



Quality of life as a predictor of work ability of employees of Sarajevo Tobacco Factory

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ABSTRACT

Introduction: Our aim was to evaluate quality of life (QOL) as a predictor of work abilities of employees in a tobacco factory.

Methods: The study was performed in the period between 2011 and 2012. The sample comprised of 270 workers, males and females, aged from 20-65, with different educational backgrounds. The study was performed as cross-sectional research, on a voluntary basis, using two standardized and anonymous questionnaires: The World Health Organization Quality of Life-Brief Version questionnaire (WHOQOL-BREF) and the Work Ability Index questionnaire (WAI).

Results: The participants subjectively perceived high values of QOL in general, with the highest values in the area of living environment. The lowest value was in the area of social interactions. Statistically significant differences were observed in the subjective assessments of QOL, especially in three defined areas (physical health, mental health, and social interactions). Workers age 50-65 years and workers with basic (primary) level of education exhibited a suboptimal (<70%) values in total value and the values of individually defined areas of QOL.

Conclusions: Strong predictors of exemplary work ability of employees are good physical and mental health, younger age, and higher level of education. A link was observed between suboptimal work ability and dissatisfaction with profession and working environment, frequent illness, absenteeism, and exposure to health risks at the workplace.

Keywords: workers; quality of life; work ability

INTRODUCTION

Technological improvements influence human health indirectly and directly. These advancements

indirectly impact economic conditions and social relationships, and they influence human health directly by causing positive and negative effects on the quality of life (QOL) (1). Working-age population spend at least one third of their time at workplace, and this significantly influences their health. It is estimated that 3-5% of gross national income is decreased each year due to economic consequences of insecure and unhealthy work environment. The quality and quantity of work influence human

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Submitted: 16 March 2016 / Accepted: 10 April 2016

DOI: <http://dx.doi.org/10.17532/jhsci.2016.344>



health in many ways, including social connections and high self-esteem (2). Work ability can be defined as a balance between a personal capacity and the capacity to meet job requirements. The modern concept of work ability emphasizes the need to adapt work conditions to employees' competences and abilities, but it is important to understand that psychophysical capabilities of employees are variable over time (3).

Divergent approaches have been adopted to QOL studies over the last decades, and the official definitions used in these studies are still not consistent. For instance, different measurements of QOL have been published, however, there is still no scientific consensus regarding official instruments for these measurements. As the result, various methods are used for the assessment of QOL (4). In addition, there is a disagreement among scientists about two basic concepts of QOL, subjectivity and multidimensionality. Subjectivity is related to the fact that QOL can only be understood from an individual perspective. Multidimensionality comes from traditional psychometric assessment of health condition and requires the evaluation of different dimensions of individual health while measuring QOL (5). The biggest obstacle in the interpretation of QOL measuring is lack of a "gold standard" or a unit of measurement that would allow comparison of QOL among different populations, regions, and over different periods (6).

METHODS

Respondents

This cross-sectional study was conducted in the campus of the Sarajevo Tobacco Factory (STF) in the period between December 2011 and February 2012. In this period, the total number of the company employees was 353 and 270 of them agreed to participate in the survey (76% response rate). After data processing, 3 respondents were excluded from the study due to incorrectly and incompletely filled out surveys.

The final sample included 69% males and 31% females aged between 20 and 65. The participants had different educational backgrounds, including: primary school, secondary school, senior vocational school, college, and Master's degree.

Research methods

Two standardized questionnaires were distributed among the participants. The first is the World Health Organization Quality of Life Questionnaire – Brief Version (WHOQOL – BREF). In this questionnaire, the subjective perception of QOL is measured in four different areas that include: physical health, mental health, social interactions, and environment (7). We used the version of WHOQOL – BREF translated and validated in Croatian language. Scores above 70% of the scale maximum (SM) indicate good QOL. Scores below 70% indicate bad QOL in the four areas (8). The second questionnaire used in this study is the Work Ability Index (WAI) questionnaire. WAI is widely used in occupational health in order to measure individual work ability, group work ability, and the work ability of an entire company (9). The index value is determined by answering questions about psychological and physical job requirements as well as psychological and physical medical conditions of employees (10).

Statistical analysis

Data values are represented as mean, standard deviation (SD), and median with corresponding interquartile range (IQR). Student *t*-test was used to determine if there are statistically significant differences in the mean values of continuous variables between two groups. When the variables were not normally distributed, the Mann-Whitney U test was used to compare differences between two groups and the Kruskal-Wallis test was used for more than two groups. Additionally, categorical variables are presented in a form of contingency tables and the Chi-squared test was applied to test the frequency distribution of the variables. A value of $p < 0.05$ was considered statistically significant. Coherence between QOL and work ability was analyzed using binary logistic regression model with WAI as a dependent variable in binary form (good work ability > 37 ; bad work ability ≤ 37) and the areas of QOL as independent variables.

RESULTS

When analyzing subjective perception of QOL with regard to the educational background of the

participants, the employees graduated from college scored the highest total value (83%) with corresponding IQR of 77-88%. On the contrary, the employees with primary education scored the lowest suboptimal value (<70% maximum scale value (MSV)) of the total value in each of the four areas (Table 1).

Analyzing subjective perception of QOL in relation to the age of the employees, the highest total value (87%, IQR [79%-90%]) was observed in the age group 20-29, while the smallest value had the employees aged from 50 to 65 (Table 2). The Kruskal-Wallis analysis of rank variances showed statistically significant differences ($H=7.15$; $df=3$; $p < 0.0672$) in subjective perception of the three areas of QOL (mental health, physical health, and social interactions) between the age groups (Table 2). Excellent work ability was reported by 42 (81%) employees aged from 20 to 29. However, bad work

ability was represented in 24 (26%) employees aged from 50-65, spanning from bad to good work ability (score 33) with corresponding IQR (25-39) (Table 3).

The value of QOL for total number of the surveyed respondents was 80% MSV with IQR (73%-86%). The highest value was noted in the area of environment with a median of 86% MSV with IQR (76%-92%). The lowest value was observed in the area of social interactions 77% MSV with IQR (67%-83%) (Figure 1).

Of the total number of the employees in Sarajevo Tobacco Factory, 71 (26%) of them had suboptimal work ability ($WAI \leq 37$), while optimal work ability ($WAI > 37$) was reported by 199 (74%) employees (Figure 2). Of the total number of 71 (100%) registered employees with suboptimal work ability, 49 (69%) employees perceived medium exposure to

TABLE 1. Subjective perception of quality of live according to the education level of participants

Education level	Physical health	Mental health	Social interactions	Environment	Total
Primary school N=24	60 (50-70)	63 (57-69)	57 (50-70)	70 (60-78)	66 (55-72)
Secondary school N=152	80 (70-90)	80 (70-88)	77 (67-83)	86 (78-92)	81 (72-87)
Senior vocational school N=30	80 (80-90)	83 (74-89)	80 (73-87)	86 (82-92)	83 (77-88)
College N=60	80 (70-80)	83 (74-88)	81 (73-87)	87 (80-92)	82 (76-87)
Master's degree N=4	80 (77-80)	80 (72-83)	80 (77-86)	90 (87-92)	82 (80-83)

TABLE 2. Subjective perception of quality of live according to the age of employees

Age	Physical health	Mental health	Social interactions	Environment	Total
20-29 N=52	90 (80-100)	86 (80-91)	83 (77-90)	88 (80-94)	87 (79-90)
30-39 N=69	80 (80-90)	86 (74-91)	80 (73-90)	88 (82-94)	83 (79-87)
40-49 N=56	80 (70-80)	81.5 (71-89)	77 (70-83)	88 (82-92)	82 (75-86)
50-65 N=93	70 (60-80)	69 (63-80)	67 (57-77)	80 (68-86)	73 (64-79)
Total N=270	80 (70-90)	80 (68-88)	77 (67-83)	86 (76-92)	80 (73-86)
H	8.87	8.04	8.22	7.15	
Df	3	3	3	3	
p	0.0311	0.0452	0.0418	0.0672	

Df: Degree of freedom; H: Calculated value by Kruskal-Wallis analysis of rank variances with χ^2 distribution

health burdens. Very strong exposure was reported by 21 (30%) employees. On contrary only 8 (4%) employees with optimal work ability perceived very strong exposure to health burdens at workplace (Figure 3). Bad work ability (WAI score 7-27) was reported by half (12) of the total number (24) of the employees with primary education. On the other hand, excellent work ability (WAI score 44-49) was reported by 57% of the total number (30) of the employees with college education (Table 4). The sick leave was not used by 118 (59%) employees with good work ability. Among 13 (18%) employees with bad work ability, 6 (8%) of them used sick leave for 61-90 days and 5 (7%) used the leave for 100-365 days in last 12 months. Long-term absenteeism was not reported by the employees with good work ability (Figure 4). Of the total number (199) of employees with good work ability, 137 (69%) of them was very satisfied with situation at work and their professions (Figure 5). The employees with bad work ability experienced their profession and situation at work as hostile 6 (8%), coercion 18 (25%), and a mean to survive (36 [51%]). However, 96 (48%) employees with good work ability perceived it as interesting (Figure 6). The majority of the employees with bad work ability (39 [55%]), has never had the opportunity to grow professionally (Figure 7). Seventy percent of the employees with good work ability stated that they have never wished to quit a job, while 27 (38%) employees with bad work ability reported that they often think about quitting the job (Figure 8).

Employees with suboptimal work ability (WAI ≤ 37) had more frequent IQR score 5 (3-7) of verified medical diagnosis while employees with optimal work ability had a median IRQ score 0 (0-2).

Based on the analysis of QOL as a binary variable, where the value < 70% MSV was considered as

TABLE 3. Subjectively perceived work ability in relation to the age groups

Age/work ability score	Bad (7-27) (%)	Good (28-36) (%)	Very good (37-43) (%)	Excellent (44-49) (%)	Total (%)
20-29	-	2 (4)	8 (15)	42 (81)	100
30-39	1 (1)	6 (9)	23 (33)	39 (57)	100
40-49	2 (4)	14 (25)	19 (34)	21 (37)	100
50-65	24 (26)	23 (25)	32 (34)	14 (15)	100

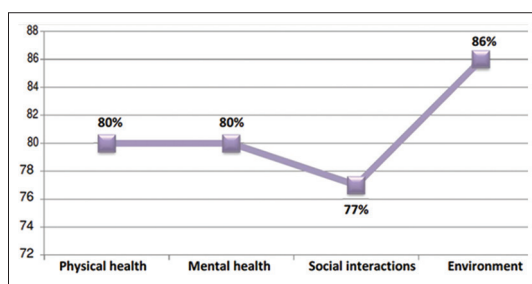


FIGURE 1. Quality of life (QOL) presented as a value of median with corresponding IQR. The value of QOL for total number of the surveyed respondents was 80% MSV with IQR (73%-86%). The highest value was noted in the area of environment with a median of 86% MSV with IQR (76%-92%). The lowest value was observed in the area of social interactions 77% MSV with IQR (67%-83%).

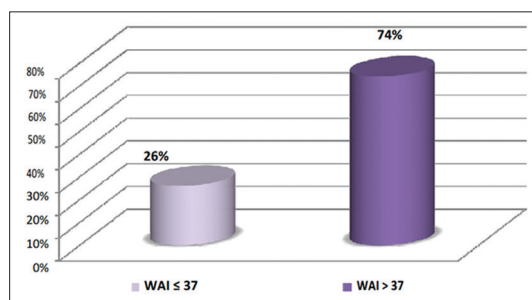


FIGURE 2. Share of the employees with suboptimal (WAI ≤ 37) and optimal (WAI > 37) work ability. Of the total number of the employees in Sarajevo Tobacco Factory, 71 (26%) of them had suboptimal work ability (WAI ≤ 37), while optimal work ability (WAI > 37) was reported by 199 (74%) employees.

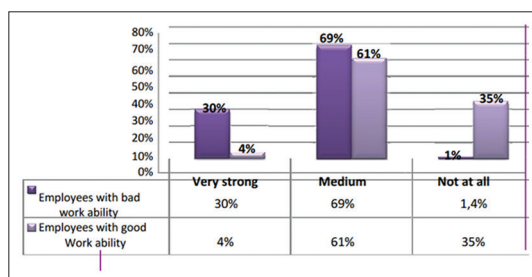


FIGURE 3. Work ability and exposure to health burdens at workplace. Of the total number of 71 (100%) registered employees with suboptimal work ability, 49 (69%) employees perceived medium exposure to health burdens. Very strong exposure was reported by 21 (30%) employees. On contrary only 8 (4%) employees with optimal work ability perceived very strong exposure to health burdens at workplace.

TABLE 4. Subjectively perceived work ability according to the level of education

WAI score/level of education	N (%)				
	Primary school	Secondary school	College	Senior vocational school	Master's degree
Bad (7-27)	12 (50)	12 (8)	2 (7)	1 (2)	0 (0)
Good (28-36)	6 (25)	23 (15)	3 (10)	11 (18)	1 (25)
Very good (37-43)	3 (17)	48 (32)	8 (26)	21 (35)	1 (25)
Excellent (44-49)	2 (8)	69 (45)	17 (57)	27 (45)	2 (50)
Total	23 (100)	152 (100)	30 (100)	60 (100)	4 (100)

WAI: Work ability index

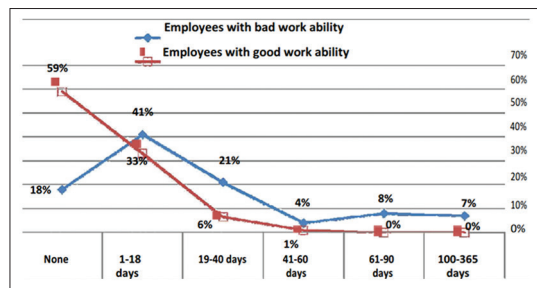


FIGURE 4. Work ability and absenteeism distribution in last 12 months. The sick leave was not used by 118 (59%) employees with good work ability. Among 13 (18%) employees with bad work ability, 6 (8%) of them used sick leave for 61-90 days and 5 (7%) used the leave for 100-365 days in last 12 months. Long-term absenteeism was not reported by the employees with good work ability.

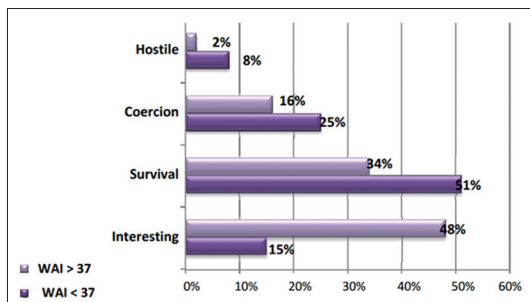


FIGURE 6. Work ability and subjective work experience. The employees with bad work ability experienced their profession and situation at work as hostile 6 (8%), coercion 18 (25%), and a mean to survive (36 [51%]). However, 96 (48%) employees with good work ability perceived it as interesting.

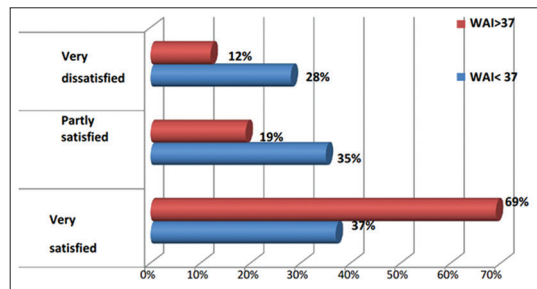


FIGURE 5. Work ability and satisfaction level in relation to situation at work and profession. Of the total number (199) of employees with good work ability, 137 (69%) of them was very satisfied with situation at work and their professions.

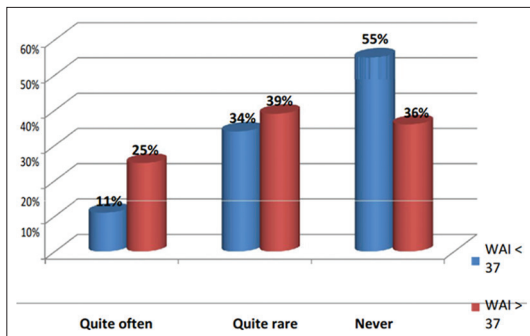


FIGURE 7. Work ability and opportunity for professional advancement. The majority of the employees with bad work ability (39 [55%]), has never had the opportunity to grow professionally.

bad QOL, and good QOL was determined with the value > 70% MSV, statistically significant relationships between physical health, mental health, and social interactions and better work ability were observed. The employees with good physical health had a better opportunity for better work ability

compared to the employees with bad physical health (OR=1.31 95% CI 1.18-1.47). The employees with good mental health had a better chance (27%) to possess better work ability than those with bad mental health (OR=1.27 95% CI 1.13-1.43). Finally, the employees with good social interactions had a

14% better opportunity for preferable work ability than the employees with bad social interactions (OR=1.14 95% CI 1.02-1.27). However, there is no statistically significant relationship between the area of environment and better work ability (Table 5).

DISCUSSION

The objective of this cross-sectional study was to determine the levels of QOL and work ability of the employees of the STF on the basis of subjective perception. The employees of this company subjectively perceived higher values of QOL (80% SM with IQR [73%-86% MSV]) and this result is in accordance with the values established in developed countries. Namely, the results of previous studies showed that average QOL in Western countries is $75\% \pm 2.5\%$ MSV while in other countries its average value varies from 60% to 80% MSV (11). In our study, the employees subjectively perceived the highest value of QOL, in the area of environment,

TABLE 5. Odds ratio for better work ability in the model of binary logistic regression with three areas of quality of life (binary variables) as predictors

Predictors of quality of life	SE	p	OR	95% CI
Physical health	0.06	<0.01	1.31	1.18-1.47
Mental health	0.06	<0.01	1.27	1.13-1.43
Social interactions	0.05	<0.01	1.14	1.02-1.27

SE: Standard error of regression coefficient; OR: Odds ratio; CI: Confidence interval

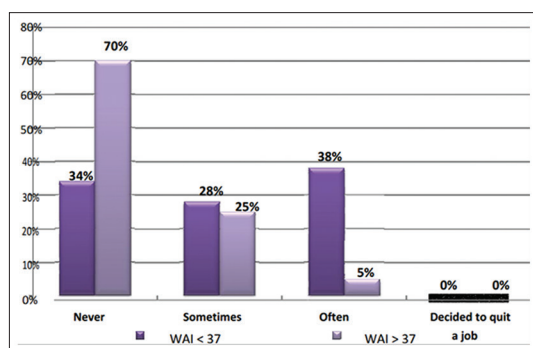


FIGURE 8. Work ability and employees' interest in a job. Seventy percent of the employees with good work ability stated that they have never wished to quit a job, while 27 (38%) employees with bad work ability reported that they often think about quitting the job.

while the smallest value was in the area of social interactions. In addition, the subjective perception of QOL differed among the age groups (with the highest values of QOL observed in age group 20-29) and the Kruskal-Wallis analysis of the rank variances demonstrated statistically significant differences between the age groups and the subjective perception of physical health, mental health, and social interactions. Also, the subjective experience of QOL was decreasing as a function of age, but it stayed within the expected value of 73% MSV with IQR (64%-79%). Statistically significant differences between QOL and the level of education was observed. The employees graduated from primary schools had the lowest suboptimal, total, and individual values (< 70% MSV) compared to the employees with other educational backgrounds. Moreover, statistically significant differences between work ability and the age groups and between work ability and the level of education were noted. The excellent work ability (WAI score 46 with IQR [44-47]) was reported the most frequently by the employees aged from 20-29, while bad work ability was observed the most frequently in the age group 50-65.

According to Bardorf (12), the low level of education and unemployment rate have shown to be the most significant predictors of bad work ability. In our study, suboptimal work ability (WAI \leq 37) was reported by 71 (26%) employees, mostly by the employees with primary educational level aged from 50-65, which also had a bigger incidence of morbidity and long-term absenteeism. This group also perceived more strongly the exposure to health burdens at workplace, inability of professional growth, professional and job dissatisfaction. According to Golubić (13), the main predictors of bad work ability in his study of Croatian nurses were older age, problems related to work organization, financial issues, and low educational level. Optimal work ability observed in 64% employees in this study, is related to low morbidity rate, low absenteeism rate, job satisfaction, and the opportunity to professionally grow. The multivariate analysis showed that good physical and mental health is significant predictor of good work ability. Moreover, employees possessing good social interactions had 14% better opportunities for better work ability compared to those who had bad social interactions.

CONCLUSION

A change in QOL with age, does not necessarily cause a decline in work ability due to the fact that functional capacity of an individual at workplace is the result of interaction of high educational level, professional advancement, job requirements, and job conditions. Finally, suboptimal work ability is related to older age, lower educational level, higher incidence of absenteeism and morbidity, very strong exposure to health burdens at workplace, job dissatisfaction, and working place environment.

CONFLICT OF INTEREST

Authors declare no conflict of interest.

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