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Health promotion in elderly patients with hyponatremia related to polypharmacy: The role of nurses

Promoção da saúde em pacientes idosos com hiponatremia relacionado a polifarmácia: A atuação do enfermeiro

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Cássia Rosa da Silva Santos
Undergraduate, Military Police College

Estefany Bruna Alves da Silva Morais
Undergraduate, Military Police College

Patrick de Sousa Siqueira Biano
Undergraduate, Military Police College

Katiulcy Carvalho Oliveira
Master's degree, Pontifical Catholic University of Goiás

ABSTRACT
Hyponatremia is a condition with a low concentration of sodium in the body that presents itself occasionally in long-lived patients, with greater aggravations in a scenario of polymedications. Objective: To analyze articles that address the theme: The importance of nurses' performance in health promotion in elderly people with hyponatremia. Method: This paper is a systematic literature review of integrative evaluation. The results find the necessary correlation between professional development, characteristics of the elderly person with hyponatremia and its implications regarding polymedication. Nurses are the main agents in health promotion, they know all the particularities of their patients, plan, implement and participate in the entire process. This work was developed with the purpose of sensitizing and providing learning to professionals, so that they are more engaged and participate in a more assertive way in the promotion of the health of the population in which they work.

Keywords: Hyponatremia, Sodium, Aged, Nurse, Health, Polymedication.

1 INTRODUCTION

In Brazil, the great change in the demographic scale occurs visibly due to the drop in fertility and the increase in longevity, that is, the young population has decreased its representativeness, giving space to the elderly, these transformations imply a change in the organizational scenario of our society and consequently activate health-related demands linked to this population group.

The high number of elderly people indicates concerns about the search for basic conditions for an adequate quality of life, since there is a low rate of trained professionals, few technologies available and scarce resources. This reality leads to the formulation of strategies established by nurses who work as managers of health units (CUNHA, et al. 2021).

It is favorable for nurses to be aware of the increasing rate of elderly people in Brazil, as it provides professionals with methods to promote more centralized care, in order to ensure safer care for the biopsychosocial capacity of this population (MALMANN, D.G, *et al.* 2014).

It is noted that, along with this growth, there is a need to follow the epidemiological transitions, since the rates of infectious diseases have decreased their expression and the moment is evidenced by chronic degenerative diseases, which can be correlated with aging (FLORES, L.P.O, 2015).

In view of this fact, the search for health care and services becomes more present, such placement goes hand in hand with the number of hospitalizations and continuity of the elderly in health units, this fact is directly related to the use of various medications and simultaneously, a situation that consequently conditions hyponatremia.

It can be stated that, due to the need to highlight the main actions of nurses in health promotion in elderly patients with hyponatremia, it is necessary to describe the care techniques and the implications for the treatment related to polypharmacy and also the signs and symptoms of severity.

2 METHODOLOGY

The present study refers to an undergraduate course completion work by the Military Police Faculty, which provides for an integrative systematic literature review by highlighting scientific articles referencing the importance of nurse care for the elderly population with hyponatremia and the causes that polypharmacy brings to this condition.

The present work is a literature review and an integrative evaluation analysis that is carried out in six stages, namely: identification of the theme and selection of the research question; establishment of inclusion and exclusion criteria; definition of pre-selected and selected studies; categorization of the selected studies; analysis and interpretation of results; presentation of the review/synthesis of knowledge (BOTELHO, CUNHA, MACEDO, 2011).

A search for scientific productions was carried out in the online databases of the Virtual Health Library (VHL), Medical Literature Analysis and Retrieval System Online (MEDLINE) and Scientific Electronic Library Online (SCIELO). Using the following descriptors in health sciences

(DeCs): elderly, hyponatremia, sodium, polypharmacy, hydroelectrolyte control, quality of life of the elderly and their respective counterparts in the languages Portuguese, English, Spanish.

The inclusion criteria were: all types of articles that addressed the proposed theme, articles with full texts, monographs and theses, available free of charge, that were linked to at least three descriptors, studies in the field of nursing; Articles written in English, Spanish and Portuguese. Studies available between 1993 and 2023 were used. We selected (XX) articles for reading in full, in which (XX) articles were used for the composition of this work.

Articles that did not address the topic in full, as well as works dated less than 2010 (except in descriptive contexts such as laws, ordinances and manuals) and those that contained only citations and information relevant to the construction of knowledge and also languages other than those previously mentioned were excluded.

3 DEVELOPMENT

3.1 CHARACTERISTICS OF THE ELDERLY POPULATION

According to the Brazilian Institute of Geography and Statistics (IBGE, 2018), the rate of aging has been growing in recent years and the number of elderly people has become increasingly representative for the Brazilian nation. According to information on the website, when highlighting the year 2017, the elderly population increased by 18%, totaling about more than 30 million elderly people in Brazil.

With the aging of citizens, there is a concern about the needs of this age group focused on chronic non-communicable diseases (NCDs) such as: Hypertension, Diabetes, cholesterol, depression, among others. Such pathologies bring with them the need for continuous medications, which leads to polypharmacy or polypharmacy, defined by the combination of five or more medications. *(SANTANA, P. H. J. 2021*).

Therefore, the health sector, both public and private, needs to be able to disseminate promotion and prevention actions for a better quality of life, in order to highlight a set of care and means that are more accessible to the elderly, preparing families and communities, paying attention to the daily reality of aging and its frailties (Zen, D. et al., 2018).

According to Zen D. et al. (2018), in this context there is a wide demand from the elderly for health services, a fact that leads directly to the frequent number of hospital admissions and prolonged stay of beds. This condition directly reflects on the technical-scientific training of the health teams, as well as the structural aspects of the institutions.

A factor related to this placement is evidenced by dehydration, which brings with it not only a decrease in fluids, but also a depletion of electrolyte levels in the body, highlighting the low volume of sodium at the serum level and thus the development of hyponatremia in the elderly, a fact that may be associated with rates of hospital admissions and increased early mortality (GOMES, E.B., PEREIRA, H.C.P, 2021).

According to Auriemma et al (2018), the elderly population is at high risk for the development of hyponatremia, due to their high age being a specific factor of the condition under discussion, since these patients also experience moments of great physiological changes.

Another association of great weight in hospitalizations, according to IBGE (2018) data of long-lived people, is correlated with polypharmacy, as this group already has high natural vulnerability and that, when adding the feat of self-medications, consultations with several professionals in which they do little to guide their patients, drug and food interactions, increasingly associate and intensify cases of severe hyponatremia, thus leading to the period of hospital stay and deaths.

3.2 DEFINITION OF HYPONATREMIA

Seen as a more common electrolyte disturbance in hospitalized patients, hyponatremia is defined as the concentration of sodium at the plasma level below 135 mEq/L. Its etiological diagnosis can be made based on the analysis of 4 laboratory parameters: plasma and urine osmolarity, urinary sodium concentration, and basic acid and potassium balance. (GOMES, E.B., PEREIRA, H.C.P, 2021).

3.2.1 Classification of hyponatremia

3.2.1.1 Severity

Auriemma, Lívia et al. (2018), highlights a classification according to the biochemical aspect, when characterizing hyponatremia in:

- Mild: sodium from 130 to 135mEq/l;
- Moderate: sodium from 125 to 129mEq/l
- Serious: < 125mEq/l

According to the classification of hyponatremia based on symptoms, the following parameters are indicated: sodium levels, rate of development, severity of symptoms, serum osmolarity, and volume status. (SPASOVSKI, Goce et al. 2017).

Table 1. Classification of hyponatremia symptoms

GRAVITY	SYMPTOMS
Moderate	Náuseas as emese
	confusion
	headache
Serious	EMESIS
	Respiratory distress
	Abnormal and profound drowsiness
	Seizures
	Level of consciousness (Glasgow Coma Scale)

FONTE: Clinical practice guideline on diagnosis and treatment of hyponatraemia

3.2.1.2 Osmolarity

Hypertonic hyponatremia is a rarer condition, is evidenced when serum osmolarity is above 280mosm/lg and is related to the accumulation of osmotically active substances that move between the intracellular (IC) and extracellular (EC) medium.

The most common presentation is hypotonic, when serum osmolarity is below 280 mosm/kg, which has the potential to cause renal or extrarenal sodium loss since water retention occurs. Therefore, it is necessary to perform a urine test in conjunction with the clinical evaluation of the patient's fluid mechanism, in order to distinguish whether the patient is losing or retaining water.

3.2.1.3 Volemia

It is important to know and specify the patient's volume situation, precisely in order to find out the appropriate treatment.

The euvolemic form points to a more common condition of hyponatremia in hospitalized patients, showing the most common cause of inappropriate antidiuretic hormone secretion syndrome (SIADH) and correlates with excess body water and decreased renal elimination (Dineen R, Thompson CJ, Sherlock M. 2017).

Hypovolemic occurs when there is a loss of extracellular fluids characterized by a pre-existence of a deficiency of water and total body sodium, either through the skin due to excessive sweating or extensive burns, digestive tract with vomiting and diarrhea and others (SPASOVSKI, Goce et al. 2017).

According to Nagler E. V et al. (2014), excess fluids as a clinical finding confers hypervolemic hyponatremia, and peripheral edema, elevated venous and jugular pressure, ascites, as well as the related signs of heart failure, cirrhosis, this condition occurs with increased water and body sodium.

3.2.1.4 Time

The classification and definition according to time contribute to finding future clinical characteristics, such as the period of development of hyponatremia, which, when exceeding 48 hours, is certified as its chronic form and, when analyzed in a period shorter than the stipulated, is considered acute. If there are no specific ways to determine which type is defined as chronic, in this case it is important to emphasize the need for clinical follow-up and history (SPASOVSKI, Goce et al. 2017).

Table 2. Causes of acute hyponatremia

CAUSES OF ACUTE HYPONATREMIA
Postoperative period
Post-prostate resection or endoscopic uterine surgery
Polydipsia
Exercise
Recent initiation of thiazide treatment
3,4-Methylenedioxymethamphetamine (MDMA)
Colonoscopy Preparation
Cyclophosphamide (intravenous)
Ocytokine
Recent initiation of treatment with desmopressin, terlipressin, vasopressin

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Signs such as: cerebral edema, decreased level of consciousness, hypoxia, coma, convulsion, among others, can be identified with anamnesis and physical examination together with laboratory tests, facilitating the understanding of the severity and helping to reduce mortality rates from the pathology, as rapid care and correct treatment are essential (GOMES; Mariana MATOS; Anne Catherine. 2021). To distinguish between acute and chronic hyponatremia, since cerebral edema occurs more frequently in less than 48 hours.

The signs of severity presented in the most acute condition are neurological signs that begin within 48 hours, due to cerebral edema leading to seizures, altered mental status, and after this period chronic hyponatremia is considered (BASER, Salih; YILMAZ, Cakmak Nuray; GEMCIOGLU, Emin. 2022)

Treatment should be carried out immediately, in order to avoid the advancement and extension of the diseases, since the signs and symptoms presented depend on the team's response to the action of recognizing clinical factors of hyponatremia (GOMES et al, 2021).

To replace sodium, a hypertonic saline solution of 100 ml at 3% is used, being 1 ml/kg/h. Any saline solution administered should contain higher osmolarity than urinary saline. Because if it has the same osmolar load of sodium, it will be eliminated at the same level as urine without loss of body water. (DOBERENZ, D. T. 2012).

3.3 NURSING ATTRIBUTIONS

The educational interventions carried out by nurses for the health promotion of the elderly are aimed at providing comprehensive health care to the individual, and should encompass all the psychosocial changes of aging itself, as well as functional capacity and quality of life. (CARVALHO, K.M, *et al.* 2018).

Non-pharmacological treatment is important in reducing morbidity and mortality. The professional should also be concerned with therapeutic interventions, so that they can improve the patient's well-being. A good conduct regarding dietary guidance is also inserted in this context, of non-pharmacological treatment. (OLIVEIRA, C.J, MOREIRA, T.M.M., 2010).

Nurses are responsible for the treatment of hyponatremia, maintaining fluid and electrolyte control, and identifying, confirming and treating hyponatremia. In addition to also replacing the catheter irrigation system with saline solution. (SANTOS, D.R.F, *et al* , 2012).

According to COFEN Resolution No. 564/2017, planned knowledge and prior preparation of patient care are increasingly present in the nurse's workday, where they use tools that prove the effectiveness of their technical-scientific actions, such as the systematic application of care.

Based on these assumptions, it is understood that nurses are qualified professionals who are able to work in various areas of health, and here we highlight the clinical impact of hyponatremia in the elderly, a condition that significantly alters functions of the central nervous system (GOMES, E.B., PEREIRA, H.C.P, 2021).

Due to this fact, CUMMING et al. 2014 frequently associate hyponatremia with this naturally fragile group, since its occurrence is characteristic of several comorbidities, risk of dehydration, electrolyte imbalance, hemostasis impairment, and use of polypharmacy.

In order to have an effective therapeutic methodology, nurses need to make significant contributions to the planning of daily life in relation to the use of medications, scheduling, and orientations, especially those elderly patients who use more than one drug (Smanioto F N, Haddad M C, 2013).

Table 3 - Factors that increase the vulnerability of the elderly to drugs

FACTORS THAT INCREASE THE VULNERABILITY OF THE ELDERLY TO DRUGS	
Pharmacokinetic	- Decreased organ function, especially in drugs eliminated renally or with the first hepatic passage. - Decrease in muscle mass and increase in fat mass, which conditions changes in distribution and accumulation
Pharmacodynamic	- Increased sensitivity to medications, especially anticholinergics and those that affect cognitive function. - Alteration of homeostatic mechanisms.

Functional Capacity	- Visual deficits that make it difficult to read instructions or labels on medications. - Hearing deficits that can contribute to problems understanding verbal instructions or explanations.
Cognitive Ability	- Difficulty remembering new instructions. - Poor adhesion conditioned by memory or comprehension problems.
Financial Factors	- Cost of medications can interfere with adherence.

Source: Galvão, 2006

According to SANTANA, Pedro Paulo Corrêa, et al. (2019) highlight the nurse as a pioneering agent in promoting the quality of life of the elderly population, so it is essential that these professionals seek constant updates regarding gerontologists' knowledge and theoretical and practical deepening in attention to the characteristics of aging.

Franco, J.N. *et al.* (2010) complements this statement by reporting that the nurse is the primary actor in the frailties and particularities of the elderly according to the needs and evidences the use of illustrative devices and means that help in a more assertive understanding of the therapeutic condition treated, which is easy to access and handle the prescription, since many members of this population, have reading difficulties, either due to low schooling or functional aspects.

According to CAVALCANTE, *et al.* (2022) The support mechanisms that meet polypharmacy and decision-making optimize the services developed by nurses and their teams, respecting an orderly process, which contributes to a holistic look at both the patient and his family in a collective and multidisciplinary way, in order to elucidate interventions and knowledge that actually contribute to the improvement of the patient's situation.

The table below presents nursing diagnoses and interventions related to polypharmacy according to the natural needs of the elderly population regarding the use of medications.

Table 4 - Nursing diagnoses and nursing interventions related to polypharmacy

Need	Nursing Diagnosis	Results	Interventions
Learn	Ineffective self-management of health, related to polypharmacy, characterized by inadequate knowledge about the treatment regimen	Effective control of the drug regimen	Conduct health education on the correct use of medications; guide dose, time, duration of treatment; schematize and organize schedules in a clear way for the elderly; to adapt the therapeutic regimen to the routine of the elderly; guide the proper storage of medications; Assess and monitor treatment adherence; schedule medications by paying attention to drug interactions; assess adverse effects; To assess cognition, visual acuity of the elderly and self-care capacity; Assess self-medication; refer to a geriatrician to reduce the prescription in order to avoid therapeutic duplication; Instruct family members and caregivers about the medication regimen.

Eating and drinking properly	Risk of dysfunctional gastrointestinal motility, related to age and treatment regimen	Functional gastrointestinal motility	Orient times away or close to meals according to the characteristics of the medication; stimulate adequate water intake;
Eliminate organic waste	Risk of electrolyte imbalance, related to treatment regimen and renal dysfunction	Electrolyte balance	Order tests to assess kidney function; identify medications that can alter electrolyte status, such as diuretics, antihypertensives, and calcium channel blockers; evaluate and guide diet and appropriate water intake; Assess signs and symptoms of kidney disease

SOURCE: Adapted from CAVALCANTE, et al. 2022

Cavalcante, et al. (2016) state that ineffective self-management of health is a very present condition in the life of the elderly, so the active role of the nurse in terms of monitoring and guidance is essential, in addition to the principle of providing this group with the necessary tools for the development of their autonomy, since the process can be hindered by signs such as: memory loss, low schooling, diffuse and poorly qualified professional guidance, ingestion of numerous medications, and lack of understanding about the therapeutic program.

Together with polypharmacy, there is another diagnosis that is focused on the risk of dysfunctional gastrointestinal motility, in which it is in the nature of the elderly person to have a slower metabolism, which can alter the absorption of the drug, which contributes to its effects mainly related to its bioavailability in the body

Risk of electrolyte imbalance, related to the treatment regimen and renal dysfunction, for this diagnosis it is essential that the nurse provides adequate guidance on the prescription provided (schedules, drug and food interactions) and encourages adequate nutrition, water intake and stimulates the elderly in the practice of physical activities, always taking into account the functional conditions and capacities of this group (CAVALCANTE, Alice Silva *et al* , 2022).

MORAIS, D. B. *et al* (2021) exposes the need for an early evaluation regarding the insertion of new drugs in the routine of the elderly, since most drugs have renal excretion, which can trigger disturbances in the hydroelectrolyte balance and, consequently, pharmacodynamic interactions.

It is in this context that the strategy of the family health service aims to meet the basic needs of the elderly, with a main focus on health promotion, where nurses perform an anamnesis and active listening in an ethical, qualified and professional way with the objective of assisting, forming bonds and improving care, elaborating care that is resolute for the life of the health system user. (*FREITAS et, al 2022).*

Nursing is seen as a great field of possibilities and attributions, which has full responsibility with regard to medical prescription, because nurses who occupy the position of monitoring cases

need to have the necessary theoretical knowledge about pharmacology, drug interactions and their adverse reactions in order to reduce risks and possible harms (DE SOUZA SOARES, Helga *et al*, 2020)

Based on the statements, it is essential that nurses know the conditions of the aging process of the population, as well as the functional and organic changes of this stage of existence CAVALCANTE, Alice Silva et al 2022). By establishing strategies and alternatives on the effects of polypharmacy on hyponatremia, in order to promote improvements in quality of life and stimuli for self-care (CUMMING *et al*. 2014).

4 RESULTS AND DISCUSSION

The growing evolution of elderly people in the world and in Brazil occurs exponentially and this is a natural process of all citizens, that said the organic condition is also modified, as well as the physiology and constitution of the systems of the living organism, so the population that represents this group makes use of more medicines, a fact that leads to mutations in the entire structure of the being.

When knowledge about the clinical aspects and management of several medications for a single elderly patient is highlighted, it is necessary to have a more efficient surveillance of the patient, since possible interactions and adverse events can lead to profound changes in their quality of life and the entire therapeutic process becomes time-consuming, which demands an expensive expenditure of energy from all those involved in the care process.

Therefore, the preceptor aims to reduce the high risk of complications that hyponatremia can cause to the patient's life. In order to reduce admissions and long stays in hospital units, to know the active ingredient of the trivial drugs in use and also to establish through daily observations, such as hours of sleep, nutrition, work activities, etc., the therapeutic and adaptive scheme based on the real state that this individual is in becomes indispensable.

Understanding that planning is the key to building improvements in the patient's life is crucial to promote a significant advance in their health, as it is at this moment that the greatest professional-client and family interaction occurs. All data on routine, presence of caregivers, socioeconomic conditions, consultations, types of medications in use are found in this phase of the construction of the therapeutic process.

The low sodium index in the body (hyponatremia) can appear at any time in the existence of a human being, however, as observed and presented in this academic study, the elderly are the ones with the highest incidence.

With the advancement of this age group in the world population, it is clear that nurses need constant updates to keep up with the high demand, so they can innovate forms of approach and guidance, facilitating the understanding of self-care and possible drug interactions resulting from polypharmacy, one of the vectors highlighted for the condition of hyponatremia.

That said, it is analyzed that nursing evolves to act in an integrative way, not excluding from its diagnosis the analysis of the social determinants of health and well-being.

5 CONCLUSION

The present study aimed to understand the relationship between polypharmacy and hyponatremia, highlighting the attributions of nurses in the face of the needs of the elderly, who are more susceptible to this condition.

Polypharmacy without specialized monitoring and guidance enables a current problem that grows in tandem with aging, as the aforementioned group naturally has multiple NCDs, a fact that leads to greater representativeness and search for health units, leading to a high number of drug prescriptions, little understanding and low treatment adherence.

It can be affirmed that the planning of the therapeutic process is a natural activity of the nursing professional, since it comprises the execution of the administration and scheduling of medications in a conscious, precise and safe manner, in addition to promoting a set of actions, with the objective of achieving improvements in the quality of life of the elderly.

Due to this fact, it is necessary to emphasize that the nurse is inserted in the environment as a key point of health promotion, connected to all the particularities of the client, aiming at educational aspects and encouragement for self-care.

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