Original Research Paper

Volume - 16 | Issue - 04 | April - 2026 | PRINT ISSN No. 2249 - 555X | DOI : 10.36106/ijar

Physiotherapy

EFFECT OF SHORT-TERM PHYSICAL THERAPY INTERVENTION ON MUSCULOSKELETAL PAIN AND FATIGUE AMONG HOUSEKEEPING STAFF OF BHAIKAKA UNIVERSITY

Dr. Nency Pandya (PT)	Assistant Professor K. M. Patel Institute of Physiotherapy, Bhaikaka University, Karamsad, Gujarat
Dr. Brijesh Acharya (PT)	Assistant Professor K. M. Patel Institute of Physiotherapy, Bhaikaka University, Karamsad, Gujarat
Megha Shah (PT)	Intern, K. M. Patel Institute of Physiotherapy, Bhaikaka University, Karamsad, Gujarat
Nachiket Dodiya (PT)	Intern, K. M. Patel Institute of Physiotherapy, Bhaikaka University, Karamsad, Gujarat

ABSTRACT **Background:** WRMSDs are non-traumatic conditions affecting the muscles, ligaments, tendons, joints, nerves, and supporting structures such the intervertebral disc. The physically demanding jobs that housekeeping staff frequently carry out may lead to fatigue and musculoskeletal diseases (MSDs). This study investigated the effects of a short-term physical therapy intervention on musculoskeletal pain and fatigue among housekeeping staff. **Methodology:** This study included 45 Bhaikaka University housekeeping staff members who had knee, lower back, or neck problems. The intervention consisted of three times-weekly workouts for four weeks. Each session included a warm-up of three minutes, interval training of twenty minutes, and a cool-down of three minutes. Both before and after the intervention, the Numerical Pain Rating Scale (NPRS) and fatigue Severity Scale (FSS) were used to measure pain and fatigue respectively. **Result:** The mean age of participants was about 39 years old, 82% of the participants were female and 38 years old, and 18% were male. Following the intervention, there were statistically significant decreases in both pain (NPRS: pre-mean 5.44 to post-mean 0.24, $p < 0.05$) and fatigue (FSS: pre-mean 30.42 to post-mean 14.93, $p < 0.05$). **Conclusion:** A short-term physical therapy intervention effectively reduced musculoskeletal pain and fatigue among housekeeping staff. This suggests that such interventions can be valuable for improving the well-being and productivity of this occupational group.

KEYWORDS : Musculoskeletal Pain, Fatigue, Exercise, Housekeeping Staff

INTRODUCTION

Housekeeping staff play a critical role in hospital sanitation and waste produce disposal. Their physically demanding occupation, such as pushing, lifting, and mopping, lead to musculoskeletal disorders (MSDs) due to poor posture and overexertion. MSDs produce pain and disability through effects on the bones, joints, and muscles. [1-3] The housekeeping employees in India have a high incidence of MSDs as reported by research studies.[6] Exercise therapy specifically stretching and strengthening prevents MSDs and enhances flexibility, muscle strength, and posture. Exercise programs for enhancing musculoskeletal function, reducing pain promoting recovery, and preventing injury. [7-9] Despite the major prevalence of MSD in housekeeping staff, due to many barriers like time or financial constraints, they do not approach the treatment. So, our need of the study was to give short-term physiotherapy treatment protocol to reduce pain and fatigue. By improving this parameters protocol will be implicated for their routine practice and enhancement of overall quality of life and functional status.

Methodology

Before commencing the study, the study proposal was prepared and submitted to the Institutional Ethics Committee (IEC) of Bhaikaka University, Karamsad. After that approval and permission for conducting a study were obtained. IEC approval was obtained on IEC/BU/161/Faculty/16/26/2025.

Source of Data: Samples (Housekeeping staff) were collected from Bhaikaka University, Karamsad.

Study Design: Experimental study.

Study Population: Housekeeping staff of Bhaikaka University.

Sampling Method: Purposive Sampling

Sampling Size: A total of 45 participants were enrolled in the study.

Inclusion Criteria

1. With a minimum of 1year Services were included.
2. Both genders (Females even during menstruation as exercises are not contraindicated during menstruation), aged between 20 to 60 years.
3. All the participants who had neck, lower back, and knee pain were screened through the Modified Nordic Questionnaire

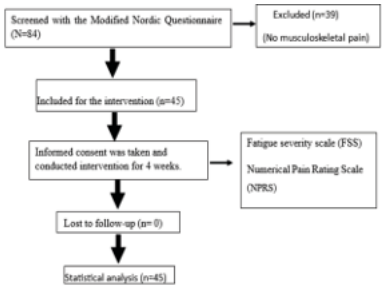
Exclusion Criteria:

1. Who was suffering from any neurological and psychological disorders
2. Any post-operative conditions < six months.

Materials Required:

Consent form
Modified Nordic Questionnaire
Fatigue severity scale (FSS)
Numerical Pain Rating Scale (NPRS)
Data collection sheet

Procedure:



Flowchart of Participant's Recruitment

Methodology

After receiving approval from the IEC, permission was obtained from the head of the housekeeping staff, and then the participants were recruited at a suitable time without disturbing their routine work. A purposive sampling method was used for participant selection, and everyone was provided written informed consent before enrolment. Based on inclusion and exclusion criteria, participants were recruited into the study. Screening was done with Modified Nordic questionnaire. After screening participants who had neck, back, and knee pain were enrolled in the study.

Modified Nordic Questionnaire

The modified Nordic questionnaire collects data regarding the location of discomfort in specific body regions by using partial or whole-body images that show areas for evaluation. The body map was divided into two portions.

Section 1: questions are particular to musculoskeletal distress and general questions that gather information on the subject. A body map that identifies the nine symptom sites which include the neck, shoulders, upper back, elbows, lower back, wrists and hands, hips and thighs, knees, and ankles and feet. Respondents are questioned about

any musculoskeletal issues that have interfered with their ability to do daily tasks during the past seven days and the past twelve months.
Section 2: More questions on the shoulders, lower back, neck, etc. that go into deeper detail about musculoskeletal problems. The questions ask about any accidents that have affected each area, how the problem has affected one's ability to perform at work and home (such as a change in job or duties), how long the condition has persisted, and how a health professional has evaluated it. [10]

It helps to assess the pain area. The validity of this scale is 100% and reliability is 0.94 which means this scale identified real pain areas. [11,12].

A total of 45 participants were educated on the importance of exercise training in the treatment of musculoskeletal pain and fatigue. The intervention was given by the intern under guidance and observation for 3 days/week up to 4 weeks in a physiotherapy department. An exercise protocol was including of a 3-minute warm-up, 20-minute interval training, and a 3-minute cool-down. (Table 1) The total exercise duration was approximately 20-30 minutes. All the exercises were given as group therapy in the physiotherapy department. Outcome measures were evaluated before and after the intervention in the form of NPRS and FSS.

Numerical Pain Rating Scale:
The Numerical Rating Scale is a self-report pain measure with 11 points. It is the unidimensional pain scale that is most frequently used. The respondent chose the whole number (0–10) that expresses pain intensity. Participants were asked to circle a number between 0 and 10 on a Numerical pain Rating Scale (NPRS). Typically, zero denotes "no pain at all," and ten denotes the "more severe pain." The following categories are frequently used: no pain = 0, mild pain = 1-3, moderate pain = 4- 6, and severe pain = 7-10. However, these classifications are not always accurate and are not useful for evaluating change. The categories could be used to set goals for the results of the intervention. [13]. It helps to assess the pain intensity. The validity of this scale is strong, and reliability is 0.96. [14]

Fatigue Severity Scale (FSS):
It is used to assess the fatigue level of participants. It consists of nine questions; each question has 7 points. 1 denote "strongly disagree" and 7 denote "strongly agree". [15] It helps to assess the fatigue level. The validity of this scale is strong, and reliability is .094. [16]

The Intervention Program: Tailor-made protocol was carried out from the ACSM guidelines for musculoskeletal conditions. [17-18]

Table 1: Tailor-made Exercise Protocol

	Type of exercise	Dosage
Warm-up (3-minutes)	stretching: cervical flexor, cervical side flexor, hamstring, quadriceps	10sec hold & 3 repetitions
Interval training(20-minutes)	AROM: cervical knee to chest, trunk flexion, rotation of the spine, prone on the elbow	10 repetitions
	Static abdominals, Static quadriceps, Vastus medialis obliques strengthening, knee extensors strengthening, straight leg raise	10 hold & 10 repetitions
Cool down(3-minutes)	Jacobson relaxation technique	

Figure 1: A: Recruitment Procedure, B: Self-stretching of Hamstring Muscle, C: AROM of Cervical Extension, D: Straight leg Raises, E: Knee to chest, F: Trunk FlexionResults:

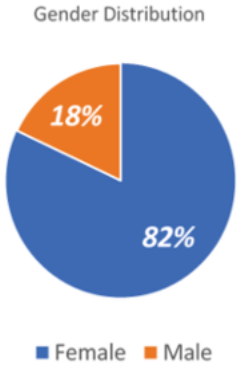


Figure 2: Gender Distribution

Figure 2 shows gender distribution, whereby the total number of participants is 45. 82 % of the respondents were females (n= 37), whereas 18% of them were males (n= 8). This indicates a significant gender disparity within the sample, with females being notably more represented than males.

Figure 3: Mean Age of Participants

Figure 3 represents the mean age and standard deviation (SD) for males, females, and the group in a study. The mean age for males is 38.25 years (SD = 11.59), and for females is 39.83 years (SD = 6.52).

Table 2: Evaluation of Outcome Measures

Outcome measures	Mean (SD)		Difference	p-value
	Pre	Post		
NPRS*	5.44(0.94)	0.24(0.54)	5.2(0.89)	<0.05
FSS*	30.42(9.19)	14.93(9.13)	15.48(9.13)	<0.05

*NPRS: Numerical Pain Rating Scale & FSS: fatigue severity scale

Table 2 presents a comparison of two outcome measures, NPRS (Numerical Pain Rating Scale) and FSS (Fatigue Severity Scale), before and after an intervention. It also shows the p-values, t-values, and the difference between pre-and post-intervention scores.

NPRS
The average pain score significantly decreased from 5.44 to 0.24 after the intervention, with a difference of 5.2. However, the p-value is less than the conventional significance level of 0.05, indicating that this change is statistically significant.

FSS
The average fatigue score decreased from 30.42 to 14.93 after the intervention, with a difference of 15.48. Like the NPRS results, the p-value is < 0.05 indicating that this change is also statistically significant.

DISCUSSION
The purpose of this experimental study done on the housekeeping staff of Bhaikaka University was to evaluate the effect of short-term physical therapy intervention on musculoskeletal pain and fatigue among housekeeping staff. There were 8 men and 37 women who participated in the study. Lestari ND et al. claim that the capacity to work between Males and females make a difference [19]. According to Rollman, women are more likely to suffer pain than men at higher

intensities, and for longer periods. Our study shows a difference between the pre-NPRS value and the post-NPRS value with a p-value of <0.05 and a difference between the pre-FSS value and post-FSS value with a p-value <0.05. Table 2 Using the paired T-test, there has been a significant reduction in musculoskeletal pain and fatigue after doing exercises among housekeeping staff. Exercise methods are inexpensive ways to reduce musculoskeletal pain and fatigue.

Physical therapy aims to prevent musculoskeletal disorders. It involves strengthening, stretching, and relaxation. They help to increase strength, flexibility, endurance, and functional capacity to decrease the impact of pain. The previous study has already shown the benefits of exercise treatment for office workers. Makki F et al. 2024 showed that exercise programs are useful in treating office workers' fatigue, musculoskeletal diseases, and work memory. [20] Similarly, Lestari ND et al.2021, showed that ergonomic exercises are beneficial for MSDs. [21] Another study, by Shariat et al. (2018) showed the effects of stretching exercises combined with ergonomic modifications in office workers and found that exercise training significantly improved musculoskeletal discomfort after six months. [22] Similar findings were made by Hsieh et al. (2022), who noticed that foam rolling exercises helped hotel housekeepers reduce pain and improve Range of motion. [23]

some studies raised concerns about the long-term efficacy of short-term physical therapy interventions, despite the above-mentioned favorable findings. In 2018, Korshoj et al. conducted a randomized controlled trial (RCT) among cleaners and observed that while aerobic exercises exhibited an improvement in neck, shoulder, and wrist pain over the 12 months, knee pain increased after the four months of intervention. While upper body pain may improve with the targeted exercises, lower body pain may persist or worsen if exercises are not essentially tailored to the specific physical demands of work. Exercise's pain-inhibitory effects are consistent with both a local and systemic response, as hypoalgesia is obtained in distant areas as well as in the contracting muscle. Recently, non-exhaustive isometric contraction was linked to decreased muscle pain sensitivity and pain reduction in both the nonexercised (contralateral) and exercised (ipsilateral) hands, according to Koltyn and Umeda. Moreover, submaximal isometric contractions decreased the mechanical sensitivity of the proximal muscles, distant muscles, and the contracted or contralateral muscles. Chronic painful disorders have also shown similar reactions. [24] Physical therapy decreased pain thresholds. [25] The main way that regular exercise reduce fatigue is by causing helping mitochondrial changes in skeletal muscle. Exercise increases the amount of these energy-producing organelles by stimulating mitochondrial biogenesis, which improves the muscle's ability to generate ATP. Additionally, it improves mitochondrial activity, such as respiration and ATP synthesis, which directly reduces fatigue-related decreases in energy. Additionally, exercise encourages mitophagy, which eliminates damaged mitochondria in order to develop a healthier and more effective network of mitochondria. These exercise-induced increases in mitochondrial quantity and quality eventually lead to more energy being available and a decrease in fatigue.

This study provides valuable evidence for the effectiveness of short-term physical therapy interventions for treating musculoskeletal pain and fatigue in housekeeping staff. These interventions would very much improve the workers' physical health and welfare. Further research is needed to determine the long-term effects of these treatments and how best to administer them to the group.

CONCLUSION

According to this study, a short-term physical therapy intervention is effective in reducing musculoskeletal pain and fatigue among housekeeping staff. The significant reductions in pain by NPRS scores and fatigue by FSS scores from pre- to post-intervention are the potential benefits of such intervention for this occupationally at-risk group. These findings suggest that regular physical therapy, incorporating warm-up, interval training (including AROM exercises, core strengthening, and lower extremity exercises), and cool-down, can be a valuable strategy for improving the well-being and productivity of housekeeping staff by addressing common musculoskeletal issues.

Limitations of the Study

Small Sample Size

The inability to follow up with the participants over a longer period made it difficult to assess how long-lasting the impacts were.

Future Projections

1. Future research could explore long term physical therapy program on pain, fatigue and endurance levels among housekeeping staff.
2. The comparison of physical therapy interventions and home exercises among housekeeping staff

REFERENCES

(1) Fikri F, Rekawati E, Permatasari H. Exercise Therapy is Efficacious in Reducing Pain of Musculoskeletal Disorders in Cleaning Workers: A Systematic Review. Indonesian Journal of Global Health Research. 2024 Apr 19;6(3):1557-68.
(2) Chheda P, Sreeraj SR. Prevalence of musculoskeletal symptoms and quality of life in housekeeping workers of a tertiary care hospital in Navi Mumbai, India: A descriptive study. MGM Journal of Medical Sciences. 2020 Jul 1;7(3):133-40.
(3) Afework A, Tamene A, Tafa A. Musculoskeletal disorders and its associated factors among hospital cleaners in Addis Ababa, Ethiopia. Scientific Reports. 2024 Feb 5;14(1):2887
(4) Joshi S. To study the relationship between ergonomics and efficiency of housekeeping employees at the workplace. Atithya: journal of Hospitality. 2016;2(1):37-42.
(5) Meenaxi T, Sudha B. Causes of musculoskeletal disorder in the textile industry.
(6) Chheda P, Sreeraj SR. Prevalence of musculoskeletal symptoms and quality of life in housekeeping workers of a tertiary care hospital in Navi Mumbai, India: A descriptive study. MGM Journal of Medical Sciences. 2020 Jul 1;7(3):133-40
(7) Gawde NC. A study of musculoskeletal pain among hotel employees, India. Journal of Ecophysiology and Occupational Health. 2018 Jun 12:44-51
(8) Parikh SM, Mehta JN, Thakkar M, Thakkar N, Gauswami M. Prevalence of musculoskeletal disorders and its risk factors among class 4 workers of rural tertiary health-care hospitals in Western India: a cross-sectional study. National Journal of Physiology, Pharmacy, and Pharmacology. 2022 Dec 1;12(12):2131-.
(9) World Health Organization. Protecting Workers' Health Series No. 5, Preventing Musculoskeletal Disorders in the Workplace. Geneva, Switzerland: World Health Organization; 2003.
(10) Rodrigues EV, Gomes AR, Tanhoffer AI, Leite N. Effects of exercise on pain of musculoskeletal disorders: a systematic review. Acta ortopedica brasileira. 2014 Nov;22:334-8.
(11) Lock AM, Bonetti DL, Campbell AD. The psychological and physiological health effects of fatigue. Occupational medicine. 2018 Nov 16;68(8):502-11.
(12) Skau S, Sundberg K, Kuhn HG. A proposal for a unifying set of definitions of fatigue. Frontiers in Psychology. 2021 Oct 13; 12:739764.
(13) Luttmann A, Jager M, Griefahn B, Caffier G, Liebers F, World Health Organization. Preventing musculoskeletal disorders in the workplace.
(14) Da Costa BR, Vieira ER. Stretching to reduce work-related musculoskeletal disorders: a systematic review. Journal of Rehabilitation Medicine. 2008 May 5;40(5):321-8.)
(15) Wilson F, Gormley J, Hussey J, editors. Exercise therapy in the management of musculoskeletal disorders. John Wiley & Sons; 2011 Feb 10.
(16) Crawford JO. The Nordic musculoskeletal questionnaire. Occupational medicine. 2007 Jun 1;57(4):300-1.
(17) British Pain Society and Faculty for Pain Medicine. Outcome Measures 2019.
(18) Lerdal, A. (2014). Fatigue Severity Scale. In: Michalos, A.C. (eds) Encyclopedia of Quality of Life and Well-Being Research. Springer, Dordrecht. https://doi.org/10.1007/978-94-007-0753-5_1018.
(19) Lestari ND, Fauzien F, Satria FE. The Effects of Ergonomic Exercise on Musculoskeletal Disorders among Cleaning Service Officers. International Journal of Nursing and Health Services (IJNHS). 2021 Jun 20;4(3):285-93.
(20) Mrunalini S, Kumar RR, Sharad KS. Effect of motor control exercises in the management of mechanical low back pain among hospital housekeeping staff
(21) Artiga O, Bucy A, Qiu R, Cramer E, Raney M. Functional training improves the effectiveness of stretching programs for university cleaning staff. International Journal of Workplace Health Management. 2022 Sep 9;15(5):639-53.
(22) Hsieh YC, Wang HM. Workplace Foam Roller Exercise for Hotel Housekeepers: An Exploratory Study. Recreation, Parks, and Tourism in Public Health. 2022;6(1):65-76.
(23) Korshøj M, Birk Jørgensen M, Lidegaard M, Mortensen OS, Krustrup P, Holtermann A, Søgaard K. Decrease in musculoskeletal pain after 4 and 12 months of an aerobic exercise intervention: a worksite RCT among cleaners. Scandinavian journal of public health. 2018 Dec;46(8):846-53.
(24) Shariat A, Cleland JA, Danaee M, Kargarfard M, Sangelaji B, Tamrin SB. Effects of stretching exercise training and ergonomic modifications on musculoskeletal discomforts of office workers: a randomized controlled trial. Brazilian journal of physical therapy. 2018 Mar 1;22(2):144-53.
(25) Anoop GA, Binoosh SA. A study on musculoskeletal disorders among two-wheeler riders of Kerala state in India. Kerala Technol Cong KETCON. 2019;6:411-8.