Revista ARACÊ
ISSN: 2358-2472

EMPIRICAL INDICATORS FOR THE CONSTRUCTION OF SOFTWARE FOR THE IMPLEMENTATION OF THE SYSTEMATIZATION OF NURSING CARE IN ASSISTED REPRODUCTION

https://doi.org/10.56238/arev6n2-159

Submitted on: 09/07/2025 **Publication date:** 10/17/2025

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Revista ARACÊ
ISSN: 2358-2472

ABSTRACT

Infertility is conceptualized as the inability to develop a successful pregnancy through sexual intercourse or artificial insemination in 12 months or more. Nursing works during the process of implementing assisted reproduction treatments. In this sense, the use of software provides support in the documentation of the actions that govern care, in addition to assisting in the elaboration of clinical judgment, which can result in better quality care. Thus, this study aimed to identify the empirical indicators of women submitted to assisted reproduction techniques to structure a support software for the Systematization of Nursing Care for these women. This is a methodological research by identifying empirical indicators related to women submitted to Assisted Reproduction techniques. As a result, a sample of 40 articles was obtained, from which 166 indicators were extracted. A total of 166 empirical indicators were obtained, of which 74 represented psychobiological needs, 88 represented psychosocial needs, and 4 represented psychospiritual HEIs. Therefore, from the identification of the altered empirical indicators of women submitted to assisted reproduction techniques in the light of the theory of Basic Human Needs, it will be possible to develop a valid software for the Systematization of Nursing Care to women submitted to assisted reproduction techniques.

Keywords: Assisted reproduction techniques, Nursing Process, Nursing, Software, Health technology.

Revista ARACÊ
ISSN: 2358-2472

INTRODUCTION

According to the American Society for Reproductive Medicine (ASRM), infertility is conceptualized as the inability to develop a successful pregnancy through sexual intercourse or artificial insemination within 12 months or more (Practice Committee of the American Society for Reproductive Medicine, 2013).

In the global context, infertility remains a highly prevalent constant. According to the WHO (2011), it affects 8 to 15% of couples of reproductive age and is characterized as a growing condition due to factors that delay motherhood and ultimately affect the fertility of spouses. It has an overall incidence of 9% on average, reaching rates of 50% in some regions of Central Africa, 11% in the developed world, and 20% in the Mediterranean region (Boivin et al., 2007; Jumayev et al., 2012).

When analyzing infertility from a macro context, it should be considered a relevant public health problem and inserted as a disease. And, not to approach it simplistically, seeing it only as a setback that affects family and individual well-being and the social insertion of affected couples (Cook; Dickens, 2014). Infertility can have harmful repercussions on women's emotional state, as well as on physical health (Mendonça et al., 2014).

To solve infertility by enabling infertile couples to become pregnant and to encompass homosexual relationships, reproductive technologies (RT) emerged in the 1980s. These individuals project, in the existing techniques, possibilities of forming a family with descendants, and thus having symbolic and social values that govern a family, even if they do not experience reproductive sexuality (Machin; Couto, 2014).

From this perspective, men and women refer to the development of assisted reproductive technologies as a strategy to compensate for the decrease in fertility due to advancing age, as it facilitates the procreation process. However, these individuals are unaware of the onerous costs of treatment and the proportion of success rates, as positive pregnancy results are not always achieved; they only demonstrate high confidence in the treatment that will be carried out (Daniluk; Koert, 1013; CFM, 2013).

It is possible to mention several activities performed by nurses in assisted reproduction treatments, even though they are not the professional who certifies the diagnosis and provides medication prescriptions (Queiroz et al., 2020). But it is the one who acts in welcoming, qualified listening to frustrated attempts to get pregnant; collects the necessary data from your gynecological and obstetric history; identifies the nursing

Revista ARACÊ
ISSN: 2358-2472

diagnoses applicable to each specificity, whether physical or psychological; plans interventions aimed at each change detected; outlines the goals and evaluates the evolution of this patient throughout the treatment. In addition, it provides clarification on the conducts that will be taken, administers medications, inspects their effects, and makes itself available to patients to enable quality health care (Queiroz et al., 2020).

Given the scenario presented by infertility, imbalances permeate the individual in this condition and raise needs. Aiming at this context, it sought to associate the concepts that excel in the balance of the human being and provide a complete well-being contained in the Theory of Basic Human Needs (NHB) by Wanda Horta.

This theory was created based on Maslow's Theory of Human Motivation, which is based on NHB. They are categorized into five levels: physiological needs, security, love, esteem, and self-actualization.

Thus, according to Horta (2015), an individual only seeks to meet the subsequent categories after being minimally satisfied in the previous ones. However, this satisfaction is never complete or lasting, otherwise, there would be no individual motivation.

Regarding BHN, these are defined as levels of tension, conscious or unconscious, resulting from hemodynamic imbalances of vital phenomena. They are exacerbated when an established imbalance occurs, which may be apparent, conscious, verbalized, or not by an individual, his family, or the community (Horta, 2015).

Empirical indicators (IES) comprise the instruments of research practices or tools used to assess concepts of a given theory (Fawcett, 2021). Thus, the study is pertinent due to the possibility of collaborating with the Systematization of Nursing Care for women submitted to assisted reproduction

Given the above, the objective of this study was to identify the empirical indicators of women submitted to assisted reproduction, to structure a software for the Systematization of Nursing Care, in the light of the Theory of Basic Human Needs.

METHODOLOGY

This is a methodological study, developed through the survey of altered empirical indicators of women submitted to assisted reproduction. These were obtained through an integrative review of the scientific literature following the following specifications: identification of the problem, definition of the research question, establishment of inclusion and exclusion criteria, definition of the information to be extracted from the studies,

Revista ARACÊ
ISSN: 2358-2472

evaluation of the included studies, interpretation of the results and synthesis of data and presentation (Soares et al., 2014).

The methodological study is intended for investigations, organization and analysis of data, elaboration, validation and evaluation of research instruments and techniques, to enable the obtaining of a reliable, accurate and usable instrument so that it can be replicated by other researchers (Polit et al.., 2019).

Thus, the following guiding question was defined for the integrative review: "What are the basic human needs of Wanda Horta's Theory found in women undergoing assisted reproduction techniques?"

The selection of articles was made through the following libraries and databases: Scientific Electronic Library Online (Scielo), Pubmed, Sciverse Scopus – Elsevier (Scopus), Latin American and Caribbean Health Sciences Information System (LILACs), Web of Science, Cochrane Library, Science Direct and Nursing Database (BDENF) via Virtual Health Library (VHL).

The search for studies in the databases took place between March and June 2020. It was performed in an uncontrolled manner through the descriptors identified in the Health Sciences Descriptors (DeCS) and in the Medical Subject Heading Terms (MeSH) through the following crosses: 1 (assisted reproductive techniques, nursing) / (assisted reproductive techniques, nursing) / (assisted reproductive techniques, nursing) and 2 (assisted reproductive techniques, women's health, nursing) / (assisted reproductive techniques, women's health, nursing) / (assisted reproductive techniques, women's health, nursing). English, Portuguese, and Spanish languages were included.

The following inclusion criteria were adopted: articles available in full, which answered the guiding question, in Portuguese, English, and Spanish, between the years 2015 and 2020. And as exclusion criteria: repeated articles, uncompleted research, editorials, book chapters, expert opinions.

RESULTS AND DISCUSSION

Following the determined parameters, the first search obtained 1,305 studies. Applying the inclusion criteria resulted in 110 articles, and with the application of the exclusion criteria, 61 articles were eliminated, and the final sample totaled 40 articles after reading in full, as shown in table 1.

Revista ARACÊ
ISSN: 2358-2472

Table 1. Studies available in the databases were acquired from the integrative literature review.

Databases	Studies acquired with crosses	Studies after application of the inclusion criteria	Studies after application of exclusion criteria	Studies after reading in full
Scielo	1	0	0	0
Pubmed	173	13	11	11
Scopus	657	57	34	22
Lilacs	6	3	0	0
Web of Science	32	7	1	1
Cochrane	225	4	3	0
Science Direct	211	26	12	6
BDENF	0	0	0	0
TOTAL	1.305	110	61	40

Source: Prepared by the authors.

Thus, the objective of this study was to recognize the altered manifestations of NHB in women undergoing assisted reproduction through an integrative literature review. The final sample totaled 40 articles. Of these, 11 were from Pubmed, 22 from Scopus, 1 from Web of Science, and 6 from Science Direct.

Studies were selected between 2015 and 2020, with a predominance in 2019 with 15 publications (37.5%), followed by 2017 and 2018 with 5 studies in each year (12.5%), 9 in 2016 (22.5%), 4 in 2015 (10%) and 2 in 2020 (5%). It was also found that 90% of the articles were international studies. Regarding the methodological design, quantitative studies were the predominant ones with 35%, followed by qualitative studies with 15%, as shown in Table 2 below.

Table 2. Distribution of the types of methodological designs and their frequency according to the integrative literature review.

Methodological design	N	%
Quantitative	14	35
Qualitative	6	15

Revista ARACÊ
ISSN: 2358-2472

Quanti-quali	1	2,5
Revision	5	12,5
Systematic review	3	12,5
Systematic review and meta-analysis	3	12,5
Randomized controlled trial	3	7,5
Almost experimental	1	2,5

Source: Prepared by the authors.

To emphasize the conceptualization of empirical indicators, Denser (2003) states that in contexts within normality or in conditions within the expected, indicators expose the modifications, and it is from their detection that one can act in the prevention of problems. Thus, this study identified inadequacies of the basic human needs of the public that undergoes assisted reproduction treatments so that it was possible to act emphatically on these points and minimize the damage caused.

Dealing with the levels of human needs, psychobiological and psychosocial needs are shared by all individuals, but psychospiritual needs are unique characteristics of the human being (Neto et al., 2019).

Thus, operational definitions were developed based on the analysis of studies in the integrative literature review. The empirical indicators were distributed in the classifications of the Theory of Wanda Horta (2015), adjusted by Garcia and Cubas (2012), and captured by the identification of these altered and subdivided NBN by the levels.

A total of 166 empirical indicators (HEIs) were obtained, of which 74 represented psychobiological needs, 88 altered psychosocial needs, and 4 represented psychospiritual HEIs, as shown in tables 3, 4, and 5 below.

In this first level of the theory addressed, some needs were not contemplated with indicators, as it was not detected in the literature altered human needs of: oxygenation, hydration, body care, physical integrity and thermal regulation.

Thus, some changes were pointed out, such as obesity, inadequate nutrition, and changes in appetite. The studies by Moura, Souza & Scheffer (2009), Donadio et al., (2008) and Martins (2009) strengthen the detection of these changes, based on the assumption that infertility has several causes, including obesity and changes in body weight, where these criteria hurt the conception process.

Problems related to sleep were identified in the literature, and to strengthen these findings, the study by Zaidouni et al. (2019) examined the effect of the nursing consultation on stress in infertile couples before starting treatment and identified 71.4% of the sample with inadequate sleep.

Revista ARACÊ
ISSN: 2358-2472

Within the psychobiological level, sexuality and reproduction were the basic human needs with the greatest quantitative representativeness, accounting for 20 indicators. This is due to its direct association with procreation, bringing as empirical indicators situations of obstetric complications and dysfunctions that involve sexual intercourse, such as dissatisfaction, decreased libido, and robotization of the sexual act.

Regarding this last indicator, Batista, Bretones, and Almeida (2016) observed in their study several complaints related to the robotization of the sexual act, which was seen as a mandatory procedure, an act that suppressed sexual pleasure with their partner. Farias et al. (2010) corroborate by stating that sex becomes an obligation, and this reflects in the disconnection of pleasure, in addition to enabling the reduction of sexual frequency. In more critical situations, the couple separates themselves, and the sexual act is absent (Marques; Morais, 2018).

Table 3. Distribution of empirical indicators regarding the basic human needs of women undergoing assisted reproduction at the psychobiological level and their frequency according to the integrative literature review.

Psychobiological Needs	Empirical indicators	N	%
Nutrition	✓ Inadequate nutrition ✓ Malnutrition ✓ Increased or decreased appetite ✓ Eating disorder ✓ Postnatal eating disorders ✓ Unhealthy eating ✓ Obesity ✓ Abnormal weight 20 < BMI < 25 ✓ Excessive caffeine intake	9	5,42
Elimination	✓ Nausea ✓ Vomiting ✓ Risk of constipation	3	1,80
Sleep and rest	✓ Problems with sleep ✓ Insomnia ✓ Fatigue	3	1,80
Physical activity	✓ Intense physical activity and exhaustion ✓ Reduced physical activity ✓ Sedentary lifestyle	3	1,8
Sexuality and reproduction	✓ Increased risk of obstetric complications ✓ Increased risk for miscarriage ✓ Increased risk for placenta previa ✓ Increased risk for gestational diabetes ✓ Increased risk for preeclampsia ✓ Increased risk for endometriosis ✓ Increased risk for polycystic ovary syndrome ✓ Increased risk for placental abruption ✓ Increased risk of preterm birth	20	12,04

Revista ARACÊ
ISSN: 2358-2472

	✓ Increased risk of fetal chromosomal abnormalities ✓ Increased risk of low birth weight ✓ Increased risk for STIs due to multiple partners becoming pregnant ✓ Sexually Acquired Pelvic Infections ✓ Sexual dysfunction ✓ Underestimating the importance of sexual intimacy in married life ✓ Sexual dissatisfaction / Less satisfaction in sexual intercourse ✓ Quality of impaired sexual intercourse ✓ Decreased libido ✓ Orgasm dysfunction ✓ Robotization of the sexual act		
Physical and environmental security	✓ Coping with violence by the partner or family ✓ Living in polluted areas ✓ Increased smoking ✓ Alcohol intake ✓ Drug use	5	3,01
Regulation: Cell growth and functional development	✓ Exposure to environmental pollutants causes increased oxidative stress ✓ Increased age results in a decreased number of follicles in the ovaries and the quality of oocytes	2	1,20
Vascular regulation	✓ Hypertension ✓ Swelling/Edema	2	1,20
Neurological regulation	✓ Mood disorder ✓ Obsessive compulsive disorder ✓ Increased risk of psychiatric disorders related to the threat of abortion	3	1,80
Hormone regulation	✓ Increased insulin level ✓ Hormonal regulation affected by stress ✓ Use of large amounts of hormone repeatedly	3	1,80
Sensory perception	✓ Colic ✓ Muscle tension ✓ Back pain	3	1,80
Therapy and prevention	✓ Non-acceptance of the treatment method ✓ Delay in treatment ✓ Low adherence to treatment ✓ Withdrawal from treatment over time ✓ Refusal to perform more invasive tests ✓ Successive treatment failures ✓ Uncertain duration and procedure of treatment ✓ Painful process of self-administration of oral, enteral, and parenteral medication ✓ Need for psychological intervention ✓ Increased Requirement for Proof of Pregnancy: More USG Exams and Check-Up ✓ Increased risk of cesarean section ✓ Risk of hysterectomy ✓ Increased risk of cancer due to increased exposure to hormone therapy ✓ Problems with ovulation induction	18	10,84

Revista ARACÊ
ISSN: 2358-2472

	✓ Ovulatory changes ✓ Treatment overload ✓ Music therapy is ineffective in reducing anxiety ✓ Inadequate professional care at times of abortion or puerperium		
TOTAL		**74**	**44,58**

Source: Prepared by the authors.

The data presented in Table 4 below correspond to the empirical indicators of altered BHN related to the psychosocial level. Indicators referring to the needs of recreation and leisure, space, and creativity were not identified in the scientific literature.

Starting with the psychosocial level, which contains the manifestations through instincts such as living in a community, establishing communication, and emotions that permeate the individual, among others (Marques et al., 2008). Regarding the empirical indicators related to psychosocial needs, the following were not addressed: recreation and leisure, space, and creativity.

As the first category of needs present at the psychosocial level, Communication establishes a close relationship with the next category, Gregaria. This is due to the intimate relationship between the obstacles in communication, which directly reflects on the distance within the relationship.

This is what Marques and Morais (2018) find when they report that attempts to fail in treatment impacted the inhibition of the spouses, which generated a lack of dialogue between the couple.

The most representative category of the study was emotional safety, as it included 40 empirical indicators, which reinforces the relevance of alluding to items associated with the emotional status of women undergoing assisted reproduction treatments. It is important to highlight that among the indicators detected in the literature, there was an explicit plurality of feelings.

In the context of infertility, these women are faced with a situation of need, where it may not lead to a physical affection, however, it weakens the psychic health of the couple and even of the entire family (Mesquita et al., 2016). Thus, given this complexity that permeates infertility, the need for interventions in the emotional sphere is notorious (Farinati; Rigoni, Muller, 2006).

Revista ARACÊ
ISSN: 2358-2472

Table 4. Distribution of empirical indicators regarding the basic human needs of women undergoing assisted reproduction at the psychosocial level and their frequency according to the integrative literature review.

Psychosocial Needs	Empirical indicators	N	%
Communication	✓ Difficulty in communication	1	0,60
Gregarious	✓ Community and family pressure in the face of infertility ✓ Parental bullying ✓ Social isolation ✓ Social exclusion, especially of family and spouse ✓ Family neglect ✓ Reduction of social and spousal support ✓ Deterioration of family relationships ✓ Avoids contact with family and friends with young children ✓ Negative social interactions ✓ Damaged marital relationship	10	6,02
Emotional security	✓ Not believing in the success of the treatment ✓ Cultural stigmatization ✓ Depression ✓ Feeling of loss ✓ Suffering ✓ Risk of emotional maladjustment ✓ Emotional pain caused by childlessness ✓ Anger ✓ Resentment ✓ Hostile behavior ✓ Sadness ✓ Jealousy ✓ Emotional exhaustion ✓ Prejudice overload ✓ Stress related to marital and personal life ✓ Feeling of guilt ✓ Anxiety ✓ Anxiety about the survival of the fetus ✓ Anguish ✓ Negative emotions ✓ Grieving process ✓ Despair ✓ Fear of continuing pregnancy ✓ Fear of losing the pregnancy ✓ Fear of miscarriage ✓ Concern associated with decreased fetal movements ✓ Fear of divorce ✓ Fear of ectopic pregnancy ✓ Fear of child malformation ✓ Fear of ineffective treatment ✓ Fear of complications in treatment / Fear about the impact of AR treatment on your health / Fear of continuing treatment due to the high hormonal load ✓ Concerns about medical procedures ✓ Avoids expressing emotions ✓ Frustration when treatment fails ✓ Insecurity	40	24,09

Revista ARACÊ
ISSN: 2358-2472

	✓ Insecurity of having a child gestated in another womb ✓ Helplessness ✓ Hopelessness ✓ Distrust ✓ Feeling under constant psychological pressure		
Love, acceptance	✓ Improper coping, avoiding the truth about infertility ✓ Difficulty accepting and adapting to reproductive dysfunction ✓ Need for explicit recognition of previous fertility trajectory ✓ Feeling that your family does not accept these methods ✓ Believing that your friends are bored with your infertility	5	3,01
Self-esteem, self-confidence, self-respect	✓ Low self-esteem ✓ Personal devaluation ✓ See yourself as different from those who get pregnant naturally ✓ Lower self-confidence between the couple ✓ Decreased self-confidence ✓ Reduced maternal confidence ✓ Feeling vulnerable ✓ Diminished self-image/Damage to self-perception ✓ Body depreciation ✓ Lack of femininity ✓ Feeling unable to share feelings ✓ Feeling inadequate ✓ Feeling of embarrassment and shame ✓ Feeling of failure ✓ Feeling of demand ✓ Loss of control over the body	16	9,63
Freedom and participation	✓ Do not have the opportunity to express your concerns during routine check-ups ✓ Interruption of working life	2	1,20
Health education and learning	✓ Insufficient knowledge about infertility ✓ Superstitions related to infertility ✓ Lack of knowledge about success rates and cost of treatment	3	1,80
Self-realization	✓ Marital dissatisfaction ✓ Lower life satisfaction ✓ Poor quality of life during treatment ✓ Decreased well-being ✓ Demotivation	5	3,01
Ensuring access to technology	✓ Late initiation of treatment due to delay in being referred to a specialist in human reproduction ✓ Inaccessible material resources (medications, exams, among others) ✓ The treatment environment has suffered a notable decrease, and interaction with professionals is reduced ✓ Difficulty in accessing the program due to the distance from their homes	6	3,61

Revista ARACÊ
ISSN: 2358-2472

	✓ Difficulty in continuing treatment due to financial issues to bear the high costs of medication and procedures ✓ Limitation of access due to the advanced age of the woman and her marital status		
TOTAL		88	53,01

Source: Prepared by the authors.

Encompassing the last level of the NHB, the following table explains the 4 HEIs of altered psychospiritual needs.

Within the psychospiritual needs, there is only one representative, Religiosity and spirituality, in which 4 empirical indicators were found in the literature: little religiosity, spiritual confrontation, feeling of divine punishment, and feeling of divine injustice.

Thus, people who face serious illnesses have a decrease in stress through their relationship with the spiritual. Likewise, there are hypotheses that the connection with the divine positively influences both the psychological and physical aspects of patients undergoing assisted reproduction treatment, which achieve better results (Braga et al., 2018).

Table 5. Distribution of empirical indicators regarding the basic human needs of women submitted to assisted reproduction at the psychospiritual level and their frequency according to the integrative literature review.

Psychospiritual Needs	Empirical indicators	N	%
Religiosity and spirituality	✓ Little religiosity ✓ Spiritual confrontation ✓ Feeling of divine punishment for mistakes made previously ✓ Sense of divine injustice	4	2,40

Source: Prepared by the authors.

To emphasize the conceptualization of empirical indicators, Denser (2003) states that in contexts within the normal range or in conditions within the expected range, the indicators expose the changes, and it is from their detection that one can act in the prevention of problems. Thus, this study identified inadequacies of the basic human needs of the public that undergoes assisted reproduction treatments so that it was possible to act emphatically on these points and minimize the damage caused.

CONCLUSION

In contexts within normality or in conditions within expectations, empirical indicators expose the changes, and it is from their detection that one can act to prevent problems. Thus, this study identified inadequacies of the basic human needs of the public that

Revista ARACÊ
ISSN: 2358-2472

undergoes assisted reproduction treatments so that it was possible to act emphatically on these points and minimize the damage caused.

The study aimed to identify the indicators of women submitted to assisted reproduction to structure a software for the systematization of Nursing Care in the light of the Theory of Basic Human Needs, as the scientific knowledge generated by nursing throughout its practice provides a demand for organization, as a result of the progress in the construction and arrangement of conceptual models. Thus, the study had its objectives achieved.

Therefore, the identification of empirical indicators of women undergoing assisted reproduction will support a sovereign care practice with theoretical foundation and support through scientific evidence. Thus, the fruits generated by this study will work as a framework for the creation of a software intended for use by the professional team and, more specifically, by nursing, aiming to ensure care that permeates all levels of Basic Human Needs and is concerned with executing the entire Nursing Process.

Revista ARACÊ
ISSN: 2358-2472

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