

Stress and Burnout Syndrome Among Nursing Professionals Working in Nephrology: an Integrative Review

Estresse e Síndrome de Burnout em Profissionais de Enfermagem que Atuam na Nefrologia: Uma Revisão Integrativa

Strés y Agotamiento Profesional en Los Trabajadores de Enfermería de Nefrología una Revisión Integradora

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ABSTRACT

Objective: The chronic work-related stress can lead to burnout syndrome development. Nurses working in nephrology are also predisposed to the occurrence of stress and burnout. **Objectives:** The study's goal has been to identify the scientific production related to burnout and stress in nephrology nursing workers; and also, discussing the risk factors with regard to burnout and stress in nephrology nursing. **Methods:** This is an integrative review. The sampling was composed by 5,253 articles, which after refinement gave 13 complete articles. **Results:** From those 13 articles, 8 presented high levels of stress and/or burnout among nurses in the hemodialysis sector, and 5 indicated that burnout was either below the average of the origin countries or compared to other health care sectors. **Conclusion:** Given the results, it is expected to amplify the scientific vision toward the issues of stress and burnout syndrome in nursing professionals working in nephrology by identifying the factors that may influence the health care.

Descriptors: Burnout, Psychological stress, Nephrology.

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RESUMO

Objetivo: O estresse ocupacional crônico pode ocasionar o desenvolvimento da síndrome de burnout. Enfermeiros atuantes na nefrologia também estão predispostos à ocorrência do estresse e burnout. **Objetivos:** Identificar a produção científica relacionada à burnout e estresse em trabalhadores de enfermagem da nefrologia; discutir os fatores de risco e os fatores relacionados ao burnout e ao estresse em trabalhadores de enfermagem que atuam na nefrologia. **Método:** Trata-se de uma revisão integrativa. A amostra foi composta por 5253 artigos e após refinamento, foram obtidos 13 artigos completos. **Resultados:** Deste número, oito apresentaram altos níveis de estresse e/ou burnout entre enfermeiros da hemodiálise e cinco apontaram o burnout abaixo da média dos países de origem ou comparados a outros setores de cuidado em saúde. **Conclusão:** Com este resultado, espera-se ampliar a visão sobre o estresse e burnout em enfermeiros que atuam em nefrologia identificando os fatores que podem influenciar na assistência..

Descritores: Esgotamento profissional, Estresse psicológico, Nefrologia.

RESUMEN

Objetivo: Estrés laboral crónico puede conducir al desarrollo del síndrome de quemarse pelo trabajo. Las enfermeras que trabajan en nefrología también están predisuestas a la aparición de estrés y agotamiento. **Metas:** Identificar la producción científica relacionada con el agotamiento y el estrés en los trabajadores de enfermería de nefrología; analizar los factores de riesgo y los factores relacionados con el agotamiento y el estrés en los trabajadores de enfermería que trabajan en nefrología. **Método:** Se trata de una revisión integradora. La muestra fue de 5253 artículos y después de refinamiento se obtuvieron 13 artículos completos. **Resultados:** De estos ocho presentada altos niveles de estrés y / o agotamiento en cinco enfermeras de hemodiálisis y el desgaste en punta por debajo de la media de los países de origen o en comparación con otros sectores. **Conclusión:** Con este resultado, esperamos visión más amplia del estrés y el agotamiento de las enfermeras que trabajan en nefrología identificar los factores que pueden influir en la asistencia.

Descriptores: Agotamiento profesional, Estrés psicológico, Nefrología.

INTRODUCTION

Work is characterized not only as a means to material survival, but also as a way of surviving in a consumer society. It is something much larger, since work is a form of socialization and identity construction.¹ In this context, it is considered that work can favor the expression of people's subjectivity and, therefore, either rescue or promote health. However, depending on the way the organization and the labor process are configured, there is a potential for the deterioration of workers' health.²⁻³ Thus, the health condition of a worker can not be separated from his/her professional activity and its both micro and macro labor contexts, paying attention to the determinants and factors involved in this complex relationship between health and work.¹

According to Luz,⁴ health is defined as the state characterized: I) by anatomical, physiological and psychological integrity; II) the ability to personally perform family, professional and social functions; III) by the ability to deal with physical, biological, psychological or social tensions; and IV) by the feeling of well-being and free from the

risk of illness or death. According to the 8th National Health Conference,⁵ "health is a result of the conditions of food, housing, education, income, environment, work, transportation, employment, leisure, freedom, access and land possession and also access to health care services". This way, it can be verified that the work can interfere in the health-illness process of the workers.

In an economically developing country, such as Brazil, one can note the increase in competitiveness, the search for better remunerations and working conditions. These fail to meet the needs of the worker in a precise way, requiring adaptability, good physical and emotional preparation to solve the most diverse problems that may occur in the work environment.⁶ In this sense, the stress in the work is due to of the insertion of the individual in this adverse work context, since the work can represent source of satisfaction or personal dissatisfaction. This occurs when the work environment is perceived as a threat to the individual, impacting on the personal and professional level, with demands greater than their handling capacity.⁷

About stress, the first to introduce this word in the area of health was the endocrinologist scientist Hans Selye in 1934. The observation of some patients that complained and presented similar symptoms such as indisposition, fatigue and pain in the body, aroused interest by the study and soon began the animal research in laboratories. A noted endocrinologist at the time, he tested rats for the effects of female hormones and observed in the rats that died during the experiments that several of them had enlarged adrenals, peptic ulcers, gastrointestinal tract abnormalities and reduced immune tissue. To these changes, after the repetition of the experiments and use of control group that produced the same changes, Selye attributed as its cause its own manipulation of the rats, since it admitted that it did not have good dominion, sometimes it dropped them and had to run behind them in the laboratories. In 1936, stress was defined as demand on the body, with unspecific result, whether of somatic or mental consequence, and the stressor as any agent that establishes a reaction of stress, whether of a physical, mental or emotional nature.⁸⁻⁹⁻¹⁰⁻¹¹

The authors Medeiros and Nobrega¹² explain the stages of Selye's stress as follows:

- Alarm phase: the individual experiences sensations that are often not identified as a sign of stress. Some of these symptoms may be palmar hyperhidrosis, tachycardia, inappetence, headache and heartburn, which are reported in the acute phase.

- Resistance phase: it happens when the individual tries to reestablish a balance, that is, when he tries to adapt to the situation. As the balance is reached, some

initial signs disappear, however for this adaptation to occur, the body uses energy from other vital functions.

- Exhaustion phase: At this moment, the adaptive energy has been extinguished and the initial signals come back and others develop. The inability to adapt the body occurs due to the absence of coping mechanisms, causing the effects of the stressors to last longer.

After Selye several theories on stress were developed, which Lazarus¹³ divided into three varieties: I) those that consider stress a physiological condition of the organism, organic trend; II) those who consider that the stress is the result of the performance of the environment; III) and theories of interactionism, such as Lazarus's transactional theory that stress is the product of the difference between the relation of demands and internal control that the individual has, are the most widespread theories today. Thus, stress occurs only when the individual, in the face of a demand from the external or internal environment, seeks in himself the capacity to adapt to the problem and cannot find it.¹³⁻¹⁴⁻¹⁵

This theory is also known as the coping theory or handling, when coping strategies of a person's repertoire are adopted and are not enough to solve a problem, stress develops, when strategies work adversity is considered a challenge and can be a stimulus. There are two types of coping, problem-focused coping, where resources are directed toward problem solving or coping, and coping focuses on emotion, where resources are used for internal change of emotions that the problem causes in the individual without change the problem, both are important depending on the situation to adapt. In this theory, stress is a process of interpretation of stimuli that can lead to organic, physical, psychic and cognitive changes.¹⁶⁻¹⁷⁻¹⁸

In many health units, workers experience stressful situations that can lead to accidents and psychic suffering, triggered by everyday situations, such as the pain and death of patients. In addition, rhythm, work intensity, emergency situations and living with illness are factors that trigger occupational stress and mental disorders and are generators of wear and tear, such as malaise, anxiety, nervousness, depression and other diseases.¹⁹

The nursing professionals have working hours most of the time exhaustive, due to the large volume of patients and the short rest time. Thus, they have their patterns of sleep, food and social activities altered, especially in night shifts. Often they are engaged in more than one job because of salaries that are not compatible with social reality.²⁰ The problems brought about by these facts become evident. They are obtained by the daily work associated to the lifestyle of the professionals and to the interference in the life quality, occurring change in the attitudes. We can then perceive that these factors have an impact on

both the biological and the behavioral and professional side of this individual.

As a reaction to chronic occupational stress, the development of Burnout Syndrome (BS), which is a psychological syndrome characterized by a poor adaptation to a work that is considered stressful and with a high tensional load, can be considered.²¹ The term burnout is a composition word, thus suggesting that the individual with this type of stress expresses physical and emotional problems.²²⁻²³ The term arose metaphorically to elucidate man's suffering in his work environment, associating with loss of motivation and the high degree of dissatisfaction resulting from exhaustion.²⁴ This syndrome is defined as a chronic stress experienced by the individual in his work context, especially in the field of professions whose essential characteristic is the direct contact with people such as professors, physicians, nurses, physiotherapists and prison staff.²⁵⁻²⁶⁻²⁷

BS is related to energy depletion, expressed through a sense of failure and exhaustion, caused by excessive wear and tear of coping resources. The recent views on BS explain this syndrome from new interpretations of the notion of individual-work mismatch. Authors maintain that the distance or the mismatch between the person and his work increases the probability of developing the syndrome.^{25,28}

BS is assessed by observing three dimensions of the individual: emotional exhaustion refers to a feeling of fatigue and energy depletion, which depletes the emotional resources of the individual; depersonalization, an interpersonal component of BS, encompasses the negative attitudes of hardness, indifference and excessive distancing manifested by professionals in the relationship with users of their services; the dimension of the professional achievement, when low, is related to a feeling of incompetence and the perception of an unsatisfactory performance in the work, portraying the aspect of self-evaluation of BS.^{25,29}

Studies in North America and Peru indicate that BS is a major bio-psycho-social problem in modern times, arousing interest and concern on the part of the international scientific community, and governmental organizations, also by American and European businesses and union organizations because of its consequences individual and collective disorders.³⁰ Burnout syndrome and stress can predispose nurses to worse health conditions, favoring the vicious cycle, which can lead to poor patient care and increased organizational costs.

In this context, mental and behavioral disorders appear to be one of the main causes of separation among workers, being more frequent among workers who serve the public, especially among those who provide care to patients. BS is responsible for dismissals at work, early retirement and medical licenses; in addition, it has been

recognized as a pathogenic agent of work in the Brazilian social security code since 1999.³¹

In view of the dynamics experienced by these professionals, the need to investigate such topic has had the following as its guiding question: what are the scientific publications about the burnout syndrome and stress in nursing professionals that work in nephrology services?

Accordingly, the objectives of the study were: to identify national and international scientific production related to burnout syndrome and stress in nursing workers working in nephrology services; to characterize the theoretical methodological approaches of the selected scientific productions and discuss the risk factors related to burnout syndrome and stress in nursing professionals that work in nephrology services.

METHODS

It is an Integrative Review of the literature, which is characterized by grouping, analyzing and synthesizing research results on a given topic or issue, in a systematic and orderly manner, in order to present, discuss and deepen knowledge about the proposed topic.³²

To constitute the method, six steps were used as follows: 1) delimitation of the study problem; identification of the research object and elaboration of the guiding question; 2) establishment of criteria for both inclusion and exclusion of studies and sample screening in the literature; 3) categorization of studies; 4) evaluation of the studies introduced in the literature review; 5) analysis of results and 6) synthesis of articles analyzed.³³

The bibliographic survey of the studies was based on the indexed material in the electronic databases: LILACS, PUBMED and SCOPUS. The choice of these databases was due to the high degree of impact of the journals indexed there, the greater number of articles found and the availability in the bases of the CAPES journals. The search for the data respected the particularity of the way of conducting the search history, maintaining the same pattern among the bases.

Psychological stress and nephrology were used as descriptors: professional exhaustion, psychological stress and nephrology, used in research in Portuguese, and the English words "burnout", "psychological stress" and "nephrology", repeated on the same bases. It should be emphasized that the nursing descriptor was not used because the term restricted the search, preventing results that involved all the multidisciplinary team of nephrology, including nurses, were related in the same. Thus, the descriptor "nursing" excluded important articles for the analysis of this review and it was decided to use only those mentioned above.

For the elaboration of the search strategy we used the descriptors mentioned above and that has a close relation with the research question: "what are the scientific publications about the burnout syndrome and stress in nursing professionals that work in nephrology services?"

The connection between the descriptors chosen for the search strategy was established by the Boolean operators AND, which functioned as connectors between them. The searches were carried out in November 2016 and counted on the use of articles published in the last 10 years (2006/2015).

The total of 5,253 articles found by the cross-references and the combination of searches in the databases were added and organized in the online reference-editing tool EndNote Web. As inclusion criteria, articles were selected in Portuguese, English and Spanish, studies in which the sample was of nursing professionals working in nephrology, who were available free of charge and within the time frame of the last 10 years. Therefore, articles that did not meet the inclusion criteria or that were repeated in the databases were excluded.

The next step was to read all the titles and summaries of the articles found by searching the databases, selecting those that included the guiding question and meeting the inclusion criteria for full reading. The inclusion criteria for these phases were: the focus population of the research problem - the nursing team, the outcomes of the research - burnout and/or stress - and nephrology, which included any scientific articles referring to the hemodialysis environment, dialysis, nephrology and related terms. All articles that did not fit these criteria, literature reviews, theses and dissertations, editorials, abstracts, catalogs, others related and documents without authorship were excluded.

The first phase after the collection of articles in the three databases chosen was the exclusion of duplicate publications. Afterwards, these works were analyzed in the following order: first, a reading of the titles of the publications and exclusion of those that did not refer to the theme of nursing, stress and burnout were done. Subsequently, the abstracts of the remaining articles were read and, therefore, publications that did not mention nursing professionals working in nephrology or the dialysis, hemodialysis and renal care environments were excluded. After two steps, a search for the complete articles was made, in order to find those that were available for free reading, finally arriving at the final sample for analysis. Among these, new analyzes were made and articles that did not fit the inclusion criteria were excluded.

In the categories elaborated were: a) year of publication, b) country where the research was carried out, c) name of the journal, d) target population, e) number of nurses participating in the research ("n"), f) burnout outcome, stress or both of them, g) research cut-off, h) type of research, i) if the outcome correlates with other factors or other factors studied, j) the stress and/or burnout risk factors found, k) the protective factors provided by the work environment that maintains the health and well-being of the worker, l) the research findings in the implications of the studies.

The methodology chosen for analyzing the categories was quantitative, through simple descriptive statistics of frequencies and percentages, and the program used for the storage and analysis of the articles were EndNote Web and the virtual file storage, management and editing tool Google Drive for

Examination of the above categories. The categories j, k, l and m had a thorough evaluation of the descriptive variety of aspects found, which led to the creation of subcategories of analysis for each category.

The subcategories of risk factors related to stress and / or burnout and protection factors were: I - patient-related; II - work-related; III - other. The conclusions were divided between articles that found or not high levels of stress and/ or burnout, as well as other characteristics with the same subcategories of risk and protection factors. The implications of the studies were subdivided into: I - skill development; II - related to the work environment; III - creation of programs and, IV - of generic suggestions that had no practical implications.

RESULTS

As shown in Table 1, the database that offered the most search results was SCOPUS, with 5,060 of the total found. The descriptors in Portuguese only presented results in the bases SCOPUS and LILACS, being the total of five of the amount of articles found, which are outside the parentheses in Table 1. The great majority of the articles were found in the searches with the English terms, which are inside the parentheses in Table 1. The researches with terms related to stress had the greatest amount of answers, with 4,533 of the total.

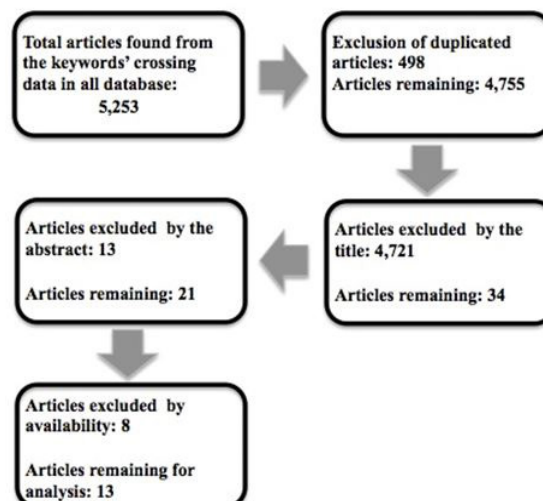
Table 1: Description of the articles found and selected in each database.

	Psychological stress AND nephrology	Burnout AND nephrology	Psychological stress AND burnout AND nephrology	Total:
Scopus	1 (4,398)	0 (471)	0 (190)	5,060
PubMed	0 (133)	0 (32)	0 (22)	187
Lilacs	1 (0)	2 (2)	1 (0)	6
Total:	4,533	507	213	5,253

Note: The number of occurrences in Portuguese (number of occurrences in English).

Flowchart 1 shows the progress of the exclusion stages of the articles, according to the previously presented criteria. In this stage, only articles that had reference to nephrology, stress and/or burnout and the nursing team were selected exclusively or with other populations, such as patients, medical or multiprofessional staff.

Flowchart 1 - Refinement of data according to scheduled criteria



Regarding the descriptive analysis, studies were performed in Australia, Germany, the United States, Turkey, England, Italy and Brazil, with Australia obtaining 38.46% of the researches, totaling five articles; Turkey and Italy with 30.76%, each with two articles; and Brazil, Germany, the United States and England with 30.76% of the surveys, being one article for each.

As shown in Table 2 below, the largest number of articles published is in the year 2009, counting three publications. Already 2007, 2008, 2012, 2014 and 2015 had two publications each, totaling 10 articles.

Table 2: Number of articles in relation to the publication year.

Year	2007	2008	2009	2012	2014	2015
Occurrence	2	2	3	2	2	2

Regarding the methodology used, 76.92% of the studies were quantitative and 23.08% quanti-qualitative, and in the research design, 92.30% were transversal and 7.70% sequential. Among the surveys, the number of participants ranged from 16 to 1,015 participants. None of these 13 articles performed any type of intervention with the sample studied.

With regard to the target audience, articles that worked only with the nursing population totaled 76.92% of the publications, that is, 10 articles. And the remaining three, each treated: nurses, physicians, and patients; Nephrology team and nurses and physicians, corresponding to 23.08% of the publications.

Regarding the subject matter, we obtained 46.15% that only dealt with the burnout syndrome, in the total of six articles. Those that dealt with stress alone accounted for 23.07% corresponding to three articles and those who discussed stress and burnout simultaneously totaled 30.76%, in other words, four articles. Regarding the correlations of the articles, 23.07% did not correlate with other factors, in a total of three, two of which addressed only burnout and one that addressed only stress, correlations with satisfaction at work and work environment

were present in 15,38% of the articles, as well as the correlations with only job satisfaction, with the same percentage and the total of two articles each. The other correlations had unique frequency and are as follows: stress and tension, patient division by nurse, work environment, life quality, patient satisfaction with the care quality, coping and resilience.

All articles presented at least two risk factors for stress and/or burnout, with a maximum of 20 described risks, totaling 71 initial risks. Risk factors were grouped in the analysis by the similarity of their examples that reduced the primary 71 risks to 10 major factors. Then, the main factors were embedded in the subcategories according to the similarities of the topic, the great majority of aspects being work related, six of the ten factors, followed by the relations with the patient, with three of the ten factors (Table 3).

Table 3: Categories and subcategories of the risk factors present in the articles

Risk Factors		
Patient-related	Work-related	Others
- Durable and intense relationship with patients (6)	- Non-specific workplace issues (10)	- Socioeconomic issues (3)
- Patient behavior, aggressiveness and severity of care (5)	- Workload, autonomy and work control (5)	
- Mourning (2)	- Little support at work, small number of staff (5)	
	- Psychosocial aspects (5)	
	- Work time (3)	
	- Lack of team communication (2)	
	- Fear of contamination (2)	

Note: The number of article occurrences is inside the parentheses.

Three of the articles did not present any factor of protection to the stress and burnout of the nurses in nephrology, the others found of one to six factors, totaling 26 protective factors. The 26 protective factors were also grouped by similarity, reduced to seven major factors. The seven major factors were divided into the same risk categories, again, the vast majority of factors were labor-related, five out of seven, and only one related to patients. The other category is equivalent to articles that did not mention protection factors (Table 4).

Table 4: Categories and subcategories of the protection factors present in the articles

Risk Factors		
Patient-related	Work-related	Others
- Durable and intense relationship with patients (6)	- Non-specific workplace issues (10)	- Socioeconomic issues (3)
- Patient behavior, aggressiveness and severity of care (5)	- Workload, autonomy and work control (5)	
- Mourning (2)	- Little support at work, small number of staff (5)	
	- Psychosocial aspects (5)	
	- Work time (3)	
	- Lack of team communication (2)	
	- Fear of contamination (2)	

Eight of the articles found that nurses in nephrology had elevated stress or burnout, five out of the 13 articles had as a result that nurses had levels of stress and burnout below the standards described for the population of their countries or compared to other populations of nurses (Table 5)..

Table 5: Research conclusions.

Conclusions	
Show burnout/stress	Do not show burnout/stress
8	5

The remaining 20 conclusions were also grouped into seven main conclusions that were repeated or similar. The seven factors were divided into the thematic subcategories, the majority of which, with four factors, were related to the work, while two were related to psychosocial characteristics and the duality of the factors for the production of stress or protection (Table 6)..

Table 6: Categories and subcategories of the conclusions aspects present in the articles.

Conclusions Aspects		
Patient-related	Work-related	Others
- Relationship with patients (2)	- The stress aspects are related to the environment and workplace (5)	Duality of aspects as stressors and protection in hemodialysis (3)
	- Work time and age (3)	Psychosocial factors (2)
	- The stress aspects are specific to the relationship in dialysis (1)	
	- Workload (1)	

Note: The number of article occurrences is inside the parentheses.

All articles presented implications of their studies, with a total of 41 suggestions, three of which only stated that the results would lead to implications in the work relationship, without proposing effective actions, placed in the subcategory of generic suggestions without practical applications. The other suggestions were grouped by similarity and repetition, reducing to eight main implications. These implications were divided into subcategories of skill development, with four implications related to the work environment and creation of programs in the area of nursing nephrology (Table 7).

Table 7: Categories and subcategories of the implications present in the articles.

Implications			
Skills development	Related to the workplace	Programs creation	Generic suggestions without practical applications
- Develop interpersonal skills with peers and social support (4)	- Improve the environment and job satisfaction (b)	- Psychological support and interdisciplinary work (4)	- Non-specific (3)
- Develop leadership skills (4)	- Improve nurses' well-being and life quality (4)	- Continuing education for processes and security (2)	
- Develop coping and coping strategies of mourning and conflict (3)			
- Develop interpersonal skills with patients (3)			

Note: The number of article occurrences is inside the parentheses.

DISCUSSION

The number of publications found at the end of the research shows that there is still little research on the subject, however, publications have remained constant since 2007 and, although the research criterion has been demarcated for the last ten years, no article was found in the years of 2006 and 2015. The greatest number of articles from Oceania can be found in three articles by the same author, of Australian origin, addressing different aspects of the same research with a comprehensive database.³⁴⁻⁶ Variation in the number of participants in the research was due to the nature of the research, where the qualitative ones had the least number of participants and the large ones, quantitative, were used electronic means or correspondence to obtain the data, being able to reach national scope. Flynn's American research, Thomas-Hawkins and Clarke,³⁷ was the largest number of

participants (1,015), which is more than twice as high as Hayes, Bonner and Douglas,³⁴⁻⁶ who reached 417 nurses in Australia and New Zealand.

The fact that the transversal cuts are the great majority of the articles is consistent with the absence of research involving intervention, due to both the difficulty of accessing the nursing population over time, the cost of research and the staff turnover, which Hinders longitudinal research and recurrent evaluations.³⁸ The majority of the public was only nurses, a fact that may have been due to the process of exclusion of articles by the criteria of the review, but may also indicate a greater tendency of the nursing academic community in worrying about the conditions of life quality and health of its professionals.

The great interest in burnout syndrome present in most of the articles is justified by the relevance of its consequences and the costs to the organization and patient care, as well as the increase of absenteeism or change of profession.^{39,37} Correlations found were largely related to work, which is in accordance with the current literature on the origin of burnout, the variety of factors points to the multifactorial condition of the development of stress and burnout syndrome and the surveys tend to seek the connections and consequences of the team's illness for the performance and for the organization.⁴⁰

The multiplicity of factors also appeared in the relation of risks pointed out in the articles. Although it is possible to clearly demarcate the aspects that pose a risk to nephrology nurses' stress and burnout, they are related to the relationship with the patient and to the conditions and organization of work, the details of these categories vary between workload, time in nephrology, small number of the team, intense and lasting relationships with patients and families, high expectations and unrealistic patients and dealing with mourning.

Except for the intense and lasting relationship with the patients and the patient's behavior, each aspect was repeated only a few times. Some articles contradict the findings, as in the case of mourning, which was related as a risk factor for Hayes, Bonner, and Douglas³⁵ and was cited as unrelated in Dermody and Bennett.⁴¹ The same was true of workload aspects, time and age, who had both articles stating that they were risk factors⁴²⁻⁴ and another indicating that the relationship was not significant.⁴⁵ More specifically in the case of working time, a study pointed to a higher risk for the younger and with less work time,³⁶ while another identified as the highest risk group the professionals that were older, and who had worked longer in nephrology⁴³, and a third pointed to an intermediate work time, from six to ten years, as the main risk factor.⁴²

What can be achieved from the risks reported by the articles is that the issues of the work environment are closer to most of them, nevertheless they are varied among them, mentioning the responsibility of the institution,^{46,42} to the employer's conduct with the nurse,⁴³ different forms of work organization³⁹ and the workplace and hospital institutions as a

higher risk.^{36,47} Other risk factors are job dissatisfaction³⁴ and with work environment, ergonomics and division of labor,⁴⁵ employment relationship⁴⁴ to have to jump and dislocating nurses and equipment to attend outside the sector.⁴¹

The articles presented a much smaller number of stress and burnout protection factors (26), when compared to risk factors (71), a circumstance that may be associated with the focus culture in the disease and the problem, which ends up ignoring the factors that keep people in the protect them from illness. It was possible to establish the same categories of risk factors for protection, and the relationship with the patient was announced as a creation of an affective bond, because there is constant and lasting contact while they are in treatment, which is usually prolonged.^{35,47,39,48} Most of the articles presented satisfaction at work and autonomy as one of the protection factors.^{43,47,45,34-6} The absence of night shifts, or on Sundays and the exchange of workplaces, as well as the absence of other employment relationships were mentioned as protection factors.⁴⁶⁻⁸ Psychosocial aspects varied between sense of teamwork, less conflict between work and personal life, belief that work is not as exhausting as other areas of nursing, interest in new technologies, sense of competence, and optimism about the future.^{46,35,45,48}

The opposition in the conclusions of the articles follows the same tendency of multiplicity of results that is perceived in the risk and protection factors. The division between those who concluded that the nursing team in nephrology suffers from high levels of stress and/or burnout^{46,41,34-6,44,42,37} and those that have resulted in low levels, when compared with other populations of nurses or with the normative standard,^{47,43,39,45,48} is only three articles pointing to stress and burnout. This division reveals only the contradiction present in the comparison of the results of all articles, while Dolan, Strold and Hamerick,⁴⁸ in Australia, have the objective of finding support for the predetermined assertion that nurses in nephrology have good coping of the occupational stressors, Flynn, Thomas-Hawkins, and Clarke³⁷ bring alarming results, where one-third of the US nephrology nurses had burnout. The differences could be explained by regional questions, but the researches of Dolan, Strold and Hamerick⁴⁸ and Hayes, Bonner and Douglas,³⁴⁻⁶ reach opposite conclusions, both with the same Australian public, similar to the case of Turkish research.^{45,42} Only the Italian researches agree among themselves that nurses in nephrology have a lower risk of stress and/or burnout.^{47,39}

In relation to the other conclusions from the articles, it was also possible to categorize them as follows: patient-related, work-related and psychosocial. Regarding those related to work, the conclusions repeated the risk factors, except for the indication of Kersten *et al.*⁴⁶ that stressors may also be related to the work process of nephrology itself, where standardized procedures do not allow the nurses' control and autonomy over the work itself, which describes it as routine and repetitive. Psychosocial issues contained conclusions about nurses' dissatisfaction with some areas of work, nurses

scored more on burnout scales than physicians, and that the effects of burnout on health care services may lead to a deficit in patient care, thereby decreasing patient satisfaction, reduce adherence in treatment and also impair clinical outcome,^{47,43,39} all three articles did not indicate prevalence of stress and burnout in nursing in nephrology.

The dualistic conclusions regarding the aspects of nursing in nephrology relate to the presence of both positive and negative aspects of how nurses are satisfied with work, but suffer from stressors that cause emotional pressure and that job satisfaction comes from the comparison with the expectation of work in other areas of nursing.^{46,35,45} Still on the question of duality, Dermody and Bennett⁴¹ presented a peculiar characteristic of the environment in nephrology that is linked to the relationship with the patient and the unit partners, the formation of a big family. The intense and lasting contact with the patients, family members, and the work team triggers an approximation between nurses and patients that can reduce the limits of the professional bond, consequently the nurse has greater protection by the involvement with the patient, as well as other stressors coming from this relationship, which are the aggressions, the expectations of the patients, the emotions involved with the non-adherence to the treatment and the difficulties with the family.

In the very end, the implications and suggestions presented by the articles are mainly responsible for the management and focus on skills development, improvement in perceptions about the work environment and creation of multidisciplinary programs, psychological support and continuing education. The subcategory of skills development had as one of the characteristics minimizing the problems in the interpersonal relationship with the team and patients, to develop the managers and the nurses heads for the leadership and recognition of the group and to develop the team in the face of stress, conflict and coping and resilience training,^{46,34-7,45,44,48} interventions that are intended only for the development of the individual and implications that match the conclusions about the risk factors are social support and the relationship with the patient.

The subcategory related to the work environment brings the need to improve the life quality and well-being in the workplace of nurses in nephrology, in addition to improving the environment, conditions and job satisfaction, which are changes in the distribution and adequacy of the tasks at work and physical changes focusing on autonomy, motivation and job satisfaction, without specifying which changes would produce such results.^{37,39,42-3,45,36,44} The minority of suggestions provided for the creation of continuing education programs, with the aim of to develop and update the nurse technologically and in the processes of safety and non-contamination, psychological support programs for bereavement and multidisciplinary programs both for patient care and for the worker health.^{39,45,36} All aspects pointed out, work-related, focuses on the individual's relationship with work and does not propose structural changes in services and organizations.

The differences found in the conclusions of the studies reflect the possibilities of possible suggestions and implications for the prevention and treatment of stress and burnout in nursing in nephrology, so another effective suggestion is that nephrology units should conduct research programs of their stressors, risk factors and protection and cyclical periodicity, with the purpose of developing and evaluating recurrent or punctual needs interventions.

Therefore, the descriptors used were identified as limitations of the present study, which may have promoted a loss of material in the database search, since not all publications in the area necessarily use the same descriptors. Exemplifying this fact, we have the choice of not using the 'nursing' descriptor due to the loss of articles; of the articles that corresponded to the inclusion criteria of the survey, eleven were lost due to the availability in full, free of charge in the databases, an expressive number considering the little publication in the area and, lastly, the non-characterization of the services rendered, making it difficult to discussion of the specific work environment that differs between sites and specific tasks.

CONCLUSION

As evidenced in the results there is a lack of available studies on the relationship between stress and burnout syndrome in the area of nephrology among nurses, both nationally and internationally, although the small number have remained constant over the last ten years. The concentration of articles in part of the world shows inequality in the field of knowledge and research in the area, also shows that some authors work with large databases and present different articles for a particular focus of analysis.

All articles presented a quantitative approach, and few also had qualitative analysis as part of the research, the case of mixed research. Most of the researches have done a cohort study, except for one of them, of a mixed approach, which began with quantitative data and, sequentially, sought qualitative data. Most of them addressed burnout and used Maslach's burnout inventory and Maslach's theory on the development of the syndrome, the result of chronic stress at work.

There was no consensus regarding the risk factors since several of them were raised and could only be organized according to subcategories. Consequently, there was no consensus on the protection factors, conclusions and implications listed. It was possible to identify two main subcategories, that of the relationships with patients and their relatives and those related to work, both in risk factors, protection factors and conclusions. The implications had three main subcategories of skill development, related to the work environment and creation of psychological or multidisciplinary support programs. The fact that the subcategory aspects present themselves for both risk and protection factors shows a dualism

in the relations with the patient and the work, a fact that still needs to be researched.

Therefore, nephrology units should be encouraged to conduct recurrent assessments of their organization, the health status of their nurses and staff, the risk factors and protection of their environment and their relationships, using ongoing prevention and promotion programs Health and well-being at work. Furthermore, contribute to national and international publications on the results of these assessments, pointing to effective directions and the most commonly encountered problems

REFERÊNCIAS

1. Souza NVDO. Riscos Ocupacionais que envolvem o trabalho de enfermagem na Policlínica Piquet Carneiro. Rio de Janeiro: Faculdade de Enfermagem da Universidade do Estado do Rio de Janeiro; 2009.
2. Dejours, C. A loucura do trabalho: um estudo de psicopatologia do trabalho. 5. ed. São Paulo: Cortez-Oboré; 2003. 168 p.
3. Pires ADS, Ribeiro LV, Souza NVDDO, Sá CMDs, Gonçalves FGDA, Santos DMD. A permanência no mundo do trabalho de profissionais de enfermagem com possibilidade de aposentadoria. Ciênc. cuid. Saúde [Internet]. 2013 [cited 2016 nov]; 12(2): 338-345. Available from: <http://periodicos.uem.br/ojs/index.php/CiencCuidSaude/article/view/18298/pdf>
4. Luz MT. Saúde. In: Escola Politécnica de Saúde Joaquim Venâncio. Dicionário da educação profissional em saúde. Rio de Janeiro: EPSJV; 2006. 231-234 p.
5. Ministério da Saúde (BR). 8ª Conferência Nacional de Saúde – relatório final. Conselho Nacional de Saúde [Internet]. Brasília; 1986.
6. Ruviano MFS, Bardagi MP. Síndrome de burnout e satisfação no trabalho em profissionais da área de enfermagem do interior do RS. Barbaroi [Internet]. 2010 [cited 2016 nov]; (33): 194-216. Available from: <https://online.unisc.br/seer/index.php/barbaroi/article/view/1555/1317>
7. Rissardo MP, Gasparino RC. Exaustão emocional em enfermeiros de um hospital público. Esc. Anna Nery [Internet]. 2013 Mar [cited 2016 Nov]; 17(1): 128-132. Available from: <http://www.scielo.br/pdf/ean/v17n1/18.pdf>
8. Selye H. The stress concept. Can Med Assoc J [Internet]. 1976 Oct [cited 2016 Nov]; 23;115(8):718. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/20312787>
9. Lipp MEN. O modelo quadrifásico do stress. In: M.E.N. Mecanismos neuropsicofisiológicos do stress: teorias e aplicações clínicas. São Paulo: Casa do Psicólogo; 2003. 17-22 p.
10. Benevides-Pereira AMT. Burnout: Quando o trabalho ameaça o bem-estar do trabalhador. 3ª ed. São Paulo: Casa do Psicólogo; 2008.
11. Meneghini F, Paz AA, Lautert L. Fatores ocupacionais associados aos componentes da síndrome de burnout em trabalhadores de enfermagem. Texto Contexto Enferm [Internet]. 2011 [cited 2016 Nov]; 20(2): 225-33. Available from: <http://www.scielo.br/pdf/tce/v20n2/a02v20n2.pdf>
12. Medeiros AJS, Nóbrega MM. O estresse entre os profissionais de enfermagem nas unidades de atendimento de urgência e emergência: Uma revisão de literatura. REBES [Internet]. 2013 [cited 2016 Nov]; 3(3): 53-7. Available from: <http://www.gvaa.com.br/revista/index.php/REBES/article/view/2499/1942>
13. Lazarus RS. Psychological Stress and the Coping Process. New York: McGraw – Hill; 1966.
14. Lazarus RS, Launier S. Stress related transaction between person and environment. In: Dervin LA, Lewis M. Perspectives in international psychology. New York: Plenum; 1978. 287-327p.
15. Lazarus RS, Folkman S. Stress, Appraisal, And Coping. New York: Springer Publishing Co.; 1984.

16. Teixeira CAB, Reisdorfer E, Gherardi-Donato ECDS. Esresse ocupacional e coping: reflexão acerca dos conceitos e a prática de enfermagem hospitalar. *Rev enferm UFPE on line* [Internet]. 2014 [cited 2016 Nov]; 8(supl. 1): 2528-32. Available from: https://www.researchgate.net/profile/Edilaine_Gherardi-Donato/publication/264966798_ESTRESSE_OCUPACIONAL_E_COPING_REFLEXAO_ACERCA_DOS_CONCEITOS_E_A_PRATICA_DE_ENFERMAGEM_HOSPITALAR/links/53f773740cf2823e5bd79fcd.pdf?origin=publication_list
17. Andolhe R, Barbosa RL, Oliveira EM, Costa ALS, Padilha KG. Estresse, coping e burnout sa equipe de enfermagem de unidades de terapia intensiva: fatores associados. *Rev. esc. enferm. USP* [Internet]. 2015 [cited 2016 Nov]; 49(Esp): 58-64. Available from: <http://www.scielo.br/pdf/reeusp/v49nspe/1980-220X-reeusp-49-spe-0058.pdf>
18. Silva RP, Barbosa SC, Silva SS, Patricio DF. Burnout e estratégias de enfrentamento em profissionais de enfermagem. *Arquivos Brasileiros de Psicologia* [Internet]. 2015 [cited nov 2016]; 67(1): 130-145. Available from: <http://seer.psicologia.ufrj.br/index.php/abp/article/view/890/928>
19. Sarquis LMM, Felli VEA. Os sentimentos vivenciados após exposição ocupacional entre trabalhadores de saúde: fulcro para repensar o trabalho em instituições de saúde. *Rev. Bras. Enfermagem* [Internet]. 2009 [cited nov 2016]; 62(5):701-704. Available from: <http://www.scielo.br/pdf/reben/v62n5/08.pdf>
20. França FM, Ferrari R, Ferrari DC, Alves ED. Burnout Syndrome and the socio demographic aspects of nursing professionals. *Acta Paul Enferm* [Internet]. 2012 [cited nov 2016]; 25(5):743-48. Available from: <http://www.scielo.br/pdf/ape/v25n5/15.pdf>
21. Maslach C, Schaufeli WB, Leiter MP. Job Burnout. *Annual Review Of Psychology* [Internet]. 2001 [cited 2016 nov]; 52(1):397-422. Available from: <http://www.annualreviews.org/doi/pdf/10.1146/annurev.psych.52.1.397>
22. Benevides-Pereira AMT. Burnout: quando o trabalho ameaça o bem-estar do trabalhador. São Paulo: Casa do Psicólogo; 2003.
23. Silva JL, Soares RD, Costa FD, Ramos DS, Lima FB, Teixeira LR. Psychosocial factors and prevalence of burnout syndrome among nursing workers in intensive care units. *Rev Bras Ter Intensiva* [Internet]; 2015 [cited 2016 nov]; 27(2):125-133. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/26340152>
24. Sobrinho CLN, Barros DS, Tironi MOS, Marques Filho ES. Médico De UTI: prevalência da síndrome de burnout, características sócio-demográficas e condições de trabalho. *Rev Bras Educ Med* [Internet]; 2010 [cited 2016 nov]; 34(1): 106-15. Available from: <http://www.scielo.br/pdf/rbem/v34n1/a13v34n1.pdf>
25. Maslach, C. What have we learned about burnout and health? *Psychol. Health* [Internet]; 2001 [cited 2016 nov]; 16(5): 607-611. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/22804502>
26. Selye, H. Stress in health and disease. Butterworth-Heinemann; 2013.
27. Neves VF, Oliveira AF, Alves PC. Síndrome de burnout: impacto da satisfação no trabalho e da percepção de suporte organizacional. *Psico* [Internet]; 2014 [cited 2016 nov]; 45(1): 45-54. Available from: <http://revistaseletronicas.pucrs.br/fo/ojs/index.php/revistapsico/article/view/12520/11440>
28. Tamayo MR. Burnout: implicações das fontes organizacionais de desajuste indivíduo-trabalho em profissionais da enfermagem. *Psicol Reflex Crit* [Internet]; 2009 [cited 2016 nov]; 22(3): 474-482. Available from: <http://www.scielo.br/pdf/prc/v22n3/v22n3a19.pdf>
29. Reatto D, Araújo DCCA. Estresse ocupacional: estudo multifuncional com profissionais da saúde de um hospital de Araçatuba (SP). *Arch Health Invest* [Internet]; 2016 [cited 2016 nov]; 5(3): 165-171. Available from: <http://www.archhealthinvestigation.com.br/index.php/ArcHI/article/view/1328/pdf>
30. Ayala E, Carnero AM. Determinants of burnout in acute and critical care military nursing personnel: a cross-sectional study from Peru. *P PLoS ONE* [Internet]; 2013 [cited 2016 nov]; 8(1): e54408. Available from: <http://journals.plos.org/plosone/article/file?id=10.1371/journal.pone.0054408&type=printable>
31. Trigo TR, Teng CT, Hallak JEC. Síndrome de burnout ou estafa profissional e os transtornos psiquiátricos. *Rev. Psiq. Clin* [Internet]; 2007 [cited 2016 nov]; 34 (5): 223-233. Available from: <http://www.scielo.br/pdf/prc/v34n5/a04v34n5.pdf>
32. Mendes KDS, Silveira RCCP, Galvão CM. Revisão integrativa: método de pesquisa para a incorporação de evidências na saúde e na enfermagem. *Texto contexto - enferm.* [Internet]. 2008 [cited 2016 Nov]; 17(4): 758-764. Available from: <http://www.scielo.br/pdf/tce/v17n4/18.pdf>
33. Oliveira RK, Costa TD, Santos VE. Síndrome de burnout em enfermeiros: uma revisão integrativa. *Rev Pesqui Cuid Fundam* [Online]; 2013 [cited nov 2016]; 5(1): 3168-3175. Available from: http://www.seer.unirio.br/index.php/cuidadofundamental/article/view/1409/pdf_682
34. Hayes B, Douglas C, Bonner A. Predicting emotional exhaustion among haemodialysis nurses: a structural equation model using Kanter's structural empowerment theory. *J Adv Nurs* [internet]; 2014 [cited nov 2016]; 70(12):2897-909. Available from: <http://onlinelibrary.wiley.com/doi/10.1111/jan.12452/pdf>
35. Hayes B, Bonner A, Douglas C. Haemodialysis work environment contributors to job satisfaction and stress: a sequential mixed methods study. *BMC nursing* [internet]; 2015 [cited 2016 nov] 14(1):1. Available from: <http://bmcnurs.biomedcentral.com/articles/10.1186/s12912-015-0110-x>
36. Hayes B, Douglas C, Bonner, A. Work environment, job satisfaction, stress and burnout among haemodialysis nurses. *Journal of nursing management* [internet]; 2015 [cited 2016 nov]; 23(5):588-598. Available from: <http://onlinelibrary.wiley.com/doi/10.1111/jonm.12184/abstract>
37. Flynn L, Thomas-Hawkins C, Clarke, SP. Organizational traits, care processes, and burnout among chronic hemodialysis nurses. *Western journal of nursing research*; 2009.
38. Guse C, Carvalho DR. Rotatividade nos profissionais de enfermagem. *Publ. UEPG Ci. Biol. Saúde* [Internet]; 2015 [cited 2016 nov]; 21(1):47-64. Available from: <http://www.revistas2.uepg.br/index.php/biologica/article/view/7405/5201>
39. Argentero P, Dell'Olivo B, Ferretti MS. Staff burnout and patient satisfaction with the quality of dialysis care. *Am J Kidney Dis* [internet]; 2008 [cited 2016 nov]; 51(1):80-92.. Available from: [http://www.ajkd.org/article/S0272-6386\(07\)01306-6/pdf](http://www.ajkd.org/article/S0272-6386(07)01306-6/pdf)
40. Maslach C. Entendendo O Burnout. In: Rossi AM, Perrewé PL, Sauter SL. Stress e qualidade de vida no trabalho: perspectivas atuais da saúde ocupacional. São Paulo: Atlas; 2005.
41. Dermody K, Bennett PN. Nurse stress in hospital and satellite haemodialysis units. *J Ren Care* [internet]; 2008 [cited 2016 nov]; 34(1):28-32. Available from: <http://onlinelibrary.wiley.com/doi/10.1111/j.1755-6686.2008.00007.x/pdf>
42. Uğur S, Acuner AM, Göktas B, Senoglu B. Effects of physical environment on the stress levels of hemodialysis nurses in Ankara Turkey. *J Med Syst* [internet]; 2007 [cited 2016 nov]; 31(4):283-7. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/17685152>
43. Ross J, Jones J, Callaghan P, Eales S, Ashman N. A survey of stress, job satisfaction and burnout among haemodialysis staff. *Journal of Renal Care* [internet]; 2009 [cited 2016 nov]; 35(3):127-133. Available from: <http://onlinelibrary.wiley.com/doi/10.1111/j.1755-6686.2009.00102.x/pdf>
44. Ferreira TC, Oliveira SP, Santos RC, Campos CG, Botti NCL, Machado RM. Enfermagem em nefrologia e síndrome de burnout. *Cogitare Enferm* [internet]; 2012 [cited 2016 nov]; 17(1):44-9. Available from: <http://revistas.ufpr.br/cogitare/article/view/26373/17566>
45. Klersy C, Callegari A, Martinelli V, Vizzardi V, Navino C, Malberti F, Tarchini R, et al. Burnout in health care providers of dialysis service in Northern Italy—a multicentre study. *Nephrol. Dial. Transplant* [internet]; 2007 [cited 2016 nov]; 22 (8): 2283-2290. Available from: <http://ndt.oxfordjournals.org/content/22/8/2283.long>
46. Kapucu SS, Akkus Y, Akdemir N, Karacan Y. The burnout and exhaustion levels of nurses working in haemodialysis units. *J Ren Care* [internet]; 2009 [cited 2016 nov]; 35(3):134-40. Available from: <http://onlinelibrary.wiley.com/doi/10.1111/j.1755-6686.2009.00108.x/epdf>
47. Kersten M, Kozak A, Wendeler D, Paderow L, Nübling M, Nienhaus A. Psychological stress and strain on employees in dialysis facilities: a cross-sectional study with the Copenhagen Psychosocial Questionnaire. *J Occup Med Toxicol* [internet]; 2014 [cited 2016

nov]; 5;9(1):4. Available from: <https://occup-med.biomedcentral.com/articles/10.1186/1745-6673-9-4>

48. Dolan G, Strodl E, Hamernik E. Why renal nurses cope so well with their workplace stressors. *J Ren Care* [internet]; 2012 [cited 2016 nov]; 38(4):222-32. Available from: <http://onlinelibrary.wiley.com/doi/10.1111/j.1755-6686.2012.00319.x/epdf>

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