

RESEARCH ARTICLE

OPEN ACCESS

Manuscript received November 4, 2022; revised November 19, 2022; accepted November 21, 2022; date of publication December 20, 2022

Digital Object Identifier (DOI): <https://doi.org/10.35882/ijahst.v2i6.172>

Copyright © 2022 by the authors. This work is an open-access article and licensed under a Creative Commons Attribution-ShareAlike 4.0 International License ([CC BY-SA 4.0](https://creativecommons.org/licenses/by-sa/4.0/))

How to cite: Mardiani, Maksuk, Husni, Widia Lestari, Aishath Hamid. "The Influence of Workplace Stretching Exercise on Nurse's Musculoskeletal Complaints at Health Services in Bengkulu, Indonesia", International Journal of Advanced Health Science and Technology, vol. 2, no. 6, pp.371-376, 20 December. 2022

The Influence of Workplace Stretching Exercise on Nurse's Musculoskeletal Complaints at Health Services in Bengkulu, Indonesia

Mardiani¹, Maksuk², Husni¹, Widia Lestari¹, and Aishath Hamid³

¹ Department of Nursing, Poltekkes Kemenkes Bengkulu, Indonesia

² Department of Environmental Health, Poltekkes Kemenkes Palembang, Indonesia

³ Consultant, WHO (World health organization), Representative to the Republic of Maldives

Corresponding author: Maksuk (e-mail: maksuk@poltekkespalembang.ac.id).

This work was supported in part by the Poltekkes Kemenkes Bengkulu, Indonesia.

ABSTRACT The most common complaints experienced by nurses in health care are musculoskeletal complaints. This condition is caused by several factors including nurses' work attitude, length of work, work shifts, and type of work. The objective of this study was to analyze the effect of giving muscle stretching exercises to reduce musculoskeletal complaints in nurses at Bengkulu City Health Services. Based on the normality, homogeneity, and t-test of the pretest-posttest data, this study was a quasi-experimental with a control group design. The nurses in Bengkulu City's health services were the study's population, and the sampling method was consecutive sampling. A total of 60 respondents were divided into two groups: the intervention group (30 respondents) and the control group (30 respondents). The sampling technique was simply random based on the inclusion criteria. Data were analyzed using the pair t test with a p value of 0.05. According to the study's findings, the majority of nurses aged 31-40 years old were females with a diploma 3 education. The statistical test results showed that the p value was 0.0005, indicating that there was a significant difference between the control and intervention groups. As a result, the Workplace Stretching Exercises intervention in the treatment group was found to be more effective than the exercise in the control group. When compared to the control group, the group that received muscle stretching exercises had fewer musculoskeletal complaints.

INDEX TERMS Workplace Stretching Exercise, Musculoskeletal complaints, Health services.

I. INTRODUCTION

Musculoskeletal disorders (MSDs) are currently a widespread and growing occupational health problem in the workplace worldwide [1]. Work-related musculoskeletal disorders (WMSDs) are a leading cause of morbidity among workers, including healthcare providers [2]. Musculoskeletal complaints, which include nurses, are symptoms experienced by workers in parts of the skeletal muscles ranging from very mild to severe. Nearly one third of cases of musculoskeletal disorders can be attributed to occupational risk factors, mainly back pain [3]. The work activities of nurses in health services include turning over, lifting, changing clothes and other actions that pose a musculoskeletal risk to nurses [4]. Nurses frequently experience musculoskeletal complaints, particularly in hospitals and other health-care settings [5]. It is caused by several factors, including the workload of nurses.

This increased workload of nurses can cause work-related risks.

The causes of musculoskeletal complaints in nurses are generally due to frequent forced movements, non-ergonomic body postures, and repetitive movements, including lifting heavy patient loads, bending postures, twisting, and standing too long [6]. Characteristics of the patient's asymmetrical body, weight, and moves without coordination make patient handling difficult for the nurse's body [7]. The complaints of low back pain were also experienced by nurses at Purbalingga Hospital, as many as 18.75% [8]. The most frequent complaints of MSDs experienced by nurses at Serang Hospital are complaints in the neck, upper back and shoulders [9]. According to a study at Bhakti Dharma Husada Hospital Surabaya, the majority of MSDs complaints are caused by wrong work attitudes [10]. Musculoskeletal complaints are experienced by nurses in several health

services, including hospitals. It is caused by several factors, including nurses' work attitude, length of work, work shifts, and type of work. One of the efforts to anticipate musculoskeletal complaints is by doing stretching exercises program in the workplace. Previous research has shown that combining physical stretching exercises and hot packs for nurses can reduce musculoskeletal complaints [11]. In addition, interventions for stretching exercises were effective to decrease pain due to MSDs (Musculoskeletal Disorders) [12]–[14]. As a result, managing work-related musculoskeletal injuries in occupational health settings is critical in the workplace, including in health services [15]. Therefore, preventive action is needed to improve working conditions and increase nurse awareness about MSDs prevention [2].

Physical stretching exercises are activities that have been promoted by the Ministry of Health as an effort to overcome musculoskeletal complaints. One of the efforts they have made is to do a muscle stretching exercise program at work, including in health services to reduce musculoskeletal complaints. Employee morale can be improved by implementing workplace physical exercise programs at least once or twice a week [16]. Based on previous studies, it showed that more than 70 percent of perioperative nurses felt that workplace stretching program can reduce musculoskeletal complaints and provide positive physical, psychological and cultural benefits [17]. The workplace exercise program that are carried out regularly for 5 days/week, 30–40 min/day can improve the physical and mental in hospital workers [18]. In addition, the aerobic exercise program carried out by nurses for eight weeks regularly by the experimental group can reduce work stress compared to the control group [19]. The stretching exercise program at workplace carried out for a long time by office workers can also reduce musculoskeletal discomfort [20]. Therefore, the study aimed to analyze the impact of providing workplace stretching exercises on musculoskeletal complaints in nurses at Health Services Bengkulu City.

II. METHODOLOGY

This study is a quasi-experimental design with a control group. This research was conducted from October to December 2021 at Health Centers in Bengkulu City. This study included all nurses who worked at the Health Service Center in Bengkulu City. The sampling method was a consecutive sampling was taken randomly. The 60 respondents were divided into two groups: the intervention group (30 respondents) and the control group (30 respondents). The sampling technique was carried out simply randomly according to the inclusion criteria. The inclusion criteria were willing to be research subjects, aged 20–60 years, worked for at least one year, physically and mentally healthy, not accompanied by physical disabilities and injuries. Based on the normality, homogeneity, and t-test

of the pretest-posttest data, the pair t test with a p value of 0.05 was used to analyze the data. The exercise actions carried out in the intervention group were Workplace Stretching Exercise (WSE) and booklets for four weeks with the help of supervision from the research team every week. The intervention group participated in a four-week supervised concurrent stretching exercise program (stretching exercises performed 5 days per week for 15–20 minutes per day) in a health care setting. Meanwhile in the control group, leaflets and stretching exercises were carried out by the respective public health center and carried out for four weeks. Before stretching exercise, to determine musculoskeletal complaints, the intervention and control groups were interviewed using the Nordic Body Map questionnaire. Furthermore, four weeks later, all participants in both the intervention and control groups were measured again using the Nordic Body Map (NBM) questionnaire. This study received ethical approval from the Health Research Ethics Committee of the Bengkulu Ministry of Bengkulu Health Polytechnic and was awarded a certificate No. KEPK/187/10/2021.

III. RESULTS

Based on TABLE 1, The results revealed that the age group was mostly 31–40 years old, with 13 people (43.3%), while the control group was also 31–40 years old, with 10 people (33.3%). The treatment group had 29 respondents (96.7%) who were female, while the control group had 28 respondents (93.3%) who were female. Body Mass Index of some respondents in the treatment group with the overweight category as many as 15 (50%), and most of the respondents in the control group as many as 19 (63.3%). The level of education in the treatment group, most of the respondents had Diploma education, as many as 15 people (50%), the control group, most of the respondents had undergraduate education, as many as 11 people (36.7%). All respondents in the treatment group worked for 7 hours/day, and in the control group the majority worked for 8 hours/day, namely 16 people (53.3%). In the treatment group, most of the respondents had a tenure of 5 years as many as 28 people (93.3%), and the control group mostly had a tenure of 5 years as many as 27 people (90%). (93.3%), and the control group mostly had a tenure of 5 years as many as 27 people (90%). Based on TABLE 2, The analysis revealed that in the intervention group, the mean of musculoskeletal complaints prior to receiving WSE was 0.67, the standard deviation was 0.479, and (95% CI = 0.49–0.85).

The mean musculoskeletal complaints after WSE were 0.20, standard deviation 0.407 and (95% CI = 0.05–0.35). The results of the analysis showed that in the control group the mean of musculoskeletal complaints before WSE was given was 0.60, standard deviation was 0.498 and (95% CI = 0.41–0.79). The mean of musculoskeletal complaints after

WSE was given was 0.40, standard deviation 0.498 and (95% CI = 0.21-0.59). Based on TABLE 3, the treatment group's mean was lower than the control group's. The analysis revealed that the p value was 0.0005, indicating that there was a significant difference between the control and intervention groups.

TABLE 1

Frequency distribution based on characteristics of respondents at public health center in Bengkulu (n=60)

Variables	Intervention Group		Control Group	
	n	%	n	%
Age				
- 21-30 years	6	20.0	9	30
- 31-40 years	13	43.3	10	33.3
- 41-50 years	8	26.7	9	30.0
- 51-60 years	3	10	2	6.7
Gender				
- Male	1	3.33	2	6.7
- Female	29	96.7	28	93.3
Body Mass Index				
- Skinny	2	6.7	0	0
- Normal	13	43.3	11	36.7
- Overweight	15	50	19	63.3
Education Level				
- Diploma three	15	50	9	30
- Diploma four	3	10	8	26.7
- Bachelor	8	26.7	11	11
- Nursing profession	2	6.7	0	0
- Master of Nursing	2	6.7	2	6.7
Length of working				
- 6 hours/day	0	0	8	26.7
- 7 hours /day	3	10	6	20
- 8 hours/day	0	0	16	53.3
Length of period				
- < 5 years	2	6.7	3	10
- ≥ 5 years	28	93.3	27	90

TABLE 2

Distribution of mean musculoskeletal complaints before and after wse interventions at public health center in Bengkulu (n=60)

Variables	Intervention Group	Control Group
Musculoskeletal complaints		
Pre		
Mean	0.67	0.60
Median	1.00	1.60
SD	0.479	0.498
Min-Max	0-1	0-1

CI for Mean 95%	0.49-0.85	0.41-0.79
Musculoskeletal complaints		
Post		
Mean	0.20	0.40
Median	0.00	0.00
SD	0.407	0.498
Min-Max	0-1	0-1
CI for Mean 95%	0.05-0.35	0.21-0.59

TABLE 3

The differences in average decrease in musculoskeletal complaints between treatment and control groups at public health center in Bengkulu (N=60)

Groups	Complaint Difference			
	Mean	SD	Std.Error	pvalue
Intervention	0.20	0.407	0.74	0,0005
Control	0.40	0.498	0.91	

IV. DISCUSSION

The study showed that most of the nurses who experienced musculoskeletal complaints at the Bengkulu City Health Center based on age were above 32 years.

According to previous studies, most of the nurses who experienced musculoskeletal complaints were nurses who were over 35 years old [21]. This is because productive age affects the work process. The greater a person's age, the greater the risk of muscle complaints; the number of nurses over 30 years old is at a very high risk of experiencing muscle complaints, as muscle strength declines with age. The longer a person works and the older he or she becomes, the more degeneration occurs, resulting in less stability in bones and muscles.

The majority of nurses at Bengkulu's health service center are female. Gender is closely related to musculoskeletal complaints because male muscle ability is physiologically stronger than female muscle ability. This study contradicts previous findings that gender has a significant effect on the risk of muscle complaints [21]. Musculoskeletal complaints are related to length of work, this is in accordance with the results of studies on weavers with long sitting position [22]. According to the findings of numerous previous studies, nurses have a relatively high prevalence of complaints: the three most common body parts are the lower back, knees, and neck [5], [23].

In both the treatment and control groups, the majority of respondents had worked for 5 years. Musculoskeletal complaints are common among nurses with more than 5 years of experience. According to the results of research on nurses working in Jeddah hospitals reported experiencing low back pain with a high prevalence [24]. Another study reported that tenure was associated with musculoskeletal complaints in nurses in the emergency room and operating room at Prambanan Hospital. [25]. The causes of musculoskeletal complaints include physical workload,

excessive physical workload with a long working period are factors that cause MSDs complaints in nurses [26].

The study's findings revealed that Workplace Stretching Exercises (WSE) had an effect on the reduction of musculoskeletal complaints in the treatment group. The control group was given educational leaflets and did stretching exercises to nurses and it was found that there was an effect of being given Workplace Stretching Exercises (WSE) educational leaflets on musculoskeletal decline in the control group. It was discovered in this study that there were differences in musculoskeletal complaints among nurses between the intervention and control groups.

According to the results of this study at Sanglah Hospital, stretching can reduce musculoskeletal complaints in nurses [27]. Workplace Stretching Exercise is an activity that is considered as one of the steps used to overcome musculoskeletal complaints [28], [29]. The stretching exercise also provides several benefits for workers in the workplace such as it can help increase morale, can improve blood circulation, improve physical function, increase body flexibility, thereby reducing the possibility of injury and musculoskeletal complaints [30]. This study supported a previous study that found physical stretching exercises to be significantly related to reducing musculoskeletal complaints in nurses at Medan hospitals [31].

Similar studies reported that improving work posture also affects the decrease in MSDs complaints in nurses [32]. Physical activity carried out by nurses on a regular basis can also reduce complaints of MSDs in nurses [33]. Workplace exercise programs can be used safely to improve the physical and mental health of hospital employees [18].

The workplace physical exercise program implemented in a hospital is a viable intervention that produces clinically relevant outcomes for nursing assistants' musculoskeletal health, as measured by increased trunk flexor muscle strength and control of low back symptoms [34]. Employee morale can be improved by implementing workplace physical exercise programs at least once or twice a week [35]. According to previous research that workplace stretching program carried out by perioperative staff can reduce musculoskeletal disorders [17].

In addition, a stretching program carried out for eight minutes can prevent musculoskeletal disorders in workers [36]. Upper extremity resistance exercises at work carried out by workers in tertiary hospitals for approximately 15 minutes can reduce fatigue, pain and discomfort in the upper extremities and neck felt by workers [37]. According to the results of previous studies that the exercise program carried out by office workers for six weeks had an effect on reducing musculoskeletal complaints [38]. The workplace exercise program conducted by female hospital staff can reduce neck, shoulder and lower back pain [39]. As a result, the workplace stretching exercise program implemented by nurses in the workplace to reduce work-related stress and musculoskeletal pain is beneficial [40]. The small number of respondents in the intervention and control groups is one of the study's limitations. The intervention method used is solely focused

on a stretching exercise program. Furthermore, we only carried out the intervention four weeks after the study began, especially after one year. Our research design is primarily concerned with worker participation in a single location.

V. CONCLUSION

Musculoskeletal complaints are still often felt by workers in health services, especially women workers. Workplace stretching exercise programs that are carried out routinely by health care workers can reduce musculoskeletal complaints. Therefore, stretching exercise programs in health services are important to be carried out independently by nurses and other health workers, especially in health services. Further research needs to be carried out using ergonomic interventions to reduce musculoskeletal disorders, especially in workers in several health service locations.

ACKNOWLEDGMENT

The authors would like to thank the Bengkulu health services for their willingness to assist with this research project.

REFERENCES:

- [1] A. Hamid, A. S. Ahmad, S. Dar, S. Sohail, F. Akram, and M. I. Qureshi, "Ergonomics hazards and musculoskeletal disorders among workers of health care facilities," *Current world environment*, vol. 13, no. 2, 2018.
- [2] H. D. Luan et al., "Musculoskeletal disorders: prevalence and associated factors among district hospital nurses in Haiphong, Vietnam," *Biomed Res Int*, vol. 2018, 2018.
- [3] R. Shiri, D. Coggon, and K. Falah-Hassani, "Exercise for the prevention of low back pain: systematic review and meta-analysis of controlled trials," *Am J Epidemiol*, vol. 187, no. 5, pp. 1093–1101, 2018.
- [4] K. Cheung et al., "Predictors of work-related musculoskeletal symptoms in shoulders among nursing assistants working in nursing homes," *PeerJ*, vol. 9, p. e11152, 2021.
- [5] N. Arsalani, M. Fallahi-Khosknab, M. Josephson, and M. Lagerström, "Musculoskeletal disorders and working conditions among Iranian nursing personnel," *International Journal of Occupational Safety and Ergonomics*, vol. 20, no. 4, pp. 671–680, 2014.
- [6] J. Y. Hou and J. S. C. Shiao, "Risk factors for musculoskeletal discomfort in nurses," *Journal of Nursing Research*, vol. 14, no. 3, pp. 228–236, 2006, doi: 10.1097/01.JNR.0000387581.04716.56.
- [7] A. Garg, B. D. Owen, and B. Carlson, "An ergonomic evaluation of nursing assistants' job in a nursing home," *Ergonomics*, vol. 35, no. 9, pp. 979–995, 1992, doi: 10.1080/00140139208967377.
- [8] H. Fathoni, Handoyo, and K. G. Swasti, "Relationship between Attitude and Work Position with Low Back Pain Nurse Purbalingga," *Jurnal Keperawatan Soedirman*, vol. 7, no. 2, pp. 120–126, 2017.

- [9] F. Wajdi and W. Kusmasari, "Occupational Risks for Musculoskeletal Complaints in Hospital Nurses," *Teknik Industri UMJ Jakarta*, no. November 2015, pp. 1–7, 2015.
- [10] B. M. Nuryaningtyas and T. Martiana, "Analisis Tingkat Risiko Muskuloskeletal Disorders (MSDs) dengan The Rapid Upper Limbs Assessment (RULA) dan Karakteristik Individu Terhadap Keluhan MSDs," *The Indonesian Journal of Occupational Safety and Health*, vol. 3, no. 3, pp. 160–169, 2014.
- [11] E. Syafrianto, P. K.H, and Z. Zulfa, "Pengaruh Workplace Stretching Exercise (WSE) dan Heat Therapy (Hot Pack) terhadap Keluhan Muskuloskeletal pada Perawat Tahun 2019," *Jurnal Ilmiah Universitas Batanghari Jambi*, vol. 19, no. 3, p. 678, 2019, doi: 10.33087/jiubj.v19i3.749.
- [12] B. Priyoto, "The Effect of Giving Stretching Exercise Intervention in the Workplace on Reducing Msds Disorders and Blood Uric Acid Levels," *Jurnal Keperawatan*, vol. 12, no. 1, pp. 53–68, 2019.
- [13] E. Maksuk Maksuk, Sherli Shobur, Mardiani, "The Effect of Workplace Stretching Exercise to Reduce Musculoskeletal Complaints in Weavers," *International Journal of Health Science and Technology*, vol. 3, no. 3, pp. 1–9, 2022.
- [14] Q. Gasibat, N. Bin Simbak, A. A. Aziz, L. Petridis, and Z. Tróznai, "Stretching exercises to prevent work-related musculoskeletal disorders: A review article," *AJSSM*, vol. 5, no. 2, pp. 27–37, 2017.
- [15] J. Prall and M. Ross, "The management of work-related musculoskeletal injuries in an occupational health setting: the role of the physical therapist," *J Exerc Rehabil*, vol. 15, no. 2, p. 193, 2019.
- [16] T. Jindo, Y. Kai, N. Kitano, K. Tsunoda, T. Nagamatsu, and T. Arao, "Relationship of workplace exercise with work engagement and psychological distress in employees: A cross-sectional study from the MYLS study," *Prev Med Rep*, vol. 17, p. 101030, 2020.
- [17] A. King, J. Campbell, C. James, and J. Duff, "A workplace stretching program for the prevention of musculoskeletal disorders in perioperative staff: A mixed methods implementation study," *Journal of Perioperative Nursing*, vol. 33, no. 4, pp. 3–10, 2020.
- [18] V. Gerodimos, K. Karatrantou, K. Papazeti, C. Batatolis, and C. Krommidas, "Workplace exercise program in a hospital environment: an effective strategy for the promotion of employees physical and mental health. A randomized controlled study," *Int Arch Occup Environ Health*, pp. 1–10, 2022.
- [19] Z. Mohebbi, S. F. Dehkordi, F. Sharif, and E. Banitalebi, "The effect of aerobic exercise on occupational stress of female nurses: A controlled clinical trial," *Invest Educ Enferm*, vol. 37, no. 2, 2019.
- [20] A. Villanueva et al., "Effect of a long exercise program in the reduction of musculoskeletal discomfort in office workers," *Int J Environ Res Public Health*, vol. 17, no. 23, p. 9042, 2020.
- [21] Helmina, N. Diani, and I. Hafifah, "Relationship of Age, Gender, Work Period and Sports Habits with Musculoskeletal Disorders (MSDs) complaints in nurses," *Caring Nursing Journal*, vol. 3, no. 1, p. 24, 2019.
- [22] S. Shobur, M. Maksuk, and F. I. Sari, "Risk Factors for Musculoskeletal Disorders (MSDs) in Ikat Weaving Workers in Tuan Kentang Village, Palembang," *Jurnal Medikes (Media Informasi Kesehatan)*, vol. 6, no. 2, pp. 113–122, 2019.
- [23] L. F. Reed, D. Battistutta, J. Young, and B. Newman, "Prevalence and risk factors for foot and ankle musculoskeletal disorders experienced by nurses," *BMC Musculoskelet Disord*, vol. 15, no. 1, pp. 1–7, 2014.
- [24] R. A. M. Gaowgzeh, "Low back pain among nursing professionals in Jeddah, Saudi Arabia: prevalence and risk factors," *J Back Musculoskelet Rehabil*, vol. 32, no. 4, pp. 555–560, 2019.
- [25] S. Supardi, A. Winarti, and A. Suprajatno, "Factors Affecting Musculoskeletal Complaints in Nurses in the Emergency Room and Operating Room at Prambanan Hospital," *Jurnal Inovasi Penelitian*, vol. 3, no. 2, pp. 5091–5100, 2022.
- [26] L. D. Pratiwi, I. K. Saputra, and M. V. Manangkot, "The Relationship between Physical Workload and Musculoskeletal Complaints in Nurses in Lely 1 and 2 Hospitals in Buleleng Hospital," *Coping: Community Of Publishing In Nursing*, vol. 8, no. 4, p. 440, 2020.
- [27] N. Lestari, P. Luh, and W. Susi, "The Effect of Stretching on Musculoskeletal Complaints in Nurses in the Ratna Room and Medical Surgical Sanglah Hospital," *Universitas Udayana*, 2014.
- [28] S. Nooryana, I. P. G. Adiatmika, and S. Purnawati, "Dynamic Stretching Exercises And Active Rest Reduce Musculoskeletal Complaints In Workers In The Garment Industry," *Jurnal Ergonomi Indonesia (The Indonesian Journal of Ergonomic)*, vol. 6, no. 1, pp. 61–67, 2020.
- [29] OSHC, *Workplace Stretching Exercises Relieve Stress*. China United Centre. 2015.
- [30] IOSH, "Musculoskeletal Disorders. Institution of Occupational Safety and Health The Grange, Highfield Drive, Wingston, Leicestershire, England," 2018.
- [31] A. Rovitri, H. S. Lubis, and M. M. Sinaga, "Perbedaan Keluhan Muskuloskeletal Sebelum Dan Sesudah Pemberian Workplace Stretching Exercise Pada Perawat Di RSIA Badrul Aini Medan Tahun 2015," *Jurnal terpadu Ilmu Kesehatan*, vol. 5, no. 2, pp. 1–9, 2015.
- [32] W. Wuriyani, E. M. Rosa, and M. Afandi, "Pengaruh Perbaikan Postur Kerja terhadap Nyeri Muskuloskeletal pada Perawat di Klinik Kitamura Pontianak," *Mutiara Medika: Jurnal Kedokteran dan Kesehatan*, vol. 17, no. 1, pp. 22–28, 2017.
- [33] B. Yazid and H. Situmorang, "Hubungan Aktivitas Fisik Dengan Gangguan Muskuloskeletal Pada

- Perawat Di RSU Sundari Medan,” *Jurnal Keluarga Sehat Sejahtera*, vol. 19, no. 2, pp. 38–47, 2021.
- [34] R. F. C. Moreira, C. S. Moriguchi, L. Carnaz, F. A. Foltran, L. C. C. B. Silva, and H. J. C. G. Coury, “Effects of a workplace exercise program on physical capacity and lower back symptoms in hospital nursing assistants: a randomized controlled trial,” *Int Arch Occup Environ Health*, vol. 94, no. 2, pp. 275–284, 2021.
- [35] T. Jindo, Y. Kai, N. Kitano, K. Tsunoda, T. Nagamatsu, and T. Arao, “Relationship of workplace exercise with work engagement and psychological distress in employees: A cross-sectional study from the MYLS study,” *Prev Med Rep*, vol. 17, p. 101030, 2020.
- [36] O. O. Aje, B. Smith-Campbell, and C. Bett, “Preventing musculoskeletal disorders in factory workers: evaluating a new eight minute stretching program,” *Workplace Health Saf*, vol. 66, no. 7, pp. 343–347, 2018.
- [37] O. Artiga, A. Bucy, R. Qiu, E. Cramer, and M. Raney, “Functional training improves the effectiveness of stretching programs for university cleaning staff,” *Int J Workplace Health Manag*, no. ahead-of-print, 2022.
- [38] A. Villanueva et al., “Effect of a long exercise program in the reduction of musculoskeletal discomfort in office workers,” *Int J Environ Res Public Health*, vol. 17, no. 23, p. 9042, 2020.
- [39] L. M. Oldervoll, M. Ro, J. A. Zwart, and S. Svebak, “Comparison of two physical exercise programs for the early intervention of pain in the neck, shoulders and lower back in female hospital staff,” *J Rehabil Med*, vol. 33, no. 4, pp. 156–161, 2001.
- [40] F. C. T. de Freitas-Swerts and M. L. do C. C. Robazzi, “The effects of compensatory workplace exercises to reduce work-related stress and musculoskeletal pain,” *Rev Lat Am Enfermagem*, vol. 22, pp. 629–636, 2014