

Quality of life and body composition among urban and rural public school teachers with musculoskeletal disorders

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Abstract—The purpose of this research was to examine how MSD affects teachers' quality of life ratings and body composition in both urban and rural settings. As a profession, teaching has been linked to high incidence of musculoskeletal diseases (MSDs), stress, and a significant decline in quality of life (QoL). Unfortunately, there is a dearth of data on how rural and urban educators fare in terms of MSD. The 36-item Short-Form Survey was used to assess participants' reports of QoL. Bioimpedance was used to analyze the subject's fat distribution. The correlation between MSD and QoL and BMI after controlling for age and gender was analyzed using a logistic regression model. There is a significant disparity in the prevalence of MSD and obesity among urban and rural educators. In order to avoid the worsening of teacher health, workplace interventions in MSD are important for those with higher MSD rates.

KEYWORDS-School personnel, students, obesity, musculoskeletal problems, and overall mental and physical health and quality of life

INTRODUCTION: Pain from musculoskeletal disorders (MSDs) is caused by trauma to the locomotor system due to either external force, excessive biomechanical stress, or psychological, social, or occupational causes (1–4). Pain from MSDs, whether acute or chronic, may be debilitating for patients and expensive for healthcare systems to treat (5, 6). Workplaces that place excessive mental and physical demands on employees are linked to MSDs (3). School teachers have one of the highest rates of multiple sclerosis in any profession. Teachers in urban or rural areas are more likely to have students with MSD, and there is a correlation between MSD and factors such as years of teaching experience, age, female gender, obesity, school type, student assignment, school infrastructure, work conditions. Both industrialized and developing nations have conducted research on MSDs. This means that data exist on how teachers' perceptions of MSD affect their QoL.

Despite the lack of evidence for MSD in the literature, it has been observed that physical and mental risk factors among Chilean schoolteachers are associated to both QoL and body composition (27). Consequently, the purpose of this research is to assess the incidence of MSD and its relationship to quality of life and body composition among Chilean urban and rural educators.

Pain and limited mobility are common symptoms of musculoskeletal diseases (MSD), which are illnesses of the musculoskeletal system.

Multiple sclerosis (MS) and other disorders have been observed in the teaching profession as a result of the strenuous mental and physical demands of the job. The frequency of MSD symptoms among teachers is estimated to range from 30 to 90% worldwide (24) and is associated with a broad range of demographic and health characteristics. The prevalence of lower back, neck, and shoulder pain has been linked to depression, anxiety, and high psychosocial demands at work. The prevalence of foot pain has been linked to age, body mass index (BMI), inappropriate footwear, and long hours of standing (29); and the prevalence of lower back pain has been linked to sleep disorders, irregular physical activity, and staying on one's feet for long periods of time among teachers (25).

Many international work groups (31, 32) and general population studies (31) have shown that MSD are related with a worse sense of quality of life (33, 34). Low quality of life ratings have been recorded by educators with MSD, which has negative effects on both physical and mental health.

It has been noted by Chilean educators that some chronic health disorders have a major effect on quality of life, particularly the mental component (20). Yet, there is a dearth of literature connecting MSD and teachers' quality of life in Chile. This research aims to assess the mental and physical health of educators in relation to the incidence of MSD.

Ministry of Education statistics show that 88.1% of Chilean educators live in cities while just 11.9% live in rural areas (28).

As most rural schools are public, this cross-sectional research may draw comparisons across institutions with similar management structures. The sample includes 14 schools from rural areas and 6 from metropolitan areas. Every educator at each of those institutions was given the opportunity to take part in the research. The first sample of 218 instructors who were willing to take part in the research According to the prevalence of MSDs in the Chilean labor force (29), we estimated that we needed a sample size of 149 people, accounting for a precision of 10%, a power of 80%, and an alpha of 5%. (urban and rural). Possible losses caused the original sample to be overstated. Finally, 65 participants were omitted due to missing data on the Nordic MSD questionnaire (40), body composition examination (14), or the SF-36 quality of life instrument (11). As a result, 153 educators constituted the final sample size.

Instruments

Musculoskeletal Conditions

The second section of the survey asked respondents whether they had experienced any of the 12 types of incapacitating pain in the previous 12 months. The instrument relies on binary responses (yes/no) to eliminate the potential for error and bias in self-reporting of pain intensity and TME durations in painful areas.

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Researchers have already visited classrooms to provide in-depth explanations of the instruments. Teachers were also required to sign an informed consent form saying their involvement was entirely voluntary. The Helsinki Declaration's requirements for bioethical conduct were followed throughout this investigation.

Of the overall sample, 53.6% were urban educators and 46.4% were from rural communities. Table 1 displays demographic, anthropometric, and body compositional information, broken down by sample size, region, and sex. It was found that women who worked as educators in rural areas spent considerably more time doing housekeeping than males did ($p < 0.05$).

There are no statistically significant variations between the sexes on the measures of marital status, contract type, or domestic work. None of the samples showed a statistically significant difference in body fat percentage or body mass index between men and women. BMI and %BF rates of obesity were greatest (28.8 and 55.8%, respectively) in rural women. In addition, female instructors in both urban and rural areas had abnormally low values for fat free mass (in kilograms), fat free mass percent, muscle mass (in kilograms), and muscle mass present Table 1 shows that 71.2% of educators had discomfort severe enough to impair their daily activities due to musculoskeletal disorders. Both urban and rural areas see high rates of MSD (90.2% and 87.3%, respectively). When broken down by body part, 68.6 percent of teachers report having had discomfort in their neck or shoulders in the last year, with 54 percent reporting that this pain has limited their daily activities. As compared to their rural counterparts, urban educators are more likely to have neck and shoulder discomfort (76.6%), with 64.6% reporting limits as a result. Another common area where urban educators show significant rates of MSD prevalence is the lower back (70.7%), where 56.1% reported limits.

The majority of instructors (79.7%) reported having the greatest multiple system dysfunctions (MSD) in the upper limb. 48.8% of urban educators met the criteria for having MSD in more than four locations ($>p50$) and 25.6% in more than six regions ($>p75$), whereas 36.6 and 15.5% of rural educators did so (see Table 2). Table 3 displays correlations between PCS and MCS quality of life

ratings (p50 and p50+) and other variables. Teachers in rural areas are more likely to have poor quality of life, as shown by a PCS summary measure that shows significant relationships for region (p 0.05). In addition, there was a statistically significant correlation between the PCS summary evaluation of QoL and teachers' p50 MSD (less than vs. more than four painful places) and p75 MSD (fewer than vs. more than six painful areas) (p 0.05). Teachers under 45 years old had the lowest score in the MCS summary evaluation for QoL (81%), and this difference was statistically significant (p 0.01). In addition, there is a statistically significant correlation between instructors with high MSD (>p75) and poor scores on the MCS (p 0.05).

TABLE 1 | Teachers in Valparaiso, Chile, had a higher rate of MSD than their urban and rural counterparts.

	Prevalence 12M n (%)			Prevalence 12M-Lim n (%)		
	Total	Urban	Rural	Total	Urban	Rural
Neck	86 (56.2)	53 (64.6)	33 (46.5)	68 (44.4)	45 (54.9)	23 (32.4)
Shoulders	71 (46.4)	42 (51.2)	29 (40.8)	50 (32.7)	34 (41.5)	16 (22.5)
Neck/Shoulders	105 (68.6)	63 (76.8)	42 (59.2)	82 (53.6)	53 (64.6)	29 (40.8)
Elbows	32 (20.9)	20 (24.4)	12 (16.9)	21 (13.7)	13 (15.9)	8 (11.3)
Wrist/Hands	69 (45.1)	36 (43.9)	33 (46.5)	41 (26.8)	26 (31.7)	15 (21.1)
Any upper limb	122 (79.7)	69 (84.1)	53 (74.6)	94 (61.4)	57 (69.5)	37 (52.1)
Upper back	69 (45.1)	41 (50.0)	28 (39.4)	49 (32.0)	31 (37.8)	18 (25.4)
Low back	88 (57.5)	58 (70.7)	30 (42.3)	66 (43.1)	46 (56.1)	20 (28.2)
Any Back	102 (66.7)	62 (75.6)	40 (56.3)	78 (51.0)	51 (62.2)	27 (38.0)
Hips/Thighs	44 (28.8)	25 (30.5)	19 (26.8)	37 (24.2)	22 (26.8)	15 (21.1)
Knees	63 (41.2)	34 (41.5)	29 (40.8)	32 (34.0)	27 (32.9)	25 (35.2)
Ankles/Feet	50 (32.7)	31 (37.8)	19 (26.8)	38 (24.8)	24 (29.3)	14 (19.7)
Any lower limb	97 (63.64)	56 (68.3)	41 (57.7)	75 (49.0)	45 (54.9)	30 (42.3)
Any MSD	136 (88.9)	74 (90.2)	62 (87.3)	109 (71.2)	61 (74.4)	48 (67.6)
>p50 ^a	66 (43.1)	40 (48.8)	26 (36.6)	75 (49.0)	49 (59.8)	26 (36.6)
>p75 ^b	32 (20.9)	21 (25.6)	11 (15.5)	30 (19.6)	20 (24.4)	10 (14.1)

Unlike in Bolivia, where rural teachers reported greater pain rates, in this research the incidence of MSD was equal in urban and rural teacher samples. In contrast to what Solis-Soto found in Bolivia, most Chilean instructors are located in metropolitan areas (28). High rates of MSD were also identified in the neck and the lower back among rural teachers. Pain prevalence was very significant in the hand/wrist region (46.5%), especially when compared to other countries that utilized the Nordic questionnaire (29% in rural teachers in Bolivia; 9.9% in the entire teacher sample; 11.6% in Turkey; and 30.7% in Botswana) (42). Only hand/wrist discomfort was shown to be more common in rural than urban teachers (46.5 vs. 43.9%).

This disparity may be attributable to differences in rural school facilities, depression, or psychological variables. Further research is required to confirm the widespread occurrence of problems affecting the carpal region. Carpal tunnel syndrome is one example of a condition that has a high incidence throughout working age owing to comfort, gender, or repeated movement exposure, indicating that instructors need preventative and safety measures to avoid it (44).

The findings indicated the greatest prevalence of discomfort for lower back among urban educators. Educators in other countries reported lower rates of neck and shoulder pain, including China (48.7%) and Turkey (43.8%) and Brazil (49.6%) in the lower back and 50.2% in the neck, respectively. It is important to note that all of the urban educators surveyed in this research worked in elementary and/or secondary schools. It's possible that the high PCS pain rates among rural teachers are due to the fact that they only teach elementary school. Workload, stress, and student conduct that is unique to their teenage development may all contribute to the increased MSD risk factors observed among secondary school teachers (14, 37). There was no difference in the prevalence of overweight and obesity between the sexes or between those with high and poor quality of life ratings in this research. Be more common than previously thought. Previous research has linked these conditions to being overweight

or obese (14, 43). As a result, the increased incidence of obesity may be contributing to the instructor overload that causes MSDs to be more common in the lower back and knees. Moreover, it has been shown that instructors who do not engage in physical exercise or sport are much more likely to be obese than their counterparts who do engage in such activities. Teachers' lack of participation in sports and other forms of physical exercise may contribute to the rising incidence of MSD by weakening their muscles. In this situation, Several research have examined this phenomenon.

Limitations

There are a number of caveats to this research. Secondly, because this is a cross-sectional study, we only get a glimpse into the lives of the respondents at the time of the interview, which might influence their answers and make it impossible to investigate any causative relationships. Second, although a representative sample of educators was collected, it should not be assumed that it is representative of the whole educator population. Its strength, however, lies in the fact that it surveys educators from not just one, but three different regions of Chile.

Conclusion

According to the results of this research, there is a high incidence of MSD among Chilean educators, with a much higher prevalence among women than males. We also examined how MSD affects teachers' quality of life, finding that younger teachers with high MSD were more likely to have poor scores on the mental component of QoL, whereas older teachers with high MSD were more likely to have low ratings on the physical component of QoL. In order to safeguard the individuals responsible for educating the nation's kids, these results should be helpful in formulating regulations to preserve teachers' physical and mental health.

REFERENCES

1. Bao S, Howard N, Lin JH. Are work-related musculoskeletal disorders claims related to risk factors in workplaces of the manufacturing industry? *Ann Work Exp Health.*(2019) 64:152–64.doi: 10.1093/annweh/wxz084
2. Das B. Gender differences in prevalence of musculoskeletal disorders and physiological stress among the brick field workers of West Bengal, India. *Work.*(2019) 63:389–403.doi: 10.3233/WOR-192945
3. Hossain MD, Aftab A, Al Imam MH, Mahmud I, Chowdhury IA, Kabir RI, et al. Prevalence of work related musculoskeletal disorders (WMSDs) and ergonomic risk assessment among readymade garment workers of Bangladesh: a cross sectional study. *PLoS ONE.* (2018) 13:e0200122. doi: 10.1371/journal.pone.0200122
4. Ng YM, Voo P, Maakip I. Psychosocial factors, depression, and musculoskeletal disorders among teachers.*BMC Public Health.* (2019) 19:234. doi: 10.1186/s12889-019-6553-3
5. Coggon D, Ntani G, Palmer KT, Felli VE, Harari R, Barrero LH, et al. Disabling musculoskeletal pain in working populations: is it the job, the person, or the culture? *Pain.*(2013) 154:856–63.doi: 10.1016/j.pain.2013.02.008
6. Shanahan EM. Work disability and musculoskeletal disease. *Int J Rheum Dis.* (2019) 22:965–6.doi: 10.1111/1756-185X.13600
7. Lentz TA, Harman JS, Marlow NM, Beneciuk JM, Fillingim RB, George SZ. Factors associated with persistently high-cost health care utilization for musculoskeletal pain. *PLoS ONE.* (2019) 14:e0225125. doi: 10.1371/journal.pone.0225125
8. Vargas C, Bilbeny N, Balmaceda C, Rodríguez MF, Zitko P, Rojas R, et al. Costs and consequences of chronic pain due to musculoskeletal disorders from a health system perspective in Chile. *Pain Rep.* (2018) 3:e656. doi: 10.1097/PR9.0000000000000656
9. Cheng HK, Wong MT, Yu YC, Ju YY. Work-related musculoskeletal disorders and ergonomic risk factors in special education teachers and teacher's aides.*BMC Public Health.* (2016) 16:137. doi: 10.1186/s12889-016-2777-7
10. Erick P, Smith D. Musculoskeletal disorder risk factors in the teaching profession: a critical review. *OA Musculoskelet Med.* (2013) 1:29.doi: 10.13172/2052-9287-1-3-939

11. Karakaya I, Karakaya MG, Tunç E, Kihtir M. Musculoskeletal problems and quality of life of elementary school teachers. *Int J OccupSafErgon.* (2015) 21:344–50.doi: 10.1080/10803548.2015.1035921
12. Ojukwu CP, Anyanwu GE, Eze B, Chukwu SC, Onuchukwu CL, Anekwo EM. Prevalence, pattern and correlates of work-related musculoskeletal disorders among school teachers in Enugu, Nigeria.*Int J OccupSafErgon.* (2018) 27:267–77.doi: 10.1080/10803548.2018.1495899
13. Hoffmann SW, Tug S, Simon P. Obesity prevalence and unfavorable health risk behaviors among German kindergarten teachers: cross-sectional results of the kindergarten teacher health study. *BMC Public Health.* (2013) 13:927. doi: 10.1186/1471-2458-13-927
14. MohseniBandpei MA, Ehsani F, Behtash H, Ghanipour M. Occupational low back pain in primary and high school teachers: prevalence and associated factors. *J. Manipulative PhysiolTher.* (2014) 37:702–8.doi: 10.1016/j.jmpt.2014.09.006
15. Shiri R, Karppinen J, Leino-Arjas P, Solovieva S, Viikari-Juntura E. The association between obesity and low back pain: a meta-analysis. *Am J Epidemiol.*(2010) 171:135–54.doi: 10.1093/aje/kwp356
16. Darwish MA, Al-Zuhair SZ. Musculoskeletal pain disorders among secondary school Saudi female teachers. *Pain Res Treat.* (2013) 2013:878570. doi: 10.1155/2013/878570
17. Cardoso JP, Araújo TM, Carvalho FM, Oliveira NF, Reis EJ. Aspectospsicossociais do trabalho e dormusculosqueléticaem professores. *Cad SaudePublica.*(2011) 27:1498–506.doi: 10.1590/S0102-311X2011000800005
18. Cezár-Vaz MR, De Almeida MCV, Pereira Rocha L, Miritz Borges A, De Oliveira Severo L, AlvesBonow. C. Trastornomusculosqueléticos en profesores: estudio de enfermeríadeltrabajo - Musculoskeletal disorders in teachers: occupational health nursing stddy. *CiencEnferm.* (2013) 19:83– 93.doi: 10.4067/S0717-95532013000300009.
19. ConstantinoColedam DH, Júnior RP, Ribeiro EAG, De Oliveira AR. Factors associated with musculoskeletal disorders and disability in elementary teachers: a cross-sectional study. *J BodywMovTher.*(2019) 23:658– 65.doi: 10.1016/j.jbmt.2018.05.009
20. Solis-Soto MT, Schön A, Solis-Soto A, Parra M, Radon K. Prevalence of musculoskeletal disorders among school teachers from urban and rural areas in Chuquisaca, Bolivia: a cross-sectional study. *BMC MusculoskeletDisord.* (2017) 18:425. doi: 10.1186/s12891-017-1785-9
21. Elias HE, Downing R, Mwangi A. Low back pain among primary school teachers in rural Kenya: prevalence and contributing factors. *Afr J Prim Health Care Fam Med.* (2019) 11:e1–7. doi: 10.4102/phcfm.v11i1.1819
22. Kebede A, Abebe SM, Woldie H, Yenit MK. Low back pain and associated factors among primary school teachers in Mekele City, North Ethiopia: a cross-sectional study. *OccupTher Int.* (2019) 2019:3862946. doi: 10.1155/2019/3862946
23. Yue P, Liu F, Li L. Neck/shoulder pain and low back pain among school teachers in China, prevalence and risk factors. *BMC Public Health.* (2012) 12:789. doi: 10.1186/1471-2458-12-789
24. Samad N, Abdullah H, Moin S, Tamrin S, Hashim Z. Prevalence of low back pain and its risk factors among school teachers. *Am J Appl Sci.* (2010) 7:634–9. doi: 10.3844/ajassp.2010.634.639
25. Figueroa A, Gutiérrez M, Miranda Celis E. Burnout, apoyo social y satisfacciónlaboral en docentes. *Psicol Esc Educ.* (2012) 16:125– 34.doi: 10.1590/S1413-85572012000100013
26. Victoria A, Sepúlveda M. Calidad de vidalaboral en docentesChilenos. *Summa Psicol UST.* (2016) 13:45–55.doi: 10.18774/448x.2016.13.256
27. Lizana PA, Vega-Fernandez G, Lera L. Association between chronic health conditions and quality of life in rural teachers. *Front Psychol.* (2020) 10:2898. doi: 10.3389/fpsyg.2019.02898
28. Fabian R, Croquevielle J. *MinutaDocentes 2019.* Chile: Gobierno de Chile (2019).
29. Vidal C, Hoffmeister L, Benadof D. Factoresasociados al dolormusculosquelético en poblacióntrabajadorachilena. *CienciaTrabajo.* (2016) 18:23–7.doi: 10.4067/S0718-24492016000100005

30. World Health Organisation. Obesity: preventing and managing the global epidemic. Report of a WHO consultation, Geneva: WHO (2000).
31. Flegal KM, Carroll MD, Kit BK, Ogden CL. Prevalence of obesity and trends in the distribution of body mass index among US adults, 1999-2010. *JAMA*.(2012) 307:491–7.doi: 10.1001/jama.2012.39
32. Olivares P. Estado de Salud de Beneficiarios del Sistema de Salud de Chile 2004 2005. Estudio de validación Cuestionario SF 36. Chile: Superintendencia de Isapres (2005).
33. Ware J, Kosinski M. SF-36 Physical and Mental Health Summary Scales. Boston, MA: The Health Institute, New England Medical Center (1994).
34. Martínez MM, Muñoz RA. Validación del cuestionario Nórdico estandarizado de síntomas musculoesqueléticos para la población trabajadora Chilena, adicionando una escala de dolor. *Rev Salud Pública*. (2017) 21:43– 53.doi: 10.31052/1853.1180.v21.n2.16889
35. Erick PN, Smith DR. A systematic review of musculoskeletal disorders among school teachers. *BMC MusculoskeletDisord*. (2011) 12:260. doi: 10.1186/1471-2474-12-260
36. Mena-Iturriaga MJ, Mauri-Stecca MV, Sizer PS, Leppe J. Quality of life in chronic musculoskeletal symptomatic Chilean population: secondary analysis of National Health Survey 2009-2010. *BMC MusculoskeletDisord*. (2020) 21:262. doi: 10.1186/s12891-020-03261-x
37. Ng Y, Ibrahim N, Maakip I. Prevalence and risk factors of musculoskeletal disorders (MSDs) among primary and secondary school teachers: a narrative review. *Austin J MusculoskeletDisord*. (2017) 4:1046.