


LOW BACK PAIN IN ENDEMIC DISEASE CONTROL AGENTS: INFLUENCE OF GENDER, AGE AND LENGTH OF PROFESSIONAL EXPERIENCE

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ABSTRACT

Objective: to evaluate low back pain among Endemic Disease Control Agents (ACE) and the influence of gender, age and time of work. **Methods:** This is a cross-sectional, census study. Data collection was carried out using a sociodemographic questionnaire and the *Japanese Orthopaedic Association Back Pain Evaluation Questionnaire* (JOABPEQ). The comparison between the categories used the Mann-Whitney U test, assuming a significance level of 5%. **Results:** Data from 304 ECAs were evaluated. The prevalence of low back pain for the group was 50.0%. In relation to gender, there was a significant difference only for the mental health domain, with worse scores for women. Regarding age, significant differences were recorded for the domains of social life and mental health, both registering worse scores for people under 40 years of age. Regarding the length of experience, significant differences were observed for the domains of low back pain, social life and mental health, with worse scores for those with less than two years of experience. **Conclusion:** Low back pain represents an important complaint for ACE, with worse impacts among women, professionals under 40 years of age and with up to two years of experience.

Keywords: Low back pain. Health Personnel. Endemic Disease Control Agent.

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INTRODUCTION

Health workers are frequently evaluated in relation to various aspects of their health conditions. However, such evaluations are almost always restricted to professionals with higher education, while those with technical level are, to a certain extent, neglected in relation to the development of studies that assess their working conditions and health. The Endemic Disease Control Agents (ACE) represent a very emblematic example of this situation. These professionals play a complementary role in the teams to combat endemic diseases and zoonoses, and are often ignored in the literature. Little is known about the profile of these workers, who are responsible for health surveillance and education, either in relation to their training process or their work practices (EVANGELISTA; FLISCH; PIMENTA, 2017).

According to article 3 of Federal Law No. 13,595/2018, the ACE have eleven main attributions, including the implementation of disease prevention and control strategies in partnership with other health teams (BRASIL, 2018). The attributions listed expose them to multiple physical, chemical, biological and mechanical risks (GUIDA *et al.*, 2012). Specifically in relation to physical conditions, the ACE perform activities that course with repetitive movements, inadequate postures for a long time, excessive physical exertion and mechanical pressure on specific areas of the body (CÂNDIDO; FERREIRA, 2017). A study carried out in Belo Horizonte (MG) highlighted the perception of precarious working conditions, the feeling of invisibility and marginalization experienced by these workers (MATOS; SILVA; SILVEIRA, 2020).

In the context of the consequences of their activities, diseases of the musculoskeletal system emerge as the most common causes of sick leave of up to 15 days, representing approximately 20% of all work-related leaves. This scenario justifies the urgent need for more in-depth investigations on the physical impacts of this profession and its consequences for the health of workers, especially with regard to musculoskeletal conditions (CÂNDIDO; FERREIRA, 2017; MATOS; SILVA; SILVEIRA, 2020).

The ACE's list of activities, in an arduous workday, creates vulnerabilities in relation to musculoskeletal diseases, especially to the lumbar spine. The position of the spine is maintained in an uncomfortable situation for long periods, which generates a static overload on the musculoskeletal structure, implying direct risks for the development of low back pain. Long working hours associated with repetitive movements generate limitations

to the performance of work functions, an aspect pointed out in other health professionals (CARGNIN *et al.*, 2019; CHOWDHURY *et al.*, 2023).

Although low back pain is a common cause of pain among many workers, there are few studies that address the topic among health professionals, especially among ACE. Studies with other professionals highlight that variables such as gender, length of service, and age have been shown to be associated with low back pain (CHOWDHURY *et al.*, 2023; ALMEIDA; FERNANDES, 2022). Research in this area can be useful to reduce absenteeism, assist in the guidance that these professionals provide to users, improve self-care, and generate data relevant to the health area. These data can support the development and/or adaptation of intervention strategies aimed at this portion of the population.

No studies were identified on the health conditions of ACE in the northern region of Minas Gerais, a transition area between the Southeast and Northeast of the country, with precarious socioeconomic characteristics and high prevalence of infectious diseases. This situation reinforces the importance of local studies that investigate the health conditions of these professionals. In this sense, the objective of this study was to evaluate low back pain among the FBAs and the influence of factors such as gender, age and length of professional experience.

METHODOLOGY

This is a project anchored in a larger research that evaluated the physical and mental health conditions of the ACE, characterizing itself as an epidemiological, cross-sectional and analytical study. The research was carried out in Montes Claros, a municipality in the north of Minas Gerais. The city is the main regional urban center and has a population of approximately 420 thousand inhabitants.

The target population of the study was the ACE who worked in the municipality in the first half of 2024. The inclusion criteria for the study were: professional registered as an Endemic Disease Control Agent in the municipality, of both sexes, in effective practice. Professionals who had worked in the city for less than six months and those who had already undergone surgical treatment for low back pain were excluded.

The study was conducted in a census manner, with the objective of reaching all professionals in the municipality and, therefore, there was no sample calculation. The project had the support of the Municipal Health Department, through the Health

Surveillance sectors and the Regional Reference Center for Workers' Health (CEREST). The data collection schedule was carried out in consensus with the municipality to release the professionals on alternate days and times to participate in the study, which occurred in a safe and comfortable environment.

For data collection, a sociodemographic characterization questionnaire was used, in addition to an internationally known instrument already validated in Brazil: the *Japanese Orthopaedic Association Back Pain Evaluation Questionnaire* (JOABPEQ) (POLETTTO *et al.*, 2017). This instrument assesses low back pain covering five main domains: pain, low back function, ambulation, social life and mental health. The score range for each domain ranges from zero to 100, with higher scores revealing better conditions. The five functional scores should be used independently and the authors warn that there is no purpose in summing the scores of each domain. In addition, there is a visual analog scale, with scores ranging from zero to 10, and, unlike the other domains, higher values indicate more intense pain. The domains evaluated include the degree of back pain, gluteal or leg pain, and the degree of numbness in the buttocks or legs (POLETTTO *et al.*, 2017; TOMINAGA *et al.*, 2018)

The instruments were applied by medical students, previously trained and monitored by three nursing professionals. Before the data collection itself, a pilot test was carried out with the participation of community health agents, allowing students to become familiar with the application process and adjust possible failures in the procedures, simulating the real conditions of the interviews.

On the days of data collection, the professionals were invited according to the CEREST and Municipal Health Department schedules and were presented with the research and the free and informed consent form. Only after signing the term, data collection began. For professionals with higher education, a questionnaire was made available to be self-administered, while for those with high school education, assisted interviews were conducted using the same instrument.

For statistical analysis, the *Statistical Package for Social Science for Windows* (SPSS), version 23.0, was used. Descriptive statistics and comparative analyses were performed between group characteristics, considering gender, age and time working as FBA using a Mann-Whitney U test, since the scores did not present a normal distribution, as determined from the Komogorov-Smirnov test. The assumed level of statistical significance was 5% ($p < 0.05$).

All ethical aspects were respected. The participants were informed about the objective, procedures and voluntariness of participation and signed a Free and Informed Consent Form. The research project was approved by the Ethics Committee of the FIPMOC University Center, according to the opinion proven by CEP No. 6.580.419.

RESULTS

A total of 304 ACE participated in the study. There was only one loss related to one participant who refused to answer the questionnaire. Most respondents were male (82.2%), were between 40 and 59 years old (50.7%), were married or lived in a stable union (57.6%) and declared brown skin color (64.5%). The majority of the group had completed high school (62.8%) and had more than two years of experience with LCA (63.3%) (Table 1).

Table 1 - Sociodemographic characterization of Endemic Disease Control Agents, Montes Claros (MG), 2024 (N=304)

Parameter	(n)	(%)
Sex		
Male	250	82,2
Female	54	17,8
Marital status		
Married/common-law partnership	175	57,6
Single	98	32,2
Separated/Divorced	26	8,6
Widower	5	1,6
Skin color		
Brown	196	64,5
Black	52	17,1
White	48	15,8
Yellow/Indigenous	5	1,6
No information	3	1,0
Schooling		
Fundamental	27	8,9
Middle school	164	53,9
Higher education	113	37,2
Age group		
Under 40 years old	118	38,8
40-59 years old	154	50,7
60 years or older	32	10,5
Household income		
Up to 2 salaries	101	32,9
3 to 5 salaries	135	44,0
More than 5 salaries	68	22,1
Acting time		
Up to 2 years	111	36,7
More than 2 years	193	63,3

The prevalence of low back pain measured among the FBAs was 50% (n=152). The JOABPEQ global scores revealed values ranging from 10.0 to 100.0 for the low back pain

domain, with a median of 62.5; values from 20.8 to 100.0 for the lumbar function domain, with a median of 80.0; values from 15.0 to 100.0 for the ambulation domain, with a median of 80.0; values from 16.7 to 100.0 for the social life domain, with a median of 75.0; and values from 14.3 to 100.0 for the mental health domain, with a median of 67.9.

Table 2 - Comparison between means for the domains of the JOABPEQ Scale, according to sex, age and time of work for Endemic Disease Control Agents; Montes Claros (MG); 2024 (N=304).

Variables and domains	Average	Standard deviation	p-value*
Sex			
<i>Low back pain domain</i>			0,284
Male	59,85	24,32	
Female	63,43	19,96	
<i>Lumbar Function Domain</i>			0,812
Male	72,30	14,72	
Female	72,45	17,71	
<i>Ambulation Domain</i>			0,533
Male	75,46	17,92	
Female	78,70	12,86	
<i>Social Life Domain</i>			0,178
Male	74,34	19,31	
Female	71,45	16,48	
<i>Mental Health Domain</i>			<0.001
Male	68,57	16,62	
Female	57,34	18,98	
Age			
<i>Low back pain domain</i>			0,730
< 40 years	60,96	22,70	
≥ 40 years	60,18	24,23	
<i>Lumbar Function Domain</i>			0,559
< 40 years	72,07	14,68	
≥ 40 years	72,49	15,65	
<i>Ambulation Domain</i>			0,356
< 40 years	75,72	15,68	
≥ 40 years	76,24	18,07	
<i>Social Life Domain</i>			<0.001
< 40 years	69,42	17,44	
≥ 40 years	76,62	19,21	
<i>Mental Health Domain</i>			<0.001
< 40 years	59,74	17,83	
≥ 40 years	70,91	15,98	
Acting time			
<i>Low back pain domain</i>			0,047
< 2 years	64,08	20,58	
≥ 2 years	58,42	25,02	
<i>Lumbar Function Domain</i>			0,222
< 2 years	73,64	15,92	
≥ 2 years	71,57	14,85	
<i>Ambulation Domain</i>			0,609
< 2 years	75,72	16,69	
≥ 2 years	76,22	17,46	
<i>Social Life Domain</i>			0,043
< 2 years	71,70	16,53	
≥ 2 years	75,05	19,99	
<i>Mental Health Domain</i>			<0.001

< 2 years	59,65	17,95
≥ 2 years	70,56	16,08

Table 2 shows the comparison between the means for the domains of the JOABPEQ Scale, according to sex, age and time of work among the FBAs evaluated. In relation to gender, there was a statistically significant difference only for the "mental health" domain, with worse scores for women. Regarding age, statistically significant differences were recorded for the domains of "social life" and "mental health", both registering worse scores for people under 40 years of age. People aged 40 years or older had worse scores in relation to the "low back pain" domain.

In relation to the length of experience, statistically significant differences were observed for the domains of "low back pain", "social life" and "mental health", with worse scores for professionals with less than two years of experience.

Table 3 - Comparison between the means for the domains of the JOABPEQ Visual Analogue Scale, according to sex, age and time of experience for Endemic Disease Control Agents; Montes Claros (MG); 2024 (N=304).

	Average	Standard deviation	p-value*
Sex			
<i>Degree of back pain</i>			0,032
Male	4,11	3,05	
Female	5,13	3,11	
<i>Degree of pain in the buttocks or legs</i>			0,012
Male	4,00	3,17	
Female	5,22	3,04	
<i>Degree of numbness in the buttocks or legs</i>			0,785
Male	3,21	3,19	
Female	3,11	3,22	
Age			
<i>Degree of back pain</i>			0,866
< 40 years	4,32	2,96	
≥ 40 years	4,27	3,17	
<i>Degree of pain in the buttocks or legs</i>			0,713
< 40 years	4,29	2,95	
≥ 40 years	4,18	3,32	
<i>Degree of numbness in the buttocks or legs</i>			0,158
< 40 years	2,89	3,16	
≥ 40 years	3,38	3,20	
Acting time			
<i>Degree of back pain</i>			0,923
< 2 years	4,26	2,92	
≥ 2 years	4,31	3,18	
<i>Degree of pain in the buttocks or legs</i>			0,174
< 2 years	4,53	3,04	
≥ 2 years	4,04	3,24	

<i>Degree of numbness in the buttocks or legs</i>			0,146
< 2 years	2,89	3,21	
≥ 2 years	3,36	3,18	

(*) Mann-Whitney U Test

Table 3 presents the results of the comparison between the means for the domains of the JOABPEQ Visual Analogue Scale, according to gender, age and time of work. For the evaluation according to gender, there was a statistically significant difference for the degree of back pain and for the degree of pain in the buttocks or legs, with worse scores for females. No other statistically significant differences were recorded in relation to the other characteristics evaluated.

The analyses revealed that there are significant differences in the degree of back pain and the degree of gluteal or leg pain between the sexes, with women reporting higher levels of pain in both categories. There was no significant difference in relation to the degree of numbness in the buttocks or legs.

DISCUSSION

The present study evaluated low back pain among ACE, a professional category little explored among health workers. The perception of occupational risks for these professionals is often restricted to contact with chemical products (GUIDA *et al.*, 2012; CANDID; FERREIRA, 2017) or the lack of specific care for protection during work activities (CÂNDIDO; FERREIRA, 2017; MATOS; SILVA; SILVEIRA, 2020; DONATELI *et al.*, 2019). No studies were identified that specifically addressed the ergonomic aspects of the ACE's work, even though a Ministry of Health manual deals with the issue in a specific way (BRASIL, 2019).

The results revealed a worrying prevalence of low back pain among the interviewees, similar to that observed in other health professionals, who work at the hospital level (CARGNIN *et al.*, 2019; SANJOY *et al.*, 2017; SANTOS *et al.*, 2017). This result highlights the magnitude of the problem and the potential negative impact on the health of these workers. In the approach according to gender, age and time of work, more negative perceptions of low back pain were recorded, especially among women and among younger professionals with less time of experience.

Women reported a significantly higher degree of back pain and gluteal or leg pain compared to men, suggesting that gender may influence pain perception. This may be related to biological factors such as hormonal and anatomical differences, as well as

psychosocial factors that affect the way men and women experience and report pain. The higher mean pain in the back and glutes or legs among women may be an indication that they face a greater burden of suffering, which is consistent with the literature that suggests that women tend to report higher levels of pain (NASCIMENTO; KOSMINSKY; CHI, 2020; IGUTI; BASTOS; BARROS, 2015).

Regarding the degree of numbness, no significant differences were observed between the sexes, suggesting that the perception of numbness may be less influenced by gender compared to pain. This finding is in agreement with another study conducted with volunteers, indicating that numbness tends to be perceived more evenly between men and women, being more influenced by age group (HASHIZUME *et al.*, 2015).

The domains that revealed the worst scores were mental health and social life. This result is in line with a Japanese study conducted with more than ten thousand patients (OHTORI *et al.*, 2010). In the scale used, the social life domain evaluates the impact of low back health related to social activities, while the mental health domain evaluates the psychological and emotional aspects associated with this pain. For both aspects, the worst scores were recorded, especially in the first two years of working as an ACE and in the female sex. These are relevant and critical findings in the working conditions of these professionals. In this sense, the monitoring of living, mental health and work conditions can enable the incorporation of other dimensions to the health care of these workers, expanding the health and work relations, based on the recognition of the realities that involve them in their daily lives (MOLINA *et al.*, 2017).

These results are similar to other studies, which also pointed to statistically significant differences for the mental health dimension (HASHIZUME *et al.*, 2015; OHTORI *et al.*, 2010). An Indian study specifically evaluated the association between chronic low back pain and various mental problems, concluding that patients with low back pain have associated psychological comorbidities, of varying extent. The authors highlight, based on the results, that a patient-centered approach is recommended for all people complaining of chronic low back pain (SINGHAL *et al.*, 2021).

It is also necessary to emphasize the need to consider the differences between men and women in pain and numbness assessments, with implications for pain treatment and management. Clinical and epidemiological findings clearly show that women are at increased risk of chronic pain, occurring through multiple biopsychosocial mechanisms, which contribute to this difference in pain perception between the sexes. Intervention

strategies need to be adapted considering these outcomes to better meet the needs of patients, especially considering that the perception and experience of pain are complex and multifactorial (MOLINA *et al.*, 2017). Considering the activities developed by the ACE, which often involve significant physical efforts, such as carrying heavy materials, going up and down stairs, walking long distances (BRASIL, 2019), it is reasonable to evaluate the results observed here in the distribution of tasks between men and women who perform the same function.

In the evaluation of the analog scale, the results indicate that the average intensity of pain and numbness, when compared by age group and time of work, do not demonstrate statistically significant differences. The means and standard deviations were consistent in all analyses, which suggests a homogeneous distribution of the most intense symptoms of pain and discomfort among the ACE, regardless of age or length of professional experience.

The absence of significant differences in domains such as low back pain and low back function may indicate the need for further research to better understand the relationship between age and these aspects, which are also influenced by variables such as lifestyle habits, use of one or more drugs, and a regular or poor self-perception of health (CAPUTO *et al.*, 2022). These aspects were not evaluated in the present study. In this study, age alone was not shown to be a determinant of pain severity for the group evaluated. However, other studies associate aging with increased low back pain (IGUTI; BASTOS; BARROS, 2015; CAPUTO *et al.*, 2022).

The fact that more than half of the group was over 40 years of age and had been working as FBA for more than two years should be considered in the interpretation of the results found. It is important to emphasize that these professionals were shaped by unfavorable working conditions as well as by an often empirical training, without basic professional qualification (EVANGELISTA *et al.*, 2019). Under these conditions, assuming incorrect postures, performing repetitive movements without regular breaks can occur and are conditions that favor the development of chronic pain among these professionals. In a large study carried out in Germany, the authors highlighted, among other aspects, some sociodemographic characteristics that are associated with low back pain, highlighting the role of occupations that require only an intermediate or low educational level. For the authors, these groups should be focused on potentially increasing healthy work lives and preventing incapacity for work (BELLER *et al.*, 2024).

Regarding the length of time working as an ACE, a negative impact was evidenced for those with less than two years of activity, especially in the domains of low back pain, social life and mental health. Although no studies with this same group were identified, a study that evaluated Community Health Agents, also members of the Primary Health Care team, concluded that the greatest stressors in the work environment include physical, cognitive and psychological overload, which highlights the need for actions aimed at the health of these workers not to disregard social and psychological aspects (LOPES *et al.*, 2018).

The lack of significant differences for some of the domains evaluated does not minimize the importance of ergonomic interventions for the ACE. On the contrary, it highlights the need for a comprehensive approach that benefits all workers, regardless of age or length of service. The lack of regular and supervised physical activity was a factor associated with a higher prevalence of low back pain in a study conducted in São Paulo (IGUTI; BASTOS; BARROS, 2015), justifying interventionist actions for this portion of the population.

It is recommended the development of educational policies that promote the teaching of techniques for the prevention of musculoskeletal injuries and the implementation of regular breaks during the workday. For other health professionals, an association between working hours and the onset of pain has already been recorded, with low back pain being the most common (MATOS; SILVA; SILVEIRA, 2020). Thus, for these professionals, it is important to identify work situations that may trigger pain and provide resolute measures for this problem (JESUS *et al.*, 2024).

The JOABPEQ scale, used here, although not recent and has already been validated in Brazil, is still little used, especially in the field of specific populations, such as health professionals, including ACE. However, it is an instrument with adequate adaptation to the Portuguese language, presenting good psychometric attributes (ALMEIDA; FERNANDES, 2022). The domains used by the scale highlight that low back pain is a relevant health problem, which reaches different dimensions of life in society, in addition to the relationship with work itself.

It is important to consider the results achieved in light of some limitations, such as sample size, which may not have been sufficient to detect small statistical differences. In addition, data collection by self-administered questionnaires may be subject to misinterpretation and subjective perception of the participants. For greater accuracy and

reliability, it is recommended that future studies include larger sample sizes and adopt objective methodologies such as clinical examinations and physical testing. Longitudinal assessments are also recommended to monitor symptom progression and the effectiveness of interventions over time. Despite these limitations, the study revealed a critical situation for an important portion of essential workers in the promotion and prevention of diseases, and this aspect cannot be neglected in health care and well-being.

CONCLUSION

Low back pain represents an important complaint for the ACE, affecting an important portion of these workers. The worst impacts were among women, among professionals under 40 years of age and among those with up to two years of experience. The results highlight the need for a specific approach for this group and reflect a possible difficulty in adapting to activities that should be carefully evaluated by health managers.

REFERENCES

1. Almeida, C. G. S. T. G., & Fernandes, R. C. P. (2022). Musculoskeletal diseases are the leading cause of sickness absenteeism among oil industry workers in Brazil: Results of a cohort study. **Brazilian Journal of Occupational Health**. <https://doi.org/10.1590/2317-6369/06220pt2020v47e9>
2. Beller, J., Sperlich, S., Epping, J., Safieddine, B., Hegewald, J., & Tetzlaff, J. (2024). Sociodemographic differences in low back pain: Which subgroups of workers are most vulnerable? **BMC Musculoskeletal Disorders**. <https://doi.org/10.1186/s12891-024-07970-5>
3. Brazil. (2018). **Lei nº 13.595, de 5 de janeiro de 2018**. Amends Law No. 11,350, of October 5, 2006, to provide for the reformulation of attributions, working hours and conditions, the degree of professional training, technical and continuing education courses and compensation for transportation of Community Health Agents and Endemic Disease Control Agents. **Federal Official Gazette**, Section 1.
4. Brazil. Ministry of Health. Secretariat of Health Surveillance. (2019). **Manual on health protection measures for agents to combat endemic. Volume 1: Arboviruses transmitted by Aedes aegypti**. Ministry of Health.
5. Cândido, A. S., & Ferreira, R. J. (2017). Risks to health and safety at work of endemic disease control agents in the municipality of Campos Sales, Ceará, Brazil. **Ensaio Ciência**. <https://doi.org/10.17921/1415-6938.2017v21n1p52-57>
6. Caputo, E. L., Souza, D. F. S., Häfele, V., & Siqueira, F. C. V. (2022). Back pain prevalence and associated factors in Brazilian Unified Health System users. **BrJP**. <https://doi.org/10.5935/2595-0118.20220022>
7. Cargnin, Z. A., Schneider, D. G., Vargas, M. A. O., & Schneider, I. J. C. (2019). Work activities and chronic nonspecific low back pain in nursing workers. **Acta Paulista de Enfermagem**. <https://doi.org/10.1590/1982-0194201900097>
8. Chowdhury, M. O. S. A., Huda, N., Alam, M. M., Hossain, S. I., Hossain, S., Islam, S., & Khatun, M. R. (2023). Work-related risk factors and the prevalence of low back pain among low-income industrial workers in Bangladesh: Results from a cross-sectional study. **Bulletin of the Faculty of Physical Therapy**. <https://doi.org/10.1186/s43161-023-00132-z>
9. Donateli, C. P., Einloft, A. B. N., Coutinho Junior, A. L., Cotta, R. M. M., & Costa, G. D. (2019). Endemic disease control agents' perception on the fight against **Aedes aegypti** and the prevention of arbovirus infections in Brazil. **PLOS Neglected Tropical Diseases**. <https://doi.org/10.1371/journal.pntd.0007741>
10. Evangelista, J. G., Flisch, T. M. P., & Pimenta, D. N. (2017). The training of agents to combat endemic diseases in the context of dengue: Documentary analysis of health policies. **RECIIS**. <https://doi.org/10.29397/reciis.v11i1.1219>

11. Evangelista, J. G., Flisch, T. M. P., Valente, P. A., & Pimenta, D. N. (2019). Agents to combat endemic: Construction of professional identities in dengue control. **Trabalho, Educação e Saúde**. <https://doi.org/10.1590/1981-7746-sol00173>
12. Guida, H. F. S., Souza, K. R., Santos, M. B. M., Silva, S. M. C. L., & Silva, V. P. (2012). The relations between health and work of Funasa's endemic disease control agents: The workers' perspective. **Saúde e Sociedade**. <https://doi.org/10.1590/S0104-12902012000400006>
13. Hashizume, H., Konno, S., Takeshita, K., Fukui, M., Takahashi, K., Chiba, K., & et al. (2015). Japanese Orthopaedic Association Back Pain Evaluation Questionnaire (JOABPEQ) as an outcome measure for patients with low back pain: Reference values in healthy volunteers. **Journal of Orthopaedic Science**. <https://doi.org/10.1007/s00776-014-0693-1>
14. Iguti, A. M., Bastos, T. F., & Barros, M. B. A. (2015). Back pain in an adult population: A population-based study in Campinas, São Paulo State, Brazil. **Cadernos de Saúde Pública**. <https://doi.org/10.1590/0102-311X00178114>
15. Jesus, N. A., Nascimento, F. P. B., Tracera, G. M. P., Sousa, K. H. J. F., Santos, K. M., Santos, R. S., & et al. (2024). Musculoskeletal pain among nursing professionals in material and sterilization centers. **Journal of the School of Nursing of the University of São Paulo**. <https://doi.org/10.1590/1980-220X-REEUSP-2023-0019en>
16. Lopes, D. M. Q., Lunardi Filho, W. D., Beck, C. L. C., & Coelho, A. P. F. (2018). Workloads of the community health agent: Research and care in the convergent-care perspective. **Text & Context - Nursing**. <https://doi.org/10.1590/0104-07072018003850017>
17. Matos, G. C. R., Silva, J. M., & Silveira, A. M. (2020). Work and health: The perspective of endemic disease control agents in the city of Belo Horizonte, MG. **Brazilian Journal of Occupational Health**. <https://doi.org/10.1590/2317-6369000031117>
18. Molina, M. R. A. L., Jansen, K., Pinheiro, R. T., Silva, R. A., Passos, M. B., & Souza, L. D. M. (2017). Depressive symptoms and relationship between genders: Differences in young adults in a randomized clinical trial. **Paideia (Ribeirão Preto)**. <https://doi.org/10.1590/1982-43272767201701>
19. Nascimento, M. G., Kosminsky, M., & Chi, M. (2020). Gender role in pain perception and expression: An integrative review. **BrJP**. <https://doi.org/10.5935/2595-0118.20200013>
20. Ohtori, S., Ito, T., Yamashita, M., Murata, Y., Morinaga, T., Hirayama, J., & et al. (2010). Evaluation of low back pain using the Japanese Orthopaedic Association Back Pain Evaluation Questionnaire for lumbar spinal disease in a multicenter study: Differences in scores based on age, sex, and type of disease. **Journal of Orthopaedic Science**. <https://doi.org/10.1007/s00776-009-1426-8>

21. Poletto, P. R., Gobbo, D. K. P., Gotfryd, A. O., Catania, S. N., Sousa, D. C., & Pereira, S. B. S. (2017). Cultural adaptation, reliability and validity of Japanese Orthopaedic Association Back Pain Evaluation Questionnaire to Brazilian Portuguese. *Einstein (São Paulo)*. <https://doi.org/10.1590/S1679-45082017AO3890>
22. Sanjoy, S., Ahsan, G., Nabi, H., Joy, Z., & Hossain, A. (2017). Occupational factors and low back pain: A cross-sectional study of Bangladeshi female nurses. *BMC Research Notes*. <https://doi.org/10.1186/s13104-017-2492-1>
23. Santos, E. C., Andrade, R. D., Lopes, S. G. R., & Valgas, C. (2017). Prevalence of musculoskeletal pain in nursing professionals working in orthopedic setting. *Revista Dor*. <https://doi.org/10.5935/1806-0013.20170119>
24. Singhal, K., Muliya, K. P., Pakhare, A. P., Behera, P., & Santoshi, J. A. (2021). Do patients of chronic low back pain have psychological comorbidities? *Avicenna Journal of Medicine*. <https://doi.org/10.1055/s-0041-1734385>
25. Tominaga, R., Sekiguchi, M., Yonemoto, K., Kakuma, T., & Konno, S. I. (2018). Establishment of reference scores and interquartile ranges for the Japanese Orthopaedic Association Back Pain Evaluation Questionnaire (JOABPEQ) in patients with low back pain. *Journal of Orthopaedic Science*. <https://doi.org/10.1016/j.jos.2018.03.010>