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Health Related Quality of Life (HRQoL) among Firefighters in Ogun State, southwest Nigeria

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Abstract

Introduction

Firefighters are not only involved in fire extinguishing, fire precautions and fire preventions but are being increasing involved in other aspects of safety and rescue during accidents domestic or otherwise. This has also led to increasing psychological and physical stress on these firefighters. Hence, all hands must be on deck to understand these threats to the wellbeing of this group of essential workers and develop modalities to reduce their effects on the physical and mental well being of firefighters.

Aim/ Objectives

This study aims to assess the health related quality of life (HRQoL) of firefighters and the association between duration of employment and HRQoL of firefighters in Ogun State, Nigeria.

Materials and Methods

This was a descriptive cross-sectional study done among firefighters in Ogun State, Nigeria. All consecutive firefighters who fulfilled the inclusion criteria and gave informed consent were recruited. A two step instrument was used to collect data. The first was used to collect the socio-demographic data and the second was an interviewer administered SF-36 health related quality of life (HPQoL) questionnaire. The data was analyzed with SPSS version 26.0

Result

There was a strong correlation between age and mental component score (p=0.974), duration of employment and mental component score (p= 0.660) as well as the physical and mental component scores. (p=0.576).

Conclusion

Authorities in Nigeria should strengthen safety and health policies in occupational disease prevention in order to improve the quality of life and life expectancy of firefighters in Nigeria.

Keywords: *Firefighters, Quality of life (QoL), Health related quality of life (HRQoL)*

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I. Introduction

Modern day firefighters are not only involved in fire extinguishing, fire precautions and fire preventions but are being increasing involved in other aspects of safety and rescue during accidents, domestic or otherwise[1]. Therefore, they should always be ready to respond immediately to emergencies, accidents and sometimes natural disasters. This put enormous stress on them to perform optimally all the time, ensure safety of lives and properties despite threats to their lives[2]. This has also led to increasing psychological and physical stress on these firefighters[3], hence all hands must be on deck to understand these threats to the wellbeing of this group of essential workers and develop modalities to reduce their effects on the physical and mental well being of firefighters[4].

Firefighters are exposed to significant health hazards especially to their respiratory[5], cardiovascular, neurological and musculoskeletal systems[6, 7, 8]. They are regularly exposed to hazardous agents such as dusts,

particulates, carbon monoxide, nitric oxide, sulphur, lead and Benzene. The effects of these ambient pollutants on the health of these firefighters are dose and time dependent[9].

Multiple studies on the mental health of firefighters have discovered that perceived stress was higher among firefighters than the general population[10, 11]. Large and small stressful situations in the workplace caused firefighters to experience significant level of exhaustion which hinders work effectiveness[12]. It was also reported that the mental and physical and emotional burden have negative effects on the mental wellbeing of firefighters[13].

The World Health Organization (WHO) defines health as a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity[14]. Key aspects of the WHO definition are the inclusion of social well-being and the emphasis on more than the absence of disease. Not everyone agrees on the inclusion of social well-being in the definition of health. Defining quality of life (QoL) has proven challenging and many approaches to defining quality of life exist[15]. However, it can be defined as a conscious cognitive judgment of satisfaction with one's life[16] and an individuals' 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[17]. Health related quality of life (HRQoL) can be defined as how well a person functions in their life and his or her perceived wellbeing in physical, mental, and social domains of health[18].

As mentioned above, many studies have been conducted on the physical and mental health of firefighters, including on occupational stress. However, there has been no study on mental health and the quality of life of firefighters in Nigeria. Therefore, this study aims to assess the health related quality of life (HRQoL) of firefighters and the association between duration of employment and HRQoL of firefighters in Ogun State, Nigeria.

II. Materials and Methods

Study area

This study was carried out among firefighters in Abeokuta, Ota and Ijebu Ode in Ogun State, Nigeria.

Study design and population

This was a descriptive cross-sectional study done among firefighters in Abeokuta, Ota and Ijebu Ode, Ogun State, Nigeria.

Study duration

The study commenced on 10th of December, 2019 and was completed on 20th of February, 2020.

Inclusion criteria

Participants must be 18 years and above, must have worked as a Firefighter for more than 1 year with or without co morbidities such as hypertension, diabetes, asthma, chronic obstructive pulmonary disease etc.

Exclusion Criteria

Non consenting Firefighters were excluded from the study.

Subject selection

The list of all firefighters was compiled and all consecutively consenting individuals above 18 years of age who fulfilled the inclusion criteria were recruited for the study. This allowed for 47 out of a total of 56 Firefighters to be used for this study.

Data collection tool

Two tools were used to collect data from study subjects

Tool 1 was used to collect the socio-demographic data such as age, sex, marital status, duration of employment in years and level of educational.

Tool 2 was a trained interviewer administered validated 36 item short form Health Survey instruments (SF-36) which was designed to evaluate 2 domains of quality of life : Physical and mental. These domains consist of eight subscales which are average scores for physical function (SF- 3, 4, 5, 6, 7, 8, 9, 10, 11and 12), role physical, due to physical problems (SF-13, 14, 15 and 16), bodily pain (SF- 21 and 22), general health perceptions (SF-1, 33, 34, 35 and 36), social function (SF- 20 and 32), role emotional well-being (SF- 17, 18 and 19), mental health (SF- 24, 25, 26, 28 and 30)and energy/vitality (SF- 23, 27, 29 and 31). The subscales were averaged and the averages represented by physical component score (PCS) and mental component score (MCS) which represents the physical and mental domains respectively. The instruments contain 36 questions that were organized into scales of between 0 and 100. Each scale measured a different domain of HRQOL. The PCS and MCS were then calculated for each study participant using the SF-36 version 2 calculator[19]. The SF-36 is one of the most commonly used instruments and is regarded as a gold standard measure of general HRQOL.

Data analysis

The data obtained were analyzed using Statistical Package for Social Sciences (SPSS) version 26.0.All numerical quantitative variables were summarized in mean and standard deviation. The mean of the numerical variables were compared using P value. Percentages and proportions were used to describe categorical variables.

Relationships between dependent and independent variables were analyzed using Pearson correlation coefficient at 5% level of significance.

Ethical clearance/approval

Ethical approval was obtained from Babcock University Health Research and Ethical Committee (***BUHREC Number:*** 407/20). Confidentiality and privacy of participants was duly respected during and after the period of collecting and collating of data. Serial numbers rather than names were used to ensure confidentiality.

III. Result

Socio-demographics

47 (forty-seven) firefighters with age ranging from 32-57 years participated in this study. The mean age was 44.09 ± 6.89 years. Majority (n=43, 91.5%) of the firefighters were male while (n=4, 8.5%) were females. Most (n=24, 51.1%) of the firefighters had secondary education followed by) (n=16, 34.0%), (n=5, 10.6%) and (n=2, 4.3%) who had tertiary, primary and technical education respectively. Majority (n=40, 85.1%) were married. (Table 1) the mean weight and height of study respondents were 73.7±11.3 kg and 1.72±10.4 m respectively. (Table 2)

Table 1 shows the socio-demographic characteristics of study subjects.

Variable	Frequency (N = 47)	Percentage (%)
Age (years)		
20-39	14	29.8
40-59	33	70.2
≥60	0	0.0
Gender		
Male	43	91.5
Female	4	8.5
Level of Education		
Primary	5	10.6
Secondary	24	51.1
Technical (Postsecondary)	2	4.3
Tertiary	16	34.0
Marital Status		
Single	3	6.4
Married	40	85.1
Divorced	3	6.4
Widowed	1	2.1

Table 2 shows the mean values and ranges of weight and height of study participants

VARIABLES	**RANGE**	**MEAN±SD**
Weight (Kg)	50.2- 93.0	73.7±11.3
Height (metres)	148.6-189.0	1.72±10.4

Occupational History

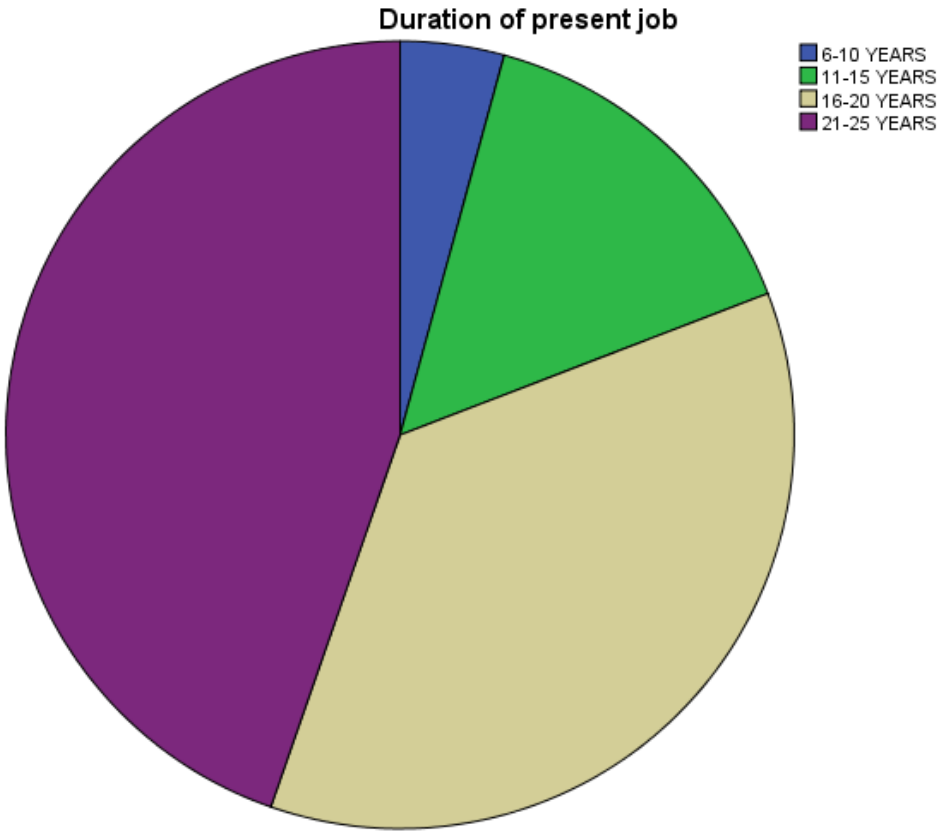
Majority of the firefighters (n=21, 44.7%) had been in service at their current job for 21-25 years while 17(36.2%), 7 (14.9%) and 2 (4.3%) had worked for 16-20 years, 11-15 years and 6-10 years respectively.(Figure 1)

Frequencies of responses to SF-36 questions by study participants

From the study, majority (n=23, 48.9%) respondents evaluated ascertained that their health in general was very good with only 4 (8.5%) having had excellent health status. However, compared to a year earlier only 19 (40.4%) ascertained that their health was much better while 10 (21.3%) had noticed no change in their general health status compared to a year earlier. **(**Table 3a**)**

Majority of respondents (n-33, 70.2%) had not seen to any extent inference of physical or emotional effect on social activities with family, friends, neighbors etc. in the previous 4 weeks prior to the study. also, about 61.7% (n=29) had mild bodily pain within 4 weeks prior to the study, while 11 (23.5) of respondents had none. 33 (70.2%) respondents ascertained that body pain did not interfere with their work and hose duty in the previous 4 weeks before this study. (Table 3a)

Figure 1 show the duration of employment of study subjects



Tables 3 (a-d) highlights the frequency of responses to SF questions by study subjects

SF	VARIABLES	FRQUENCY (%)
1	**In general, would you say your health is:**	
	Excellent	4 (8.5)
	Very good	23 (48.9)
	Good	16(34.1)
	Fair	4 (8.5)
	Poor	0
	TOTAL	47 (100)
2	**Compared to one year ago, how would you rate your health in general now?**	
	Much better than one year	19 (40.4)
	Somewhat better than one year ago	15 (31.9)
	About the same as one year ago	10 (21.3)
	Somewhat worse than one year	3 (6.4)
	Much worse now than one year ago	0
	TOTAL	47 (100)
32	**During the past 4 weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbors, or groups?**	
	Not at all	
	Slightly	33 (70.2)
	Moderately	10 (21.3)
	Quite a bit	3 (6.4)
	Extremely	1(2.1)
		0
	TOTAL	47 (100)
21	**How much bodily pain have you had during the past 4 weeks?**	
	None	11 (23.5)
	Very mild	29 (61.7)
	Mild	5 (10.6)
	Moderate	2 (4.2)
	Severe	0

	Very severe	0
	TOTAL	47 (100)
22	**During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?**	
	Not at all	33 (70.2)
	A little bit	9 (19.2)
	Moderately	5 (10.6)
	Quite a bit	0
	Extremely	0
	TOTAL	47 (100)

Table 3a

In terms of whether the respondents health limited various physical activities, 29 (61.7%) agreed that their health had limited their participation in vigorous activities a little, 44 (93.6%) ascertained that their health not limited at all moderate activities, 44 (93.6%), 38 (80.8), 42 (89.4), 41 (87.3) and 35 (74.5) had not noticed any effect of their health status on their ability to perform physical activities such as lifting or carrying groceries, climbing several flights of stairs, climbing one flight of stairs, bending, kneeling, or stooping and walking more than a kilometer respectively. (Table 3b)

In terms of how much of the time in the prior 4 weeks had respondents had problems with their work or activities as a result of physical health, Most respondents 40 (85.2%), 35 (74.5%), 45 (95.7%) and 36 (76.6%) had not ant any time had any problem leading to cut down on the amount of time you spent on work or other activities, accomplished less than you would like, were limited in the kind of work or other activities and had difficulty performing the work or other activities. (Table 3b)

As a result of emotional problems in 4 weeks prior to the study, majority 43 (91.5%), 40 (85.1%) and 32 (68.0%) of respondents reported that emotional problems such as depression has had not limited or led to cut down on the amount of time they spent on work or other activities, accomplishment of less than they liked and did work or other activities less carefully than usual respectively. (Table 3b)

SF	**VARIABLES**	**FRQUENCY (%)**	**FRQUENCY (%)**	**FRQUENCY (%)**	**N=47 (100%)**
	Does your health now limit you in these activities? If so, how much?	**Yes, limited a lot**	**Yes, limited a little**	**No, not limited at all**	
3	Vigorous activities, such as running, lifting heavy objects, participating in strenuous sports.	0 (0.0)	29 (61.7)	18 (38.3)	100
4	Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf.	0 (0.0)	3 (6.4)	44 (93.6)	100
5	Lifting or carrying groceries.	0 (0.0)	3 (6.4)	44 (93.6)	100
6	Climbing several flights of stairs	2 (4.3)	7 (14.9)	38 (80.8)	100
7	Climbing one flight of stairs	0 (0.0)	5 (10.6)	42 (89.4)	100
8	Bending, kneeling, or stooping	1 (2.1)	5 (10.6)	41 (87.3)	100
9	Walking more than a kilometer	5 (10.6)	7 (14.9)	35 (74.5)	100
10	Walking several hundred metres	1 (2.1)	4 (8.5)	42 (89.4)	100
11	Walking one hundred metres	0 (0.0)	1 (2.1)	46 (97.9)	100
12	Bathing or dressing yourself	0 (0.0)	0 (0.0)	47 (100.0)	100

Table 3b

SF	**VARIABLES**	**FRQUENCY (%)**	**FRQUENCY (%)**	**FRQUENCY (%)**	**FRQUENCY (%)**	**FRQUENCY (%)**	**N=47 (100%)**
	During the past 4 weeks, how much of the time have you had any of the following problems with your work or other regular daily activities as a result of your physical health?	**All of the time**	**Most of the time**	**Some of the time**	**A little of the time**	**None of the time**	
13	Cut down on the amount of time	0 (0.0)	0 (0.0)	1 (2.1)	6 (12.7)	40 (85.2)	100

	you spent on work or other activities						
14	Accomplished less than you would like	0 (0.0)	2 (4.3)	5 (10.6)	5 (10.6)	35 (74.5)	100
15	Were limited in the kind of work or other activities	0 (0.0)	0 (0.0)	0 (0.0)	2 (4.3)	45 (95.7)	100
16	Had difficulty performing the work or other activities (for example, it took extra effort)	0 (0.0)	0 (0.0)	2 (4.3)	9 (19.1)	36 (76.6)	100
	During the past 4 weeks, how much of the time have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?						
17	Cut down on the amount of time you spent on work or other activities	0 (0.0)	0 (0.0)	1 (2.1)	3 (6.4)	43 (91.5)	100
18	Accomplished less than you would like	0 (0.0)	0 (0.0)	5 (10.6)	2 (4.3)	40 (85.1)	100
19	Did work or other activities less carefully than usual	2 (4.3)	2 (4.3)	9 (19.1)	2 (4.3)	32 (68.0)	100
	These questions are about how you feel and how things have been with you during the past 4 weeks. For each question, please give the one answer that comes closest to the way you have been feeling. How much of the time during the past 4 weeks						
23	Did you feel full of life?	6 (12.8)	13 (26.7)	19 (41.3)	6 (12.8)	3 (6.4)	100
24	Have you been very nervous?	1 (2.1)	3 (6.3)	16 (34.0)	27 (57.6)	0 (0.0)	100
25	Have you felt so down in the dumps that nothing could cheer you up?	0 (0.0)	0 (0.0)	0 (0.0)	16 (34.0)	31 (66.0)	100
26	Have you felt calm and peaceful?	19 (40.4)	21 (44.7)	6 (12.8)	1 (2.1)	0 (0.0)	100
27	Did you have a lot of energy?	11 (23.4)	29 (61.7)	5 (10.6)	2 (4.3)	0 (0.0)	100
28	Have you felt downhearted and depressed?	6 (12.8)	3 (6.4)	1 (2.1)	4 (8.5)	33 (70.2)	100
29	Did you feel worn out?	13 (26.5)	3 (6.4)	3 (6.4)	22 (45.8)	7 (14.9)	100
30	Have you been happy?	39 (83.0)	7 (14.9)	0 (0.0)	1 (2.1)	0 (0.0)	100
31	Did you feel tired?	11 (23.4)	5 (10.6)	12 (25.5)	19 (40.5)	0 (0.0)	100
20	**During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting with friends, relatives, etc.)?**	0 (0.0)	2 (4.3)	5(10.6)	7 (14.9)	33 (70.2)	100

Table 3c

About how the respondents felt and how things had been with them during the previous 4 weeks before the study was done, 19 respondents (41.3%) said the were full of life all the time, 27 (57.6%) had been nervous a little of the time, 31 (66.0) had never felt so down in the dumps that nothing could cheer them up but only 19 (40.4%) had felt calm and peaceful most of the time. Majority 29 (61.7%) reported having lots of energy most of the time, 29 (61.7%) felt downhearted and depressed none of the time, 22 (45.8) felt worn out a little of the time, 39 (83.0%) were happy most of the time and 19 (40.5) felt tired some of the time within the 4 weeks prior

to the study. 33 (70.2%) also reported that at none of the time did their physical or emotional problems interfered with their social engagements within 4 weeks prior to the study being conducted. (Table 3c)

SF	Variable	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	N=47 (100%)
	How TRUE or FALSE is each of the following statements for you?	**Definitely true**	**Mostly true**	**Don't know**	**Mostly false**	**Definitely false**	
33	I seem to get sick a little easier than other people	0 (0.0)	0 (0.0)	3 (6.4)	27 (57.4)	17 (36.2)	100
34	I am as healthy as anybody I know	7 (14.9)	13 (27.7)	7 (14.9)	11(23.4)	9(19.1)	100
35	I expect my health to get worse	1 (2.1)	3 (6.4)	0 (0.0)	0 (0.0)	43 (91.5)	100
36	My health is excellent	10 (21.3)	22 (46.8)	0 (0.0)	15 (31.9)	0 (0.0)	100

Table 3d

About 57.4% (n=27) believed it was definitely false that they seem to get sick a little easier than other people, 13 (27.7%) believed it was mostly true that they were as healthy as anybody they knew, 43 (91.5%) believed it was definitely false that they expected their health to get worse while 22 (46.8%) believed it was mostly true that heir health was excellent. (Table 3d)

Table 4 shows the summary of the mean scores of SF-36 survey among firefighters in Ogun State.

SF-36 (Version 2)	Normative data	Mean score (SD)	p-value
Physical Functioning	82.4	76.2 (11.6)	0.014
Role Physical	89.4	71.3 (29.4)	0.062
Body pain	83.7	90.5 (42.1)	0.004
General Health	87.4	83.4 (10.5)	<0.001
Vitality	72.3	84.2 (21.3)	<0.001
Social Functioning	78.6	76.2 (10.7)	<0.001
Role Emotional	71.4	88.3 (24.6)	0.002
Mental Health	87.4	85.7 (16.4)	<0.001
PCS	50	77.9 (12.9)	0.004
MCS	50	79.5 (11.3)	<0.001

From the study result, the mean scores of the eight subscales were 76.2± 11.6 (p-values =0.014), 71.3 ±29.4 (p-values =0.062), 60.5±42.1 (p-values =0.004), 83.4±10.5 (p<0.0001), 84.2±21.3 (p<0.0001), 76.2±10.7 (p<0.0001), 88.3±24.6 (p=0.002) and 85.7±16.4(p<0.0001) for physical functioning, role physical, bodily pain, general health, vitality, social functioning, role emotional and mental health respectively. Role physical was not statistically significant. (p> 0.05). (Table 4) The mean of physical component and mental component scores were 77.9±12.9 and 79.5±11.3 respectively and they were statistically significant. (p< 0.05). (Table 4)

Table 4 shows the relationships between the age of respondents, duration of employments in years, the physical component and mental component scores. There was a strong correlation between age and mental component score (p=0.974), duration of employment and mental component score (p= 0.660) as well as the physical and mental component scores. (p=0.576) (Table 5)

Table 5 shows the association between age, duration of employment, Physical component score and mental component score of study participants.

Correlations

		Duration of present job	AGE BY LAST BIRTHDAY	PHYSICAL COMPONENT SCORE	MENTAL COMPONEBT SCORE
Duration of present job	Pearson Correlation	1	.816**	-.164	-.066
	Sig. (2-tailed)		.000	.269	.660
	N	47	47	47	47
AGE BY LAST BIRTHDAY	Pearson Correlation	.816**	1	-.203	-.005
	Sig. (2-tailed)	.000		.171	.974
	N	47	47	47	47
PHYSICAL COMPONENT SCORE	Pearson Correlation	-.164	-.203	1	.084
	Sig. (2-tailed)	.269	.171		.576
	N	47	47	47	47
MENTAL COMPONEBT SCORE	Pearson Correlation	-.066	-.005	.084	1
	Sig. (2-tailed)	.660	.974	.576	
	N	47	47	47	47

**. Correlation is significant at the 0.01 level (2-tailed).

IV. Discussion

To the best of the knowledge and information available to us, this is the first and the only study in Nigeria and Sub-Saharan Africa to assess health related quality of life (HRQoL) among firefighters. In the past, only three studies have looked at HRQoL among firefighters[8, 11, 21].In the latter study, professional firefighters with disaster exposure reported a significantly poorer physical health related quality of life (HRQoL) and vitality compared to their non exposed colleagues[21].

In fact, there was only one study in the international literatures that evaluated the association between age and duration of employment with HRQoL among firefighters[20].We have previously reported that there was a strong association between respiratory symptoms and spirometry abnormalities from the same group of firefighters but di not analyze the SF-36 data of the firefighters with respiratory symptoms and spirometry impairment[5].The age distribution, gender orientation, marital status and job experience/ duration of employment of firefighters reported in this study was consistent with findings from other studies conducted in other parts of the world[8, 20, 21]but different from the study done by Soteriades et al [22].

In our study, firefighters by virtue of their occupation, firefighters had clinically significant poorer HRQoL than the general population. The mean values of all subscales except for body pain, vitality and role emotional are lower than the general population with statistically significance in the mean values of physical component and mental component scores with the general population. This finding is similar to findings by Berninger et al [21].

Finally, a statistically significant association was identified between ages, duration of employment and reported physical among firefighters, component and mental component scores. Therefore, Public health specialists, respiratory physicians and authorities in Nigeria should strengthen safety and health policies in occupational disease prevention in order to improve the quality of life and life expectancy of firefighters in Nigeria.

The limitation of this study is the relatively small number of participants and the cross sectional design which limited the authors' ability of evaluated causal relationships.

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Conflict of interest

The authors have no conflict of interest to declare.

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