

Contribution of WHOQOL-Bref domains, in the quality of life of workers at a radioactive facility

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Abstract. The goals of this study were to analyze the contribution of the WHOQOL-Bref domains (physical, social, psychological and environmental) to global quality of life (QOL) for individuals who are occupationally exposed to ionizing radiation and also verify the social-demographic variables, work conditions and lifestyle inter relationship of these workers. The sample was consisted of 86 professionals and each one answered a questionnaire which had social-demographic, working conditions and lifestyle questions and the WHOQOL-Bref tool. Data analysis involved descriptive statistics and nonparametric tests. The results showed that the psychological domain had the highest average score (75.9 ± 12.4) and the environmental, the lowest (62.5 ± 11.4). There were significant correlations ($p < 0.05$) among the four domains with the global QOL. There were no significant differences between the WHOQOL-Bref domains and the studied variables. The internal consistency of the tool for the sample, verified by Cronbach's Alpha, was high (0.832).

1 Introduction

The World Health Organization (WHO) defines quality of life (QOL) as the “individuals' 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 [1, 2].

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, 3].

At the last decades, the interest in the study of QOL has been growing in many human activity areas. Among them, the increasing and diversified use of ionizing radiation in medicine and in other areas cannot be dissociated from the concern of security, safety and well-being of workers to the risk of ionizing radiation.

Therefore, in this study the importance of evaluate the QOL of the occupationally exposed individuals (OEI) to ionizing radiation of a radioactive facility was

considered, once it is related to various aspects of everyday life such as work conditions which radioactive material is involved.

The World Health Organization Quality of Life Instrument, abbreviated version, WHOQOL-Bref was used in this study to evaluate the OEI quality of life to ionizing radiation. The Brazilian Portuguese version, validated in Brazil for some pathology and for some population has been used, however it had never been used in an OEI sample. Besides, the absence of a specific, tested and validated tool for this sample of individuals was the reason for the choice of WHOQOL-Bref.

The WHOQOL-Bref contains a total of 26 questions related to the last two weeks experienced by the respondent. The first two questions evaluate the global QOL and the health satisfaction. The others 24 questions are split 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). The final score of the domains are calculated by means of syntax, available at WHOQOL Group site [4, 5].

The goals of this study were to analyze the contribution of the WHOQOL-Bref domains (physical, social, psychological and environmental) to Global domain of quality of life (QOL) for individuals who are occupationally exposed to ionizing radiation and also verify the social-demographic variables, work conditions and lifestyle inter relationship of these workers.

2 Materials and Methods

This is a descriptive exploratory study with qualitative and quantitative approach, performed in a radioactive facility in Brazil. Data collection occurred between April and May 2009.

103 OEI's were studied. However, the sample consisted of 86 professionals (83.5% of the population) who agreed to participate and signed the Agreement Form. 17 professionals did not participate of the study. 9 of them did not agree to answer the questionnaire and 8 of them were absent during the data collection.

The inclusion criteria were: having an employment contract with the institution (40 hours per week) and signing the Agreement Form. Workers who were absent during the data collection and those who did not agree to participate answering the questionnaire were excluded. Besides these, students, interns and contractors were excluded because they do not have an employment contract with the institution.

2.1 Procedures to data collection

After being informed about the research purpose, data reliability and the take back possibility, the employees were interviewed in their workplace. They agreed to participate signing the Agreement Form. A copy was given to the employee and the other was retained by the person in charge of the research.

Data collection was performed through a self-administered questionnaire, divided into two parts. The first part (information sheet about the respondent) was composed of questions about social-demographic variables, work conditions and lifestyle of the

participants; and the second part, the specific tool for QOL evaluation, the WHOQOL-Bref.

2.2 Statistical data analysis

Data were analyzed using softwares: Statistical Package for Social Science (SPSS) version 16, Excel Office 2007 e Minitab 15 [6, 7].

The statistical analysis performed in the studied sample included nonparametric statistical tests and techniques. For descriptive analysis of the studied variables and WHOQOL-Bref domains, were used central tendency measures, location measures and dispersion measures. 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 and 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).

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

The reliability and internal consistency for this sample was verified using the Cronbach's Alpha.

3 Results and discussion

3.1 Results of the first part of the questionnaire (information sheet about the respondent) – social-demographic variables, work conditions and life styles

Most of the sample was composed by male gender (80.2%). The individual's age ranged from 23 to 70 years, mostly, aged from 41 to 50 years (66.3%) and an average of 47.8 ± 7.0 years. It was observed that most of the sample was composed of married people (74.4%), followed by singles (17.4%). As for educational level, 55.8% were graduated and 44.2% had high school [8].

Figure 1 shows the sample distribution according to the variables related to working conditions of participants, such as working time, job satisfaction and tasks performed. There was evidence of extensive professional career, 52.4% of the participants are between 16 and 25 years of work and the working time average of the sample was 22.8 ± 6.7 years. The largest number of workers was observed in the task of radioisotopes and radiopharmaceuticals production and quality control, which is 55.8% of the sample. For the 86 workers who participated in the survey, 53.4% were satisfied with their job involving ionizing radiation.

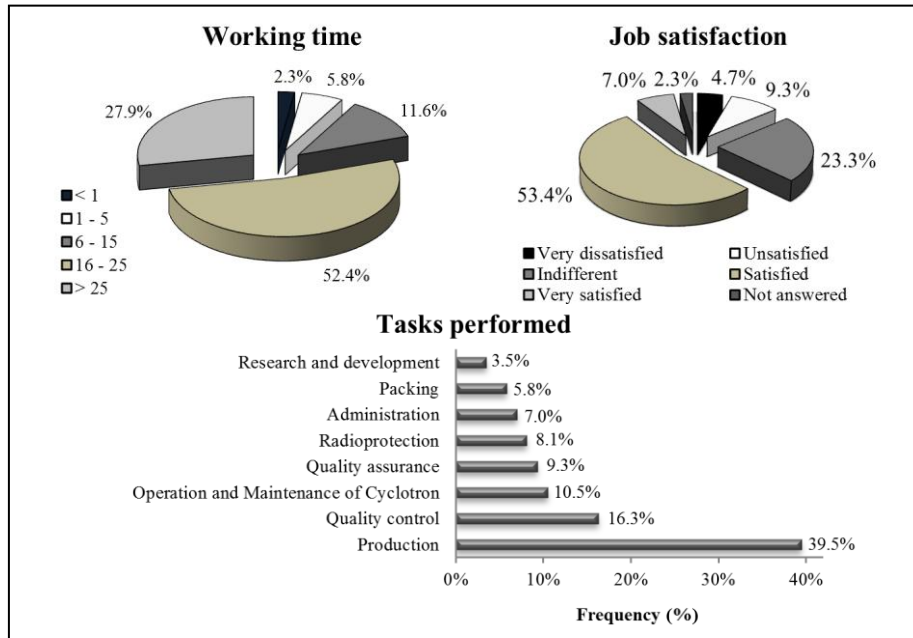


Fig. 1. Sample distribution according to variables related to working conditions

Figure 2 shows the sample distribution according to the variables that expresses the participants' lifestyle and self-perception of health. According to the findings, 20.9% of the sample was formed by smokers, 58.1% used some type of alcoholic drinking and 34.9% had done physical activity at least three times per week. Regarding the self-perception of health status, 84.8% of the participants answered "good or very good" [8].

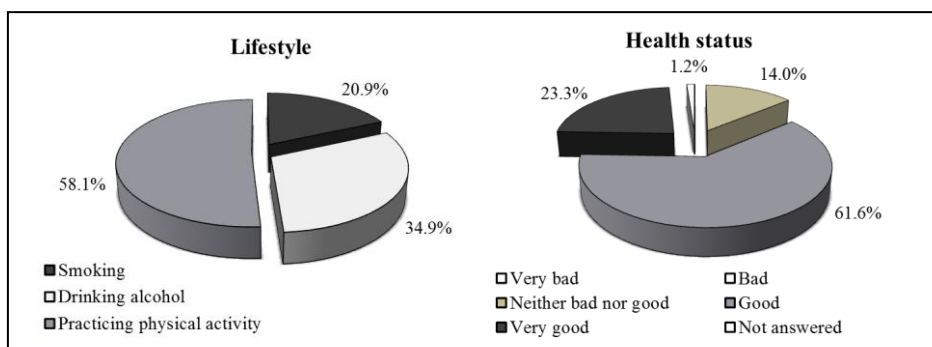


Fig. 2. Sample distribution according to the variables that expresses the participants' lifestyle and self-perception of health

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

Table 1 presents the descriptive analysis of quantitative variables: age, working time and WHOQOL-Bref domains.

Table 1. Descriptive analysis of quantitative variables: age, working time and WHOQOL-Bref domains

	Age	Working time	Physical	Psychological	Social	Environmental	Global QOL
N	86	81	86	86	86	86	85
Average	47.8	22.8	75.2	75.9	72.8	62.5	71.5
SD	7.0	6.7	13.5	12.4	15.1	11.4	16.4
VC	15%	29%	18%	16%	21%	18%	23%
Minimum	23	3	35.7	37.5	25.0	37.5	0.00
Maximum	70	38	100.0	100.0	100.0	100.0	100.0
CI	1.5	1.5	2.9	2.6	3.2	2.4	3.5

N: sample; **SD:** standard deviation; **VC:** variation coefficient; **CI:** confidence interval

According to Table 1, it was observed that the variability is low in all variables presented. This finding may be associated with the variation coefficient (VC) value that is less than 50%, which demonstrated the homogeneity of the data [8].

Regarding to OEI quality of life, it was observed that the environmental domain was the lowest score (62.5 ± 11.4), noting that the participants believe that they have some difficulties related to economic conditions (score 54.1) and physical environment: pollution/noise/traffic/climate (score 57.5), leisure opportunity (score 50.6%), health care (score 61.6), opportunities to acquire new information and skills (score 61.9) and transportation (score 66.9).

Considering the scale of zero (worst QOL) to 100 (best QOL), the social domain was the second lowest average (72.8), though satisfactory. In this domain, social relationship, personal support and sexual activity are valued. The final score of this domain was not so high, probably because the participants were not satisfied with the social support (score 65.7%).

For the physical domain, who had an average score of 75.2, the main items that possibly contributed to this outcome were mobility (score 81.5) and work ability (score 77.9). In this domain, the sample showed only dissatisfaction for the sleep and rest (score 52.5). This may be related to the fact that 51.2% of the sample work in shifts or in casters plan, even at night.

The psychological domain had the highest score, averaging 75.9 ± 12.4 . Looking the questions that comprise this domain individually, it was found that self-esteem (score 82.3), bodily image and appearance (score 80.2) and spirituality/religion/personal beliefs (score 77.0) may be influenced the answers of the participants.

The result of the Global QOL domain was zero score (0.00) and showed the highest variation coefficient (VC=23%) among the others domains. This result can be

justified because one participant of this study evaluated his QOL as “very bad” and answered “very dissatisfied” with his health, questions 1 and 2. Therefore, when the questions were processed, according to the WHOQOL scale, the questions reached zero score (worst score of QOL). Nevertheless, the sample had final average score of 71.5 in this domain.

Table 2 presents an estimation of Spearman (r_s) correlation coefficients between quantitative variables: age, working time and WHOQOL-Bref domains.

Table 2. Estimation of Spearman (r_s) correlation coefficients between quantitative variables: age, working time and WHOQOL-Bref domains

		Age	Working time	Physical	Psychological	Social	Environmental
Working time	r_s	49.8%					
	p	<0.001	.				
Physical	r_s	6.2%	10.6				
	p	0.568	0.346	.			
Psychological	r_s	0.6%	-8.0%	69.3%			
	p	0.960	0.480	<0.001	.		
Social	r_s	-2.7%	-4.0%	61.0%	73.2%		
	p	0.807	0.725	<0.001	<0.001	.	
Environmental	r_s	2.9%	3.2%	44.9%	39.2%	50.7%	
	p	0.793	0.778	<0.001	<0.001	<0.001	.
Global QOL	r_s	10.9%	11.7%	60.1%	43.2%	45.4%	37.2%
	p	0.322	0.299	<0.001	<0.001	<0.001	<0.001

Classification scale: Very bad (0-20), Bad (20-40), Regular (40-60), Good (60-80) and Very good (80-100), Significant correlation to a level of 5% ($p < 0.05$)

According to Table 2, the age variable showed a significant statistical correlation ($p < 0.05$) with working time (49.8%). This result indicates that as older the individual is, higher is the working time. These two variables did not present any significant correlation with the four-domains as well as for the Global QOL domain.

In the correlations among the domains, it was observed that the highest coefficient of correlation is the psychological and the social domains, the value of 73.2% indicates that the higher the social score is, the greater is the psychological score.

Regarding the domains influence in Global QOL in the group studied, it was found that the physical domain showed the highest correlation (60.1%). The social (45.4), psychological (43.2%) and environmental (37.2%) domains had lower correlations, however significant.

Table 3 presents comparisons of qualitative variables studied in each WHOQOL-Bref domain (physical, psychological, social and environmental). It was used the nonparametric Mann-Whitney and Kruskal-Wallis tests to investigate the differences among the variables.

Table 3. Comparisons of qualitative variables studied in WHOQOL-Bref domains

Variables (n=86)	Domains				
	n	Physical	Psychological	Social	Environmental
Gender					
Female	17	71.4±12.6	72.1±14.0	67.2±21.3	67.1±13.8
Male	69	76.1±13.6	76.9±11.9	74.2±13.0	61.3±10.5
	P-value^(MW)	0.173	0.213	0.262	0.092
Marital Status					
Married	64	76.6±12.0	77.0±9.9	74.9±12.4	62.7±11.2
Divorced	6	77.4±14.4	77.1±19.9	72.2±25.1	62.8±13.6
Single	15	68.1±17.7	70.8±17.8	64.4±19.3	61.5±12.3
	P-value^(KW)	0.184	0.430	0.199	0.891
Working time					
1-5 years	5	83.6±12.0	80.0±12.6	80.0±16.2	70.0±16.5
6-15 years	9	66.3±14.2	71.8±13.1	66.7±15.6	58.7±9.2
16-25 years	45	75.5±12.8	76.4±13.0	73.1±15.6	60.9±9.3
> 25 years	24	76.8±13.7	75.3±11.6	72.9±12.8	66.2±12.9
	P-value^(KW)	0.171	0.627	0.516	0.061
Job satisfaction					
Very dissatisfied	4	76.8±13.0	72.9±12.2	75.0±16.6	70.3±11.5
Dissatisfied	8	69.8±8.5	72.4±11.0	71.9±18.0	59.8±21.3
Neither satisfied nor dissatisfied	20	72.5±9.8	74.0±15.7	71.2±12.5	63.1±15.5
Satisfied	46	75.6±12.4	76.3±11.2	72.3±15.9	61.5±8.3
Very satisfied	6	83.9±14.5	84.0±12.7	80.6±15.1	65.1±11.1
	P-value^(KW)	0.232	0.558	0.666	0.862
Shift work					
No	40	73.0±14.6	74.3±12.6	70.8±16.8	64.6±9.6
Yes	46	77.1±12.3	77.3±12.2	74.5±13.4	60.6±12.6
	P-value^(MW)	0.213	0.255	0.404	0.054
Smoking					
No	67	75.4±12.8	75.7±11.6	72.5±14.9	63.1±11.7
Yes	18	74.2±16.6	76.6±15.5	74.1±16.4	60.4±10.4
	P-value^(MW)	0.746	0.534	0.602	0.424
Drinking alcohol					
No	33	74.1±12.2	75.0±10.9	69.4±16.1	60.9±11.3
Yes	50	75.5±14.6	76.0±13.5	74.5±14.1	63.1±10.4
	P-value^(MW)	0.607	0.708	0.156	0.492
Practicing physical activity					
No	55	73.8±13.5	74.5±12.0	72.4±13.2	62.1±11.2
Yes	30	77.7±13.6	78.4±13.1	73.6±18.6	63.3±12.0
	P-value^(MW)	0.325	0.136	0.793	0.828

Mann-Whitney (MW) and Kruskal-Wallis (KW) tests; Significance level ($p < 0.05$)

According to the statistical tests performed on the influence of qualitative variables (listed in Table 3) in the WHOQOL-Bref domains, it was observed that there is not "effect" of these variables on the outcome of the WHOQOL, in all your domains. Therefore, were not found levels of statistical significance ($p < 0.05$) among these variables and the QOL domains.

Comparing the WHOQOL-Bref domains in the genders it was observed that the domains physical (76.1 ± 13.6), psychological (76.9 ± 11.9) and social (74.2 ± 13.0) reached higher averages of QV in the male gender, while who in the environmental domain it was showed a higher QOL score for the female gender.

Regarding marital status, the highest average was obtained by the physical (77.4 ± 14.4), psychological (77.1 ± 19.9) and environmental (62.8 ± 13.6) domains occurred among divorced people; a similar result was reached in the social domain (74.9 ± 12.4) for married people. All domains had a lower average among singles.

The analysis of the working time variable with all domains of WHOQOL-Bref showed a higher QOL in the range 1-5 years of work and lower QOL average in the range 6-15 years of work.

It was observed that the group, who answered "very satisfied" with the job, achieved higher averages in the physical (83.9 ± 14.5), psychological (84.0 ± 12.7) and social (80.6 ± 15.1) domains. However, the group that answered "very dissatisfied" in the environmental domain, reached the highest average (70.3 ± 11.5).

As for work in shift, the group that answered "yes" had higher QOL averages compared to physical (77.1 ± 12.3), psychological (76.6 ± 15.5) and social (74.5 ± 13.4) domains. The group that does not work in shifts had a higher average in the environmental (64.6 ± 9.6) domain.

The smokers presented the lowest average, comparing to the physical (74.2 ± 16.6) and environmental (60.4 ± 10.4) domain, they also presented the highest average in relation to psychological (76.6 ± 15.5) and social (74.1 ± 16.4) domains.

The group who stated "drinking alcohol" and "practicing physical activity" showed the highest QOL averages in all WHOQOL-Bref domains.

4. Conclusion

The WHOQOL-Bref proved to be a suitable instrument or tool, being quickly and easily application, with a high level of reliability (Cronbach's Alpha = 0.832).

The results showed that all WHOQOL-Bref domains contributed significantly ($p < 0.001$) in Global QOL domain, and the physical domain had the highest contribution (60.1%).

There were no significant differences (contributions) among the variables such as social-demographic, working conditions and life style and all WHOQOL-Bref domains.

Finally, this study provided to know the perception of QOL in the occupationally exposed individuals to ionizing radiation.

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