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Active commuting to work among teachers of public basic education of the state of Minas Gerais

Transporte ativo para o trabalho entre professores da educação básica pública do estado de Minas Gerais

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Abstract – The aim of the study was to verify the prevalence and factors associated with active transport to work among public basic education teachers in the state of Minas Gerais. An epidemiological survey of the websurvey type was carried out with teachers from the state public system of basic education in Minas Gerais. The collection took place from August to September 2020 via digital form. The dependent variable was active transport to work and the crude; and adjusted Poisson Regression was used. 15,641 teachers participated in the study, of which, 26.1% were actively commuting to work. There was a higher prevalence among women (PR=1.08; 95%CI 1.01; 1.17), aged 41 to 59 years (PR=1.20; 95%CI 1.12;1.28), from the urban area (PR=1.51; 95%CI 1.37;1.66), with lower family income (PR=1.75; 95%CI 1.48;1.93), those with working time higher than 20 years (PR=1.27; 95%CI 1.19;1.35), who work as teachers for up to 39 hours per week (PR=1.15; 95%CI 1.06;1.25), with eutrophic weight (PR=1.09; 95%CI 1.02;1.17) and those who practiced physical activity 5 times or more a week (PR=1.25; 95%CI 1.15;1.36). The results showed that there is a significant prevalence of teachers who do not carry out active transport to work. The highest prevalence of active transport to work was significantly associated with several variables, among which the census area and family income. Incentives are needed to promote active transportation among teachers.

Keywords: Energy metabolism; Health surveys; Motor activity; Occupational health; School teachers.

Resumo – *O objetivo do estudo foi verificar a prevalência e os fatores associados ao transporte ativo para o trabalho entre professores da educação básica pública do estado de Minas Gerais. Foi realizado inquérito epidemiológico do tipo websurvey com professores da rede pública estadual de educação básica de Minas Gerais e a coleta ocorreu de agosto a setembro de 2020 via formulário digital. A variável dependente foi o transporte ativo para o trabalho e foi utilizada a Regressão de Poisson bruta e ajustada. Participaram do estudo 15.641 professores. Desses, 26,1% faziam transporte ativo para o trabalho. Houve maior prevalência entre as mulheres (RP=1,08; IC95% 1,01; 1,17), aqueles com idade de 41 a 59 anos (RP=1,20; IC95% 1,12;1,28), da área urbana (RP=1,51; IC95% 1,37;1,66), com menor renda familiar (RP=1,75; IC95% 1,48;1,93), os com tempo de trabalho superior a 20 anos (RP=1,27; IC95% 1,19;1,35), que trabalham na docência em até 39 horas semanais (RP=1,15; IC95% 1,06;1,25), com peso eutrófico (RP=1,09; IC95% 1,02;1,17) e aqueles que praticavam atividade física 5 vezes ou mais por semana (RP=1,25; IC95% 1,15;1,36). Os resultados evidenciaram que há prevalência significativa de professores que não realizam o transporte ativo para o trabalho. A maior prevalência de transporte ativo para o trabalho teve associação significativa com diversas variáveis, dentre os quais se destacam área censitária e renda familiar. Incentivos são necessários para promover o transporte ativo entre professores.*

Palavras-chave: *Atividade motora; Gasto energético; Inquérito epidemiológico; Professores; Saúde do trabalhador.*

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INTRODUCTION

School teachers health has been extensively studied in recent years, showing a relevant prevalence of illnesses, expressed by symptoms such as musculoskeleta[1] pain, stress, insomnia and exhaustion[1]. Associated with this context of illness, there are losses in the professional sphere, such as an increase in sickness related absence; and a reduction in the quality of teaching, as well as in the personal aspect, in which teachers' suffering is perceived[2] related to a high prevalence of sedentary lifestyle[3,4].

A sedentary lifestyle is a modifiable risk factor for chronic noncommunicable diseases and contributes to up to a quarter of the disease burden in the world[5]. On the other hand, the increased practice of physical activities provides various health benefits, such as reduction of psychiatric symptoms and prevention of chronic diseases[5].

Despite the benefits, there is a high prevalence of insufficient physical activity practices in the adult population worldwide6. It is estimated that the Brazilian reality is even worse, since almost half of the adult population does not reach the minimum recommendation for the practice of physical activity[6]. Seeking to change this reality, active commuting to work is a promising alternative, as it incorporates physical activity into the routine[7], making it easier to reach the recommended amount of physical activity.

Active commuting (AC) is a form of mobility for transporting people that uses only physical means. Among them, cycling and walking are advantageous for bringing multi-sector benefits, such as increased interpersonal interactions, reduced gas emissions and traffic jam, improved health conditions and greater economic movement[8]. Besides, active transport is more accessible and cheaper for its users.

Active commuting to work may be a strategy for creating healthy habits that contribute to improve health conditions. Little is known in the literature about active commuting among basic education teachers. Due to the great social importance of the profession, it is necessary to understand the reality of this class as well as the possibilities for intervention. Therefore, this study aims to verify the prevalence and factors associated with active transport to work among public basic education teachers in the state of Minas Gerais.

METHOD

This is a web-type epidemiological survey, carried out with basic education teachers (kindergarten, elementary and high school) from public schools in the state of Minas Gerais, Brazil. The state of Minas Gerais had approximately 90 thousand basic education teachers in 2020, working in 3,441 public schools in the state[9].

Data collection for the present study reached 15,641 teachers. Since this is a web survey, in an attempt to increase the quality and interpretation of the results obtained[10], this study followed the considerations of The Checklist for Reporting Results of Internet E-Surveys[11].

For the sample size, a formula considering infinite populations was used. A prevalence of 50% was considered with the intention of obtaining the largest sample size and power of inference. The tolerable error adopted was 3%. The sample was duplicated (deff=2). A 20% increase in the sample size was made

to compensate for possible losses. Thus, a minimum sample of 2,564 teachers was estimated. The sample calculation also provides a guarantee of minimum proportionality by region of the state.

The following were the criteria adopted for teachers being included in the research: being in the teaching role in 2020; working in kindergarten, elementary and/or high school; having a link in the network of state schools and freely accepting to participate in the research. Retired professors, those who answered "no" when asked if they accepted to participate in the study, and those who were working in a position other than the teaching function – such as directors, coordinators, among others – did not take part in the survey. There was no restriction on the participation for those on sick leave.

A pilot study was carried out to test and correct the data collection instrument. Data collection took place from August 20th to September 11th, 2020. The data collection instrument was performed through an online digital form made available via Google Forms® platform. The form link was sent to the institutional e-mail of all teachers in the state for which we had the support of the State Department of Education (SEE-MG). To avoid the automatic filling of the form, a reCAPTCHA was used, preventing the usage of robots. All questions on the form were mandatory, aiming to minimize loss of information. The study also guaranteed the anonymity of teachers.

This study was conducted adopting transport to work as the dependent variable, and it was estimated through the question: "Which means of transport do you use most often to go to the school where you work? a) walking; b) bicycle; c) motor vehicle; d) other". To analyze active transport to work, alternatives "a" and "b" were considered.

The independent variables adopted were: sex, age (in years), region of the state, census area (teacher's workplace), family income (the current minimum wage of R$1,045.00 was considered), marital status, child(ren), working time (in years), hours of weekly teaching work, job satisfaction, smoking status, anxiety and/or depression (diagnosed by a doctor), Body Mass Index (BMI), hours of television exposure per day and physical activity on weekdays. BMI was calculated from the self-reported weight and height and classified using cut-off points established by the World Health Organization (WHO), being: normal weight ≤ 24.9Kg/m2, overweight from 25 to 29.9Kg/m^2 and obesity ≥ 30Kg/m^2 [12]. In this analysis, pregnant women were not considered, aiming to avoid compromising the final result.

Data were organized, audited and analyzed using the Statistical Package for Social Sciences (SPSS®) version 22.0. Simple frequency and total prevalence of both independent variables and as to commuting to work were presented. Bivariate analyzes were also performed using Poisson Regression, showing crude Prevalence Ratio (PR), 95% Confidence Interval (95%CI) and p-value. Only the variables that presented p-value ≤ 0.20 were initially selected to compose the multiple model through Poisson Regression, with robust variance. The magnitude of associations in the multiple model was estimated by the adjusted PR, 95%CI and a significance level of 5% ($\alpha \leq 0.05$). To assess the quality of the model, the Deviance test was used.

The project was submitted to the Research Ethics Committee of the State University of Montes Claros (Unimontes) and approved with embodied report nr 4.200.389/2020. All participating teachers received, along with the data collection form, the Informed Consent Form advising on the study methodology,

its objectives and reliability of the information. All of them answered "yes" to the question related to their agreement to participate in the research. The research also complied with Resolution nr 466/12 of the National Health Council/Ministry of Health, which deals with research with human beings.

RESULTS

The form was accessed by 16,210 teachers, of which 15,641 agreed to participate in the survey, resulting in a recruitment rate of 96.5% and a completion rate of 100%. Teachers from 93.2% of Minas Gerais cities participated in the research. Among the participants, 81.9% were female, 97.4% were 60 years old or less and 59.5% had a family income between three and five minimum wages. As for the occupational profile, 62% reported more than 10 years of teaching experience and 54% were permanent employees. Of the total number of teachers, 26.1% were actively commuting to work.

Table 1 describes the characteristics of the participants who carry out active transport to work. In the bivariate analysis, variables sex, age, state region, census area, family income, marital status, child(ren), working time, weekly work hours, job satisfaction, smoking status, body mass index (BMI) and physical activity were associated with active transport to work, at a significance level of up to 20%.

In the adjusted multiple model, according to Table 2, there was a higher prevalence of active transport to work among women (PR=1.08; 95%CI 1.01;1.17); those aged 41 to 59 years (PR=1.20; 95%CI 1.12;1.28); from the state regions of Zona da Mata (RP=1.47; 95%CI 1.35;1.60), Norte (RP=1.40; 95%CI 1.29;1, 53), Sul (RP=1.23; 95%CI 1.12;1.35), Triângulo (RP=1.14; 95%CI 1.03;1.26) and Vale do Aço (RP=1.31 ; 95%CI 1.19;1.45); those from the urban area (PR=1.51; 95%CI 1.37;1.66); with family income from 3 to 5 mininum wages (PR=1.36; CI95% 1.24;1.48); and earning 1 to 2 minimum wages (RP=1.75; 95%CI 1.48;1.93); single ones (RP=1.12; 95%CI 1.06;1.19); with children (PR=1.08; 95%CI 1.01;1.16); those with more than 20 years of work (PR=1.27; 95%CI 1.19;1.35); who work in teaching up to 39 hours per week (PR=1.15; 95%CI 1.06;1.25); with normal weight according to BMI (PR=1.09; 95%CI 1.02;1.17); and those who practiced physical activity 5 times or more per week (PR=1.25; 95%CI 1.15;1.36). The statistics of the Deviance test, obtained in the final multiple model, was equal to 0.675 (p-value = 0.738), indicating that the model was an adequate fit.

Table 1. Type of commuting to work and gross association of independent variables with active transport among teachers. Minas Gerais, 2020 (n=15.641).

VARIABLES	Total	Type of commuting to work		PR gross (CI95%)	p-value
		Passive	Active		
	n (%)	n (%)	n (%)		
Sex					0,000
Male	2.824 (18,1)	2.179 (77,2)	645 (22,8)	1	
Female	12.817 (81,9)	9.386 (73,2)	3.431 (26,8)	1,172 (1,08;1,26)	
Age (in years)					0,000
From 21 to 40	6.447 (41,2)	5.028 (78,0)	1.419 (22,0)	1	
From 41 to 59	8.793 (56,2)	6.255 (71,1)	2.538 (28,9)	1,31 (1,23;1,38)	

PR: Prevalence Ratio; CI95%: 95% confidence interval; p-value: Wald Test; BMI: Body Mass Index. *Variation in "n" due to data loss. +Pregnant women were withdrawn from the analysis (n=246).

Table 1. Continued...

VARIABLES	Total	Type of commuting to work		PR gross (CI95%)	p-value
		Passive	Active		
	n (%)	n (%)	n (%)		
Older than 60	401 (2,6)	282 (70,3)	119 (29,7)	1,34 (1,15;1,57)	
State Region					0,000
Metropolitana	3.560 (22,8)	2.811 (79,0)	749 (21,0)	1	
Zona da Mata	2.891 (18,5)	2.010 (69,5)	881 (30,5)	1,44 (1,33;1,57)	
Norte	2.982 (19,1)	2.122 (71,2)	860 (28,8)	1,37 (1,25;1,49)	
Sul	2.296 (14,7)	1.719 (74,9)	577 (25,1)	1,19 (1,08;1,31)	
Triângulo	2.014 (12,9)	1.532 (76,1)	482 (23,9)	1,13 (1,02;1,25)	
Vale do Aço	1.898 (12,1)	1.371 (72,2)	527 (27,8)	1,32 (1,19;1,45)	
Census Area					0,000
Rural	2.076 (13,3)	1.666 (80,3)	410 (19,7)	1	
Urban	13.565 (86,7)	9.899 (73,0)	3.666 (27,0)	1,36 (1,24;1,49)	
Family income (in minimum wages)					0,000
More than 6	2.371 (15,2)	1.918 (80,9)	453 (19,1)	1	
3 to 5	9.301 (59,5)	6.947 (74,7)	2.354 (25,3)	1,32 (1,21;1,44)	
1 to 2	3.969 (25,4)	2.700 (68,0)	1.269 (32,0)	1,67 (1,52;1,83)	
Marital status					0,000
Married	10.453 (66,8)	7.867 (75,3)	2.586 (24,7)	1	
Single	5.188 (33,2)	3.698 (71,3)	1.490 (28,7)	1,16 (1,09;1,22)	
Child(ren)					0,001
Without	4.291 (27,4)	3.257 (75,9)	1.034 (24,1)	1	
With	11.350 (72,6)	8.308 (73,2)	3.042 (26,8)	1,11 (1,04;1,18)	
Working time*					0,000
Up to 20 years	11.729 (75,0)	8.912 (76,0)	2.817 (24,0)	1	
21 years or more	3.911 (25,0)	2.652 (67,8)	1.259 (32,2)	1,34 (1,26;1,41)	
Weekly work hours*					0,000
More than 40 hours	2.472 (15,8)	1.923 (77,8)	549 (22,2)	1	
Up to 39 hours	13.167 (84,2)	9.642 (73,2)	3.525 (26,8)	1,20 (1,11;1,30)	
Job satisfaction					0,003
Unsatisfied	672 (4,3)	503 (74,9)	169 (25,1)	1	
Indifferent	3.205 (20,5)	2.444 (76,3)	761 (23,7)	0,94 (0,81;1,09)	
Satisfied	11.764 (75,2)	8.618 (73,3)	3.146 (26,7)	1,06 (0,93;1,21)	
Smoking Status					0,132
Non-smoker	14.123 (90,3)	10.450 (74,0)	3.673 (26,0)	1	
Former smoker	665 (4,3)	505 (75,9)	160 (24,1)	0,92 (0,80;1,06)	
Smoker	853 (5,5)	610 (71,5)	243 (28,5)	1,09 (0,98;1,22)	
Anxiety and/or depression					0,748
No	10.594 (67,7)	7.825 (73,9)	2.769 (26,1)	1	
Yes	5.047 (32,3)	3.740 (74,1)	1.307 (25,9)	0,99 (0,93;1,04)	
BMI*+					0,005
Obesity	3.679 (23,9)	2.759 (75,0)	920 (25,0)	1	
Overweight	4.380 (28,5)	3.286 (75,0)	1.094 (25,0)	0,99 (0,92;1,07)	
Normal weight	7.326 (47,6)	5.327 (72,7)	1.999 (27,3)	1,09 (1,02;1,16)	
Hours of television exposure per day					0,403
Less than 3 hours	13.851 (88,6)	10.256 (74,0)	3.595 (26,0)	1	
3 or more hours	1.790 (11,4)	1.309 (73,1)	481 (26,9)	1,03 (0,95;1,12)	

PR: Prevalence Ratio; CI95%: 95% confidence interval; p-value: Wald Test; BMI: Body Mass Index. *Variation in "n" due to data loss. +Pregnant women were withdrawn from the analysis (n=246).

Table 1. Continued...

VARIABLES	Total	Type of commuting to work		PR gross (CI95%)	p-value
		Passive	Active		
	n (%)	n (%)	n (%)		
Physical activity in days per week					
					0,000
No day	5.650 (36,1)	4.233 (74,9)	1.417 (25,1)	1	
1 to 2 days	3.609 (23,1)	2.674 (74,1)	935 (25,9)	1,03 (0,96;1,10)	
3 to 4 days	4.535 (29,0)	3.388 (74,7)	1.147 (25,3)	1,01 (0,94;1,07)	
5 days or more	1.847 (11,8)	1.270 (68,8)	577 (31,2)	1,24 (1,14;1,35)	

PR: Prevalence Ratio; CI95%: 95% confidence interval; p-value: Wald Test; BMI: Body Mass Index. *Variation in "n" due to data loss. +Pregnant women were withdrawn from the analysis (n=246).

Table 2. Adjusted association of independent variables with active commuting among teachers. Minas Gerais, 2020 (n=15.641).

VARIABLES	PRadjusted (CI 95%)	p-value
Sex		0,027
Male	1,00	
Female	1,08 (1,01;1,17)	
Age (in years)		0,000
From 21 to 40	1,00	
From 41 to 59	1,20 (1,12;1,28)	
Older than 60	1,16 (0,98;1,38)	
State Region		0,000
Metropolitana	1,00	
Zona da Mata	1,47 (1,35;1,60)	
Norte	1,40 (1,29;1,53)	
Sul	1,23 (1,12;1,35)	
Triângulo	1,14 (1,03;1,26)	
Vale do Aço	1,31 (1,19;1,45)	
Census Area		0,000
Rural	1,00	
Urban	1,51 (1,37;1,66)	
Family income (minimum wage)		0,000
6 or more	1,00	
3 to 5	1,36 (1,24;1,48)	
1 to 2	1,75 (1,58;1,93)	
Marital Status		0,000
Married	1,00	
Single	1,12 (1,06;1,19)	
Child(ren)		0,017
Without	1,00	
With	1,08 (1,01;1,16)	
Working time*		0,000
Up to 20 years	1,00	
21 years or more	1,27 (1,19;1,35)	
Weekly work hours*		0,000
40 hours or more	1,00	
Up to 39 hours	1,15 (1,06;1,25)	
BMI*+		0,003
Obesity	1,00	
Overweight	0,99 (0,92;1,07)	

PR: Prevalence Ratio; CI95%: 95% confidence interval; p-value: Wald Test; BMI: Body Mass Index. *Variation in "n" due to data loss. +Pregnant women were withdrawn from the analysis (n=246).

Table 2. Continued...

VARIABLES	PRadjusted (CI 95%)	p-value
Normal weight	1,09 (1,02;1,17)	
Physical Activity in days per Week		0,000
No day	1,00	
1 to 2 days	1,03 (0,96;1,11)	
3 to 4 days	1,02 (0,95;1,09)	
5 days or more	1,25 (1,15;1,36)	
Deviance: 0,675 / p-value: 0,738		

PR: Prevalence Ratio; CI95%: 95% confidence interval; p-value: Wald Test; BMI: Body Mass Index. *Variation in "n" due to data loss. +Pregnant women were withdrawn from the analysis (n=246).

DISCUSSION

The data from the present study showed that less than a third of basic education teachers in the state network of Minas Gerais were actively commuting to work. However, it also demonstrates a higher prevalence of active transport to work when compared to other countries, such as the United Kingdom[13], and it is still a relatively low prevalence when compared to the benefits of active transport.

The construction of cities aimed at the development of motorized transport, as the main forms of population commuting, which produced a certain dependence on cars[14]. Thus, active transport remained to be the least used. Besides, there are other obstacles to the use of active transportation such as the distance to be covered and the morphology of the city[15].

This study found that females present a higher frequency of active commuting to work. Predominance of females was also found in a study carried out with students from Barcelos, Portugal[16]. Women are more aware of the benefits of physical activity and also tend to exercise more frequently due to their concern with body image[13]. A possible cause of the lower prevalence of AC among men is the fact that they are less concerned with their own health, but this is also a relevant justification for implementing the habit of using active transport to work, since it could greatly benefit their health.

Regarding age, this study showed a higher prevalence of active transport to work among teachers aged 41 to 59 years compared to teachers aged 21 to 40 years. Although there is evidence that points to an inverse relation between age and active commuting[17], it is important to emphasize that it may be associated with life stages and, therefore, it is not presented in a linear way[18]. Younger adults tend to reduce physical transport to spend more time building their careers and raising children, while those middle aged have more time available to spend with physical activities[18], which may explain the results obtained.

As for income, it was noticed that teachers with a family income of less than 6 minimum wages (especially less than 2 minimum wages) had higher prevalence of active transport to work. A similar result was found in a survey conducted with adults in an Australian study which also noticed that people living in wealthier neighborhoods are less likely to carry out active transport[19]. A possible explanation is that people with unfavourable financial situation are less able to purchase motor vehicles and, therefore, resort to active means of transport[20].

Regarding BMI, this study showed that the use of active transport to work is more prevalent among teachers with normal weight. A similar result

was found in a study carried out with adults in Chile[21]. Due to the fact that active transport helps with weight loss[22], a possible explanation is that those performing active transport already do so with the intention of maintaining a healthy weight. Active transport to work is a useful way to increase the level of physical activity[7]; and consequently, contribute to the loss of body weight[22], therefore, it could bring many benefits to overweigh people[23].

With regard to the association of active transport with the practice of physical activity, it was found that teachers who practice physical activity more than five days a week performed more active transport compared to teachers who do not practice physical activity on any day of the week. Other studies also indicate that total physical activity is positively associated with active commuting[24,25]. A study found that people who are physically active at work for ≥150 min. per week are more likely to undertake active transport[25]. These results may be explained by the finding that more physically active people have a greater perception of the benefits of it and, therefore, are more likely to adopt physical activity practices.

Some limitations of the study need to be considered, among which are data collection being performed over the internet, with the possibility of selection bias; and responses based on self-report, enabling the occurrence of memory bias. On the other hand, strengths of the study must be highlighted, such as the methodological rigor, the robustness of the sample, the support of SEE-MG, the good distribution of the sample across the state, the representativeness of 93.2% of Minas Gerais municipalities and coverage of 13.3% of teachers working in rural areas. The fact that the respondents were teachers guarantees greater credibility of the information.

CONCLUSION

The present study found that active commuting to work is not performed by a considerable number of public basic education teachers in Minas Gerais; and the higher prevalence of this practice has a positive association with the following teacher´s groups: women, older, with adequate weight, without spouse, with children, with lower family income, who practice physical activity, with less weekly working hours, who live in non-metropolitan regions, and work in urban areas. Among the analyzed variables, the most significant association between active transport to work with the census area and family income stands out.

Active transport is a promising tool for increasing the number of hours of physical activity and is related to various health benefits. Knowledge of the factors associated with the prevalence of this practice may contribute to the formulation of strategies to encourage active transport, maximizing the benefits to health and quality of life improvement.

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COMPLIANCE WITH ETHICAL STANDARDS

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Ethical approval

The project was submitted to the Research Ethics Committee of the State University of Montes Claros (Unimontes) and approved with embodied report nr 4.200.389/2020. The protocol was written following the patterns established by the Declaration of Helsinki.

Conflict of interest statement

The authors have no conflict of interests to declare.

Author Contributions

Conceived and designed the study: RRVS, NSSS, MFS, MFSFB, LP and DSH. Analyzed data: NSSS and RRVS. Wrote the paper: RRVS, NSSS, VFB, GHLM and GOM. All authors read and approved the final version of the manuscript.

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