

## Delayed surgical recovery: a concept analysis

*Recuperação cirúrgica retardada: análise do conceito*  
*Recuperación quirúrgica retardada: análisis del concepto*

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### ABSTRACT

**Objective:** analyze the concept of delayed surgical recovery. **Method:** the Rodgers' concept analysis provided the procedural mechanisms to guide the study, and an integrative review was performed to achieve the second activity of the model adopted. The PubMed, CINAHL, EMBASE and LILACS databases were selected to search for primary studies. **Results:** sixty-six primary studies were included and served as basis to construct the use and meaning of delayed surgical recovery concept. In the analysis, six attributes were outlined, which are interrelated and underpin the research concept definition. Preliminary experience was identified as the antecedent. The consequences of the concept are expressed through clinical manifestations, re-interventions, dependence on care and reduced quality of life. **Conclusion:** the definition of the concept was constructed, and the antecedents and consequents were identified. The use and meaning of the delayed surgical recovery concept point to the use of the qualifier 'impaired' instead of 'delayed'.

**Keywords:** Concept Formation; Nursing; Perioperative Period.

### RESUMO

**Objetivo:** analisar o conceito de recuperação cirúrgica retardada. **Método:** o modelo de análise de conceito de Rodgers guiou os mecanismos processuais do estudo. Revisão integrativa foi conduzida para alcançar a segunda atividade do modelo adotado. As bases de dados PubMed, CINAHL, EMBASE e LILACS foram selecionadas para a busca dos estudos primários. **Resultados:** Foram incluídos 66 estudos primários e sua análise permitiu identificar seis atributos, os quais se inter-relacionam e subsidiam a definição do conceito investigado. Experiência prévia (relacionada à cirurgia, fatores fisiológicos, psíquicos ou ambientais), foi o antecedente identificado. Os consequentes foram expressos por manifestações clínicas, reintervenções, dependência de cuidados e redução na qualidade de vida. **Conclusão:** a definição do conceito foi construída e identificados os antecedentes e consequentes. O uso e significado do conceito recuperação cirúrgica retardada apontam para o uso do qualificador "prejudicada" em substituição ao termo "retardada".

**Descritores:** Formação de Conceito; Enfermagem; Período Perioperatório.

### RESUMEN

**Objetivo:** analizar el concepto de recuperación quirúrgica retardada. **Método:** el modelo de análisis de concepto de Rodgers proporcionó los mecanismos del proceso para guiar el estudio. Una revisión integradora fue realizada para alcanzar la segunda actividad del modelo adoptado. Las bases de datos PubMed, CINAHL, EMBASE y LILACS fueron seleccionadas para la búsqueda de los estudios primarios. **Resultados:** el uso y el significado del concepto recuperación quirúrgica retardada fueron contruidos utilizando datos extraídos de 66 estudios primarios incluidos. En el análisis, fueron definidos seis atributos, que están interrelacionados y subsidian la definición investigada. La experiencia previa fue el antecedente identificado. Los consequentes del concepto recuperación quirúrgica retardada son expresos por manifestaciones clínicas, re-intervenciones, dependencia de cuidados y reducción en la calidad de vida. La definición del concepto fue construida. **Conclusión:** los resultados nos permiten recomendar el uso del calificador deteriorado en lugar de retardada.

**Palabras clave:** Formación de Concepto; Enfermería; Periodo Perioperatorio.

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## INTRODUCTION

Surgical recovery is a complex matter due to its multidimensional nature. The return of patients to their daily activities does not always occur as expected neither has the same quality intended. Daily life is interrupted by the surgical-anesthetic procedure and the process evolution is often delayed by complications, affecting the patients' quality of life, extending recovery time and postponing the return to usual activities. In addition, medical-hospital care costs are increased, as well<sup>(1-2)</sup>.

The results of studies about the surgical recovery process show that surgical patients may feel discomforts that could persist for years after the surgery, such as: pain, fatigue, problems with the surgical wound and mobility, among others that affect the resumption and performance of activities that maintain life, health and welfare. These problems can be related to incorrect/mistaken treatment, kind of surgery, the patient's low capacity of coping with stress and insufficient information provided by health professionals<sup>(1-4)</sup>.

Delayed surgical recovery is a concept defined by NANDA International, Inc (NANDA-I) as: "extension of the number of days after surgery to restart and resume activities that maintain life, health and welfare"<sup>(5)</sup>. Nursing methodologies play a core role in nursing care, providing the concepts and definitions of the phenomena, favoring evidence-based practice and decision-making in the field of health and, as such, should be continuously updated<sup>(6)</sup>.

The identification and understanding of the use of a concept can provide inputs to advance knowledge and build a shared and valid language to the nursing practice<sup>(7)</sup>. More specifically, this study provides evidence capable of promoting advances in the knowledge about human experiences regarding the surgical recovery process, as well as the planning and implementation of nursing care that will contribute to reaching better results to the patient. Thus, the objective of the study was to analyze the concept of delayed surgical recovery.

## METHOD

The study adopted the evolutionary method to analyze Rodgers' concept<sup>(8)</sup>. This method proposes a more interactive process throughout the investigation, comprising six activities: identify the concept of interest and associated expressions; identify and select the proper field for data collection; collect data relevant to the concept analysis; analyze data and identify the concept characteristics; identify a concept example, whenever applicable; identify the hypotheses and implications to further develop the concept. After selecting the concept of interest (delayed surgical recovery) to reach the second activity of the model, the integrative review was performed to identify the primary studies published in health disciplines using this concept. The stages performed to prepare the review were based on studies by academics in review method<sup>(9)</sup>.

The guiding question of this integrative review was: What is the evidence available in literature about the concept of delayed surgical recovery? The PubMed, CINAHL, EMBASE and LILACS databases were selected to search for primary

studies. To ensure the strict search we have delimited controlled (MeSH DATABASE, CINAHL Headings, EMBASE Entrée, Health Sciences Descriptors) and uncontrolled descriptors (key works) according to each database. The controlled descriptors delimited for the search in English were combined in different ways, like *Postoperative Period AND Recovery of Function AND Signs and Symptoms; Scale OR Questionnaires AND Postoperative Period*. The *Scale* and *Questionnaire* descriptors were used to identify studies that investigated ways of measuring the concept studied. The uncontrolled descriptors, in turn, were combined to expand the search for primary studies, for example, *Recovery Process OR Delayed Surgical Recovery OR Delayed Recovery AND Postoperative Period*. In the LILACS, the controlled descriptors were combined according to the database, for example, *Recovery of physiological function AND Postoperative Period AND Signs and symptoms; Scales OR Questionnaire AND Postoperative period*.

The inclusion criteria established for the primary studies were: 1) Articles approaching the concept of delayed surgical recovery in different health areas; 2) Research on human beings; 3) Articles in English, Spanish and Portuguese, regardless of the year of publication. The narrative/traditional reviews of literature; articles adopting revision methods like systematic revision; response letters and editorials were excluded. To extract data from primary studies we prepared an instrument that was subjected to face and content validation, comprising the following items: 1) Study identification; 2) Objective and kind of research question; 3) Methodological characteristics; 4) Results; 5) Concept analysis; and, 6) Findings. Three nurses (professors) with a doctor's degree and experience in perioperative nursing, nursing diagnosis, concept analysis and validation of instruments were invited to the face and instrument content validation. The suggestions presented by the experts referred to the forms of presenting the instrument and the inclusion of items to fulfill the research objectives; the researchers accepted the suggestions.

The analysis on the research outlining for primary studies was based on the concepts presented by scientific methodology academics<sup>(10-11)</sup>. The power of evidence in studies was analyzed according to the classification of evidences for different clinical questions<sup>(12)</sup>. This classification, depending on the clinical question in the primary study, should employ a hierarchy of evidences. For example, for a clinical question oriented to treatment/intervention in the health field, the evidence power can be classified in seven levels, where level 1 is the strongest and level 7 is the weakest. However, in evidence hierarchies according to the clinical question, academics do not discuss the methodological research. The Jadad<sup>(13)</sup> scale was used to evaluate the methodological quality of controlled random clinical trials in the sample. This scale assesses three aspects of the clinical trial: randomization, blinding and losses/exclusions of subjects. According to the Jadad<sup>(13)</sup> scale, clinical trials scoring 4 or 5 are considered of high methodological quality; score 3 shows moderate quality; and, scores 2 or 1 indicate low quality.

The integrative review allowed searching, evaluating and summarizing the primary studies selected, i.e., complete the

second activity of the evolutionary method to analyze the Rodgers' concept<sup>(8)</sup>. For the third activity of the model, data were organized in chronological order according to the publication year of primary studies, and categorized according to the health areas: medicine, nursing, psychology, dentistry, physical therapy and speech therapy. Data analysis (fourth activity of the concept analysis model) focused on the identification of consensus regarding the use and meaning of descriptive elements regarding the delayed surgical recovery as a means to define the current status of knowledge about the concept. This activity comprised the search for and organization of attributes (descriptors of consensual expressions about the concept of delayed surgical recovery) and its meaning in the context of each primary study.

According to the evolutionary method, in a concept sample identification, an example that has not been built by the investigator should be identified in literature or in practice. However, no practical example capable of representing the meanings inherent to the complex human experiences related to delayed surgical recovery could be found in literature. The implications and hypotheses to the future development of the concept investigated will be presented in the following items.

## RESULTS

The search in database showed 1,155 potentially eligible primary studies, of which 103 were secondary studies, 836 did not comprise the selection criteria and 150 were duplicated. The integrative review sample was made of 66 primary studies, of which 41 were published by medicine professionals (first author), 14 by nursing, 6 by psychology, 3 by dentistry, 1 by speech therapy and 1 by physical therapy. Descriptive studies were more frequent (39), followed by cohort (13) and control case (1) with clinical questions of prognostic or etiology, where 14 primary studies were classified as evidence level II and 39 with evidence level IV. Regarding the six studies with clinical questions of intervention, a study was classified as evidence level III (clinical trial without randomization) and five studies were evidence II, of which one article was scored 1 in Jadad<sup>(13)</sup>, two were scored 2, one was scored 3, and one was scored 5. Among the primary studies part of the review, only one had a qualitative methodological approach to evaluate meaning, and was classified as evidence level II. It is noteworthy that we included six studies (methodological research) oriented to build and validate measurement instruments to assess surgical recovery.

Based on the analysis of the articles, the authors identified the set of components of the concept (attributes, antecedents, consequents, substitute terms), as presented below (Figure 1).

### Attributes of the delayed surgical recovery concept

Through the literature analysis we found six core attributes that make up the concept of delayed surgical recovery.

Attribute 1 – change in the surgical recovery process: it is related to complications that change this process<sup>(1-2,14)</sup>. The surgical recovery process is complex, dynamic and starts when the anesthetic-surgical procedure ends, continuing for

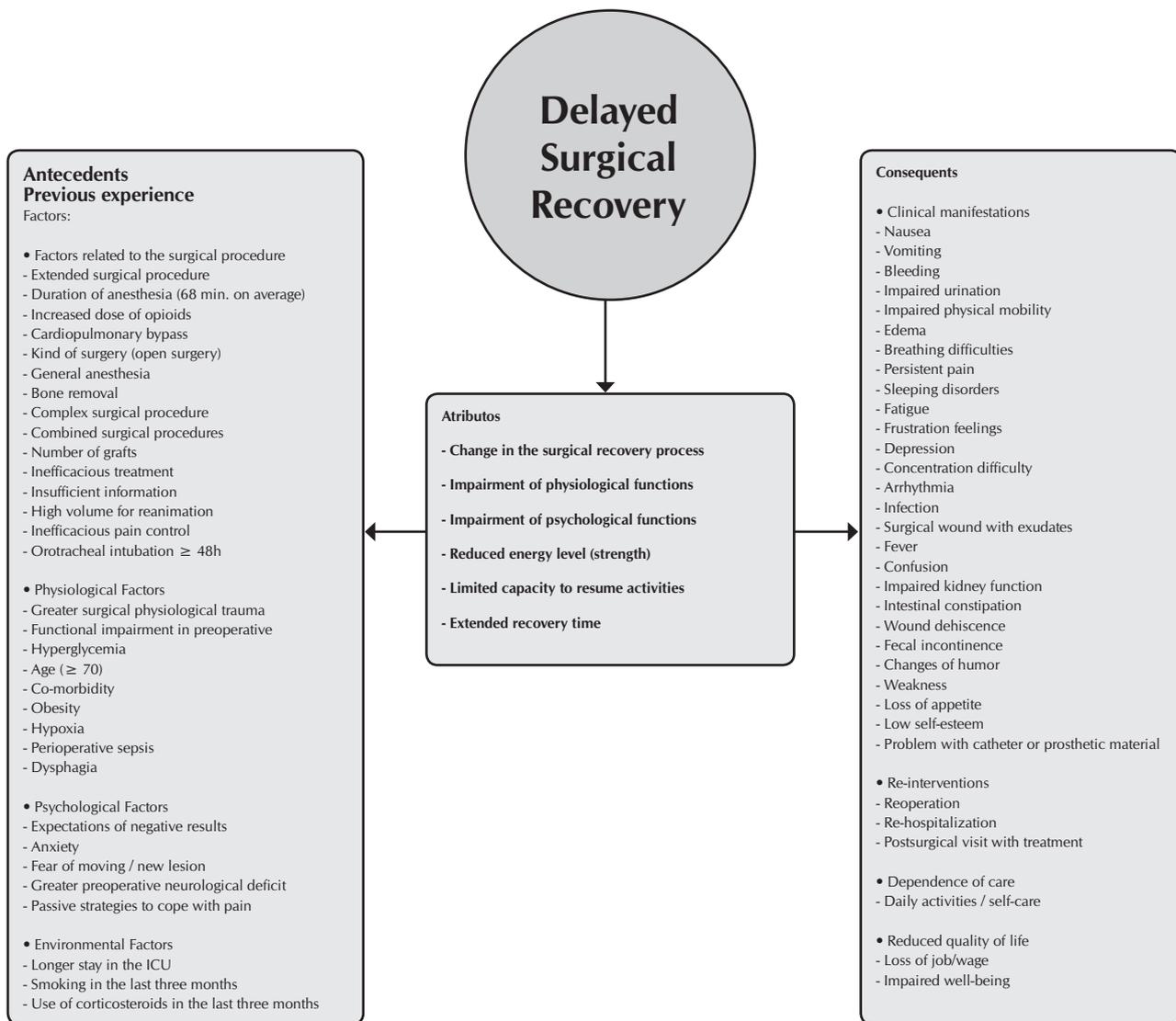
a variable time span. Surgical recovery involves several domains, ending with the full restitution of the patient's baseline values to the same level as in the preoperative period, reaching independence/dependence degree in usual activities<sup>(2,15)</sup>.

Attribute 2 – Impairment of physiological functions: comprises the domains of physiological functions: impaired elimination, cardiovascular complications, impaired structural integrity (complication related to the surgical wound healing phases), breathing complications, digestive and sexual dysfunction. These domains are manifested by signs and symptoms that have an impact on patients' lives, hindering the recovery to the same condition as in the preoperative period<sup>(16-18)</sup>. The impaired structural integrity is an expressive domain in literature. Complications related to the surgical wound healing phases (inflammation, proliferation, maturation) cause damages to the patient's recovery such as: wound dehiscence; surgical wound with exudates, infection, persistent pain, edema, bleeding and impaired physical mobility<sup>(3,16,18-19)</sup>.

Attribute 3 – Impairment of the psychological functions: comprises the psychological functions domains: impaired psychosocial working, poor emotional status and cognitive-behavioral impairment, manifested by signs and symptoms and that interfere on the patients' lives<sup>(1,15)</sup>. The impairment of psychological functions may involve manifestations of anxiety, changes of humor, confusion, difficulties to concentrate, depression, sleeping disorders, concerns and low self-esteem<sup>(2-3,14,16)</sup>.

Attribute 4 – Reduced level of energy (strength): high demand in comparison to the patient's reserve of energy, exceeding their personal resources, hindering the recovery of integrity and leading to the need for resting (sleeping) during the day to recover energy<sup>(3,20-21)</sup>. In conditions of high demand for energy (for example, complications in the surgical recovery process), the patient's energy reserve may become chronically impoverished. Hence, patients experience manifestations that interfere on their daily function such as: lack of energy, muscle weakness, increased need for sleeping, reduced capacity of concentration, tiredness with exercise or rest and exhaustion<sup>(2-3,14,20)</sup> {!!! INVALID CITATION !!!, ;Horvath, 2003, Postoperative recovery at home after ambulatory gynecologic laparoscopic surgery}{Horvath, 2003, Postoperative recovery at home after ambulatory gynecologic laparoscopic surgery;Zalon, 2004, Correlates of recovery among older adults after major abdominal surgery;Allvin, 2009, Development of a questionnaire to measure patient-reported postoperative recovery: Content validity and intra-patient reliability;Rosén, 2010, Patients' experiences and perceived causes of persisting discomfort following day surgery}.

Attribute 5 – Limited capacity to resume activities: involves the following domains: impaired social activity, impaired functional activity and impaired leisure activity. Patients developing complications during the surgical recovery process had their functional activities more intensively impaired<sup>(15)</sup>. Clinical manifestations such as pain, fatigue, depression and problems with the surgical wound, among others, have an important influence on the patient's everyday life and interfere with their capability of participating in usual social activities.



**Figure 1** - Components of the concept of delayed surgical recovery

Functional disability is referred to as a relevant factor to permanent disability for working resulting in loss of job and wage<sup>(23-24)</sup>.

Attribute 6 – Extended recovery time: stands for the extended time for the patient to recover functional capabilities and resume everyday activities performed in the preoperative period, due to the development of complications and the perception of patients needing more time for recovery, leading to longer hospital stay and postponing the patient's discharge after the surgical procedure<sup>(4,16-17)</sup>. Physiological and psychological/psychosocial complications may affect patients during the surgical recovery process. Some patients may not recover the same health status as in the preoperative period, or may have their physical and/or emotional condition worsened even years after the intervention<sup>(3-4)</sup>{Peters, 2010, Predictors of physical and emotional recovery 6 and 12 months after surgery}. In this context, the surgical recovery period can be extended for a variable period due to the presence of complications or discomforts (signs and symptoms) that extend the

time taken for patients to resume their usual daily activities performed in the preoperative period<sup>(3,15-16)</sup>.

Thus, the analysis of the attributes identified led to define delayed surgical recovery as: a change in the surgical recovery process, involving impairment of physiological and psychological functions, triggering high demand in comparison to the patient's energy reserve thus restraining their capacity of resuming and performing activities of daily living, extending the recovery time needed to reach a health status that is better than or equivalent to that in the preoperative period.

#### **Antecedents of the delayed surgical recovery concept**

Antecedents stand for the events or circumstances prior to the occurrence of the concept<sup>(6)</sup>. The antecedent identified was previous experience, either recently or in a remote past, involving aspects related to current hospitalization or other hospitalization events, as well as to other factors capable of directly or indirectly influencing on the surgical process. This antecedent comprised 32 factors that could negatively affect

the surgical recovery process, comprising aspects related to the surgical procedure (examples: kind of surgery; anesthesia duration); and physiological (examples: co-morbidity, hyperglycemia); psychological (example: expectations of negative results, anxiety); and environmental aspects (examples: longer stay in the intensive care unit, smoking).

During the surgical recovery process, many factors can contribute to positive or negative results. The kind of surgery may play a decisive role in the recovery process. The groups of patients subjected to laparoscopic surgeries in a study presented the shortest hospital stay and fewer complications like pain and fatigue against open surgery<sup>(3)</sup>. Increased doses of opioids in the intraoperative period can cause undesired effects such as breathing depression and maximize the frequency of nausea and vomiting<sup>(25)</sup>. Obese patients or those suffering from diabetes mellitus (poor glycemic control) or aged patients ( $\geq 70$  years of age) presented more complications and problems in the surgical recovery process<sup>(1,19)</sup>. Psychological factors in the preoperative period, like expectation of negative results (pessimistic behavior) regarding the surgical procedure and recovery process, as well as anxiety and fear have negative impacts on the postoperative recovery variables, jeopardizing recovery after surgery<sup>(4)</sup>. Regarding environmental factors, we found that longer stay in the intensive care unit had a negative impact on the surgical recovery process. Factors like smoking and using corticosteroids three months prior to the surgery have been associated to failure in the surgical healing process<sup>(2)</sup>.

### Consequents of the concept of delayed surgical recovery

The consequents of the concept of delayed surgical recovery identified herein were: clinical manifestations, re-interventions, dependence of care and reduced quality of life. Following, the authors briefly explain each consequent.

Consequent 1 – clinical manifestations: represent the evidences of complications in the surgical recovery process that bring about negative physical, psychosocial and economic effects, affecting the everyday life and welfare of patients<sup>(2,17-18,25)</sup>. These clinical manifestations describe the results when delayed surgical recovery is installed, i.e., manifestations that could be present when patients experience delayed surgical recovery. The signs and symptoms presented by patients in the postoperative can persist for variable time and influence on the surgery recovery quality, such as: surgical wound dehiscence; surgical wound with exudates, infection, fever, edema, bleeding, nausea, vomiting, and pain, which prevent them from performing their daily activities. Postoperative pain is associated with delayed hospital discharge and recovery, lower satisfaction of patients, and higher hospital costs. Despite the advances in the development of new standards to manage postoperative pain, it remains as the most prevalent symptom after surgery. According to studies, pain is often managed inadequately, favoring the development of acute pain to chronic pain which results in physical disability, reducing the patient's quality of life<sup>(16,18,25)</sup>.

Consequent 2 – Need for re-intervention: involves issues related to re-hospitalization, re-operation or unexpected post-surgery visit to health services due to complications that demand the administration of a new therapeutic regimen

(dressing, wound reopening, antibiotic prescription or other treatment)<sup>(1,15,18)</sup>. According to results of studies, almost 31% of patients suffered symptoms that delayed hospital discharge, of which 3% were hospitalized again after discharge, and 7% had to undergo surgery again during the initial hospitalization or re-admission<sup>(16)</sup>.

Consequent 3 – care dependence: comprises the need for assistance to the patient regarding self-care in the hospital environment or at home to perform activities of daily living, due to disabilities that required special care after the anesthetic-surgical procedure. Patients with higher rates of complications needed new surgery and/or intensive care<sup>(1)</sup>. Admission in postoperative for critical care is associated to longer recovery time and resumption of activity or labor resulting in economic impact to patients and health services<sup>(1,23)</sup>. Literature shows that 32.9% of the participants subjected to colorectal surgery need home care services to handle complications and manifestations in the postoperative period<sup>(20)</sup>. Among patients subjected to hysterectomy or myomectomy, 69% reported to need two or more weeks of care by caregivers. In addition, those employed at the time of the surgery reported to have lost 58 weeks of work on average in postoperative, whereas 43% of caregivers lost on average 1.2 weeks of work to take care of the patients<sup>(26)</sup>.

Consequent 4 – Reduced quality of life: comprises physiological and/or psychological problems that interfere with daily living and welfare conditions (clinical manifestations, difficulties in resuming usual daily activities, loss of labor and wage) reducing the quality of life of surgical patients<sup>(1,14)</sup>. A study points out that patients with alterations in the surgical recovery process and functional limitations reported lower levels of quality of life six months after surgery. Postoperative complications (high pain intensity, nausea and fatigue) result in reduced quality of life and recovery<sup>(4)</sup>.

### Substitute terms

Substitute terms are alternative words or expressions to the concept<sup>(7)</sup>. The substitute terms have emerged in literature with a standard of use tending to combine the surgical recovery concept with additional or qualifying descriptors that could add ambiguity to the concept, such as: extended surgical recovery; affected surgery recovery; poor surgical recovery; slow surgical recover; late surgical recovery; impaired surgical recovery; and, complicated surgical recovery<sup>(1,21)</sup>. These data supported the authors in their analysis on the diagnosis of Delayed Surgical Recovery (00100) presented in NANDA-1<sup>(6)</sup>.

### DISCUSSION

The production of knowledge about the concept in study involved different health areas (medicine, nursing, psychology, dentistry, physical therapy and speech therapy), where the use of the concept presented similarities. Hence, based on the analysis of the concept components this study built a definition of delayed surgical recovery.

In nursing, the NANDA-I diagnosis classification system is one of the most renowned systems and contributes to standardize nursing language to assist the clinical judgment and

expand the development of nursing as a discipline and profession. The taxonomy diagnostic categories derive from concepts and present theoretical models or formulations to provide observations with meaning<sup>(7,27)</sup>. As aforementioned, the conceptual definition of Delayed Surgical Recovery (00100) standardized by NANDA-I is “extension of the number of days after surgery to restart and resume activities that maintain life, health and welfare”<sup>(5)</sup>. In a study<sup>(28)</sup> with the aim to analyze the concept of delayed surgery recovery, based on the Walker and Avant model, the authors found no change in the definition of the concept in study, reinforcing most of its elements as defined by NANDA-I<sup>(5)</sup>.

This study identified elements of the concept previously referred to in a study based on the Walker and Avant model<sup>(28)</sup> and the NANDA-I<sup>(5)</sup>, additionally to new elements that make up the concept of delayed surgical recovery (Figure 1). The literature<sup>(28)</sup> findings and the findings of this study showed differences regarding the attributes and temporal characteristics of the concept (antecedents, consequents) as differences as for the relationships of ideas referring to the concept of delayed surgical recovery.

The “extension of the number of days after surgery” is the main attribute presented by NANDA-I<sup>(5)</sup> in the concept definition. Thus, the time required to perform activities is used as a standard for surgical recovery. However, the sense of “extension of number of days after surgery to restart and resume activities” is vague, since it does not refer to the ideal limit of postoperative time for surgical recovery, to how such postoperative extension may happen, and to which kind or level of activity to maintain life, health and welfare, thus hindering a sound judgment by nurses.

Therefore, the concept definition proposed herein shows that surgical recovery is a process starting at the end of the anesthetic-surgical procedure, continuing for a variable period until the patient recovers welfare at a level higher than or equivalent to the preoperative period<sup>(2,14)</sup> through the reestablishment of all recovery domains: physiological functions; psychological functions; energy level; and, activities. However, when this process suffers alterations, i.e., failures in recovering specific and inter-related domains such as: impairment of physiological functions; impairment of psychological functions; reduced energy level (strength); limited capacity of resuming activities; and, extended recovery time, surgical recovery is impaired.

The qualifier “delayed” suggests a reductionist tendency within a scope insufficient to describe the meanings inherent to the complex human experience when undergoing changes in the surgical recovery process. In face of the aforementioned, the data presented herein show that the “impaired” qualifier or judgment represents best the failures or damages in the surgical recovery process, as the “delayed” qualifier exclusively comprises the idea related to the period of recovery.

Surgical recovery should be understood in a broad perspective because it goes beyond hospitalization and hospital discharge time<sup>(2)</sup>. Hence, it implies that the quality of post-surgical recovery should be assessed based on the baseline condition of the patient. The investment in efforts to improve surgical patients’ recovery demands understanding predictive factors of manifestations and the impact of complications on the recovery process, as well as proper communications between the multidisciplinary team, patient and family to provide proper information before and after surgery<sup>(3-4,7,14)</sup>.

## CONCLUSION

The analysis of the delayed surgical recover concept allowed the definition of the phenomenon, identification of six attributes and antecedents, consequents and substitute terms. This is a multidimensional concept with biological, psychological and environmental dimensions; the “impaired” qualifier or judgment best represents the failures or damages in the surgical recovery process, replacing the “delayed” qualifier, which exclusively approaches the idea related to the period of recovery.

The use of the impaired surgery recovery concept should be continuously assessed to remain useful and relevant to the practice of nursing in the perioperative period. To that purpose, studies could be performed with different methodological approaches (quantitative, qualitative or mixed) to explore the results presented and promote additional clarifications about the concept and its use in practical nursing situations.

The use of the impaired surgical concept by nurses would allow characterizing the phenomena, describe situations, establish effective communication, and identify factors that could affect the surgery recovery process, thus facilitating the implementation of effective interventions and achievement of better results and the patient’s welfare.

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