

Sociodemographic and workplace determinants of Quality of life (Qol) among quarry workers in Nigeria: A Cross sectional study

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February 28, 2022

Abstract

The manuscript presents an original research study on quality of life determinants among neglected population of workers in quarry industry

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Abstract

Background

Quality of life is an important topic in every organization as it determines the future of the organization. This study assessed the sociodemographic and workplace determinants of Quality of life (Qol) among quarry workers in Nigeria.

Method

A cross-sectional study was conducted among the respondents. Data were collected using self-administered questionnaires consisting of socio-demographic characteristics, Standard Nordic Musculoskeletal Questionnaire and World Health Organization Quality of life BREF questionnaires (WHOQOL-BREF). A total of 266 quarry workers involved in this study were selected through systematic random sampling technique. The data were analyzed using SPSS version 26. Simple and multiple logistic regression were used to identify the determinants of quality of life among the respondents.

Result

The result showed that majority of the respondents (74.1%) had poor quality of life with variation across four domains of physical, environmental, socio relationship and psychological. Following multiple logistic regression modelling, WRMSDs (ORadj 4.24, 95% CI 1.84, 9.77, p-value=0.001) and the poor work design (ORadj 3.22, 95% CI 1.52, 6.82, p-value=0.002) remained significant determinants of Qol.

Conclusion : This study showed poor quality of life among quarry workers in Ebonyi state, Nigeria. Those with WRMSDs and had poor work design were more likely to have poor quality of life compared to those who had no WRMSDs and work in well-designed workplace.

Keywords : Work related musculoskeletal disorders; Quality of life; Quarry workers; associated factors; workplace.

Background:

Working is regarded as one of the major things that guide individual life and, because of the vitality of work in the daily life of individuals; work must be understood across economic, cultural and social spheres. By engaging in one form of works, people earn means of support, establish their identities, perceive life as meaningful and establish social network with others [1]. Despite the fact that work is vital for life and health, the organizational pattern, mode of operation and the related factors have reportedly caused numerous diseases among workers [1,2]. Psychosocial factors arising from the interaction between work description, content, work organization, working condition, level of technological advancement and the workers' level of competence, needs, resources and other personal factors all exert untold effects on the workers' wellbeing and quality of life [3,4].

Quality of Life according to World Health Organization (WHO) is seen as an "individual's perception 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" [5, 6]. This therefore involves four main areas of work life: safety at work; employee health care; adequate working time; and a commensurate salary [7, 8]. Individual worker perceives high quality of life when he has positive feelings towards his work and its prospect, and hence motivated to stay on the job and commit to its performance [9].

The quality of life is a product of several factors inherent in the work environment [10]. The performance of the employees at various work positions is intricately related to the set of factors affecting workers' health, well-being, habits, work environment and quality of life. Moreover, quality of life is also reported to be significantly associated with employees' job satisfaction, high moral, output at work, level of wellness, job security and safety at work [11] and varies across occupation, occupational disorders and socio-demographic characteristics [8,12, 13, 14, 15, 16] .

Quarry industries are one of the important industries across the world serving as major sources of raw materials for key developmental strides in the society [17]. According to British Geological Survey [18] quarry work is second to agriculture as the major sources of employment mostly in rural areas with the products exported to the developed areas as finished products. It accounts for over 40 million Euros economic growth across countries [19]. Over 20 million workers earn living from quarry industries in developing countries [20,21].

Despite the above enormous contributions, quarry works have been characterized by poor technological involvement and use of human being in place of automation [19, 22]. Poor condition of work, lack of job security and low monthly earning were also common among quarry workers in developing countries where quarry industries are mostly located for want of low cost for labour [19]. It has also been reported as the riskiest job across occupations with various occupational disorders [23,24,25]. Assessment of quality of life is a vital managerial tool to map out preventive measures for health deviations as a result of work activities and formulation of policies for safety at work [26]. This study therefore assessed the quality of life and the associated factors among quarry workers in Nigeria.

Materials and Method:

Study design:

This study utilized cross-sectional survey design to assess Sociodemographic and workplace determinants of Quality of life (Qol) among the quarry workers in Nigeria.

Area of the study:

This study was carried out in the quarry industry located at Umuoghara in Ezza North Local Government Area of Ebonyi State, Nigeria. There are about 50 plants in the company all located within one premise. There are about 800 workers all together in the company according to the register from the administrative officer.

Inclusion Criteria :

Male and female workers working in the quarry industries in Ebonyi state at the time of this study. Workers involved in the stone processing such as the blasters, operators of crushers, lorry drivers, manual stone handlers and loaders. Workers who have worked for at least one year in the quarry company were considered for inclusion.

Sample Size Estimation:

The sample size for this study was determined according to the objectives of the study. Objective 1: to determine the quality of life among the quarry workers. Sample size was determined using single proportion formula as follows: $N = \frac{p(1-p)}{E^2}$ N = sample size, p = proportion of “very poor quality of life” in population, Z = standard normal distribution, E = precision, Where $p=0.5$ (Mazlan et al.,) [8], $Z= 1.96$ and $E= 0.06$. $n = 0.5(1-0.5)(1.96/0.06)^2$.

Therefore $n = 0.25 \times 32.67 \times 32.67$. $N=266$ respondents.

Objective 2: to determine the sociodemographic and workplace determinants of quality of life among quarry workers. The sample size was calculated using PS software. Alpha = 0.05, power = 0.8, $m = 1$, $P_0 = 0.50$ (Mohammad et al., 2018), $P_1 = 0.75$ (expert opinion), sample size = 174 (Dissatisfied/poor QOL = 116, Satisfied/good QOL=58). P_0 = probability of exposure to the risk (WRMSDs) in controls (good QOL) OR WRMSDs / quarry workers. P_1 = probability of exposure to the risk (WRMSDs) in cases (poor QOL).

Therefore, the largest sample size for this study was 266 respondents as shown in objective 1 above.

Instrument for Data collection:

The questionnaires used for this study had three parts: part A, B and C. Part A consist of the socio-demographic variables of the respondents and the workplace factors while part B was World Health Organization Quality of Life questionnaire (WHOQOL BREF) with 26 items and Part C was the Standard Nordic Musculoskeletal questionnaire used to assess the rate of work related musculoskeletal disorders. The Nordic Musculoskeletal question was scored 1 for yes and 0 for no. It is used to assess the disorders of the musculoskeletal system within 12 months duration. It has questions on the nine parts of the body that are commonly affected by WRMSDs. This questionnaire has been tested for reliability by the developers through test retest method with a good Cronbach’s alpha value of 0.78, 0.91 and 1.00 across the times. The WHOQOL questionnaire was developed by WHO in 1995 to assess the effect of workers’ work on their quality of life and impacts of disease on the workers life. It was developed based on the perception of the individual about their quality of life in different domains. It was designed for transcultural uses and in clinical and research studies.

The quality of life questionnaire has five likert scale items that were scored using “1” = very dissatisfied, “2” = dissatisfied, “3” = neither dissatisfied nor satisfied, “4” = satisfied, “5” = very satisfied. To further determine the predictors of quality of life among the quarry workers using multiple logistic regression, the researcher had categorized the quality of life from four domains into two domains (Dissatisfied/poor Qol and satisfied/good Qol). This categorization was made based on the workers responses to one of the questions, which seeks to determine the overall level of the workers’ quality of life. The reliability of WHOQOL questionnaire has been established with a Cronbach alpha value of 0.7 and 0.8 across studies [27, 28].

Sampling method and Data collection:

The respondents for this study were selected through systematic random sampling method from 800 sample frame. All the 800 workers are from the same quarry company in Umuoghara in Ezza North Local Government Area. The sampling was done during their meeting time when all the workers were gathered together. Statistical package for social sciences (SPSS) was used to randomly select number 2 which was used in the sampling. Every second name on the sample frame was selected for this study. The researcher approached the respondents through the management and introduced himself to the respondents. Then the purpose of the study was explained verbally and in written form prior to distribution of the questionnaires. He then swiftly screened for the inclusion criteria and applied systematic random sampling as described above to

sample the required respondents. The respondents were requested to decide voluntarily either to participate in this study or not. Those who volunteered to participate received the respondents' information sheet and consent forms and were asked to sign. The researcher distributed the questionnaires to the respondents and retrieved same after responses on same day. A total of 266 questionnaires were distributed and retrieved from the workers. The data collection took place from July to September 2020.

Data Analysis:

Data were coded and analyzed using SPSS 26. The socio-demographic variables of the respondents were presented using descriptive statistics. Descriptive statistics (frequency, percentage and mean) was used to determine the level of quality of life of the quarry workers. The score on the quality of life were computed and converted to scale 100 as per scoring guideline. Simple logistic regression was used to screen the independent variables. The independent variables with significance value less than 0.25 were selected for multiple logistic regression. Backward and forward variable selection approach was used in the multiple logistic analysis. The final multiple logistic regression model included those independent variables with significant value of less than 0.05. Model fitness was then assessed based on Hosmer and Lemeshow test, classification table and receiver operating characteristics (ROC).

Results:

Table 1 shows the socio-demographic characteristics of the respondents. The mean age of the respondents was 31.0(8.28). The majority of the workers are young, less than 30 years old (46.2%), males (66.9%) and majority had secondary level of education (49.6%). Most of the them were married (49.6%), worked as blasters (24.4%) and had normal BMI (62.9%). Majority of the respondents had 0-2 children (54.5%), 35.8% had monthly income of more than 10,000 Naira per month and 51.5% had 3-6 family members being catered for by the monthly income.

Table 1: Socio-demographic characteristics of the quarry workers (N=266)

Variables	Mean (SD)	Frequency	Percentages (%)
Age <20 20-29 30-39 40-49	31.0(8.28)	17 106 92 51	6.4 39.8 34.6 19.2
Gender Female Male		88 178	33.1 66.9
Education No formal education Primary education Secondary education Tertiary education		0 94 132 40	0 35.5 49.6 15.1
Marital status Single Married Divorced Widow/widower		106 132 14 14	39.8 49.6 5.3 5.3
Work type Blaster Drivers Loaders Manual workers Evacuators Operators		65 38 56 41 28 38	24.4 14.3 21.1 15.4 10.5 14.3
Health related factors BMI Obese (BMI[?]30) Not Obese	26.2(4.10)	98 167	36.8 62.8
Other health problem No problem Has problem		248 18	93.2 6.8
Use of Medication Yes No		58 208	21.8 78.2

Variables	Mean (SD)	Frequency	Percentages (%)
Smoke Yes No		108 158	40.5 59.5
No of children 0-2 3-5 6-8	2.3(2.34)	145 87 34	54.5 32.7 12.8
Monthly income (Naira) <10,000 10,000-15,000 16,000-21,000 22,000-27,000 28,000-33,000 34,000-39,000 [?] 40,000	10,625# (7500)	160 54 25 16 8 1 2	60.2 20.3 9.4 6.0 3.0 0.4 0.8
No of Family members <3 3-6 7-10 11-14		78 137 50 1	29.3 51.5 18.8 0.4

Table 2 shows the work-related factors of the quarry workers. About 66.2% of the respondents had work experience of 1-5 years with mean 4.9 years. Majority of the respondents (96.6%) worked for 7-9 hours per day (mean 8.0 hours), mean break time per day 14.0 minutes. About 86.6% reported lack of work training while most of the respondents (94.4%) worked under high temperature. Majority of the workers (95.5%) reported working with injury while 97.4% of the respondents never used personal protective equipment (PPE) at work.

Table 2 Work- related factors of the quarry workers (N=266)

Variables	Mean (SD)	Frequency(n)	Percentages (%)
Work Experience 1-5 6-10 11-15 16-20	4.9 (3.00)	176 76 11 3	66.2 28.6 4.1 1.1
Working Hours <4 4-6 7-9 10-12	8.0 (4.3)	1 5 257 3	0.4 1.9 96.6 1.1
Duration of break time <10 minutes 10-15 minutes 20-25 minutes 30-35 minutes >35 minutes	14.0 (11.80)	100 25 89 50 3	37.6 9.4 33.5 18.8 0.8
Exposure to vibration Yes No		124 142	46.6 53.4
Work Training No Yes		231 35	86.8 13.2
High temperature workplace Yes No		251 15	94.4 5.6
Repetitive work Yes No		264 2	99.2 0.8
Awkward posture Yes No		235 31	88.3 11.7
High job demands Yes No		262 4	98.5 1.5
Working with injury Yes No		254 12	95.5 4.5
Use of PPE Yes No		7 259	2.6 97.4

Variables	Mean (SD)	Frequency(n)	Percentages (%)
Poor work design		231 34	87.2 12.8
Yes No			

Table 3 shows the prevalence of WRMSDs among quarry workers. More than half of the respondents (89.8%) reported having WRMSDs. Majority of the respondents (45.5%) reported experience of moderate pains followed by the mild level of pain (24.8%). About 62.4% of the respondents had difficulties in performing daily activities due to the WRMSDs.

Table 3: Prevalence of work-related musculoskeletal disorders(N=266)

Items
WRMSDs Yes No Level of Pain No pain Mild pain Moderate pain Severe pain Very severe pain Effect of pain on acti

WRMSDs= work-related musculoskeletal disorders. One of those without WRMSDs reported presence of pain at level of pain hence No pain=26.

In terms of quality of life, about 74.1% of the respondents reported poor overall quality of life with variation across domains. The physical domain had the highest mean score (62.8) closely followed by the environmental domain while the social relationship and psychological domains recorded the least mean score table 4.

Table 4: Domains of quality of life among quarry workers:

Variables	Frequency	Percentage
Overall quality of life Good Qol. Poor Qol	69 197	25.9% 74.1%
Domains	Mean	Standard Deviation
Physical domain	62.8	11.99
Psychological domain	36.7	7.573
Environmental domain	57.6	14.816
Social domain	29.8	7.146

From the simple logistic analysis number of children (p-value= 0.102), smoking (p-value =0.157), break time (p-value=0.096), type of work (driver: p-value=0.011, operator: p-value= 0.076), level of pain (P-value=0.001), WRMSDs (p-value <0.001), Age (P-value= 0.018), monthly income (p-value=0.046), working with injury (p-value= 0.015), working under high temperature(p-value=0.018), vibration exposure (p-value= 0.014) and poorly designed work (p-value=0.002) showed significant association with quality of life at p-value < 0.05.

Table 5. Univariate logistic analysis of factors associated with quality of life among quarry workers.

Variable
WRMSDs No Yes Age Gender Female Male Education Primary Secondary Tertiary Work experience Work type B

*significant at p-value<0.25, OR=Odd Ratio, CI= Confidence Interval, BMI= Body Mass Index #0.999965 (0.999931, 0.999999)

Following the multiple logistic regression modelling, WRMSDs (p-value=0.001) and the poor work design

(p-value=0.002) remained significantly associated with the quality of life among quarry workers in Ebonyi state Nigeria. Based on the odd ratio, those who had WRMSDs had 4 times more odds to have poor QoL compared to those who had no WRMSDs. In addition, those who had poor work design were 3 times more likely to have poor QoL.

Table 5 Final model of factors associated with Quality of life among quarry workers

Variables	Adjusted OR (95% CI)	P-value
Poor Work design No(R) Yes	1 3.22(1.52, 6.82)	0.002*
WRMSDs No(R) Yes	1 4.24(1.84, 9.77)	0.001*

NB: *significant at p-value <0.05, B regression coefficient, CI= confidence interval.

Discussion:

This study revealed that 74.1% of the quarry workers had poor quality of life. This finding could entail being dissatisfied with their work and working condition which directly affects the morale of the workers [29]. The quality of life of the workers is a vital element in the organizational management and plays key role in the growth and continued productivity of the organization. Therefore, deliberate efforts must be put in place to improve and maintain satisfied quality of work life among the workers as to ensure commitment and motivation on the part of the workers [6]. The condition of work, policy on welfare of the workers and every other organizational factor capable of impacting on the workers wellbeing should be addressed among the quarry industries in a timely manner [30]. One of such key approaches includes adequate social support, proper working conditions, good remuneration and psychological supports [31]. Low quality of life was also indicated in other studies conducted among different group of workers [26,32,33,31].

The result was contrary to the study done on accredited social health activist in Malaysia which revealed that 60% of the participants reported good quality of life [3]. This difference may be attributed to condition of work at the various industries, technological involvement, level of risk, health status of the workers, socio-cultural context [35] and the availability of psychosocial supports across countries [32]. Also, the relevance of the needs of the individual workers have been reported to vary across culture and organizations hence may account for the differences above [36].

Regarding the domains of the quality of life, the physical and environmental domain had the highest scores which however remained low on the 100% scale. These low scores may be accounted for by the poor working conditions and health status [32].

More also, at univariant analysis using simple logistic regression, certain independent variables showed significant association with quality of life. The factors include age, type of work, monthly income, level of pain, working with injury and work design. This is in agreement with reports of other research studies [35,32,37,38, 39 10].

Moreover, the multivariable analysis of the independent variables showed that two key independent variables, WRMSDs and poor work design remained significantly associated with quality of life of the respondents. WRMSDs is significantly associated with quality of life of the quarry workers in this study with unadjusted odd (4.28) when those without WRMSDs was used as reference. This therefore means that workers with WRMSDs have high odd (4.28) of being dissatisfied with their quality of life compared to those without WRMSDs. A few studies had reported a link between poor quality of life with job dissatisfaction, safety at work and low morale [11,40]. Therefore, appropriate preventive measures against WRMSDs is implicated by this finding as to improve the quality of life of the workers as well their commitment to organizational goal since evidence shows negative effects on poor quality of life on productivity at work [36]. This finding is in line with a study among primary healthcare workers which reported a significant association between health status and quality of life [33]. A similar finding was also indicated in a study among industrial dwellers in

Poland in which their health status had significant association with their quality of life [32] and a study among physical therapist in Korea [41].

Poor work design also had remained significantly associated with the quality of life of the workers. This implies that workers working in poorly designed work environment were 3 times more likely to have poor quality of life than those who work in well-designed workplace. Therefore, the ergonomic design of the working units in the quarry industries in Nigeria is a predictor of the highly dissatisfied quality of life among the quarry workers. Previous study has reported the reiteration among construction company workers of the need for improved working environment for efficiency and improved health at work [42]. This study further confirms this reiteration. Similar study in Malaysia showed that 80% of the respondents found their work environment and work design as safe and adequate which is not comparable to the poor workplace design reported in this study [8]. International Labour Organization supported these findings that ergonomic principles of automation, substitution, and enclosure must be implemented in addition to ergonomic postural training of the workers to ensure safety at work [38].

Study conducted in Taiwan reported that workplace design and other environmental factors are sources of psychological threat and burnout among workers; burnout has in turn been a significant predictor of poor quality of life among workers [43]. This agrees with the result of the present study among the quarry workers in Nigeria. These predictors of quality of life need to be considered in developing interventional programs to address the welfare of the quarry workers in Nigeria as research evidence has attributed human performance at work to workplace factors experienced by the workers [44].

Conclusion.

Poor quality of life among the quarry workers in Ebonyi state, Nigeria was indicated in this study across the four domains. Factors such as age, monthly income, number of children, work experience, working with injury, work types and poor work design were significantly associated with poor quality of life among the workers. Moreover, multiple logistic modelling also showed that WRMSDs and poor work design remained the significant predictors of poor quality of life among the respondents.

Strength and Limitation

The key strength of this study lies in the fact that it is the first empirical study assessing quality of life among quarry workers across Nigeria using a valid and reliable tool. The use of standard tool is the major strength of this study in that it avoided trial and error chance and its findings are reliable [45]. It is also the first empirical study that modelled the socio-demographic factors, workplace factors and WRMSDs with quality of life among the quarry workers in Nigeria.

The key limitation of this study lies in the cross-sectional design employed which may not have allowed for detailed exploration of the quality of life among the quarry workers. This study also focused on the quarry workers in Ebonyi state, Nigeria and therefore, the result may not be generalized to other quarry workers in other states in Nigeria.

Recommendation:

Based on the result of this study, the researchers recommend that the quarry industries should be properly examined with working conditions in mind as to ensure improved welfare for the workers. The environmental health and occupational health officers should swing into actions to ensure compliance with standard of work design as majority of the workers reported poorly designed work environment and that was also found to be a major determinant of quality of life. Improved mechanization of some of the work processes especially those involving exposure to vibration and other high risk aspect is highly recommended.

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