INFLUENCE OF WORK SHIFT AND CHRONOTYPE ON THE QUALITY OF LIFE OF NURSING PROFESSIONALS

Sônia Beatriz Coccaro de SOUZA[a], Juliana Petri TAVARES[b], Andréia Barcellos Teixeira MACEDO[c], Priscilla Wolff MOREIRA[d], Liana LAUTERT[e]

ABSTRACT

The purpose of this study was to investigate the influence of shift work and chronotype on the quality of life of nursing staff at a university hospital in the state of Rio Grande do Sul, Brazil. It is an analytical and cross-sectional study, developed with a sample of 101 nursing professionals working in clinical and surgical units for adult inpatients. Chronotype and quality of life were evaluated using the Horne and Ostberg Morningness–Eveningness Questionnaire (MEQ) and the WHOQOL-Brief. None of the WHOQOL-Brief domains demonstrated any association with shift work (p> 0.05). It was observed, however, that individuals with a certain chronotype agreeing with the shift in which they work (67.01 ± 10.8) showed higher means than those disagreeing (59.16 ± 14.67) on the WHOQOL field that assesses the environment (p = 0.03). Thus, it is suggested that agreement with the chronobiological shift might be a factor determining quality of life for the nursing staff.

Descriptors: Nursing. Shift Work. Quality of Life. Occupational Health. Chronobiology.

RESUMO

O objetivo do estudo foi verificar a influência do turno de trabalho e cronotipo na qualidade de vida dos trabalhadores de enfermagem de um hospital universitário do Rio Grande do Sul, através de um delineamento transversal e analítico, realizado com 101 trabalhadores de enfermagem, que atuavam em unidades clínicas e cirúrgicas de internação de adultos. O cronotipo e a qualidade de vida foram avaliados por meio do Questionário de Matutinidade-Vespertinidade de Horne-Östberg e pelo WHOQOL-Breve. Nenhum dos domínios do WHOQOL-Breve apontou associação ao turno (p>0,05), mas se verificou que os indivíduos com cronotipos concordantes com o turno em que trabalhavam (67,01±10,8) demonstraram média superior aos discordantes (59,16±14,67), quanto ao domínio "meio ambiente" do WHOQOL (p=0,03). Assim, foi evidenciado que a concordância cronobiológica com o turno de trabalho pode se constituir como um fator de qualidade de vida para a equipe de enfermagem.

Descritores: *Enfermagem. Trabalho em turnos. Qualidade de vida. Saúde do trabalhador.*
Título: *Influência do turno de trabalho e cronotipo na qualidade de vida dos trabalhadores de enfermagem.*

RESUMEN

El objetivo del estudio fue investigar la influencia del trabajo por turnos y el cronotipo en la calidad de vida del personal de enfermería de un hospital universitario en Rio Grande do Sul. Es un estudio transversal, realizado con 101 personas del equipo de enfermería que trabajaba en unidades clínicas y quirúrgicas con enfermos adultos. El cronotipo y calidad de vida se evaluó mediante las escalas de Horne y Östberg y el WHOQOL-Breve, respectivamente. Ninguno de los dominios del WHOQOL breve tuvo asociación con calidad de vida (p> 0,05). Los sujetos con cronotipo en conformidad con el turno en el que trabajan (67,01 ± 10,8) tuvieron mayor promedio que los discordantes (59,16 ± 14,67) en el campo del WHOQOL-Breve que evalúa el medio ambiente (p = 0,03). Por lo tanto, se evidenció que la concordancia con el cronotipo con el turno de trabajo se puede constituir en un factor de calidad de vida para el personal de enfermería.

Descriptores: *Enfermería. Trabajo por turnos. Calidad de vida. Salud laboral. Disciplina de cronobiología.*
Título: *Influencia del trabajo por turnos y cronotipo en la calidad de vida de los profesionales de enfermería.*

a RN. Ph.D. in Medica Sciences and Psychiatry. Adjunct professor of the School of Nursing at Federal University of Rio Grande do Sul (EENF/UFRGS). Porto Alegre, Rio Grande do Sul, Brazil.
b RN. Student of the Nursing Doctorate Program, UFRGS. CAPES fellow. Porto Alegre, Rio Grande do Sul, Brazil.
c RN at the Porto Alegre Clinics Hospital (HCPA). Public Health and Occupational Health Specialist. Student in Nursing Master's Program, UFRGS. Porto Alegre, Rio Grande do Sul, Brazil.
d Nursing graduate, EENF/UFRGS. Fellow of the Research Apprenticeship Program/UFRGS. Porto Alegre, Rio Grande do Sul, Brazil.
e RN. Ph.D. in Psychology. Associate Professor at EENF/UFRGS. Porto Alegre, Rio Grande do Sul, Brazil.

Versão on-line em Português/Inglês: http://www.scielo.br/scielo.php?script=sci_serial&pid=1983-1447&lng=pt&nrm=iso

INTRODUCTION

The division of professionals into groups according to their work shifts constitutes a system of work organization that is relatively old and occurs mainly in services that require coverage of activities around-the-clock, which is certainly the case in nursing. More recently, however, studies have evaluated the problems that this type of work organization is causing to the health of these professionals[1-4].

Shift work usually refers to the arrangement of working hours, which uses two or more groups to cover the total time needed for work production, and can also be considered any type of organization where the working hours differ from the traditional daily workday[1].

Literature has pointed out disadvantages of shift work for the health of professionals involved, such as cardiovascular and metabolic alterations, poor sleep quality, fatigue, harm to the family relationship, interactions in the work place and diminished cognitive functions[2-4]. These effects may be explained, among others, by chronobiology, which is the science that studies human biological rhythms, including the circadian rhythm.

Circadian rhythms are determined by internal and external events that occur in 24-hour cycles, determining the temporal patterns of each species. Among the endogenous factors, the secretion of hormones stands out and, among the external synchronizers, luminosity, heat, temperature, nutrition and social activities[5].

Conceptually, people can be classified into three groups according to their chronobiological profile as morningness, eveningness and indifferent subjects, with most of the population allocated in the last group[6].

The individual who toils under the shift work system is invariably exposed to an adaptation process, since human beings are biologically programmed to develop physical and mental activities during the day and rest at night. Due to this inversion in the rest period which occurs with night activity, the individual may suffer biological alterations in body temperature, hormonal levels, psychic and behavioral alterations, and/or cognitive performance[7].

By demanding the provision of care uninterruptedly, nursing is one of the professions in which the effects of shift work on the professional's health are better observed, particularly in the hospital environment. The participants of these teams must adapt their biorhythms to develop their work activities, and this adaptation may cause changes in the short, medium and long term, with repercussion that may affect their quality of life.

The term quality of life implies a very subjective focus, generating several definitions. The Ministry of Health defines "Quality of Life" as the "level of satisfaction of the human life needs – such as nutrition, access to drinkable water, housing, employment, education, health, leisure and material elements – which has as reference, subjective notions of comfort, well-being and individual and collective achievement"[8].

In this last decade, Brazilian researchers have studied quality of life in areas of great technical complexity[9], as well as the chronotype as a cause of work accidents among nursing professionals[10-11]. Nevertheless, there is still a gap in knowledge regarding the relationship between quality of life and the agreement between chronotype and shift work shift in nursing professionals employed in hospitals.

This study stands on the hypothesis that workers who present a chronobiological profile agreeing with their work shift evidence better quality of life in relation to those who present disagreeable aspects. Thus, the relevance of the present study exists in seeking subsidies for the adaptation of work shifts according to the chronotype of the professionals involved, aimed at the maintenance of a better quality of life and the prevention of occupational diseases.

The present study also examines the difference in the quality of life of morningness professionals allocated to the morning shift, and eveningness professionals allocated to the night shift, in relation to the opposite: morningness subjects who work at night and eveningness subjects working the morning shift. Therefore, its general purpose is to broaden the knowledge in this area of the relationship between work shift and worker's chronotype and its influence on their quality of life.

METHOD

This study utilizes a cross-sectional design with a quantitative approach, and was developed at a university hospital in the south of Brazil.

Versão on-line em Português/Inglês: http://www.scielo.br/scielo.php?script=sci_serial&pid=1983-1447&lng=pt&nrm=iso

The study population consisted of 128 professionals of the nursing staff who work on clinical and surgical adult hospitalization units. The subjects were selected randomly and stratified based on their daily work schedule, respecting the proportion between professional categories (two technicians/assistants for every nurse). The sample included nursing professionals who were actively working during the period of data collection, worked in a system of fixed morning and night shifts, and remained on the same work shift schedule for the past three years. Exclusion criteria applied to individuals who had been away on vacation and/or were absent due to any cause during data collection. Finally, the sample included 101 subjects, with a proportional allocation of the total number of people by strata (nurses, nursing technicians and assistants). Beta error was defined as **20% and the level of significance was 95% (alpha error = 5%).**

Data collection was performed in the year 2009, through a self-administered questionnaire. Controlled variables were: age (in years), gender, professional category and length of time working in the shift system (in years).

The variables in the study included: 1) work shift (morning and night), 2) chronobiological profile (morningness, indifferent and eveningness subjects) and 3) quality of life. The study considered "agreement" as occurring when the morningness subjects worked in the morning and eveningness subjects worked at night; inversely, "disagreement" occurred when morningness subjects worked at night and eveningness subjects were allocated to the morning shift. Due to this methodological decision, the study excluded subjects who worked in the afternoon and those who presented an indifferent chronotype since, by definition, these individuals do not have a preferential time to perform activities.

The Morningness–Eveningness Questionnaire[12] used is already validated in Brazil[13]. It contains 23 analogous-visual questions related to life habits, daily activities and the time at which the individuals prefer to perform them. The scale total sum provided scores that allow the classification of each professional according to their chronotype.

The **morningness chronotype** is represented by people who prefer to wake up earlier, are more willing to perform activities throughout the day and experience a decrease in their state of alertness as the sun sets, going to bed earlier as well. The **eveningness chronotype** is characterized by the predisposition to develop activities later on in the day, resting later, and showing a reduction in their state of alertness in the morning. Indifferent individuals are those who have an intermediate pattern of biological rhythm between the morningness and the eveningness pattern, adapting more easily to developing their activities at various times[6].

The evaluation of quality of life was made through the World Health Quality of Life (WHOQOL-Brief) instrument, developed by the Quality of Life Group of the World Health Organization and validated in Brazil[14]. WHOQOL-Brief contains 26 questions that evaluate five domains [14]:

1) Physical (pain, energy, sleep, mobility, daily life activities, dependence on medication/treatments, ability to work);

2) Psychological (positive/negative feelings, thoughts, self-esteem, body image, spirituality);

3) Social relationships (personal relationships, social support and sexual activity);

4) Environment (physical safety, home environment, financial resources, health and social care, opportunities to acquire information and skills, recreation/leisure, physical environment and transportation);

5) General (global quality of life and general health perceptions).

The result provides scores for each domain. A specific syntax for the SPSS, available on the website www.ufrgs.br/psiq/whoqol84.html, was used for calculation[14].

The program SPSS 16.0 for Windows was used in data analysis. Continuous data were analyzed using the Student's T test for independent samples, and association analyses were calculated through the Chi-Square Test with Yates' correction, or Fisher's Exact Test.

The study had the approval of the Ethics Committee of the institution involved in the study, under protocol no. 05165. Ethical principles were respected, keeping in confidentiality the identification of the study participants, according to resolution 196/96 of the National Health Council (BRAZIL, 1996) and subsequent resolutions. This was clarified to the subjects when the Free and Informed Consent Form was presented. Before signing it, the participant became aware of the confidentiality, anonymity and right to cease their participation at any stage of the study, without any fear of harm or embarrassment.

RESULTS

The studied sample included 101 subjects (nurses, nursing technicians and assistants), including 96 (90.6%) female and 4 (8.4%) male subjects. The mean age of the night professionals was 45.5 (±7.1) years and the morning professionals 41.1(±6.6) years (p=0.002). Regarding their education, morning professionals generally had more years of education than night professionals (14.7±3.4 years and 13.9±3.2 years, respectively; p=0.30). The mean length of time working their particular shift was 14.5 (±7.6) years among morning professionals and 20.5 (±9.1) years for night professionals (p=0.001).

Among the 101 professionals, 65 (64.3%) worked the night shift and 36 (35.6%) worked the morning shift. There was no association between work shift and physical (p=0.986), psychological (p=0.175), social relationships (p=0.221), environment (p=0.454) and general (p=0.069) domains of the WHOQOL-Brief (table 1).

According to table 2, eveningness subjects presented worse scores in the physical domain in comparison to morningness and indifferent subjects (p=0.003). The subjects with a morning chronotype presented higher scores in the psychological (p=0.02) and social relationships domains (p=0.01), followed by those of indifferent and evening chronotypes. There was no association observed between chronotype and the environment domain (p=0.94), with morningness subjects presenting significantly higher means than those with indifferent and eveningness chronotypes in the general domain (p=0.01).

Of the 65 subjects who worked at night, 14 (87.5%) exhibited the morningness chronotype, 38 (76%) were indifferent and 13 (37.1%) were

Table 1 – Distribution of the means of the WHOQOL-Brief domains according to work shift. Porto Alegre, 2009.

WHOQOL – Brief domains	Morning N=36	Night N=65	p Value
Physical	74.79±10.60	74.83±11.72	0.986
Psychological	74.47±12.21	71.14±11.35	0.175
Social relationships	70.23±15.29	65.90±17.52	0.221
Environment	65.62±10.25	63.82±12.03	0.454
General	75.71±14.83	70.26±13.82	0.069

Source: Data collection through questionnaire. SOUZA, Sônia Beatriz Coccaro de. Porto Alegre, 2011.

Table 2 – Distribution of the means of the WHOQOL-Brief domains by chronotype. Porto Alegre, 2009.

WHOQOL – brief domains	Chronotype			p Value
	Morningness N=35	Indifferent N=50	Eveningness N=16	
Physical	76.8±10.4[b]	76.0±10.6[b]	66.3±10.1[a]	0.003
Psychological	75.0±12.6[a]	72.7±11.1[a,b]	65.4±9.6[b]	0.020
Social relationships	70.0±15.6[c]	69.4±16.1[b,c]	56.7±17.2[a]	0.010
Environment	64.9±12.7[a]	64.1±10.6[a]	64.2±12.4[a]	0.940
General	77.8±11.7[a]	69.8±15.6[b]	67.2±12.8[b]	0.010

Source: Data collection through questionnaire. SOUZA, Sônia Beatriz Coccaro de. Porto Alegre, 2011.
Note: *One-way ANOVA with Bonferroni's correction and results were expressed in mean (± standard deviation). †Different letters represent statistically significant differences in scores among chronotypes by WHOQOL domain and equal letters indicate the inexistence of statistically significant differences in scores.

Table 3 – Distribution of the means of the WHOQOL-Brief domains according to the agreement between chronotype and work shift. Porto Alegre, 2009.

WHOQOL – Brief domains	Agreeing N=36	Disagreeing N=15	p Value
Physical	73.80±11.13	72.85±12.93	0.79
Psychological	72.10±12.02	71.66±13.92	0.91
Social relationships	65.50±17.94	66.66±17.81	0.83
Environment	67.01±10.83	59.16±14.67	0.03
General	74.30±14.31	75.00±9.44	0.86

Source: Data collection through questionnaire. SOUZA, Sônia Beatriz Coccaro de. Porto Alegre, 2011.
Note: Student's T test and results expressed in means (± standard deviation).
In table 3, it is observed that subjects who are allocated in an agreeing way according to their chronotype and work shift present higher scores than those disagreeing in the environment domain (p=0.03).

eveningness chronotypes (p<0.001). From the 36 professionals who worked the morning shift, 2 (12.5%) were morningness, 12 (24%) were indifferent and 22 (62.9%) were eveningness chronotypes (p<0.001). Regarding the distribution of chronotypes according to the shift worked, it was observed that 15 subjects (29.41 %) were in agreement, whereas 36 (70.58 %) were allocated in a disagreeing way as far as chronotype and work shift.

DISCUSSION

Despite the entrance of men into the nursing work force, the prevalence of women is still corroborated by other studies[3, 15-18]. Studies have proved the association between overload caused by night work and the female gender, due to the reduction of daily sleep, responsibilities for activities at home and child care[2-3], which could discourage women from working this shift. However, in the present study, night shift professionals have been working in this shift longer than morning shift professionals in theirs (p=0.001), which allows us to suppose that the convenience of working at night (shift premium pay, autonomy, possibility of having a second job and / or continuing their studies) exceeds the disadvantages that have been described in the literature[4,15,18]. In this study, there was prevalence of individuals with an indifferent chronotype. Considering the genetic component of the chronobiological profile, it is possible to infer that the indifferent chronotype may also be an expression of an adaptation of the individuals to the prolonged exposure to working in shift work[7,19].

Although the relationship of shift work with physiological variables has not been examined, it is possible to determine that, at least in one of the studied chronotypes (the eveningness subjects), there were worse scores in the physical domain (pain, energy, sleep, mobility, daily life activities, dependence on medication/treatments, ability to work) (p=0.003). This finding may result from the higher mean age of professionals in this shift in relation to the morning shift, or may agree with studies that found a correlation between shift work and cardiovascular alterations, poor sleep quality, decreased alert states, metabolic alterations, physical and mental weariness, and musculoskeletal diseases[2-4,16]. Nevertheless, the multicausality of chronic-degenerative alterations prevents the attribution of a direct relationship between etiology and the system of night and shift work.

The representatives of the morningness chronotype presented higher scores in the psychological domain (positive-negative feelings, thoughts, self-esteem, body image, spirituality) and in the domain of social relationships (personal relationships, social support and sexual activity) (p=0.02). The improvement of the scores may also result from the fact that these morningness professionals present more factors of resilience: they were younger (p=0.002) and had been working in that shift for a shorter period of time (p=0.001). On the other hand, the literature [2,4] indicates that night shift professionals often experienced disadvantages in social relationships and interactions due to the differences between their work shifts

and the time in which the activities of their relatives and friends occurred.

Meanwhile, it was possible to observe that subjects with agreement between chronotype and shift also prevailed on the morning shift (61%) – and presented better scores in relation to disagreeing subjects in the environment domain (recreation and leisure, physical safety, information, health care, financial resources, home environment and transportation), which may suggest that this agreement is a protective factor for quality of life.

CONCLUSION

The authors conclude that there was no evidence for the association between work shift and quality of life in the studied sample. As a matter of fact, some of the findings could be equally related to different aspects of the routine of professionals who are exposed to shift work, such as satisfaction with their work shift and the way they perceive the effects of this system on their body and their lives. On the other hand, results evidenced a significant association between the agreement of chronotype and work shift and quality of life in the environment domain. This may indicate that, at least for morningness professionals, such agreement may constitute a factor of protection against adverse effects on the quality of life of professionals who work in shifts, which thus indicates and supports the need for future further studies.

The WHOQOL-Brief scale was judged appropriate for this study, as it is easily applied and presents consistent results. Regarding the study limitations, its cross-sectional design stands out, since in this case reverse causality cannot be rejected. Moreover, the use of self-administered questionnaires allows subjects to ignore certain questions if desired.

It is suggested, however, to continue studying this area regarding the influence of shift work on occupational health, since the demand for professionals in this work system is continuing to grow and our knowledge regarding prevention level is still incipient.

REFERENCES

1 Costa G. Factors influencing health of workers and tolerance to shift work Theoretical Issues in Ergonomics Science. 2003; 4 (3-4): 263-288.

2 Gemelli KK, Hilleshein EF, Lautert L. Efeitos do trabalho em turnos na saúde do trabalhador: revisão sistemática. Rev Gaúcha Enferm. 2008; 29 (4): 639-46.

3 Maynardes DCD, Sarquis LMM, Kirchhof ALC. Trabalho noturno e morbidades de trabalhadores de enfermagem. Cogitare Enferm. 2009; 14 (4):703-8.

4 Silva RM, Beck CLC, Magnago TSBS,Carmagnani MIS,Tavares JP, Prestes FC. Trabalho noturno e a repercussão na saúde dos enfermeiros. Esc Anna Nery. 2011; 15 (2): 270-276.

5 Pereira DS, Tufik S; Pedrazzoli M. Moléculas que marcam o tempo: implicações para os fenótipos circadianos. Rev. Bras. Psiquiatria. 2009; 31 (1): 63-71.

6 Martins T, Gomes CRG. Cronobiologia dos indivíduos em situação de trabalho. Revista Saúde e Pesquisa. 2010; 3 (3): 309-314.

7 Lisboa MTL, Oliveira MM, Reis LD. O trabalho noturno e a prática de enfermagem: uma percepção dos estudantes de enfermagem. Esc Anna Nery. 2006; 10 (3): 393-8.

8 Ministério da Saúde (BR). Secretaria-Executiva. Secretaria de Vigilância em Saúde. Glossário temático: promoção da saúde [internet]. Brasília; 2012 [citado 2012 agosto 09]. Disponível em: http://bvsms.saude.gov.br/bvs/publicacoes/glossario_promocao_saude_1ed.pdf

9 Schmidt DRC, Dantas RAS. Qualidade de vida no trabalho de profissionais de enfermagem, atuantes em unidades do bloco cirúrgico, sob a ótica da satisfação. Rev. Latino-Am. Enfermagem. 2006; 14 (1): 54-60.

10 Alves AL, Campos FP, Deghi LP. Identificação do cronótipo de membros de uma equipe de enfermagem que trabalham nos turnos diurno e noturno. ConScientiae Saúde. 2008; 7 (1): 49:54.

11 Dalarosa MG, Lautert L. Acidente com material biológico no trabalhador de enfermagem em um hospital de ensino: estudo caso-controle. Rev Gaúcha Enferm. 2009; 30 (1): 19-26.

12 Horne JA, Ostberg O. A self-assessement questionnaire to determine morningness-eveningness in human circadian rhythms. Intern J Chronobiol. 1976 abril; 4 (2): 97-110.

13 Benedito-Silva AA, Menna-Barreto L, Marques N; Tenreiro S. Self-assessment questionnaire for the

Versão on-line em Português/Inglês: http://www.scielo.br/scielo.php?script=sci_serial&pid=1983-1447&lng=pt&nrm=iso

determination of morningness-eveningness types in Brazil. Prog Clin Biol Res. 1990; 314 (b): 89-98.

14 Fleck MPA, Louzada S, Xavier M, Chachamovich E, Vieira G, Santos L, Pinzon V. Aplicação da versão em português do instrument abreviado de avaliação de qualidade de vida "WHOQOL - bref". Rev Saude Publica. 2000;34 (2): 178-83.

15 Magalhães AMM, Martins CMS, Falk MLR, Fortes CV, Nunes VB. Perfil dos profissionais de enfermagem do turno noturno do Hospital de Clínicas de Porto Alegre. Rev. HCPA 2007; 27 (2): 16-20.

16 Souza MLP, Ernst ML, Filus WA. A opinião de profissionais de enfermagem sobre alguns aspectos do trabalho noturno em hospital público de Curitiba. Boletim de enfermagem. 2008; 1: 15-27.

17 Ferreira LRC, De Martino MMF. Stress no cotidiano de equipe de enfermagem e sua correlação com o cronotipo. Estudos de Psicologia. 2009; 26 (1): 65-73.

18 Silva RM, Beck CLC, Guido LA, Lopes LFD, Santos JLG. Análise quantitativa da satisfação profissional dos enfermeiros que atuam no período noturno. Texto Contexto Enferm. 2009; 18 (2): 298-305.

19 Pereira DS, Tufik S, Pedrazzoli M. Moléculas que marcam o tempo: implicações para os fenótipos circadianos. Rev. Bras. Psiquiatria. 2009; 31 (1): 63-71.

Author's address / *Endereço do autor* / *Dirección del autor*
Sônia Beatriz Coccaro de Souza
Rua São Manoel, 963, Campus Saúde, Rio Branco
90620-110, Porto Alegre, RS
E-mail: sbcs@terra.com.br

Received: 13.04.2012
Approved: 31.08.2012

Versão on-line em Português/Inglês: http://www.scielo.br/scielo.php?script=sci_serial&pid=1983-1447&lng=pt&nrm=iso