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EMERGENCY NURSES' WORKLOAD AND THEIR RELATION WITH STRESS AND SALIVARY CORTISOL

CARGA HORÁRIA DOS ENFERMEIROS DE EMERGÊNCIA E SUA RELAÇÃO COM ESTRESSE E CORTISOL SALIVAR

CARGA HORARIA DE LOS ENFERMEROS DE EMERGENCIA Y SU RELACIÓN CON EL ESTRÉS Y CORTISOL SALIVAR

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ABSTRACT

Objective: to correlate workload, stress and salivary cortisol among emergency hospital nurses. **Method:** transversal study, quantitative, performed with 95 nurses in 2012. Instrument for personal and professional characterization, Inventory of stress in nurses and Sallivette® device were used. Spearman Correlation test was employing. The research project has been approved by the Ethics Committee in Research, Protocol 1272/2010. **Results:** women who worked from 37 to 57 hours per week have predominated. As for the occupational stress, 69.5% showed moderate levels. Regarding salivary cortisol, no results above the reference value for normalcy and not found correlation between workload, occupational stress and salivary cortisol. **Conclusion:** although the majority of nurses work for more than 36 hours/week, they showed moderate levels of occupational stress and cortisol levels were not increased; coping mechanisms may have been used by observing their life stories and organizational climate. **Descriptors:** Nursing in Emergency; Workday; Physiological Stress; Psychological Stress; Hydrocortisone.

RESUMO

Objetivo: correlacionar carga horária, estresse e cortisol salivar entre enfermeiros de emergência hospitalar. **Método:** estudo transversal, quantitativo, realizado com 95 enfermeiros em 2012. Utilizou-se instrumento para caracterização pessoal e profissional, Inventário de Estresse em Enfermeiros e dispositivo Sallivette®. Realizou-se Teste de Correlação de Spearman. O projeto de pesquisa foi aprovado por Comitê de Ética em Pesquisa, Protocolo nº 1272/2010. **Resultados:** predominaram mulheres que trabalhavam de 37 a 57 horas semanais. Quanto ao estresse ocupacional, 69,5% apresentaram níveis moderados. Com relação ao cortisol salivar, não houve resultados acima do valor de referência para a normalidade e não se constatou correlação entre carga horária, estresse ocupacional e cortisol salivar. **Conclusão:** embora a maioria dos enfermeiros trabalhasse por mais de 36 horas/semana, apresentou níveis moderados de estresse ocupacional e seus níveis de cortisol não se mostraram aumentados; mecanismos de enfrentamento podem ter sido utilizados, observando suas histórias de vida e clima organizacional. **Descritores:** Enfermagem em Emergência; Jornada de Trabalho; Estresse Fisiológico; Estresse Psicológico; Hidrocortisona.

RESUMEN

Objetivo: correlacionar carga horaria, estrés y cortisol salivar entre enfermeros de emergencia hospitalaria. **Método:** estudio transversal, cuantitativo, realizado con 95 enfermeros en 2012. Se utilizó instrumento para caracterización personal y profesional, Inventario de Estrés en Enfermeros y dispositivo Sallivette®. Se realizó Test de Correlación de Spearman. El proyecto de investigación fue aprobado por el Comité de Ética en Investigación, Protocolo nº 1272/2010. **Resultados:** predominaron mujeres que trabajaban de 37 a 57 horas semanales. Referente al estrés ocupacional, 69,5% presentaron niveles moderados. Con relación al cortisol salivar, no hubo resultados encima del valor de referencia para la normalidad y no se constató correlación entre carga horaria, estrés ocupacional y cortisol salivar. **Conclusión:** a pesar de que la mayoría de los enfermeros trabajasen por más de 36 horas/semana, presentó niveles moderados de estrés ocupacional y sus niveles de cortisol no se mostraron aumentados; mecanismos de enfrentamiento pueden haber sido utilizados, observando sus historias de vida y clima organizacional. **Descritores:** Enfermería en Emergencia; Jornada de Trabajo; Estrés Fisiológico; Estrés Psicológico; Hidrocortisona.

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INTRODUCTION

The world of contemporary work goes through profound transformations and thematics, like globalization, flexibilization, competitiveness, and new ways of work organization have guaranteed place in the analyses of the scholars of the organizations. In the so-called phase Third Industrial Revolution, workers become the source of greatest interest, since they provide the competitive advantage in their work environments. These changes generate a complex environment, marked by technological and scientific advances, changes of concept, of breaking paradigms and values that guide all segments of society.¹

To work means more than just having a job that guarantees survival. It represents the commitment of personality to respond to a task, the power of feeling, thinking and inventing involves gestures, know-how, engaging the body, mobilize the intelligence, be able to reflect, interpret and react to situations.² Then, it provides a value to the life of those who work. In this context, the workday corresponds to the period of time that the employee must pay service or remain at the disposal of the employer, and can perform extraordinary work hours. This journey is an important factor in job quality and echoes in the safety and health of the worker, in personal and family matters, as well as on the organization of work within the institution.³

Work in excess or overload of work, or also known as expanded work, can be understood as the situation in which the employee increases, by his own will or by determination of his employer, his workload, working consequently hours beyond those usual. It means the expansion of the number of hours used, and may occur, for example, doubles or triples journeys carried out in the same work environments, similar or different from each other, in off-hours performed in these environments, at employee's home or in other employment locations.⁴

In relation to Nursing, the Resolution of the Federal Council of Nursing Care (COFEN) 293/2004 regulates that, for the preparation of monthly scale of nursing staff, the workload should be 36 hours per week for care activity, both in hospitals and in Public Health, and 40 hours a week for administrative activities.⁵ On current date, there is the Law Project 2,295/2000 in the House of Representatives, establishing maximum journey of 30 hours per week for Brazilians nurses, technicians and nursing

assistants.

The nursing staff has as object the sick individual, most of the time. Thus, these professionals are faced constantly with sorrows, fears, conflicts, tensions, anxiety and stress, coexistence with life and death, in addition to long journeys to work, among many other factors that are inherent in the everyday life of these workers.⁶ Nursing is constituted mostly by female professionals who perform paid work held in diverse and culturally jobs also are responsible for unpaid family dedication, composed by both domestic activities such as assistance to family members.

The number of complaints submitted by healthcare workers during the course of the years, has been intensified. Thus, there is an environment with intense recovery by productivity being that the worker must constantly be prepared for changes and adaptations. However, such changes in society and in the relations of production have been accompanied by changes in expressions of suffering and psychopathology in individuals.⁷

Complaints/health problems are referred to in informal contacts with reports of physical and mental fatigue, loss of sleep and appetite, need to use anti-anxiety drugs and/or other drugs, weight loss and/or increased body weight, episodes of crying, feeling sadness, headaches, joint pain, among other, apparently coming from work or its excess, represented by expanded journeys and/or more than one work shift, sometimes in the same institution or in different jobs, being stress generators.⁴ In this context, it should be noted that stress is a reaction of the organism, with physical and/or psychological components, caused by psycho-physiologic changes that occur when a person is confronted with a situation that, one way or another, is irritating, frightening, exciting, confusing or even making him immensely happy. It is a set of reactions of the organism at physical, mental, infectious abuse, and other capable of disrupting homeostasis of the individual.⁸

Special attention has been paid to the occupational stressors, tensions and problems arising from the exercise of a professional activity. Concerning nursing, nurse's work by its very nature and characteristics, it is especially susceptible to occupational stress, making them more susceptible to accidents and occupational diseases.

Occupational stress is a result of interaction of working conditions with the characteristics of the worker, in which the demand for labour exceeds his abilities to



face them. Excess tension, culminating in long journey, is among the major stress factors for Brazilian professionals, with 70% of its economically active population suffering sequels due to the high level of tension. The lack of information and awareness of the stress level has collaborated for worsening situation.⁹

The stress is not good nor bad, being impossible and undesirable to eradicate it. It can be an important resource and useful for a person doing in front of different life situations they face in their daily lives. This ability has been of fundamental importance for the human species, helping them to survive and develop alternatives on how to tackle the multiple situations of threat - actual or symbolic - they can find in its existence.¹⁰

Health professionals who work in emergency care units should be able to take quick decisions and need observing priorities and evaluating the patient holistically. In addition, one of the most striking characteristics of these units is the intense dynamics. Thus, agility and objectivity become fundamental requirements, since the severe patient does not accept delay in making decisions or failures of behaviors. These requirements become sources of stress for the professionals of these units.

Research among nurses shows that it is necessary an investigation of the causative agents of stress in the workplace and measures to deal with such situations, promoting benefits not only for nurses but also to all individuals assisted by them.¹¹ Coping is what the person really thinks and feels and what he would do in certain situations. It is a strategy that the person uses, not necessarily conscious, to know as much information about the events and conditions in order to reduce the psychological responses to stress and maintain balance organic. Such a process can change depending on the evaluation and re-evaluation of the stressor aimed at adaptation of person, decreasing the tension and restoring balance.¹²

The mediators hormones to stress response, glucocorticoides and Catecholamines act exercising beneficial or harmful effects to the organism. Cortisol is a primary glucocorticoid hormone, synthesized from cholesterol by the adrenal cortex under action of adrenocorticotrophic hormone (ACTH). It is synonymous with hydrocortisone whose physiology is 11- β ,17- α , 21-trihydroxy-4-pregnen-3.20-Dione, molecular formula=C₂₁H₃₀O₅ and molecular

mass=362.466 g/mol. It is essential to life, by regulating the metabolism of carbohydrates, proteins and lipids. In addition, it maintains normal blood pressure and acts as an inhibitor of allergic and inflammatory reactions.¹³

Cortisol secretion undergoes a circadian rhythm with maximum peak when waking up and minimum of 14 to 18 hours after it. It ranges from -100 to +120% around an average in the same individual, and can be reduced almost to half or increase beyond twice on the same day.¹⁴

The dosage of salivary cortisol, which evaluate the free fraction of the hormone, has become increasingly popular, with several commercial tests available. It has been used to evaluate the hypothalamic-pituitary-adrenal (HPA) in changes in cognitive function, in situations of stress, anxiety, depression, panic syndrome, in the evaluation of sleep deprivation in patients and in those with chronic fatigue.¹⁵

This dosage provides several advantages over doses on serum or plasma. The collection of samples for the determination of cortisol in saliva is not invasive nor expensive. Moreover, it is easy to use it. Some situations may change the circadian rhythm of cortisol secretion, as changes in sleep pattern, feeding times, situations of physical and psychological stress, in addition to changes in the central nervous system and pituitary, liver disease, kidney disease and alcoholism.¹⁶

The study of cortisol as an indicator of stress comes stimulating more researchers deepening their research as the need to control the effects of stress is necessary, not only to the quality of life of individuals, as well as income and health of workers.

Although the studies of the health problems of nursing workers had increased in recent years, their relationship to stress factors in the working environment still requires further elucidation. In this sense, knowing the profile of nursing workers in ER, on their perception of psychological demands and control over the work, it will be able to subsidize the planning and implementation of actions for better quality of life and work, both by the employees as managers of health institutions.¹⁷

From all these things, the objective of the present study was to analyze the existence of correlations between the hours of weekly work with levels of occupational stress and cortisol level among nurses working in hospital emergency units.



METHOD

This research had the work presented in the III Forum of Integration of Professional Masters in Nursing, held on November 27, 28 and 29, 2013, at the Nursing School of Ribeirão Preto/SP.

It is a descriptive correlational research, cross-sectional and quantitative approach. It was carried out in a public hospital of Ribeirão Preto-São Paulo, Brazil. This hospital that has unique characteristics with regard to patients assisted, since not only their emergency room, but all other sectors coexist with situations related to emergencies and urgencies.

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The population was composed of 131 nurses operating in all sectors and shifts. The sample was composed of 95 of these nurses (72.5%) and the selection criteria established were: be available on the dates stipulated for the collections, this nurse be hired by the Support Foundation to the hospital or by the State, stressing that such contracts are independent; in the first situation, the nurse was not admitted through civil service exam and at the second underwent such exam; to be working in the first shift (morning) in the dates for the collection of data; not having worked on the night shift on the date preceding the collections and have followed specific recommendations before the salivate collection procedure. Thus, all subjects presented uniform conditions.

Data collection was held in the second half of 2011 and the first half of 2012, and the study was approved by the Ethic Committee in Research, Protocol 1272/2010, as Resolution 196 of 1996 regulating research involving human beings.¹⁸

For data collection a tool for personal and professional characteristics composed of 12 structured and semi-structured questions were used directed to the variables that aimed at the identification of the worker and of their professional activity.

To identify the perceived stress in the workplace, the Stress Inventory in Nurses (SIN) was applied that addresses questions about the presence of stressors agents in the

profession.¹⁹ This inventory is presented in a *Likert* scale, containing 44 items with responses of intensity 1 (never) to 5 (always). It is composed of three specific factors: Interpersonal Relations (IR), Career Stressors Roles (CSR) and Intrinsic Factors to Work (IFW) and a second-order factor, Structure and Organizational Culture (SOC). Each factor can achieve the top score of 55 points and the total sum of factors may vary between 44 and 220 points. The higher the scores obtained, the bigger the voltage levels in the workplace.

Every factor scores were considered for all nurses. To evaluate the reliability of the referred instrument, internal consistency analysis was carried out for this study, through the Cronbach's alpha Coefficient being $\alpha=0.923$, i.e. the items were highly correlated to each other, indicating a homogeneity.

Saliva samples from all individuals listed in this research were collected with the Sallivette® device (Sarstedt, Australia), which consists of a pressed cotton roller, a suspended container (plastic tube for containment of this roller) and a plastic tube for separation of saliva. After scoring the tubes with the information of the subjects, the devices containing these rollers with saliva were frozen at least 70°C until the moment of use. To obtain the saliva after all the samples taken, they were defrosted at room temperature and the devices were centrifuged for 5 minutes. Soon after, the suspended containers containing the cotton rollers were discarded, and saliva on the separation tubes were immediately used to determine the concentration of cortisol, which was established by competitive enzyme-linked immunosorbent assay according to the manufacturer's recommendations (Salimetrics). Each laboratory should establish its own reference values using instruments, sampling methods and techniques commonly used dosing in the laboratory.

The data collection by questionnaires and the saliva was previously programmed with the Nursing Division of the hospital in study and were carried out by the researcher, in an appropriate place and targeted by the immediate leadership. In the period between seven and nine hours, saliva samples have been prioritized and, subsequently, the data collection of data by questionnaires according to the availability of the nurses, who were distributed in their jobs.

The first author was visiting the service the day before collections, keeping a first contact with the nurses for presentation and signing of



the FICS and delivery of written guidelines with respect to necessary care prior to salivary collection, i.e. light diet for breakfast; for a period of 30 minutes prior to saliva collection, do not ingest food or drink (except water) and do not smoke; immediately prior to the collection, it is advisable to rinse the mouth with water by light mouthwashes; the collection is not recommended in cases of oral lesions with active or potential bleeding; not having dental treatment in the last 24 hours; have brushed the teeth in the last 3 hours in order to prevent gum bleeding and not to have consumed alcohol in the previous 12 hours to the collection.

The data obtained were inserted into MS-Excel program (2007) with the technique of double typing and validated after that. Then, they were exported to the *application Software System Statistical Package for Social Science* (IBM SPSS®) 19.0 version for statistical descriptive analysis and inferential statistics of the data.

Descriptive statistics, frequency and percentage for the qualitative variables and measures of central tendency (mean and median) and dispersion (standard deviation) for the interval variables were performed.

As normality of the distribution of the measures has not been confirmed by the Kolmogorov-Smirnov test, the employing Spearman test was used to check possible correlations between the load time of work with the variables: occupational stress and salivary cortisol level; the significance level was considered $\alpha=0.05$.

RESULTS

95 subject were researched and, from them, 85 (89.4%) were female. The age ranged from 23 to 61 years old. As for marital status, it was found that 42 nurses (44.2%) were singles and 41 (43.2%) married or living with partner. With respect to employment links, 76 (80%) had only one, 17 (17.9%) had two and two nurses reported having three jobs. As regards the type of employment contract, 27 (28.4%) were hired by the Support Foundation of the hospital, 65 (68.4%) were State civil servants and only three had an employment contract by the Foundation and by the State.

The weekly working hours developed ranged from 21 to 78 hours, being that the median found was 42 hours. It was emphasized that the workload developed by the subject was 36 hours/week for contractors by the Foundation and 30 hours/week for State civil servants. Regarding the return on vacation, 71 nurses (74.7 percent) had returned more than 30 days, considering the date of data collection and 24 of them (25.3%) had less than 30 days of this date, which justifies some answers of weekly workload of less than 30 hours.

Figure 1 presents the distribution of nurses as the weekly workload developed in their working environments.



Figure 1. Percentage distribution of nurses from the public hospital according to the weekly workload developed. Ribeirão Preto - SP, 2012. (n=95)



Figure 2 presents stress levels presented by nurses through the Stress Inventory in

Nurses.¹⁹

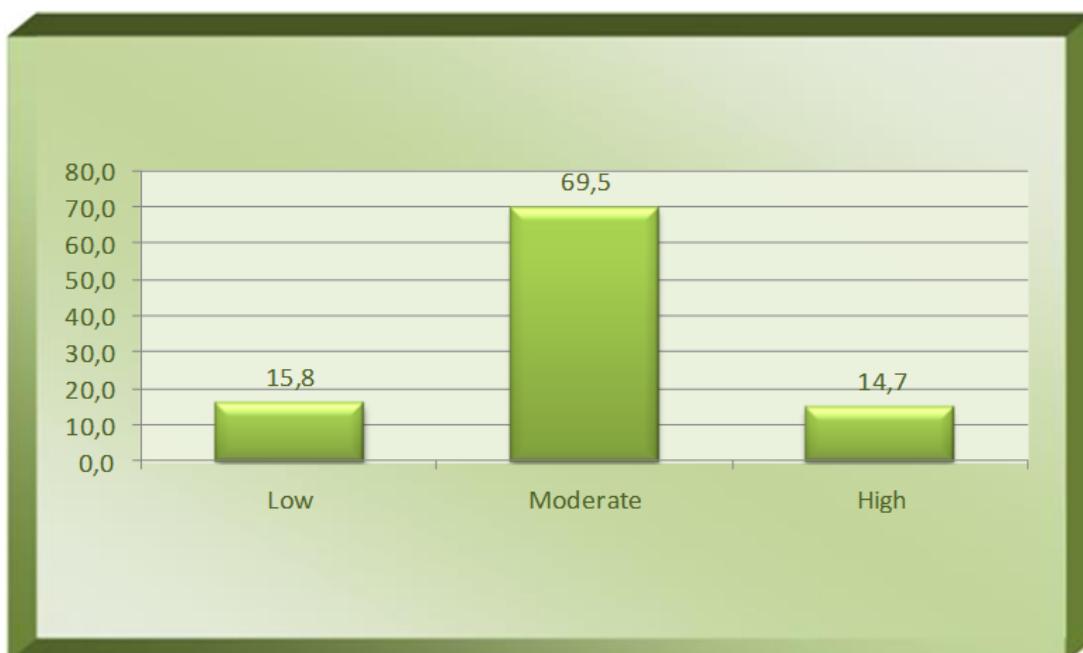


Figure 2. Nurses distribution of emergency unit according to stress levels presented through the Stress Inventory in Nurses (SIN). Ribeirão Preto - SP, 2012. (n=95)

In the present study, the sum of the items in Stress Inventory in Nurses, which corresponds to the level of *occupational stress* of these professionals ranged from 60 to 178 points. With respect to the stress level of workers, 69.5% showed moderate levels and found that there was no statistically significant relationship between the weekly

workload developed and occupational stress levels.

The table 1 presents the descriptive statistics of scores of stressors, according to categories, as nurses' evaluations, introducing measures of central tendency (mean and median) and dispersion (standard deviation).

Table 1. Descriptive statistics of nurses of public hospital according to the scores of stressors (SIN) according to the categories. Ribeirão Preto - SP, 2012.

Categories of SIN	Minimum	Maximum	Median	Mean	Standard deviation
Intrinsic factors to work *	13	46	33	32,5	7,4
Relations at work*	11	46	32	31,0	6,9
Career Stressors Roles*	18	46	30	30,5	6,2
Estructure and organizational culture*	16	49	35	33,8	6,9

*The total of items per category is 11, score varying from 11 to 55.

Regarding salivary cortisol concentrations observed in the present study, these values of 0.06 to 1.29 nm/ml (all within the normal range) and it was noted the absence of correlation between the weekly workload developed and salivary cortisol levels.

DISCUSSION

In this study, there was a predominance of female nurses (89.5%) and these results demonstrate that nursing remains a profession essentially developed by women of different ages, as it has occurred throughout history, this reality evidenced in Brazil and in other countries.²⁰

Study developed with nursing staff of a teaching hospital of Rio de Janeiro-RJ, Brazil, demonstrated the predominance of female workers (81.6%), with ages from 40 to 49 years old and married (50.7%). All these aspects could signal an increase in

responsibilities and daily activities, since in current society the woman still has to divide between the work and the responsibility to take care of domestic and family tasks, generating a couple workdays, which overloads the nursing worker.²¹

With respect to the number of jobs and to weekly workload found, it was noted that although 80% of the subjects respond to possess only one job, the median of the weekly workload developed was 42 hours (ranged from 21 to 78 hours per week), demonstrating that such workers develop overtime at the same institution.

This fact development of normal working hours and overtime at the same institution can foster a better adaptation to particular sector where exercise activities, minimizing the stress often caused by change of the workplace during the daily workload. Remaining in the same location, the nurses



have a higher knowledge of the reality of the shift assumed, i.e. they know the technicians and the nursing assistants who will be subordinate to him, the medical staff and other professionals on duty, the amount and the conditions of patients under his/her responsibility, availability of materials and equipment, among others.

In the present investigation, the sum of items of the Stress Inventory in Nurses¹⁹, which corresponds to the *level of occupational stress* of these professionals ranged from 60 to 178 points. As for the stress level of workers, 69.5% showed moderate levels and found that there was no statistically significant relationship between the weekly workload developed and occupational stress levels.

Divergent results were evidenced in an investigation carried out among nurses working in hospitals of the Armed Forces of Thailand, who detected the excessive workload as the main source of stress.²²

Some responses among the items belonging to the SIN were of great relevance to the discussion of the results of this study: 71.6% of nurses responded that often or always the salary cause them stress, showing that the number of extra hours worked increases monthly wage income, working as a positive factor in their lives; 65.3% reported that assist the patient causes them stress never or rarely, as well as specialty work (55.8%) assisting severe patients (52.7%) and implementation of quick procedures (52.6%). These factors referred to as never or rarely stressful show satisfaction for the majority of subjects in developing their labour activities in emergency units.

Exploratory study carried out in Porto Alegre-RS, Brazil, with nursing staff of a clinical emergency service showed that most (84.7%) of the surveyed worked until 40 hours a week in the sector. However, 98 workers, more than 1/5 (21.4%) possessed labour activity in another location and 65.3% developed journey between 41 and 60 total weekly hours. The variables that showed significant association with stress were weekly workload working in emergency and total workload of the week (activity in another workplace, emergency or not). Workers with more hours of work in the same type of service showed lower percentage of stress.²³

It is notorious to emphasize that the nurse plays many activities, which consist of psychosocial factors that cause the presence of stress at work, when associated with the fast activity, the excessive and journeys to work in shift, can result in occupational

stress.²⁴

Research carried out in the western region of Paraná State, Brazil, which aimed to evaluate the stress level of 26 nurses of intensive care unit operating at night of public and private institutions, found that stress among these workers classified in median level and that there was no statistical relevance to its occurrence, depending on the type of institution, as in the present study. The areas that most contributed to the event of stress were the conditions of work (night work, critical and closed sector).²⁵

Study developed in a referral hospital for urgent/emergency high complexity of the city of Caxias do Sul/RS/Brazil with 10 nurses and using the Bianchi Range of Stress Scale, showed that administrative activities were considered of greatest stress for this population.²⁶

With regard to salivary cortisol concentrations observed in the present study, they show values of 0.06 to 1.29 nm/ml (all within the normal range) and it was noted the absence of correlation between the weekly workload developed and salivary cortisol levels. The stimulus for the release of CRH and ACTH by the central nervous system is episodic and rhythmic, synchronized with the sleep-wake cycle the circadian rhythm. Cortisol production begins usually with six to eight hours of sleep, with a peak between eight and ten o'clock in the morning, when the demand for glucocorticoides is greater. During the day, the concentration decreases gradually, and there are fewer secrecy peaks, reaching undetectable levels during the first few hours of sleep.¹⁶

Research found a significant increase of free cortisol levels (salivating) and total (plasma) during the first hour after waking up, with big peaks in the first 15/30 minutes to 45 minutes, and in healthy adults increase between 50 and 100% of cortisol levels during this period was reported.²⁷

Study of emergency nurses and other hospital areas in Singapore aimed to evaluate and compare the self-perception of occupational stress and salivary cortisol levels (a collection in the morning and one in the afternoon) and found that the emergency nurses present occupational stress levels higher than the other surveyed, and cortisol levels morning newspapers were better correlated with the instrument used for the verification of occupational stress, increasing the possibility of the use of a single collection in the morning salivary cortisol to reflect on the stress perceived by them. Cortisol collected in the mornings was lower in



emergency nurses,²⁸ similar with the findings of this study.

Cortisol is one of the most important stress hormones in human beings and increased basal levels of this hormone are considered valid for a sustained activation marker. Study in Norway investigated the relationships between salivary cortisol profiles, job stress, workload and 44 health nurses who filled out a questionnaire and collected five samples of saliva on two consecutive days. There was no relationship between psychosocial factors at work and cortisol levels in the mornings.²⁹

It should be emphasized that the ER nurse experience stress situations and they are not only related to negative stress of their performance, as the greatest source of satisfaction in their work in emergency focuses on the fact that its interventions assist in the maintenance of human life. In general, people try to find reasons for satisfaction and fulfillment in their work. In the performance of their duties, but especially in the face of adverse situations, the body seeks to maintain the balance using personal forms of adaptation, releasing hand of different attempts; the body constantly works to maintain its stability and its personal well-being, in spite of adversity.³⁰

It is necessary the investigation of causative agents of stress in the workplace of nurses, as well as of measures to deal with such situations, promoting benefits not only for such workers but also to all individuals assisted by them.¹²

CONCLUSION

Nursing deals daily with conflicts in the vertical and horizontal relations between professionals, family members and patients. Accordingly, to take care of professionals who provide health services can be fundamental strategy, since effective care users depend on mainly healthy teams.

In this study, it was evidenced that there were not observed correlations between the weekly workload developed, occupational stress and salivary cortisol, but even if the workload has not correlated with the stress, it can cause fatigue and influence the occurrence of errors, interfering with quality of care to patients. Therefore, the workload has relevance in the context of workers' health.

Stress is an occupational risk for workers, hence the relevance of being recognized early. The completion of this research allows to assert that in the hospital searched nurses coexist with numerous stressors, however of

them most can deal appropriately and use of effective coping mechanisms, agree with the literature. It is thought that in this way they remain healthy, providing a good assistance and contributing to the maintenance of a positive image of the Organization studied before the community.

It is also important that managers, through frequent meetings with the nurses, have personal and workplace reality presented by them in order to promote the exchange of experiences and proposals aimed at the improvement of the conditions and the working environment. The workload developed by the workers, in particular by these nurses, should be monitored efficiently to ensure that its development does not interfere with the physical, mental and social health of them, emphasizing that the improvement of the financial income is valid and it is factor of stimulation and motivation, since such health conditions are kept.

The identification of stressors at work can be considered as agent of change. Once identified, employees and managers can discuss them and propose possible solutions to minimize its effects, which can make the daily life of nurses more productive, less stressful and valuing them to more human and professional aspects. Interventions focused on the individual aims to reduce the impact of existing risks through the development of an adequate repertoire of individual coping strategies.

Despite the relevance of the results of this study, it should be considered taking into account its limitations due to the complexity of the phenomenon studied and the restrictions of the methodological approach employed. The use of cross-sectional design held at a single institution, for a limited period of time, restricts comparative analyses with other investigations, so their results cannot be generalized. For further deepening of the theme, it is suggested to conduct further investigation with different designs, such as the longitudinal research, favoring the sequenced collection including salivary cortisol and studies involving this issue with other perspectives, and it can even be used a qualitative approach and participant observation.



REFERENCES

1. Pires JCS, Macêdo KB. Cultura organizacional em organizações públicas no Brasil. *Rev Adm Publica* [Internet]. 2006 [cited 2013 Dec 15]; 40(1): 81-105. Available from: <http://bibliotecadigital.fgv.br/ojs/index.php/rap/article/view/6805/5387>
2. Dejours C. Subjetividade, trabalho e ação. *Revista Produção* [Internet]. 2004 [cited 2013 Dec 15];14(3):27-34. Available from: <http://www.scielo.br/pdf/prod/v14n3/v14n3a03.pdf>
3. Lee S, Mccann D, Messenger JC. Duração do Trabalho em Todo o Mundo: Tendências de jornadas de trabalho, legislação e políticas numa perspectiva global comparada, Secretaria Internacional de Trabalho. Brasília: OIT; 2009.
4. Robazzi MLCC, Mauro MIC, Dalri RCMB, Silva LA, Secco IAO, Pedrão LJ. Exceso de trabajo y agravios mentales a los trabajadores de la salud. *Rev Cubana Enfermer* [Internet]. 2010 April [cited 2010 April 25];26(1):52-64. Available from: http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S086403192010000100009&lng=es&nrm=iso
5. Cofen. Conselho Federal de Enfermagem. Resolução COFEN nº293/2004 - Fixa e Estabelece Parâmetros para o Dimensionamento do Quadro de Profissionais de Enfermagem nas Unidades Assistenciais das Instituições de Saúde e Assemelhadas. Brasília, DF: Ministério da Saúde; 2004.
6. Martins JT, Robazzi MLCC, Bobroff MCC. Prazer e sofrimento no trabalho da equipe de enfermagem: reflexão à luz da psicodinâmica Dejouriana. *Rev esc enferm USP* [Internet]. 2010 Dec [cited 2014 Jan 22]; 44(4):1107-11. Available from: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S008062342010000400036&lng=en
7. Sêcco IAO, Robazzi MLCC, Shimizu DS, Rubio MMS. Typical occupational accidents with employees of a university hospital in the south of Brazil: epidemiology and prevention. *Rev latino-am enfermagem* [Internet]. 2008 Oct [cited 2014 June 02]; 16(5): 824-31. Available from: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S010411692008000500005&lng=pt
8. Lipp M. Stress: conceitos básicos. In: Lipp M, organizadora. *Pesquisas sobre stress no Brasil: saúde, ocupações e grupos de risco*. Campinas: Papirus; 1996.
9. Rossi AM, Meurs JA, Perrewé PL. (Organizadores). *Stress e qualidade de vida no trabalho: melhorando a saúde e bem-estar dos funcionários*. São Paulo: Atlas; 2013. 211 p.
10. França ACL, Rodrigues AV. *Stress e trabalho: uma abordagem psicossomática*. 4th ed. São Paulo: Atlas; 2012. 191p.
11. Ferreira LRC, De Martino MMF. O estresse do enfermeiro: análise das publicações sobre o tema. *Rev Ciênc Méd* [Internet]. 2006 May [cited 2014 Feb 20];15(3):241-48. Available from: <http://periodicos.puccampinas.edu.br/seer/index.php/cienciasmedicas/article/view/1115/1090>
12. Calderero ARL, Miaso AF, Corradini-webster CM. Estresse e estratégias de enfrentamento em uma equipe de enfermagem de Pronto Atendimento *Rev Eletrônica Enferm* [Internet]. 2008 [cited 2013 Dec 14]; 10(1): 52-62. Available from: <http://www.fen.ufg.br/revista/v10/n1/v10n1a05.htm>
13. Araújo MR. A influência do treinamento de força e do treinamento aeróbio sobre as concentrações hormonais de testosterona e cortisol. *Revista de Desporto e Saúde da Fundação Técnica e Científica do Desporto* [Internet]. 2005 June [cited 2014 June 30];4(2):67-75. Available from: <http://www.scielo.gpeari.mctes.pt/pdf/mot/v4n2/v4n2a09.pdf>
14. Laboratório Biolíder. Cortisol: hidrocortisona. [Internet]. 2013 [cited 2014 June 10]. Available from: http://www.laboratoriobiolider.com.br/medias/images/00001820_CORTISOL.pdf
15. Castro M, Moreira AC. Análise crítica do cortisol salivar na avaliação do eixo hipotálamo-hipófise-adrenal. *Arq Bras Endocrinol Metab* [Internet]. 2003 Sept [cited 2011 Sept 21];47(4). Available from: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S000427302003000400008&lng=en&nrm=iso
16. Aron DC, Findling JW, Tyrrell B. Glucorticoids & Adrenal Androgens. In: Greenspan, FS, Gardner, DG. *Basic and Clinical Endocrinology*. 7th ed. San Francisco: McGraw-Hill; 2004.
17. Urbanetto JS, Silva PC, Hoffmeister E, Negri BS, Costa BEP, Figueiredo CEP. Estresse no trabalho da enfermagem em hospital de pronto-socorro: análise usando a Job Stress Scale. *Rev latino-am enfermagem* [Internet]. 2011 Oct [cited 2014 June 20];19(5):1132-38. Available from: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0104-11692011000500009&lng=pt
18. Brasil. Ministério da Saúde. Conselho Nacional de Saúde. Resolução 196 de 10 de



outubro de 1996. Normas Regulamentadoras de Pesquisa Envolvendo Seres Humanos, Brasília: Ministério da Saúde: 1996.

19. Stacciarini JMR, Tróccoli BT. Instrumento para mensurar o estresse ocupacional: inventário de estresse em enfermeiros (IEE). Rev Latino-Am Enfermagem [Internet]. 2000 Dec [cited 2014 May 18]; 8(6): 40-9. Available from:

http://www.scielo.br/scielo.php?script=sci_arttext&pid=S01041169200000600007&lng=pt

20. França FM, Ferrari R. Burnout Syndrome and the socio-demographic aspects of nursing professionals. Acta paul enferm [Internet]. 2012 [cited 2014 June 20]; 25(5):743-78. Available from:

http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0103-21002012000500015&lng=en

21. Mauro MYC, Paz AF, Mauro CCC, Pinheiro MAS, Silva VG. Condições de trabalho da enfermagem nas enfermarias de um hospital universitário. Esc Anna Nery [Internet]. 2010 [cited 2014 June 20]; 14(2): 244-52. Available from:

http://www.scielo.br/scielo.php?script=sci_arttext&pid=S141481452010000200006&lng=en

22. Wei-Wen Liu, Feng-Chuan Pan, Pei-Chi Wen, Sen-Ji Chen, Su-Hui Lin. Job Stressors and Coping Mechanisms among Emergency Department Nurses in the Armed Force Hospitals of Taiwan. International Journal of Human and Social Sciences. 2010 [cited 2014 June 22];5:10. Available from:

<http://waset.org/Publication/job-stressors-and-coping-mechanisms-among-emergency-department-nurses-in-the-armed-force-hospitals-of-taiwan/6130>

23. Panizzon C, Luz AMH, Fensterseifer LM. Estresse da equipe de enfermagem de emergência clínica. Rev Gaúcha Enferm [Internet]. 2008 [cited 2014 July 01];29(3):391-99. Available from:

<http://seer.ufrgs.br/index.php/RevistaGauchaEnfermagem/article/view/6759>;

24. Rocha MCP, DE Martino MMF. O estresse e qualidade de sono do enfermeiro nos diferentes turnos hospitalares. Rev esc enferm USP [Internet]. 2010 June [cited 2014 Feb 10];44(2): 280-86. Available from:

http://www.scielo.br/scielo.php?script=sci_arttext&pid=S008062342010000200006&lng=en

25. Versa GLGS, Murassaki ACY, Inoue KC, Melo WA, Faller JW, Matsuda LM. Estresse ocupacional: avaliação de enfermeiros intensivistas que atuam no período noturno. Rev Gaúcha Enferm [Internet]. 2012 June [cited 2013 June 22];33(2):78-85. Available from:

http://www.scielo.br/scielo.php?script=sci_ar

[ttext&pid=S198314472012000200012&lng=pt&nrm=iso](http://www.scielo.br/scielo.php?script=sci_arttext&pid=S198314472012000200012&lng=pt&nrm=iso)

26. Kirchof RS, Guido LA, Freitas EO, Benetti ERR, Lopes LFD. Estresse entre enfermeiros emergencistas. J Nurs UFPE on line [Internet]. 2012 June [cited 2014 June 26];6(12):2927-33. Available from:

http://www.revista.ufpe.br/revistaenfermagem/index.php/revista/article/view/3414/pdf_1766

27. Clow A, Thorn L, Evans P, Hucklebridge F. The awakening cortisol response: methodological issues and significance. Stress [Internet]. 2004 [cited 2014 July 01];7(1):29-37. Available from:

<http://www.ncbi.nlm.nih.gov/pubmed/15204030>;

28. Yang Y, Koh D, Ng V. Salivary Cortisol Levels and Work-Related Stress Among Emergency Department Nurses. J Occup Environ Med [Internet]. 2001 [cited 2014 July 01];43:1011-18. Available from:

<http://www.ncbi.nlm.nih.gov/pubmed/11765672>

29. Harris A, Ursin H, Murison R, Eriksen HR. Coffee, stress and cortisol in nursing staff. Psychoneuroendocrinology [Internet]. 2007 [cited 2014 July 01];32:322-30. Available from:

<http://www.ncbi.nlm.nih.gov/pubmed/17350175>

30. Furegato ARF. Identifying stress. Rev Latino-Am Enfermagem [Internet]. 2012 July [cited 2014 July 01];20(5):819-20. Available from:

http://www.scielo.br/scielo.php?script=sci_arttext&pid=S010411692012000500001&lng=pt



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