2011 International Nuclear Atlantic Conference - INAC 2011
Belo Horizonte, MG, Brazil, October 24-28, 2011
ASSOCIAÇÃO BRASILEIRA DE ENERGIA NUCLEAR - ABEN
ISBN: **978-85-99141-04-5**

QUALITY OF LIFE EVALUATION OF RADIODIAGNOSIS SERVICE WORKERS ACCORDING TO WHOQOL-BREF

Ivani M. Fernandes, Amanda J. da Silva, Paula P. N. Silva and Janete Cristina G. G. Carneiro

Instituto de Pesquisas Energéticas e Nucleares, IPEN – CNEN/SP
Av. Prof. Lineu Prestes, 2242 - Cidade Universitária
05508-000 São Paulo - SP – Brasil
imfernandes@ipen.br

ABSTRACT

Objectives: To evaluate the quality of life (QOL) of radiodiagnosis service workers at a hospital in the city of São Paulo, Brazil; the World Health Organization Quality of Life instrument (WHOQOL-Bref), abbreviated version from WHO was used. This study aims to analyze the contribution of the instrument domains (physical, psychological, social and environmental) in the global domain; to know the profile of these workers identifying the socio-demographic variables related to work and variables that express the individual's lifestyle as well as its influence on workers QOL. **Methods:** The sample was formed by 118 workers that answered a questionnaire divided into two parts. The first part involved questions about the variables of interest and the second part corresponding to the WHOQOL-Bref instrument. The analyzed data included descriptive statistics, nonparametric tests and linear regression. The reliability of the instrument, for the studied sample, was verified by Cronbach's alpha (α). **Results and discussion:** The average scores of each WHOQOL-Bref domain were: physical (76.2±12.7), psychological (73.6±19.3), social (73.8±19.3), environmental (60.6±15.6) and global domain (69.6±19.7). There were significant correlations ($p<0.05$) among the four domains with the global domain. The highest correlation coefficient was observed among the physical and psychological domains ($r=61.2$). Linear regression analysis showed that none of the socio-demographic variables interfered among domains and only the variables related to the work contributed in the psychological domain ($p=0.040$). **Conclusion:** The WHOQOL-Bref showed to be an adequate instrument, with a high level of reliability ($\alpha=0.884$), being easy to apply for evaluation of radiodiagnosis service workers.

1. INTRODUCTION

The increasing and diverse use of ionizing radiation in medicine and in other areas cannot be dissociated from the concerns of security, safety and well-being of workers. Therefore, researches have been conducted focusing on occupational exposure to ionizing radiation associated to radiation protection practices and the work process optimization.

The health professionals from Radiodiagnosis Service are part of a group of people with singularities that differenciate them from other professionals, especially when it has to do with their own health care. These professionals have long working hours, there can be double shift, the responsibility is too extensive, they are exposed to occupational risks such as chemical, physical, ergonomic and biological and there is always the possibillity of multiple employment [1].

In this context, it is important to evaluate the quality of life (QOL) of radiodiagnosis service workers since it is related to various aspects of daily life.

Different concepts of QOL have been established, from more general to more specific and also some studies show a distinction between global quality of life and the different QOL domains. According to Spilker the evaluation of global QOL is defined as the individuals overall satisfaction with life and general sense of well-being [2]. The World Health Organization (WHO) defines quality of life as the "individual' perceptions of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns". This is an approach based on the individuals perception of their action in many areas of life, such as physical health, psychological status, social relations, family, work, relation with the environment, among other [3, 4].

The instrument used in this study was developed by the WHOQOL group of the WHO. The Word Health Organization Quality of Life Bref Instrument (WHOQOL-Bref), Portuguese version, was validated in Brazil for some pathology and for some population [3, 4], however it had never been used to evaluate the quality of life in a radiodiagnosis service workers sample. Besides, the absence of a specific, tested and validated instrument for this sample of individuals, with potencial risk to ionizing radiation, and with satisfying psychometric caracteristics [5, 6, 7], was the reason for the choice of WHOQOL-Bref.

Considering that working is a factor that can influence the quality of life of people, the goals of this study was to evaluate the quality of life of radiodiagnosis service workers at a hospital in the city of São Paulo, applying the WHOQOL-Bref instrument and its psychometric properties; to analyze the contribution of the domains (physical, social, psychological and environmental) to the global quality of life (QOL); to know the profile of these workers and to identify the sociodemographic variables related to work and variables that expresses the individuals lifestyle, as well as its influence on workers QOL.

2. METHODOLOGY

The study was conducted in a University Hospital at São Paulo city-Brazil, between February and October of 2010, after approval of the Hospital Research Ethics Committee.

The sample consisted of 118 professionals (97.5% of the population) who agreed to participate of the research, and after being informed about the purpose of research, data reliability and the possibility of withdrawing their consent at any time, they signed a term of voluntary and informed consent. One copy was delivered to the worker and the other was retained by the person in charge of the research.

The occupational categories of workers involved in this study were: physicians, radiology technologist, nursing, nursing assistants, and others professionals.

2.1 Procedures to data collection

Each participant received a self-administered questionnaire divided into two parts. The first part (respondent information form) was composed of questions about socio-demographic variables, work conditions and lifestyle of the participants; and the second part, the generic instrument for QOL evaluation, the WHOQOL-Bref, abbreviated version of the WHOQOL-100 [3, 4].

The WHOQOL-Bref contains 26 questions related to the last two weeks experienced by the interviewee. The first two questions assess the Global QOL. The others 24 questions are divided into four domains: physical, psychological, social and environmental. The answers of the questions are presented in the form of a Likert type scale offering five alternative answers (1-5), which are converted into final scores ranging from zero (worst QOL) to 100 (best QOL).

2.2 Statistical data analysis

Data were organized and analyzed using softwares: Statistical Package for Social Science (SPSS) version 16, Excel Office 2007 e Minitab 15 [8, 9].

Initially, a descriptive study of the data (measures of central tendency, measures of location and dispersion) was performed, with the purpose of knowing the socio-demographic profile, working conditions and lifestyle of the workers, as well as to evaluate the distribution of scores of each WHOQOL-Bref domain.

The statistical analysis accomplished in the study included nonparametric statistical tests and techniques. Spearman correlation test was used to investigate the relationship between the quantitative variables studied and the WHOQOL-Bref domains. To analyze the differences between the WHOQOL-Bref domains with the qualitative variables it was used the Mann Whitney test (for two categories variables) and the Kruskal-Wallis test (for variables divided into three or more categories).

In this study, the psychometric properties (reliability and validity) of the WHOQOL-Bref instrument, for the radiodiagnosis service workers sample, were studied. The reliability was assessed by Cronbach's alpha coefficient (α). Spearman correlation coefficients and Linear Regression coefficients were used to evaluate the criterion validation.

The significance level in this study was 5% ($p<0.05$), with a statistical confidence interval of 95%.

3. RESULTS E DISCUSSION

3.1 Results from first part of the questionnaire (respondent information form) – socio-demographic variables, work conditions and life styles

Table 1 shows the distrubution of the sample (118 individuals), according to the studied **socio-demographic variables**: age, gender, marital status and educational level. It was observed that the sample had a mean age of 43.7±10.3 years, and the age range varied from 24 to 72 years old. According to analized data, the frequency for age range is concentrated in the range of 41-50 and 51-60 years old, for both genders, corresponding to 59.3% of the sample.

Table 1: Distribution of sample according to the studied socio-demographic variables

VARIABLES	N=118
Age: (average±sd)	(43.7±10.3)
Gender	**Frequency (%)**
Male	60 (50.8)
Female	58 (49.2)
Marital status	
Married	59 (50.0)
Single	43 (36.4)
Divorced	10 (8.5)
Widower	5 (4.3)
Did not answer	1 (0.8)
Educational level	
Undergraduation	71 (60.2)
High school	42 (35.6)
Basic education	2 (1.7)
Did not answer	3 (2.5)

N: sample number; **sd:** standard deviation

Figure 1 illustrates the sample distribution according to variables related to **working conditions** in the radiodiagnosis service at the hospital analyzed, including: (a) working time with ionizing radiation (b) job satisfaction in the presence of ionizing radiation (c) shift work and (d) the existence of other employment.

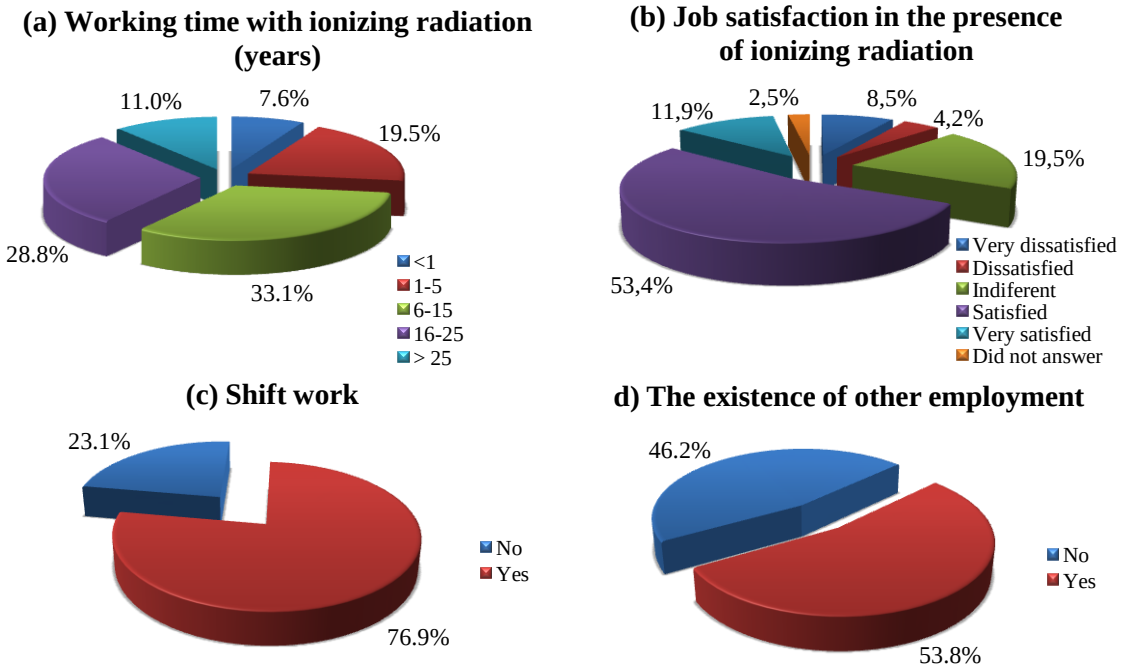

Figure 1: Sample distribution according to variables related to working conditions in the radiodiagnosis service at the hospital analyzed

The average working time of the radiodiagnosis service workers at the hospital analyzed was (14.6±10.0) years.

According to the sample distribution in the professional categories, the highest number of workers was observed in the "physician" category (17.8%) followed by the "radiology technologist/technician" (50.0%) category, corresponding to 67.8% of sample studied. The other categories (nursing, nursing technicians and nursing assistants and other professionals) amounted 32.2% of the sample. Analyzing the categories by gender, in the "physician" category, the male was majority (76.2%) as well as also in the "radiology technologist/technician" (66.1%) category. In other categories, the female gender was the majority, about 90.0% of the sample.

In the distribution of workers by sector of work, it was verified that most of them concentrated in the sectors of hemodynamic (36.4%), bed X-ray (25.4%) and computed tomography (14.4%). The sectors of nuclear medicine, ambulatory X-rays, mammography and radiation protection amounted 23.8% of the sample.

Figure 2 shows the distribution of the **variables that express the lifestyle of the participants**: smoking habit, drinking alcohol and physical activity, both for male and female. The results showed that 16 individuals (13.6%) of the sample were smokers, 64 (54.2%) drinking alcohol and 52 (44.1%) practice physical activity.

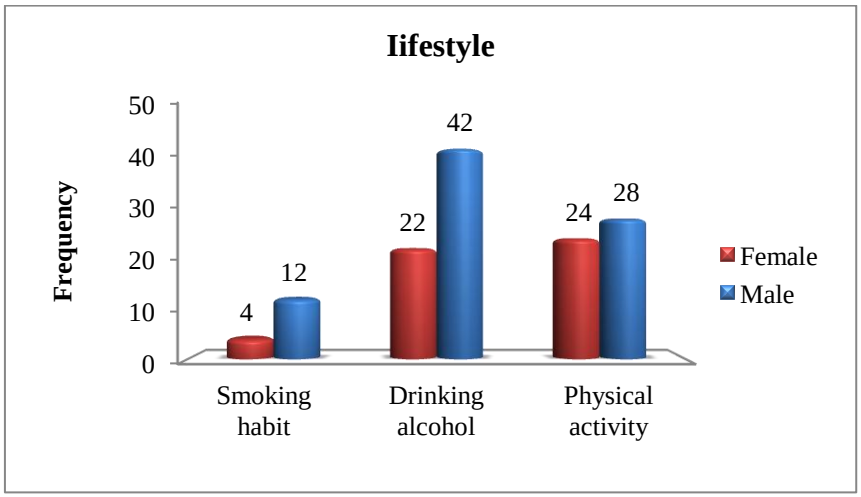

Figure 2: Distribution of the variables that express the lifestyle of the participants both for male and female

3.2 Results of the second part of the questionnaire – WHOQOL-Bref

Table 2 shows the descriptive analysis of the WHOQOL-Bref different domains. It was found that in all variables the variability was low, because the coefficient of variation (CV<50%) which demonstrates that the data were homogeneous. All domains showed higher maximum score, achieving 100.0 (best QOL). The social domain and Global QOL reached zero score (worst QOL); this result can be explained, as three participants rated their QOL as "very bad" and proved to be "very dissatisfied" with their health. As for the social domain, what may

have contributed to achieve the same zero score was the fact that participants had proved to be "very dissatisfied" in sexual life (9 individuals), personal relationships (3 individuals) and social support (2 individuals).

Regarding the average scores of each WHOQOL-Bref domain, the environmental domain showed the lowest average (60.6±15.6), probably due to some participants of the study had answered having some difficulties related to the opportunity for recreation and leisure (35 individuals), the physical environment: pollution/noise/traffic/climate (20 individuals), financial (21 individuals), transport (33 individuals) and health care (34 individuals). The average found for the physical (76.2±12.7), psychological (73.6±19.3), social (73.8±19.3) and global QOL (69.6±19.7) domains were similar, showing consistency among these aspects in the analyzed individuals lives.

Table 2: Analysis of the WHOQOL-Bref in the different domains

Descriptive Analysis	WHOQOL-Bref domains				
	Physical	**Psychological**	**Social**	**Environmental**	**Global QOL**
Score average	76.2	73.6	73.8	60.6	69.6
Median	78.6	75.0	75.0	60.0	75.0
Standard Deviation	12.7	14.9	19.3	15.6	19.7
CV	17%	20%	26%	26%	28%
Q1	67.9	66.7	66.7	53.1	62.5
Q3	85.7	83.3	89.6	68.8	75.0
Minimum	32.1	20.8	0.0	6.3	0.0
Maximum	100.0	100.0	100.0	100.0	100.0
N	118	118	118	118	117
CI	2.3	2.7	3.5	2.8	3.6

CV: coefficient of variation; **Q1 e Q3:** 1st e 3rd quartile; **N:** total sample; **CI:** confidence interval; **QOL:** quality of life.

3.2.1 Psychometric properties of the WHOQOL-Bref instrument

The **reliability (**internal consistency**)** of the WHOQOL-Bref was tested by Cronbach's alpha (α). The analysis was performed for the 26 questions of the instrument, considering the 118 participants of the study. The result obtained (α=0.884) indicates that the internal consistency of the instrument for the sample was considered high.

Table 3 presents the results of the **criterion validation** assessed by Linear Regression Model (β) and Spearman Correlation Coefficients (r) among the WHOQOL-Bref different domains in relation to Global QOL. All domains showed a statistically significant correlation from regular to good (46.3% to 60.2%, $p<0.001$) with the Global QOL domain. However, the generated Linear Regression model was not significant ($p=0.234$), with an R^2 (percentage of explained variance) of 11.9%. The R^2 value can vary from 0% to 100%, so the higher the value the better the model.

Table 3: Linear Regression (β) and Spearman Correlation Coefficient (r) among the WHOQOL-Bref different domains in relation to Global QOL

Domains (independents variables)	Global QOL (dependent variable)			
	β	P-value	r	P-valor
Physical	0.15	0.284	46.3%	<0.001
Psychological	0.48	0.003	60.2%	<0.001
Social	0.07	0.517	50.1%	<0.001
Environmental	0.31	0.010	59.5%	<0.001
R^2	11.9%			
P-value	0.234			

Scale of classification for Spearman Correlation Coefficients: Very bad (0-20), Bad (20-40), Regular (40-60), Good (60-80) and Very good (80-100).

When the WHOQOL-Bref domains were correlated with each other and with the quantitative variables (age and working time at the hospital) of the first part of the questionnaire, it was found that they all showed a significant correlation among them ($p<0.001$), from regular to good ($r=42.0\%$ to $r=61.2\%$). However, there was no statistically significant correlations between the domains with any of the quantitative variables, i.e., these results are statistically independent.

Regarding the obtained results through the Linear Regression model between the WHOQOL-Bref domains (dependent variables) with work-related socio-demographic variables, it was observed that only the statistical model, generated for the psychological domain, was significant ($p=0.040$); it can still be evaluated that the variables: employment sector ($p=0.049$), occupation ($p=0.004$) and shift work ($p=0.032$) contributed to the results of this domain.

In order to verify if there was any influence of these variables on QOL of the analyzed workers, all qualitative variables from the first part of the questionnaire were compared with the WHOQOL-Bref domains.

According to the analyzed results, comparing the WHOQOL-Bref domains with gender variable, it was found higher scores QOL for male in the physical (78.2), psychological (74.6) and social (77.1) domains. In the environmental (61.3) domains and Global QOL (69.7), the female showed higher QOL scores. In this analysis it was concluded that only the social domain showed a statistically significant difference ($p=0.007$) for male and female. This result can be related to the parcipants sexual life, because in this item was obtained a percentage of 7.6% to “very dissatisfied”, 2.5% to “dissatisfied” and 17.8% to “indifferent”.

Comparing the WHOQOL-Bref domains with marital status and educational level, none of the results had a significant influence ($p<0.05$) for the analyzed individuals QOL, being that the married had higher QOL scores in the physical (77.2), psychological (74.9) and social (75.0) domains, while the widowers achieved higher scores in the environmental (65.3) domain and Global QOL (75.0). In education level, the values of the QOL scores for undergraduate and high school were, approximately, equal, around 70.0.

Figure 3 presents the results of comparisons of the WHOQOL-Bref domains with the qualitative variables related to working conditions in the radiodiagnosis service at the analyzed hospital.

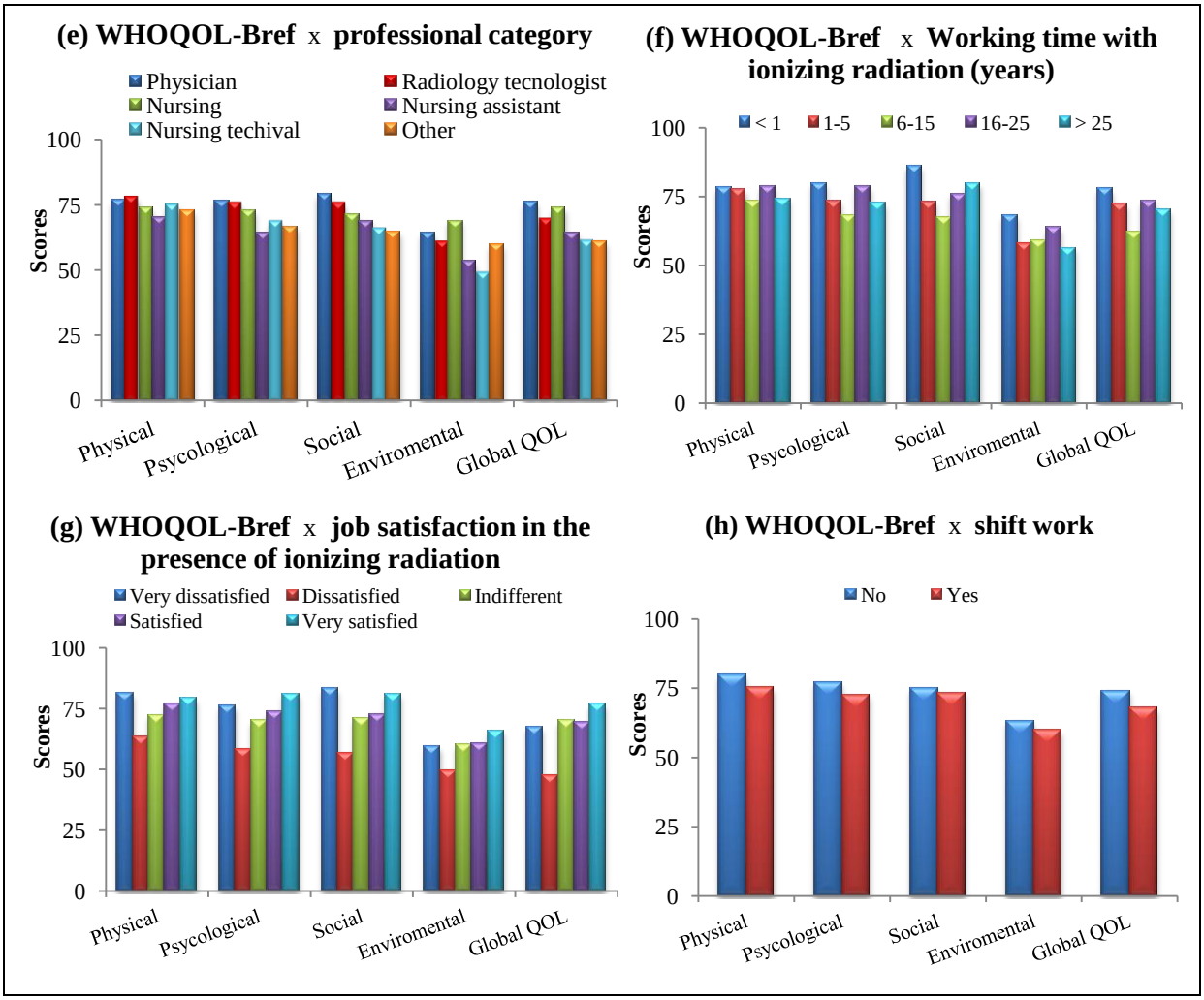

Figure 3: Comparisons of the WHOQOL-Bref with the qualitative variables related to working conditions of the participants of the study

It was found that the professional category variable, figure 3(e), showed no statistically significant difference ($p<0.05$) for any of the WHOQOL-Bref domains. It may be noted that the "physician" category had higher QOL scores in the most of domains.

For the variable, working time with ionizing radiation, figure 3(f), only the psychological domain showed a statistically significant difference ($p=0.017$). It was observed that as the shorter the working time, higher was the QOL score in all WHOQOL-Bref domains.

For the variable, job satisfaction in the presence of ionizing radiation, figure 3(g), the physical domain showed a statistically significant difference ($p=0.041$), and the group "very dissatisfied" was the one who contributed to this result. The group that answered "very

satisfied" achieved higher QOL scores in the Global QOL, psychological and environmental domains.

The Shift work, as well as the accumulation of two or more employment can be considered as possible causes of physiological and psychological disorders and distress in social and family life, impacting on the productive performance and on the QOL of worker [1]. In Figure 3 (h) can be observed that the group that work on shifts showed lower QOL scores in all WHOQOL-Bref domains. However, there was no statistical significance for this variable in any of the domains.

4. CONCLUSIONS

The radiodiagnosis service workers showed a general satisfaction with life and general sense of well-being, indicating a good Global QOL (score=69.6). In addition, workers presented good level of satisfaction in the physical, psychological and social domains, which was not observed in the environmental domain that showed a lower QOL score.

With the application of the WHOQOL-Bref, it was possible to detect, in the radiodiagnosis service workers, items in the environmental domain that showed the lowest QOL scores. These items, which might have influenced the results included: opportunity for recreation and leisure, physical environmental (pollution/noise/traffic/climate), financial resource, transportation and health care.

The institution or workplace cannot be entirely responsible for these results, since the QOL involves other aspects of life beyond work. However, knowing the aspects that are involved may be interesting to human resource managers so they can implement programs to treat the most affected individuals.

This study showed that the psychometric properties of the WHOQOL-Bref were appropriate with good internal consistency (α=0.884). Finally, the study allowed knowing the Radiodiagnosis Service workers, as well as its perception of the quality of life.

ACKNOWLEDGMENTS

The authors thank all the staff of the hospital, who promptly volunteered to participate in the study answering the questionnaire and also to the CNPq for financial support received.

REFERENCES

1. CALEGARO M. S. K. **Exposição à radiação ionizante dos profissionais de saúde em hemodinâmica: o enfoque da enfermagem.** Dissertação de mestrado apresentada no Centro Biomédico/ Faculdade de Enfermagem da Universidade Estadual do Rio de Janeiro, 2007.
2. Spilker, B. (Ed.). Quality of life assessments in clinical trials. New York: Raven Press, 1990.

3. The WHOQOL Group. The World Health Organization quality of life assessment (WHOQOL): position paper from the World Health Organization. ***Soc. Sci. Méd.;*** 41(10):1403-10. 1995.
4. Universidade Federal do Rio Grande do Sul. Departamento de Psiquiatria e Medicina Legal. Divisão de Saúde Mental. Grupo WHOQOL. Versão em português dos instrumentos de avaliação de qualidade de vida (WHOQOL) 1998 (texto na internet). Available in: HTTP://www.ufrgs.br/psiq/whoqol1.html.
5. FLECK M. P. A, LOUSADA S, XAVIER M, CHACHAMOVICH E, VIEIRA G, SANTOS L, PINZON V. Aplicação da versão em português do instrumento abreviado de avaliação da qualidade de vida WHOQOL-Bref. ***Rev. Saúde Pública***; 34(2):178-83, 2000.
6. Pasquali L. Medida Psicométrica. IN; Pasquali L. **Teoria e Métodos de medida em Ciências do Comportamento.** Brasília: Laboratório de Pesquisa em Avaliação e Medida. Instituto de Psicologia. UNB: INEP, 1996, 73-112.
7. Pilatti, L. A.; Pedroso, B.; Gutierrez, L. G.; Propriedades psicométricas de instrumentos de avaliação: um debate necessário. ***R. B. E. C. T.***, vol. 3, nº 1, Jan./abr. 2010.
8. SPSS FOR WINDOWS VERSION 16.0: A Basic Tutorial. Available in: http://www.ssric.org/spss_manualv16/spss_v16.pdf. Access: 30 jun. 2011.
9. MINITAB 16 STATISTICAL SOFTWARE. Conheça o Minitab 16. Available in: http://www.minitab.com/uploadedFiles/Shared_Resources/Documents/MeetMinitab/PT16_MeetMinitab.pdf. Access: 30 jun. 2011.