn't supervene the teaching. So, studies about learning strategies and techniques to prevention can bring meaningful contribution.

It is therefore a question of stimulating the paradigm shift, moving beyond the restricted model to the transmission of information, advancing towards a more relevant and profound teaching, which promotes meaningful learning, in the understanding given by Ausubel.³ For the author, learning is only meaningful if new knowledge integrates itself with the old one, generating new meanings. On this article's perspective, this occur when routine and proceedings taughts give meaning and motivation to implement self-care. In the context of lymphedema prevention, meaningful learning is about changing the way to deal with such women favoring the meaningful learning of the clinical condition that affects them, its foundations and especially its relationship with the self-care measures of preventive nature.

However, meaning learning is not a simple task for the apprentice, requiring personal variables linked to knowledge and attitudes, as well as the use of appropriate techniques and technology. Among the alternatives that facilitate meaningful learning are the potentialities associated with metacognition, which can be understood as an educational technology that helps the teaching-learning process, by increasing the awareness and management of the learner's cognitive processes. As an educational technology, metacognition becomes a useful tool for understanding the teaching-learning process.⁴

Learning is a metacognitive action, because it represents a conscious process that transforms knowledge into acquired information.⁵ Self-appreciation and cognitive self-control are benefits of learning in the metacognitive perspective. These, when developed enable the apprentice to play an active role on managing his own development. That is, metacognition enables having conscious of processes used for learning and also making adequate decisions about which strategies to use in each task and, still, evaluate it's validity, making needed modifications when expected results are not reached. Notably, the effectiveness of learning depends on age, experience and intellectual level, as well as on the acquisition of cognitive and metacognitive strategies that allow the learner to plan and monitor their performance.⁶

Metacognition is a capability and also a key technology for the learning process. However, preventive measures are deduced from the pathophysiology of lymphedema. Therefore, it is very important that women in breast cancer treatment can depart from the naive understanding of their condition and better understand the preventive measures of lymphedema. And, among others, it is the understanding that generates meaningful learning and the effective adoption of self-care practices, minimizing the injuries and complications of lymphedema.

It follows from it the notion of metacognition as an educational technology.⁴ This is a topic to be developed later in this text, but it is enough now understand it as a tool to favor the construction and maintenance of learning contexts that aim to attain educational goals compatible with meaningful learning. Thus, this paper aims to present metacognition as an educational technology for meaningful self-care learning, taking the prevention of lymphedema after breast cancer surgery as a relevant illustration for this proposal.

Self-care

With the change in the profile of the increase of chronic diseases, there has been a growing incentive to engage the people in self-management practices that are compatible with autonomy, self-direction and personal responsibility.⁷ Different concepts are presented to cover the idea of users of health systems responsabilizing themselves for health care, among them: self-care, self-managing, managing symptoms, self-efficiency and caring for oneself.^{8,9} The study adopts the concept of self-care in a broader perspective recognizing that the term involves the skill of caring for oneself and the needed performance to develop that care, the capacity for health as a process for health and for health development.^{8,10}

Primary Care Department (PCD) of Brazil's Ministry of Health, through Health Gateway defines self-care when addressing to the population: "looking for the self, observing and choosing actions and ways to care of one's health".¹¹ Still according information contained on the website, motivation and information are necessary, so people can care for themselves. It expresses that the fundamental principal for selfcare is that the individual to be the center of everything, once he is the person that knows what he needs for his well being, as well as recognize what helps or interferes in his process of change.¹¹ It seems to us that such perspectives are conceptually comprehensive and may incorporate different meanings of the concept of self-care and even implicitly of self-care, however for this article and for the application of the knowledge contained therein this is not a concern.

Although different definitions can be presented for self-care and related terms, common elements seem to be present: the recognition that self-care is influenced by culture and the specific situation, which involves the ability to make decisions and perform activities, which is directed to actions under the control of the person, and that is influenced by different personal characteristics.⁸

In people that live with this chronic form and through a long period of time with care demands it's common to acquire a level of empowerment and develop expertise in managing this condition. They become "expert patients" that gather capacity of organizing themselves systematically, and construct mutual respect with the physician.¹² This social perspective of engagement and potentialization of the person follows current self-care perspectives with which the present paper aligns itself.

On Nursing, the concept of self-care almost always approximates itself with theoretical contributions of Dorothea Orem, a nursing theorist that describe it as activities that a person initiates and develops, in time, for themselves and on interest of mantaining life, of healthy functioning, and of the continuous of personal development and well being.¹³ She points out that one of requirements for self-care is related to health alterations. Thus, sick individuals, beyond body structures and compromised physiological and psychological mecanisms, have also alteration on the integral functioning.¹³ In chronic situations, self-care, many times, requires specific knowledge of practices and actions, as for example, the measurement of glycemia in diabetic people.

The author affirms that self-care in health is not only related to the capacity of subjects to do things, for themselves. This self-care is directly related to the behavior that the individual - in a deliberate, responsible and effective manner - performs for their own benefit to maintain life and health and promote well-being.¹³

Publications that focus on self-care for women that developed lymphedema related to cancer demonstrate that preventive and corrective actions should be performed through all the life, for example, lymphatic self-draining performed by the own patient or family member, after the professional care phase, meticulous care with skin and remediation exercises.^{14,15} So, it is important to emphasize the role of self-care as a preventive measure to be learned and incorporated permanently into the daily routine of the person.

Apparently self-care activities are simple, for example, using gloves to manipulate pans on the oven or stove, avoiding removing cuticule; daily skin hydration, using moisturizing cream. There are additional learning available in specialized literature, but what matters is that all impact significantly the life of these women. They are not difficult care per se, but must be done regularly and continuously for a lifetime. Despite their simplicity, they demand discipline and changes in habits.

From research, it is verified that it seems to exist association between engagement in general self care and symptoms' severity, indicating a tendency of people experience more self-care practices, as an attempt to maintain control of these symptoms, when the occurrence of the problem indicates more severity and decrease in quality of life.¹⁶ For this, women that experience more complication risks will need a more intensive use of resources and technologies.

Preventive selfcare adherence doesn't depend exclusively of a professional prescription, it requires mainly the woman's awareness about her health condition.¹⁷ She needs to be aware that breast cancer treatment doesn't end with discharge from the hospital, but it goes on throughout life, requiring motivation and information as well as adherence to practices of self caring. However, self care related to health conditions require more than just information and motivation. For people with chronic diseases, it requires knowledge about health condition and ways of harm prevention, as well as awareness about and the need of changing behavior and life style, and more over insertion of new habits in the daily life.

Information sources accessed by women can come from nurses, surgeons and other health professionals or non professional sources, such as people, on the internet and other women with lymphedema.¹⁶⁻¹⁸ Vast quantity of available information and of easy access on the internet - but not always precise and reliable - seems to be an additional drive to seek strategies to improve women's capacity to develop self-care.

In front of what was exposed there is a question: how to stimulate awareness for the need of preventive self-care and change of life habits to make an autonomous and well sustained decision? A possible answer is to use metacognition as a technology for learning preventive self-care for lymphoedema after breast cancer surgery.

Metacognition as an educational technology in health

John Flavell, american psychologist, was the first author to use the term metacognition. For him, metacognition can be considered as a second-level discourse on cognition - a cognition about cognition.¹⁹ He indicates transcendence of cognition that is, a reflection about the process of knowing, in the individual perspective and under a cognitive bias.²⁰

From another perspective, metacognition can be understood as technology for constituting itself "as an organized system of concepts directed to the design, the realization and the maintenance in state of operation of the sets of technical objects".^{4:16} And as educational technology can make the process of teaching-learning of preventive measures of lymphedema to be more effective by stimulating individuals on critical and reflexive thinking, oriented by a conscious and autonomous decision making process.

A study conducted with patients with renal disease found that a greater metacognitive ability was significantly associated with the choice of self-care dialysis modality, in detriment of fully assisted dialysis. Being that meta concentration self-reported by the patient was significantly associated to this choice.²¹ Thus, there is potential for planning interventions within the nursing process. The nurse can favor a significant understanding of the dialysis process and produce a consequent empowerment of the client to perform the self-care dialysis.

Another study points out that metacognitive processes or decision processes would be personal determining elements on self-regulated learning, that is, they would be cognitions of higher level that enable the person to integrate general knowledge and information of situation to plan and exercise control about one's behavior. Thus, supposedly, self-regulation planning would implicate in deciding when using a strategy and how to adopt it in an specific context.²² Nurses concerned with meaningful learning could, during their educational actions, make sure that significant connections occur. For example, the pathophysiology of lymphedema is presented and when speaking of prevention it returns to the foundation (... this is why you need ...). Or still through questioning focused on relation (...why to do...? How do you think that it will take these measures at home?, etc.)

In this way, metacognitive processes would collaborate with the learning of the care in general, and the self-care so necessary for the woman who lives the demands of lymphedema prevention. By its interpretative nature, metacognition would provide the necessary knowledge about the appropriate circumstances and modes of applying knowledge about health and related variables.

Comprehension is facilitated observing Nelson and Narens²³ model of metacognitive functioning. On it, metacognition is described as an information flow, where there is a superior and metacognitive level that is more abstract, and where ideal models of behavior are located: meta level. This level monitors the object level, located below, where in course cognitive processes occur that is a regulated flow send information collected and produced there up. On meta level they are processed and compared with ideal models, generating a new control informational flow for the object level. Thus, when done properly, this ongoing process of regulation and control explains why self-care can develop effectively and regularly. And the same step justifies the concern that nurses should have in using metacognitive resources for the benefit of their clients.

When adopting metacognition as technology is recommendable that self care orientation and training for lymphedema prevention must encourage reflection on their importance in women. In this approach, when reflecting in her personal beliefs about lymphedema and preventive self-care, the woman uses metacognition and with it reveals her ideal models, which are necessarily idiosyncratic and possibly naive and far from scientific knowledge. It is important to highlight here that every mastectomized woman, with or without lymphedema, have knowledge and explicative models of this condition. More than that, she acts according to it, being explicit or not. Moreover, the greater the discrepancy between this prior knowledge, which is necessarily idiosyncratic, and that of the health professional, the greater the distance between the understanding of what is taught and what will be learned. And likewise, the greater the likelihood of failure in prevention. This is why it is so important for the nurse to make sure the alignment between what is taught and what is learned by the person.

Even though there are no studies showing the value of metacognition as an educational technology for self-care, it's benefits have been investigated in other health contexts. For example, metagonitive training have been employed with people who suffer from mental illness and neuropsychological damages, improving self-efficiency, humor and fatigue of patients with multiple sclerosis,²⁴ being well recieved by patients in depression,²⁵ and reducing delusions in schizophrenics;²⁶ among other applications in health.

Relations between self-care and metacognition as preventive educational technology of lymphedema

To deepen the relationship between self-care and metacognition as preventive technology, Orem's phylosophical assertives on self-care were adopted and, based upon these, arguments were developed that allowed to verify convergence

on metacognition. One of the philosophical assertions of application to the context and condition is related to the power of the person to act deliberately for self-care, as well as in identifying the needs and obtaining what he needs to self-care. From this assertion we can presume that metacognition can influence the preventive action of lymphedema in women who underwent surgery as a treatment for breast cancer. Metacognition as educational technology enables teaching of self-regulated and adaptive behaviors that when apprehended can be internalized²⁷ and used on daily routine. The use of metacognition may also enable the woman to reflect and think critically, in relation to the need of changing quotidian habits, that many times were established throughout life and become rooted or implied.

The act of reflectively and critically examining already established habits reveals elements hitherto hidden from the level of consciousness. Independently of the person's cultural level, metacognitive questionings have a relevant role. Here, the nurse could promote dialogue through appropriate questions, made at the right time, addressed to the metacognitive aspects of reflection. For example, she will question the client about easiness and difficulties that she foresees to implement self-care. She will seek to bring to consciousness what preconceived models and ideas are justifying his actions, omissions and resistances. From this, metacognitive knowledge about the person, tasks and strategies can emerge. Well applied, such products from metacognitive knowledge transform themselves in elements that can be applied and confronted with what was taught by the health team.

The application of awareness also represents for the woman an extension of her self-knowledge as well as promoting empowerment, especially by allowing her to decide in a conscious, deliberate and autonomous way the best way to take care of herself. Notably, the most current conceptions of health converge to the formation of autonomy and/or user empowerment, both to achieve clinical efficiency and to minimize the social costs of health care.

Another philosophical assertive is related to deprivations linked to limitations for self-care action. In this case, metacognition through control and care of cognitive processes can favour the woman, in risk of developing lymphedema, take note of its limits and possibilities. Again, through dialogue such limits and possibilities can be idiosyncratic explicated, opening the client vision for eventual resources that can reduce limitations and amplify possibilities.

Commonly preventive self-care actions tend to be generalized when taught by health professionals, however, the woman will test her limits, module change and be aware continuously of the capacity of self-care. The human being lives in a dynamic state, therefore, what was possible to be realized at a given moment in the past may not be achievable in the future. With the use of metacognition, the woman has a technology capable of allowing her to be more clear about her past and present condition, and about which strategy would be better suited to the accomplishment of a certain task in the face of new limits. By becoming aware of their impossibilities, it will also be possible to recognize the

timing of applying for help, whether from a professional or family member, as well as providing them with sufficient elements to modulate and individualize aid.

Change from self-knowledge of new limits due to the use of metacognition, probably, will make the woman capable to develop a level of self-care that can not be defined, at first, by teaching developed by health professionals, strengthening her independence and knowledge of self.

Another philosophical assertive that refers to the exercise of discovery, development and transmission of necessary ways and resources to identification the needs and meeting the requirements for self-care. Metacognition as an educational technology for learning preventive lymphedema self-care, amplifies the context of teaching-learning on enabling monitoring, analysis, planning, evaluation and reevaluation that enable development of control, reflexive self-regulation of thought and managing cognitive processes. As all other exemplifications the questioning continue to have a relevant role. It can be verbal, but it doesn't restricts to it, because, usually the nurse obtain in her formation amplified knowledge of pedagogical processes and techniques (movies, theater, cuts, group dynamic techniques). Such techniques can be explored for the metacognitive development. It should be emphasized that the striking is not the technical procedure itself, but the goal to be achieved by the technique performed. In fact, it's not intended exclusively to teach a content, but specially, it aims to promote consciousness about one's own process of learning. Critical and reflexive thought favours conscious development and opens a pathway for identifying the needs that go beyond preventive measures taught by professionals, amplifying autonomous possibilities by the woman and intensifying it's corresponsability by one's health.

It is important to highlight that awareness about a certain situation enables control, amplifying chances of error reduction or difficulties. On the other hand, women with cancer may have other needs that are ignored by professionals and that are discovered by her when metacognition is applied. Discovery/identification of new needs by the woman opens a space to seek new complementary measures of support what amplifies her vision directed to lymphedema as well as improve level of self-knowledge and the concept about health.

The last philosophical assertive that we will approach is referred to the construction of structured relationships that enable participation of groups of people that live similar experiences. On structuring educational groups with the use of metacognition, health professionals favor experience exchange in a more active, conscious and autonomous form.

Experience exchange are important, because, doubt and curiosity of a woman can arouse reflections on others, beyond, of course, amplifying repertoire of possibilities and choices to various situations that these women face in their daily routines. Another groups' contribution is related to motivation. To motivate and aware the woman for self-care must be one of the aims of health education, that is, using external motivation, of active, dynamic and reflexive form, to take internal motivation aiming

conscious to self-care. Some studies point out that people are willing to change behavior when they can reflect in a profound form about one's responsibility with oneself.^{28,29} For this reflection to occur awareness, critical thinking and motivation are necessary.

CONCLUSION

It is recognized that self-care for lymphedema prevention after breast cancer surgery is a fundamental action, in so far as it makes it possible to reduce the risks of complications, sequelae and disabilities. It is pointed out that adherence to self-care, in people with chronic diseases, depend of some factors such as: change of behavior, habits and life style and the capacity to develop specific care, as for example, lymphatic self-drainage. It is emphasized that for the prevention of lymphedema, the self-care that will be learned should be permanently incorporated into the daily routine of women, and for this, it is necessary technologies and techniques that can be used by her.

Metacognition, if incorporated into the teaching - learning process of preventive self - care practices of lymphedema, will function as a type of educational technology. On this perspective, it is defended that it favours awareness by the woman and amplifies her autonomy on choosing actions more adequate to prevention task. However, choices depend of what the woman knows about the task, about herself and about characteristics of action to be chosen. By using metacognition as an educational technology that favors self-care learning, the professional can stimulate reflexive and critical thinking in women. Likewise, the use of metacognition is intensified through the stimulation of consciousness and the management of the cognitive processes necessary to the knowledge of health condition and needs.

Of course, the implication for the practice of health professionals is to coexist with women who are more self-conscious about their condition, responsibilities and ability to implement, throughout their lives, a practice of preventive self-care for lymphedema. This tends to change their condition on the relation with professional care and with other actors involved in their health context. The implications arising from the social construction of more autonomous and co-responsible women for their health tend to reverberate in society with the construction of values of citizenship and social benefits as necessary to the health systems in their broadest sense.

Finally, the attentive reader will have realized that metacognition as a tool has the potential to extrapolate the specific context of lymphedema prevention. This already showed itself in many references here presented. But what in special we desire to caught your attention if that this potential is linked to the capacity of potentialize and become learning more meaningful. It is well known that learning is an instrument and presupposition of both multiple health situations and outside it. In a more universal way, living is a way of learning, or if we prefer, learning is a way of living. And so we dare to assert, metacognition is a form of combat alienation and an invitation to a healthier and richer life. And concluding, we invite the gentle reader to reflect on this.

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^a Bases: Portal de Periódicos Capes, Biblioteca Virtual em Saúde e PUBMED. Keywords: learning, health education, lymphedema, self-care and prevention in Portuguese and its analogues, without time limitation and using the boolean operator "AND" in combinations between the descriptors.