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Health-related quality of life and working conditions on public transport workers in the Metropolitan Region of Belo Horizonte, Brazil, 2012

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Abstract: Health-related quality of life and working conditions on public transport workers in the metropolitan region of Belo Horizonte, Brazil, 2012: Luiz Sérgio Silva, *et al*. School of Medicine, Universidade Federal de Viçosa, Brazil—Objectives: Drivers and conductors working in public transport are frequently exposed to inadequate working conditions and consequently to health problems relating to their work activities. This study investigates the relationship between the working conditions of drivers and conductors in the Metropolitan Region of Belo Horizonte and their perception of health-related quality of life. **Method:** Health-related quality of life was measured in a sample of 1,607 public transport workers in the city of Belo Horizonte using the SF-12 (Medical Outcomes Study Short-Form General Health Survey). The presence and magnitude of independent associations between the SF-12 domains and the exposure variables were determined by means of odds ratios obtained through logistic regression. **Results:** After adjustments, the PCS (Physical Component Score) was found to be negatively associated with the existence of breaks during the working day and positively associated with unavailability of technical resources for meeting needs. The MCS (Mental Component Score) was positively associated with being female, having two or more medical diagnoses of illnesses, absenteeism and recent episodes of aggression or threats, and feeling vibration in the whole body. The MCS was negatively associated with the practice of physical exercise. Both components were negatively associated with older age and positively associated with having a poor self-assessment of health. **Conclusions:** Exposure to a variety of risk factors while performing work worsened health-related quality of life. The results obtained may provide support for rethinking and guiding public policies directed towards metropolitan populations.
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Transport is a crucial activity for urban life, since it is directly related to social dynamics, with effects on citizens' well-being and economic development. Although policies and projects within the transport sector are strictly not health-care interventions, their effects influence both individual and public health. Respiratory and eye diseases result from the pollutants generated by intense traffic. Cardiovascular diseases, accidents and early mortality occur more frequently in localities where the concentration of vehicles disturbs the circulation and thus increases the pace of life for people moving within or between cities. Motorized transport indirectly stimulates sedentary lifestyles, which have been recognized as a risk factor for many types of chronic diseases[1)].

New means of transportation and specific urban transport policies interfere with the *métier* of bus workers[2)]. Today, the activities of the bus drivers and conductors that enable citizens to move around subject them to citizens' attitudes and reactions. They are also exposed to the burdens generated in the ergonomic environment of the buses and those generated in traffic on specific circulation routes[3, 4)]. These burdens are associated with increased risk of various diseases that are prevalent in bus stations and have been studied in different countries[2, 5–7)].

At the macro level of the system, the way in which services are organized is linked to the conventional system of norms (the legal code and its rules), which aim to control the traffic intensity, traffic lights, congestion and risks of accidents. Regarding the ergonomic conditions of the vehicle, the location of the engine (which is close to where the driver oper-

ates the vehicle from) and deficiencies in vehicle maintenance (which influence the degree of exposure to noise and vibration) have been cited. Moreover, bus workers carry out their professional activities on public roads that are subject to the vagaries of the weather and the state of conservation of the road surface and that entail risks of violence and risks derived from the way in which the company is organized and the work process itself[8]. Depending on the technical and organizational arrangements and the way in which public urban transport policies have been set up, there are possible constraints of a physical and mental nature. These, in turn, are associated with negative outcomes such as morbidity, sick leave and poor quality-of-life scores[9].

Quality of life is a broad and multidimensional concept that allows individuals' subjective experiences to be addressed. It relates to individuals' perceptions regarding their position in life, according to the context and value systems within which they live, and in relation to their objectives, expectations, standards and concerns[10]. Mental and physical health, social networks and work or productive activity are dimensions addressed when seeking to evaluate an individual's quality of life[11].

Taking into consideration the occupational realities of bus drivers and conductors resulting from the interlinking of microenvironmental conditions (bus and passengers) and macroenvironmental conditions, it is possible that the effects of these conditions influence these workers' ways of life. Nonetheless, studies focusing on the dimensions of the quality of life of groups of bus workers are scarce.

In light of the social relevance of the urban transport sector and the illness rates among the people involved in it, the present study sought to evaluate these individuals' perceptions relating to the dimensions of quality of life. The objective was to evaluate the relationship between drivers and conductors' working conditions in the Metropolitan Region of Belo Horizonte and their health-related quality of life.

Methods

The present study was of a cross-sectional nature. It was submitted to and approved by the Research Ethics Committee of the Federal University of Minas Gerais, and all the participants signed a consent form.

It was conducted in the three major cities of the Metropolitan Region of Belo Horizonte (MRBH), that is, Belo Horizonte, Contagem and Betim. The MRBH is the third largest urban agglomeration in Brazil, with a population of 5,152,217 inhabitants. It comprises 34 municipalities, totaling 9,460 km^2 including Belo Horizonte, the capital of the state of Minas Gerais. It is the political, financial, commercial, educational and cultural center of Minas Gerais, representing around 40% of the economy and 25% of the state population. This region has a gross domestic product (GDP) of nearly 45 billion of dollars.

The eligible population in all of the three cities investigated comprised 17,470 workers (Belo Horizonte=6,500 drivers and 6,750 conductors; Betim=696 drivers and 524 conductors; Contagem=1,800 drivers and 1,200 conductors), according to the metropolitan public transport company (BHTrans: Empresa de Transportes e Trânsito de Belo Horizonte, 2009).

For sampling, the statistical power was taken to be 80%, with a 95% confidence interval, and losses of 20% were predicted. A proportional quota from all the professionals in each of the three cities was selected, according to occupation (drivers and conductors). The sample obtained comprised 565 drivers and 561 conductors and was distributed as follows: Belo Horizonte, 72% of the drivers and 80% of the conductors, Contagem, 20% of the drivers and 14% of the conductors; and Betim, 8% of the drivers and 6% of the conductors. The reliability of the interviews was measured by reapplying the questions to the same respondent in the case of 12% of all of the participants).

During data gathering, there were 21 refusals (12 drivers and 11 conductors), equivalent to 1% of the interviews. Of these, 90% (n=19) were men and 10% (n=2) were women. The sociodemographic characteristics of this group were similar to those of the sampled group ($p>0.05$). The losses corresponded to 1% of the interviews conducted (n=25).

The data investigated were sociodemographics, such as gender, age, self-declared race/skin color, schooling level, marital status, number of children and family income; lifestyle factors, such as sociocultural activities, engaged in physical activity, smoking and abuse of alcoholic drinks; general aspects of health, such as medical diagnoses of diseases, general use of medications, use of medications for depression, medically approved sick leave or time off work over the last twelve months, self-rated health status and body mass index (BMI); security-related factors, such as episodes of aggression or threats over the last twelve months; and work-related factors, such as position, length of service in the company, receipt of overtime payments, perception of vibration of the whole body, internal temperature of the bus, internal lighting of the bus, perception of traffic, existence of breaks during the working day and noise inside the bus).

To evaluate quality of life, the Medical Outcomes Study Short-Form General Health Survey was used in its reduced version (SF-12), which has been validated and is widely used for health-related quality-

of-life evaluations[12]. It was originally developed in the United States and it is a shorter alternative to the SF-36, which is used for large-scale health surveys[13]. The SF-12 contains a subset of 12 items extracted from the SF-36, relating to the components of physical health (Physical Component Score, PCS) and mental health (Mental Component Score, MCS)[12]. In Brazil, it was validated by Andrade *et al*. (2007)[14].

The values range on a scale from zero to 100, such that the higher the score is, the better the quality of life also is. The mean score and standard deviation used for the physical and mental components were 50 and 10, respectively[13]. It was decided to dichotomize the final scores for the physical domain (PCS) and mental domain (MCS) at the lowest quartile (poor quality of life). Thus, the cutoff points used for satisfactory levels of PCS and MCS were>36.22 and>26.10, respectively[15].

Since the distribution of the final quality-of-life scores did not meet the assumptions of multiple linear regression, it was decided to use logistic regression. For this, the response variables, i.e. the final quality-of-life scores in the physical domain (PCS) and mental domain (MCS) of the SF-12, were dichotomized using the cutoff point of the value of the lowest quartile of the score distribution. The group of workers in the lowest quartile was classified as having poor quality of life and was compared with the others in relation to all the variables of interest.

The magnitude of the statistical association between poor quality of life and the independent variables (sociodemographics, lifestyle, health-related and security-related factors and general information about work) was measured using the odds ratio and 95% confidence interval, which were obtained by means of multiple logistic regression. The Stata 10 statistical package was used (Stata Corp, College Station, TX, USA).

Associations between the SF-12 domains and the different variables were tested in three stages. Initially, each variable was tested separately. Then, each block of similar variables was tested with the PCS and MCS domains. In the earlier stages, all the variables associated with poor quality of life at the level of $p<0.20$ were considered for the multivariate analysis. Following this, models with gradual adjustment of the variables using the variables retained from the preceding group were constructed. The following order of blocks of variables was used: sociodemographics, lifestyle, general health condition, security and working condition factors. Only the variables that remained associated at the level of $p<0.05$ were kept in the analysis and in the final model.

Results

There were 1,607 participants in this study (1,400 men and 207 women). Their mean age was 36 years (range: 18 years to 75 years), and 75% of the group was under 44 years of age. Most of the subjects (73%) self-declared their skin color as mixed or black; 82% reported that they had had eight or more years of schooling; 61% were married; 72% had children; and 65% had a family income greater than two minimum salaries per month. A small majority (53%) were drivers of traditional buses with conductors or were drivers of single-man buses (Table 1).

Among the interviewees, 67% were not participating in any sociocultural activity; 52% were not engage in the practice of any physical activity; 69% did not consider themselves to be smokers; and 87% did not fulfill the criteria that would lead them to be considered to be suspected alcohol abusers. It was noteworthy that 45% of the respondents stated that they had experienced one or more episodes of aggression or threatened aggression while working, in the last twelve months; 70% reported that they had been medically diagnosed with one or more diseases; 65% reported that they had taken medically approved sick leave during the last twelve months for health reasons; and 20% rated their own health as poor or very poor (Table 1).

Regarding the subjects' occupational situations, almost half of them (43%) reported that they had been working for the company for less than two years and 34% reported that they had not been paid for overtime worked. Regarding working conditions, vibration, thermal discomfort and lighting discomfort were reported by 60%, 74% and 33% of the respondents, respectively. The following were predominant: experiencing poor or very poor traffic conditions (84%); having difficulty in adjusting the seat (66%) (not tabulated); not having breaks during the working day (83%); and a group that was exposed to high or intolerable noise (38%) (Table 1).

The mean values and 95% confidence intervals for the physical scores (PCS) and mental scores (MCS) for the whole sample were 39.90 (95% CI: 34.27–45.53) and 34.70 (95% CI: 23.41–45.99), respectively. According to the cutoff points used, 75% of the workers presented satisfactory quality-of-life levels in relation to the physical and mental domains. Table 1 shows comparison between the means for PCS and MCS according to sociodemographic, lifestyle, health and security-at-work characteristics and general information about work.

After adjustments (Table 2), the physical component was found to be negatively associated with being older and taking breaks during the working day, but

Table 1. Distribution of scores of the SF-12 (Physical and Mental Components), according to sociodemographics, lifestyle, health conditions, security and general working conditions of the public transport workers in the Metropolitan Region of Belo Horizonte (2012)

Variables	N	Percent	PCS		MCS	
			Mean scores	(95% CI)	Mean scores	(95% CI)
Sociodemographic block						
Gender						
Male	1,400	87	39.95	39.65–40.25	34.19	33.59–34.80
Female	207	13	39.52	38.54–40.51	38.41	36.48–40.33
Age (years)						
16–25	257	16	39.48	38.80–40.16	33.65	35.11–38.18
26–35	580	36	39.60	39.12–40.08	35.58	34.59–36.58
36–45	450	28	40.11	39.56–40.66	33.82	32.79–34.85
46–55	258	16	40.55	39.77–41.32	33.25	31.83–34.66
56 +	62	04	40.37	38.95–41.79	29.95	27.13–32.76
Self-declared race/skin color						
White	320	20	40.10	39.47–40.73	34.93	33.56–36.31
Mixed or black	1,175	73	39.87	39.53–40.21	34.56	33.89–35.22
Yellow / Indian	108	07	39.65	38.47–40.82	35.53	33.21–37.85
Schooling level (years)						
1 to 4	97	06	38.97	39.54–40.19	35.03	34.38–35.68
5 to 7	200	12	39.87	39.01–40.55	33.58	32.04–35.11
8 +	1,310	82	40.59	39.40–41.77	32.38	30.13–34.64
Marital status						
Married	972	61	40.15	39.78–40.53	33.97	33.26–34.69
Single	635	39	39.50	39.03–39.96	35.83	34.85–36.81
Number of children						
None	457	28	39.83	39.29–40.37	35.33	34.22–36.43
1 +	1,150	72	39.93	39.58–40.27	34.44	33.75–35.12
Family income						
Until 2 minimum salaries	504	35	39.97	39.47–40.47	34.08	33.07–35.08
2.1 or more minimum salaries	946	65	39.82	39.47–40.47	35.19	34.44–35.94
Block lifestyle						
Sociocultural activity						
Yes	1,137	33	39.97	39.63–40.30	34.22	33.55–34.89
No	450	67	39.72	39.13–40.31	35.95	34.79–37.10
Engage in physical activity						
Never	818	52	39.74	39.32–40.16	36.63	37.80–37.47
1 or 2 times per week	399	25	40.28	39.71–40.86	32.79	31.70–33.89
3 or more times per week	254	23	39.81	39.27–40.37	32.43	31.33–33.54
Smoking						
No	1,088	69	39.91	39.56–40.26	34.89	34.18–35.60
Former smoker	239	15	40.57	39.79–41.35	33.81	32.32–35.29
Yes	254	16	39.18	38.46–39.90	34.61	33.18–36.05
Suspected alcohol abusers						
No	1,350	87	39.90	39.59–40.21	34.33	33.70–34.95
Yes	211	13	39.88	39.03–40.72	37.23	35.61–38.86

Table 1. Distribution of scores of the SF-12 (Physical and Mental Components), according to sociodemographics, lifestyle, health conditions, security and general working conditions of the public transport workers in the Metropolitan Region of Belo Horizonte (2012) (continued)

Variables	N	Percent	PCS		MCS	
			Mean scores	(95% CI)	Mean Scores	(95% CI)
General aspects of health						
Medical diagnose of diseases						
None	448	30	40.70	(40.26–41.15)	30.70	(29.79–31.61)
1 or 2	589	39	40.10	(39.64–40.57)	34.21	(33.30–35.12)
3 or more	477	31	38.81	(38.21–39.41)	39.43	(38.34–40.53)
General use of medications						
None	1,153	74	40.13	(39.80–40.45)	33.79	(33.13–34.44)
1–2	363	23	39.45	(38.76–40.14)	36.72	(35.41–38.02)
3 or more	46	03	37.39	(35.26–39.53)	43.32	(40.16–46.48)
Use of medications for depression						
Yes	1,439	92	40.01	(39.72–40.31)	34.18	(33.58–34.77)
No	132	08	38.45	(37.27–39.64)	41.01	(38.81–43.22)
Medically approved sick leave (last 12 months)						
No	1,181	79	40.05	(39.73–40.37)	33.69	(33.05–34.34)
Yes	311	21	39.33	(38.61–40.04)	38.79	(37.41–40.18)
Self-rated health status						
Very good / good	1,247	80	40.44	(40.14–40.74)	33.13	(32.52–33.74)
Average / poor / very poor	316	20	37.63	(36.83–38.43)	41.25	(39.83–42.66)
BMI (body mass index)						
Normal	612	51	39.87	(39.40–40.33)	35.06	(34.12–36.00)
Underweight	22	02	38.62	(36.78–40.46)	37.83	(32.51–43.16)
Overweight	556	46	39.89	(39.41–40.37)	34.33	(33.39–35.27)
Obesity	6	01	40.51	(33.86–47.16)	34.04	(14.52–53.55)
Security-related factors						
Episodes of aggression or threats last twelve months						
None	814	55	40.48	(40.11–40.85)	31.71	(31.01–32.41)
1 or 2	182	12	38.83	(37.87–39.79)	37.37	(35.57–39.16)
3 or more	477	33	39.27	(38.73–39.82)	39.09	(37.99–40.18)

it was positively associated with poor self-rated health status and availability of technical resources (Table 2). Variables of the blocks lifestyle and security had no significance and did not participate in the PCS of the SF-12 multivariate analysis.

The final model of the physical component of the SF-12 is shown in Table 3.

The models with adjustments for the mental component of the SF-12 are shown in Table 4. Abuse of alcoholic drinks, despite being important in the mental component, lost its significance and did not participate in the final model. The same occurred to marital status and schooling level.

There were negative associations between the mental component of the SF-12 and being older and engaging in physical activity. The following factors were positively associated with the mental component of the SF-12: being female, reporting that two or more diseases had been diagnosed over the last twelve months, being absent from work because of illness during the last twelve months, perceiving vibration of the whole body and considering the lighting and noise levels inside the bus to be poor (Table 5).

Discussion

The results from the present study add evidence regarding the influence of working conditions on these subjects' quality of life. Although there is no national standard value for Brazilians, compared with a population of Brazilian bank workers[16] the average scores

Table 1. Distribution of scores of the SF-12 (Physical and Mental Components), according to sociodemographics, lifestyle, health conditions, security and general working conditions of the public transport workers in the Metropolitan Region of Belo Horizonte (2012) (continued)

Variables	N	Percent	PCS		MCS	
			Mean scores	(95% CI)	Mean scores	(95% CI)
Work-related factors						
Position						
Drivers	853	53	39.92	(39.54–40.30)	33.85	(33.09–34.61)
Conductors	754	47	39.87	(39.43–40.32)	35.67	(34.78–36.56)
Length of service in the company (years)						
0–2	687	43	39.94	(39.49–40.39)	34.69	(33.76–35.62)
2.01–5	347	22	39.98	(39.36–40.61)	35.22	(33.94–36.50)
5.01–10	231	14	39.05	(38.28–39.82)	35.73	(34.21–37.25)
10.01–20	280	17	40.40	(39.73–41.07)	33.59	(32.35–34.82)
20.01–35	61	04	40.09	(38.67–41.52)	32.64	(29.82–35.47)
Receipt of overtime payments						
Always/almost always	1,064	66	39.98	(39.64–40.31)	33.75	(33.06–34.44)
Sometimes	270	17	39.90	(39.10–40.71)	36.23	(34.70–37.76)
Never/rarely	269	17	39.64	(38.86–40.42)	37.01	(35.52–38.50)
Perception of whole body vibration						
Never/rarely	637	40	40.83	(40.44–41.21)	30.97	(30.19–31.75)
Sometimes	338	21	39.37	(38.69–40.04)	35.58	(34.41–36.75)
Always/almost always	631	39	39.20	(38.69–39.71)	38.13	(37.12–39.15)
Perception of internal temperature of the bus						
Tolerable	425	26	40.46	(39.97–40.95)	31.28	(30.26–32.30)
Bother a little	459	29	40.03	(39.52–40.55)	34.01	(33.00–35.04)
Bother much/unsupportable	723	45	39.47	(39.00–39.95)	37.19	(36.29–38.10)
Perception of internal lighting of the bus						
Good	1,076	67	40.14	(39.80–40.49)	33.15	(32.48–33.83)
Average	400	25	39.32	(38.74–39.89)	37.60	(36.39–38.82)
Poor	131	08	39.64	(38.28–41.00)	38.88	(36.67–41.10)
Perception of traffic						
Good/average	248	15	40.67	(40.03–41.31)	31.58	(30.30–32.86)
Poor/very poor	1,357	85	39.75	(39.43–40.07)	35.29	(34.65–35.94)
Existence of breaks during working day						
Never	274	17	40.26	(39.62–40.89)	32.02	(30.77–33.27)
Sometimes / rarely	848	53	39.92	(39.53–40.32)	34.39	(33.64–35.13)
Always / almost always	474	30	39.65	(39.08–40.22)	36.84	(35.63–38.06)
Noise inside the bus						
Very low / average	987	62	40.30	(39.93–40.67)	32.33	(31.57–33.10)
High / unsupportable	606	38	39.51	(39.07–39.95)	33.85	(36.15–37.84)

obtained for the components of the SF-12 in this study are low even though they are near the normalized values for the general US population[12].

Episodes of aggression or threatened aggression, perception of vibration of the whole body and reports of discomfort regarding lighting and noise levels were significantly associated with poor quality of life. Unavailability of adequate technical resources

Table 2. Results of the multivariate analysis (odds ratio and 95% confidence intervals) of the association between poor quality of life in the physical domain of the SF-12 (PCS) and sociodemografics and health-related and general working conditions of the public transport workers in the, Metropolitan Region of Belo Horizonte (2012)

Variable	Category	Model 1*	*p*	Model 2**	*p*	Model 3***	*p*
Age	16–45	1.00		1.00			
	46 +	0.77 (0.57–1.03)	<0.05	0.70 (0.52–0.94)	<0.05	0.73 (0.54–0.98)	<0.05
Marital status	Married	1.00		—		—	
	Not Married	1.22 (0.95–1.57)	>0.05	—		—	
Schooling level (years)	0–7	1.00		—		—	
	8 +	0.99 (0.80–1.23)	>0.05	—		—	
Self-rated health status	Very good / good			1.00		1.00	
	Average / poor / very poor			1.70 (1.22–2.37)	<0.01	1.67 (1.19–2.35)	<0.01
Availability of technical resources	No					1.00	
	Yes					1.28 (1.07–1.52)	<0.01
Existence of breaks during the working day	No					1.00	
	Yes					0.82 (0.68–0.98)	<0.05

*Adjusted as per the socio-demographics block variables, **Adjusted as per the variables from the socio-demographics and health-related conditions blocks, ***Adjusted as per the variables from the socio-demographics and health related conditions and general working conditions blocks, ****In the blocks lifestyle and security, none of the variables had significance and they did not participate in this multivariate analysis.

Table 3. Odds ratio and 95% confidence intervals for the physical component of the SF-12 (PCS) according sociodemographics and health-related and general working conditions of the public transport workers in the Metropolitan Region of Belo Horizonte, (2012)

Variables	OR	95% IC
Age (years)		
16–45	—	—
46 +	0.73	0.53–0.97**
Self-rated health status		
Very good / good	—	—
Average / poor / very poor	1.67	1.19–2.35*
Unavailability of technical resources		
No	—	—
Yes	1.28	1.07–1.52*
Breaks during working day		
No	—	—
Yes	0.82	0.68–0.98**

*p<0.01, **p<0.05, ****In the blocks lifestyle and security, none of the variables had significance, and they did not participate in this multivariate analysis.

and lack of breaks during the day also influenced the self-assessment of quality of life (in the physical domain). Women, younger individuals and individuals who reported being not engaged in physical activity were more likely to report poor quality of life (in the mental domain). As expected, morbidity (reports of having been medically diagnosed as presenting diseases) and sick leave negatively influenced the quality of life (in the mental domain).

Bus workers operate within a paradoxical environment because they are "shut into" a microenvironment with their passengers while they circulate around roads within urban areas. Thus, they are not protected by any security agents belonging to their companies, who would take care of security for employees within the system if they were present[17]. In two Brazilian state capitals, São Paulo and Belo Horizonte, a high incidence of violence on buses has been observed[18].

Table 4. Results of the multivariate analysis (odds ratio and 95% confidence intervals) of the association between a poor quality of life in the mental domain of the SF-12 (MCS) and the sociodemographics, behavior, health-related conditions and security and general working conditions of the public transport workers in the Metropolitan Region of Belo Horizonte, Brazil, (2012)

Variable	Category	Model 1 *	*p*	Model 2**	*p*	Model 3***	*p*	Model 4****	*p*	Model 5*****	*p*
Gender	Male	1.00		1.00		1.00		1.00		1.00	
	Female	1.94 (1.25–3.00)	<0.01	1.78 (1.15–2.75)	*p*<0.01	1.49 (0.93–2.38)	*p*>0.05	1.65 (1.03–2.67)	*p*<0.05	1.68 (1.04–2.71)	*p*<0.05
Age	16–45	1.00		1.00		1.00		1.00		1.00	
	46 +	0.78 (0.68–0.89)	<0.01	0.76 (0.68–0.85)	*p*<0.01	0.63 (0.55–0.71)	*p*<0.01	0.66 (0.58–0.75)	*p*<0.01	0.68 (0.59–0.77)	*p*<0.01
Marital status	Married	1.00		—		—		—		—	
	Not married	1.11 (0.86–1.45)	>0.05	—		—		—		—	
Schooling level (years)	0–7	1.00		—		—		—		—	
	8 +	1.05 (0.83–1.33)	>0.05	—		—		—		—	
Engaged in physical activity	Yes			1.00		1.00		1.00		1.00	
	No			0.70 (0.68–0.85)	<0.01	0.76 (0.65–0.89)	<0.01	0.77 (0.66–0.90)	*p*<0.01	0.78 (0.67–0.92)	*p*<0.01
Abuse of alcoholic drinks	No			1.00		1.00		1.00		—	
	Yes			1.73 (1.16–2.58)	<0.01	1.51 (1.00–2.30)	*p*<0.05	1.38 (0.90–2.12)	*p*>0.05	—	
Medical diagnoses of diseases	No					1.00		1.00		1.00	
						2.02 (1.67–2.44)	<0.01	1.83 (1.50–2.22)	*p*<0.01	1.77 (1.45– 2.15)	*p*<0.01
Medically approved sick leave	No					1.00		1.00		1.00	
	Yes					2.04 (1.39–2.98)	<0.01	1.89 (1.28–2.80)	*p*<0.01	1.81 (1.22–2.68)	*p*<0.01
Self-rated health status	Very good / good					1.00		1.00		1.00	
	Average / poor / very poor					2.13 (1.40– 3.26)	<0.01	1.98 (1.29–3.04)	*p*<0.01	1.77 (1.15–2.72)	*p*<0.01
Episodes of aggression or threats over the last twelve months	No							1.00		1.00	
	Yes							1.66 (1.41–1.96)	*p*<0.01	1.54 (1.30–1.83)	*p*<0.01
Perception of vibration of the whole body	Yes									1.00	
	No									1.12 (1.03–1.22)	<0.05
Internal lighting of the bus	Very good / good									1.00	
	bad / very bad									1.39 (1.08– 1.79)	<0.01
Noise inside the bus	Low									1.00	
	High / very high / unsupportable									1.33 (1.01–1.76)	<0.05

*Adjusted as per the socio-demographics block variables, **Adjusted as per the variables from the socio-demographics and lifestyle blocks, ***Adjusted as per the variables from the socio-demographics, lifestyle and health-related conditions blocks, ****Adjusted as per the variables from the socio-demographics lifestyle, health-related conditions and security blocks, *****Adjusted as per the variables from the socio-demographics, lifestyle, health-related conditions, security and general working conditions blocks.

Table 5. Odds ratio and 95% confidence intervals for the mental component of SF-12 (MCS) according sociodemographics, lifestyle, health-related conditions, security and general working conditions of the public transport workers in the Metropolitan Region of Belo Horizonte (2012)

Variables	OR	95% IC
Gender		
Male	—	—
Female	1.68	1.04–2.71**
Age (years)		
16–45	—	—
46 +	0.68	0.59–0.77*
Physical activity		
No	—	—
Yes	0.78	0.67–0.92*
Medical diagnosis of one or more diseases		
No	—	—
Yes	1.77	1.45–2.15*
Medically approved sick leave (last 12 months)		
No	—	—
Yes	1.81	1.22–2.68*
Self-rated health status		
Very good / good	—	—
Average / poor / very poor	1.77	1.15–2.72*
Episodes of aggression or threats in last twelve months		
No	—	—
Yes	1.54	1.30–1.83*
Perception of whole body vibration		
No	—	—
Yes	1.12	1.03–1.22*
Perception of poor internal lighting of the bus		
No	—	—
Yes	1.39	1.08–1.79*
Noise inside the bus		
No	—	—
Yes	1.33	1.01–1.76**

*$p<0.01$, **$p<0.05$.

Between 2000 and 2002, assaults with firearms were reported by 38.5% and 43.4% of bus drivers in São Paulo and Belo Horizonte, respectively. In our study, 45% of the interviewees reported that they had experienced at least one episode of aggression or threatened aggression over the last twelve months. These individuals presented a 54% greater chance of poor quality of life (mental domain).

The proportion of the respondents who reported that they had been exposed to vibration of their whole body was noteworthy: 60% of the respondents reported this, of which 21% were sometimes exposed and 39% were always or almost always exposed. Exposure to vibration increased the chance of poor quality of life by 12% (in the mental domain). It is known that vibration of the whole body is generally associated with lumbago[19]. In addition, the effects of vibration on the human body may cause loss of balance, lack of concentration and blurred vision[6, 21]. In general, these morbid conditions are associated with the poorest quality of life among workers[22–25], thus explaining the results obtained.

The activity of driving requires attention and alertness, and it can lead to fatigue when the working day is prolonged. Environmental factors and ways of acting modulate this effect. Ergonomic discomfort is associated with dissatisfaction, increased risk of accidents, diminished productivity, additional costs and

impaired health[6]. In situations of thermal discomfort, mood alterations (irritability and aggressiveness) and diminished performance (lack of attention and drowsiness) are observed. In closed environments, the quality of ventilation and its efficacy modulate the perceived thermal stress[23]. The groups of respondents who perceived more discomfort regarding lighting and noise conditions presented 39% and 33% greater chances of poor quality of life (mental domain), respectively, in relation to those who reported that their exposure to these factors was less uncomfortable.

Unavailability of technical resources adequate for carrying out a task was associated with poor quality of life (in the physical domain). This result is consistent with a previous report in which it was shown that a poor state of conservation or poor ergonomic design of the driver's seat and restricted space in the driver's cabin that impaired the range of motion in handling the steering wheel, among other factors, are harmful situations[23]. These factors influenced the perceptions of quality of life in the group of bus workers studied here, such that there was a 28% greater chance of presenting poor quality of life when they reported that the ergonomic conditions were inadequate.

Breaks serve to ensure rest and recuperation, meal times and the time for social interaction. However, in agreement with previous studies, the bus workers did not have breaks that were in accordance with their needs, i.e. the situation diverged from the norms and current legislation. Generally, the temporal organization of work restricts the duration of breaks and it is not rare for the circumstances and random factors (environmental and traffic conditions) to place limits on the stipulated breaks[18, 24]. Among the participants of the present study, 17% reported that they did not have breaks during their working day. On the other hand, the existence of breaks improved quality of life by 82% (in the physical dimension).

Self-assessed state of health is considered to be an overall indicator of general and mental health[26]. In the present study, 20% of the workers assessed their own health as poor or very poor, and this increased their chance of reporting poor quality of life by 67% (in the physical dimension). It was observed that there was a positive relationship between self-assessed health and poor scores for quality of life (in the mental domain), and this was 77% greater among workers with poor assessments of their health.

In relation to men, women were 1.67 times less favorable regarding quality of life (in the mental dimension). It has been recognized that women in defined age groups often report poor quality of life[27, 28]. Nonetheless, there is still no consensus regarding the association between poor quality of life and gender in studies in which the SF-12 has been used[16, 29].

Older individuals presented a 68% greater chance of better physical and mental quality of life, in comparison with younger individuals. However, this result should be interpreted cautiously. While, on the one hand, functional capacity is expected to reduce with advancing age[28, 29], with negative repercussions on the perception of quality of life, on the other hand, experience modulates judgments that individuals make regarding their potential capacity[30]. It has been seen that there are tendencies towards greater optimism in the results from self-assessment and towards behavior that might compensate for functional frailness, among older individuals.

Engaging in physical activity has consistently been negatively associated with low quality of life in the mental domain[28, 31, 32].

Morbidity influences workers' quality of life. Chronic diseases worsen physical and mental quality of life[31]. Reports of one or more diseases diagnosed over the last twelve months were positively associated with poor quality of life in the mental domain. These data are consistent, since for each mental illness reported, a 15-point reduction in the final quality-of-life score is expected. In the case of physical morbidity, the reduction may be 3 to 4 points[34].

Absenteeism (medically approved sick leaves) influences quality of life in both the physical and mental domain. In fact, such an event is the independent variable with the greatest association with reduced quality-of-life scores[35]. Nonetheless, among the present bus workers, the influence of reports of absenteeism was seen in reduced quality-of-life scores in the mental domain, without any influence on the physical domain.

The number of respondents (n=1,607) was 51% greater than the sample size calculated for the outcome of interest. This discrepancy was due to the survey design, which also covered other outcomes and therefore led to a broadened strategy with the aim of ensuring adherence. These results are descriptive and do not relate either to objective measurements of these individuals' states of health or to objective approaches towards their behavior. However, this limitation is compensated for by the advantage obtained through taking into account reports relating to these individuals' perceptions of facts about their health and quality of life in accordance with socially constructed ideas.

Notwithstanding the abovementioned advantages, this study has some limitations. The healthy worker effect may have interfered with the results[16, 36]. It is possible that drivers and conductors with poor health-related quality of life did not answer the questionnaire or were inactive during the period of the fieldwork. Thus, it cannot be ruled out that there may have

been overrepresentation of healthy individuals in the sample. However, it is also feasible that this effect may have been compensated for by the attraction of responding affirmatively to questions referring to an association between work, illness and quality of life, which is common in occupational surveys[37].

Conclusion

This work suggested that drivers and conductors working in public transport in the Metropolitan Region of Belo Horizonte, Minas Gerais, Brazil, with a poor health-related quality of life have a greater chance of being exposed to adverse working conditions, measured and adjusted as per the confounding variables (sociodemographics, lifestyle factors, general aspects of health, security-related factors and work-related factors), as discussed above. Different from expectations, variables such as age, engaging in physical activities, smoking and medical diagnosis of a disease in the physical component, participating in sociocultural activities and use of medications in the mental component and abuse of alcoholic drinks and perception of internal temperature of the bus in both components (all confounding variables) had no significance in the statistical analysis. Our results reinforce the importance of including health-related quality of life as one more dimension in the study of the relationships between health and work. In addition, the results suggest that some work conditions may influence components of quality of life and that others may influence the mental components of quality of life. Therefore, since the results of the present study identify the possible influence of working conditions and experiences of violent acts on health-related quality of life among drivers and conductors working in public transport, they are relevant for decision-making relating to public policies directed towards this sector.

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