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RESEARCH ARTICLE

Effectiveness of Video Assisted Training Program on low back pain and functional disability among housekeeping employees in selected educational institutions in Bengaluru

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Abstract

Low back pain (LBP) is a wide spread musculoskeletal condition that impacts a large proportion of global workforce significantly limiting their work productivity, and quality of life. Repetitive movements and frequent heavy lifting, often performed in awkward or incorrect body postures contribute to an increased risk for developing low back pain among housekeeping employees. The current study aimed to evaluate the effectiveness of a video-assisted training program in reducing low back pain and improving functional capacity among housekeeping employees. One group pretest post-test design quasi-experimental design was used and 30house keeping employees were selected by non-probability purposive sampling. Baseline characteristics, pre-test measure of pain at lower back and functional disability was collected using demographic Performa, Quadruple visual analogue pain scale and Oswestry disability index scale. After the pretest, video assisted training program on exercises such as stretching, back strengthening and core strengthening was administered for 5 weeks and post-test was measured after 5 weeks. The mean pre-test pain score (26 ± 1.31) was decreased to 22.67 ± 0.76 on post-test and this reduction was statistically significant (t_{29} = 10.561, p = 0.001). Similarly functional disability scores were reduced from 13 ± 3.71 to 10.37 ± 0.96 on post - test (t_{29} = 3.989, p = 0.001). The study also revealed a substantial positive association between pain at lower back and functional impairment among housekeeping employees (r = 0.672, p = 0.001). The study findings highlight the need for integrating a combination of visual educational tools and exercise program at workplace to enhance the health outcomes of employees in physically demanding jobs to build a healthy and resilient workforce.

Keywords: Effectiveness, Video Assisted Training, Low back pain, Functional disability, Housekeeping employees.

Introduction

Low back pain (LBP) is a common worldwide musculoskeletal ailment affecting a substantial proportion of global workforce and significantly impairing job performance, competence and overall wellbeing (Russo *et al*., 2021). As reported by the Global Disease Burden Analysis study, LBP is consistently listed within the 10 top leading causes of disease and disabilities (Wami *et al*., 2019). LBP has been strongly linked to occupations such as driving, manual handling, and housekeeping, which often demand repetitive or inappropriate body movements. It is especially prevalent among housekeeping employees due to frequent tasks such as cleaning, scrubbing, bending, crouching, extending, shoving, and carrying heavy loads—often carried out in awkward or incorrect postures (Wami *et al*., 2019).

Previous research studies have reported a prevalence of LBP ranging from 46-77% in different parts of the world (Güneş & Ayaz-Alkaya, 2022; Rahman & Zuhaidi, 2017; Habib *et al*., 2012; Ibrahimi *et al*., 2022). In India, a descriptive study conducted in Navi Mumbai, in the year 2020 reported a substantial presence of musculoskeletal disorders (MSDs), particularly in the low back, knees and lower leg (Hosseini *et al*., 2023). Similarly, a cross-sectional study from Gondar; Ethiopia reported a 58.1 % prevalence of LBP among hotel housekeeping employees. Jobs involving reaching or overstretching or repetitive bending have been identified as major risk factors of low back pain (Russo *et al*., 2021). Sudden anticipated falls, carrying heavy loads, working beyond

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physical limit, lack of training in injury prevention were also reported as contributing factors of pain at lower back among cleaning staff (Jember *et al*., 2022). Work experience of more than 10 years in domestic job has been identified as a significant factor contributing to the development of pain at lower back among domestic workers in Bengaluru (Jebaraj *et al*., 2022).

Given the high occurrence of low back pain, its financial burden and significant contribution to job related disability and absenteeism, preventing low back pain has become an occupational health priority globally. Commonly recommended strategies include muscle strengthening and stretching exercises, education on body mechanics and ergonomic practices, the use of supportive devices, and workplace ergonomic modifications. A review on personal and technical interventions on low back pain reported education combined with practical training as an effective workplace intervention for low back pain (Roman-Liu *et al*., 2020).

Exercise is crucial for sustaining health and fitness and it remains essential across all aspects of life. Exercise intervention- including strength training, flexibility exercises, stabilization techniques and aerobic workouts have been e consistently proven to alleviate pain and improve functional status (Sipaviciene & Kliziene, 2020). Education further complements these strategies by enhancing workers' understanding of risk factors, proper body mechanics, and preventive practices. A randomized controlled trial conducted in India reported that combining pain education with standard physiotherapy significantly reduced pain severity, functional disability and improved wellbeing index (Sidiq *et al*., 2021). Although there is substantial evidence supporting the beneficial effect of workouts and education separately, there remains a critical gap in evaluating comprehensive interventions that integrate both interventions especially among housekeeping employees. Moreover, current educational interventions often depend on verbal or written instructions which may be less effective for workers with limited health literacy.

Video assisted training offers innovative and practical approach by offering visual demonstrations of ergonomics, proper postures and preventive exercises which improve comprehension, memory retention and practical application. Compared to traditional methods, video-based interventions deliver standardized, engaging, and easily accessible content, making them especially suitable for workforces with diverse background and low-literacy levels. Therefore, this study aims to assess the beneficial effect of a video-assisted instructional program on reducing low back pain and improving functional ability among housekeeping employees. This study is unique in integrating exercises and educational components into a video-based intervention especially designed for housekeeping staff targeting an important health concern. The findings are anticipated to aid in developing scalable, accessible and preventive approaches for minimizing work-related musculoskeletal disorders and promoting occupational wellbeing.

Materials and Methods

Approval for the study was granted by the institutional ethical committee (IEC No.PGN-18). Participants were provided with detailed information regarding the study and their right to discontinue their participation at any time and all participants signed a written informed consent form. The study employed a quasi-experimental design with a single group, pre and post-test measurements. The study was conducted among housekeeping employees of an educational institution located at south Bangalore where approximately 50 housekeeping employees are employed on a permanent basis. No control group was included in the study due to practical limitations such as the limited number of available housekeeping employees and ethical constraints in withholding a potentially benefiting intervention from employees with LBP.

The study included male and female housekeeping employees aged between 25 and 55 years, employed on a permanent basis, working a minimum 8 hours for 6 days in a week, with current history of LBP experienced at least over the last 3 months and who were willing to participate. Participants were excluded, if they had a history of surgery to the spine, lower limb injury with in the last 6 months, a diagnosis of disc herniation, lumbar stenosis, spondylolisthesis or spine tumor, severe and unstable chronic cardiac and respiratory disorders, were currently engaged in exercise program similar to the study intervention or were pregnant. Based on earlier studies on the intensity of LBP, the sample size was calculated using 90%power, a 5 % margin of error and a 95% confidence interval. The final estimated sample size was 30 housekeeping employees.

Interventions

A training program was conducted for the housekeeping employees. The video was prepared by the researcher and validated by the experts in physiotherapy practice and occupational health safety and environment. Exercise program included back strengthening (Quadruped position with arm lifting, Quadruped position with leg lifting, Quadruped position with opposite arm and leg lifting alternatively and Superman exercise), core strengthening (Abdominal curls, Squats, Lunges, Lower stomach to spine) and stretching exercises (Child pose, Knee to chest pull, Piriformis muscle stretch, Spinal seated twist, Hamstring muscle stretching) and these three sets of exercises to be repeated for 3 times per day. Back strengthening, core strengthening exercises were performed under the supervision of the researcher at the designated time period

and stretching exercises were performed by the participants at home with the help of the video. The entire duration of training program was for 5 weeks. The researcher had undergone the training for the exercises before the data collection. The participants were monitored for adherence to stretching exercises through regular exercise logbooks, regular telephone follow ups and in person checks during exercise training program.

Materials & Outcome measures

Section 1

Baseline Performa to assess the sample characteristics - It consisted of details related to baseline characteristics, information related to ergonomic factors and information related to clinical variables.

Section 2

The Quadruple Visual Analogue Scale (QVAS), to measure the intensity of low back pain among housekeeping employees. It is a unidimensional pain assessment tool from 0-10, which consists of four scales: current pain level, average pain intensity, least and maximum pain experienced.

Section 3

The Oswestry Disability Index (ODI) scale to assess the level of functional disability among housekeeping employees. It is a self-administered questionnaire that provides a self-reported percentage score indicating the level of functional capacity(disability) in performing everyday tasks among individuals experiencing recovery from low back pain. The scale consists of 10 domains with 6 items in each domain with the maximum score of 50. The scoring of each item ranges from 0-5 depending on the disability. Disability is categorized by percentage as 0-20% indicating minimal disability, 21- 40% indicating moderate disability, 41-60% indicating severe disability, 61-80% indicating crippled status and 81-100% (completely disabled/bedridden).

Data collection

Data was collected by using baseline Performa, QVAS and ODI scale. The video assisted training program was completed on the same day the housekeeping employees took the pre -test. The video assisted training program was conducted for 45 minutes and it consisted of an educational session on risk factors, correct body postures and prevention on low back pain. After the pretest reseracher showed the video to the housekeeping employees and answered their questions. Stretching exercises (5 exercises each) were taught to the participants and they were instructed to repeat each stretching exercises three times at home with the help of the video. Back strengthening and core strengthening exercises (4 exercises each) were demonstrated to the participants and they were asked to perform under the supervision of researcher at the designated time period and three sets of exercises to be repeated for 3 times per day. Similar procedure was repeated for the second and third group of participants.The training program was administered for a period of 5 weeks. Then post test measurement of Quadruple visual analog scale and Oswestry Disability Index scale were obtained at the end of fifth week.

Results

Statistical package of social science (SPSS) version 26.0 was used to enter and analyze the obtained details and the data was analysed with a significance level set at 5% ($p < 0.05$). Both descriptive and inferential analysis were conducted. The Kolmogorov–Smirnov test was applied to assess data normality and paired t-test was used to determine the effectiveness of intervention. Thirty participants were included in the study and the collected data was analysed as per the hypotheses and objectives of the study and organized in to 5 sections.

Section-I Description of baseline characteristics, ergonomics and clinical variables of housekeeping employees.

All the participants were females even though the study was open to both genders. All of them were married, belonged to Hindu religion. Majority (66.67%) of them were educated up to primary level and had two children (56.66%), all the participants reported a working hour of 8 -10 hrs/day, not working in the same position for > 2hrs and bending as the most common posture used and (16.67%) participants had diabetes mellitus, (40%) had hypertension and (43.33%) had no history of comorbid disease (Table1).

Section-II: Comparison of pre and posttest scores of low back pain among housekeeping employees

The participants had a mean of 7.1 ± 0.7 as pain right now at pretest and this was reduced to 5.5 ± 0.7 at post-test. Similar patterns were observed for average pain 6.1 ± 0.9 at pretest to 5.3 ± 0.4 at post-test, pain at its best (4.1 ± 0.6 to 4.3 ± 0.7), pain at its worst (8.5 ± 0.5 to 7.5 ± 0.9). Similarly, the total QVAS pain score was reduced to (22.67 ± 0.76) at post-test from pretest score of (26 ± 1.31) (Figure 1).

Section-III: Comparison of pre and post-test scores of functional disability among housekeeping employees

The data in the table 2 depicts that all the participants reported minimal disability at post-test.

Section- IV: Effectiveness of video assisted instructional program on LBP and functional disability among housekeeping employees

Table 3 presents the comparison of pre- and post-intervention scores for the (QVAS) and (ODI). The mean QVAS score significantly decreased from (26 ± 1.31) at baseline to (22.67 ± 0.76) and ODI score decreased from (13

Table 1: Frequency and percentage distribution of participants based on baseline characteristics, ergonomic and clinical variables, N = 30

S. No.	*Baseline characteristics*	*Frequency*	*Percentage*
1	Educational status		
	Primary education	20	66.67%
	Secondary education	10	33.33%
2	No of children		
	One child	8	26.66%
	Two children	17	56.66%
	Three children	5	16.66%
3	Marital status		
	Married	30	100%
4	BMI		
	18.5 - 24.9 - Normal	29	96.66%
	25.0 - 29.9 - Overweight	1	3.33%
5	Working more than 2 hrs in same position		
	No	30	100%
6	Common working postures used		
	Bending	30	100%
7	History of back injury		
	No	30	100%
8	Use of OTC medications		
	No	30	100%
9	History of comorbid disease		
	Diabetes	5	16.67%
	Hypertension	12	40.00%
	None	13	43.33%

± 3.71) at baseline to (10.37 ± 0.96) post-intervention. The median scores of QVAS and ODI also reflected this reduction, decreasing from 26 (IQR: 25–27) to 22.5 (IQR: 22–23) and 11.5 (IQR: 10–18) to 10 (IQR: 10–11). A paired t-test indicated that the obtained p value was < 0.001, hence the null hypotheses was rejected and was inferred that video assisted training program was effective in reducing low back pain and functional disability among housekeeping employees.

Section- V: Correlation of low back pain and functional disability among housekeeping employees

The analysis also revealed a strong positive correlation (r = 0.672, p < 0.001) between functional disability and LBP among housekeeping employees (Table 4).

Discussion

Low back pain is marked by long lasting pain and discomfort, weak muscles and limited physical mobility which can severely affect the quality of life of a person by restricting daily activities and job performance (Russo *et al*., 2021). The main objective of the present study was to determine the effectiveness of video assisted training program on low back pain and functional disability among housekeeping employees. In the current study, all the subjects were female and a greater proportion of them (53.33%) were aged between 25-55 years and 96.66% had normal BMI. Comparable results have been reported by a previous study to investigate the contributing factors at workplace and occurrence of low back pain among workers with low wages in which majority (91.9%) of the participants were females with their age ranging between 18 – 59 years and 65.6% of the participants had normal BMI (Russo *et al*., 2021; Nasim *et al*., 2024). It was observed that all the participants 100% were working 8-10 hours per day and were using bending as the common posture. A study conducted on the occupational

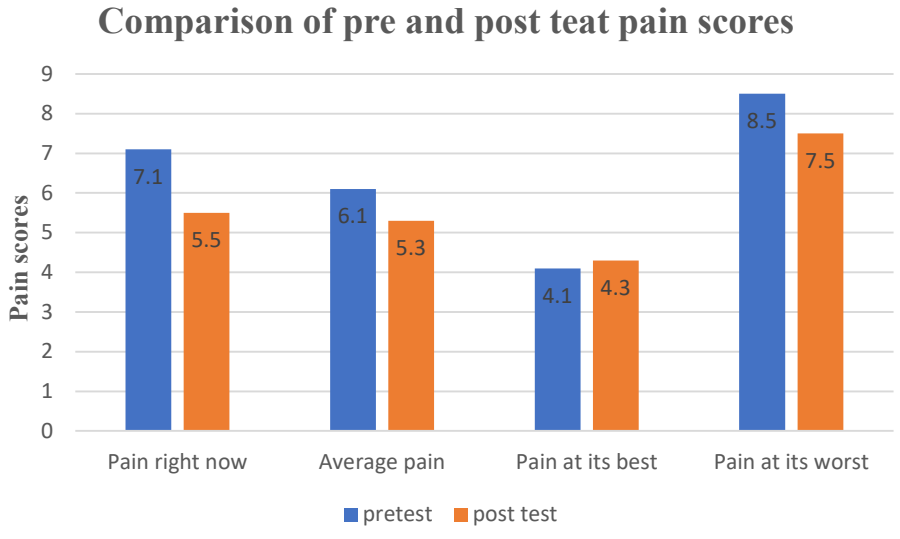

Figure 1: Comparison of pre and posttest pain scores of housekeeping employees on 4 components of Quadruple visual analog scale

Table 2: Frequency and percentage distribution of housekeeping employees based on level of functional disability on 10 items of Oswestry disability index scale, N = 30

Sl. No.	*Levels of functional disability*	*Pre-test*		*Post-test*	
		Frequency	*Percentage*	*Frequency*	*Percentage*
1	Minimal disability (0-20%)	10	33%	30	100%
2	Moderate disability (21-40%)	20	67%	0	0

Table 3: Effectiveness of video assisted instructional program on LBP and functional disability among housekeeping employees, N = 30

Variable	*Range*	*Mean ± SD*	*Median (IQR)*	*t-value*	*p-value*
Pre QVAS	24 - 28	26 ± 1.31	26 (25 - 27)	10.5612	<0.001
Post QVAS	22 - 24	22.67 ± 0.76	22.5 (22 - 23)		
Pre ODI	9 - 18	13 ± 3.71	11.5 (10 - 18)	3.9899	
Post ODI	9 -12	10.37 ± 0.96	10 (10 - 11)		

risk factors and the occurrence of low back pain among workers in low paying industries in Bangladesh reported that majority of the participants 81.5% had a working duration of < 8hrs. Approximately 13.54% of the workers performed their tasks in improper postures and 13.80% remained in a fixed position for extended periods. Similar results were observed in an earlier s study in which 83.2% of participants worked for ≤ 8 hours and majority of the participants' job required repetitive bending (Selvamani *et al*., 2022). Frequent twisting and bending of the body, working beyond physical limit, use of wrong posture and carrying heavy loads were identified as factors linked to low back pain among hospital cleaning staff. These findings underscore the need for awareness programs focusing ergonomic practices and preventing repetitive strain injury among employees.

The current study noted a significant drop in the post intervention score of low back pain of the participants to 22.6 ± 0.67 from a pretest score of 26 ± 1.31 ($p < 0.001$). Similarly, the study also observed a significant reduction in the post test scores of functional disabilities to 10.37 ± 0.96 from a pretest score of 13 ± 3.71 ($p < 0.001$). Similar findings were reported by a study which reported that three interventions such as stretching exercises with education on back care, lumbar stabilisation combined with education on back care and only education on back care had significant effects in reducing low back pain and improving functional ability of individuals with work associated low back pain. Participants in stretching exercises group had more significant reduction in low back pain and functional limitations compared to the other two groups. Stretching exercises led to more significant reduction in pain levels and associated functional limitations at 4th & 8th week (Egwuonwu *et al*., 2013). These observations are in congruence with the results of prior studies where low back pain, rehabilitation and physio progressive back exercise had significant effect on physical impairment and low back pain intensity among non-acute, moderate low back pain (Egwuonwu *et al*., 2013). A RCT done

Table 4: Correlation on low back pain and functional disability among housekeeping employees, N = 30

Variables	*Karl-Pearson correlation*	*p-value*	*Inference*
Pretest -LBP (QVAS) Pretest – FD (ODI)	0.672	< 0.001	S*

S*= Significant

to compare self-administered stretching exercises and motor control exercises (MCE) on chronic low back pain reported that self-stretching exercises which are also termed as global postural re-education were equally effective as compared to MCE in decreasing pain and improving functional ability. These exercises help in promoting the myofascial chain elongation and enhance antagonist muscle isometric activation (Turci *et al*., 2023). Stretching exercises reduce low back pain by minimizing muscle tension on nerve roots. Static stretching exercises are considered as safe, feasible and effective strategies for managing non-specific low back pain. Previous literature suggests that these exercises can reduce pain, improve flexibility, increase range of motion and enhance muscle strength. These are cost effective and feasible approaches and to be recommended in treating chronic low back pain and functional disability (Ruchi *et al*., 2024).

Strengthening exercises focus on the superficial trunk muscles which play a vital role in absorbing physical stress are found to be beneficial for those with non-specific low back pain of chronic in nature. These exercises help to improve strength and coordination of superficial core musculature and enhance stability of the spine and thereby reducing pain and functional disability (Hlaing *et al*., 2020). Before intervention, majority of the participants (67%) reported moderate level of functional disability and following the intervention none of them remained in the moderate category of disability and all of them reported only minimal disability. This shift from moderate to

minimal level of disability indicates an improved functional independence with decreased pain and activity limitation highlighting the beneficial role of intervention in enhancing functional capacity of individuals affected with LBP. The current study intervention integrating education with stretching and strengthening exercises for a duration of 5 weeks was evidenced as an effective strategy in treating pain and functional disability among housekeeping employees. This highlights the need for integrated workplace-based interventions in fostering musculoskeletal wellbeing and quality of life of employees.

In the current study, LBP was positively correlated with functional disability among housekeeping employees. LBP is marked by a reduction in physical mobility and community participation due to complaints of pain, discomfort and functional limitation. Perception of one's ability to regulate discomfort affect the extent of functional capacity (Abdelbasset *et al*., 2022). A systematic review conducted in 2024 on nonspecific low back pain (NSLBP) reported that physical exercise significantly decreases pain, functional disability, and depression, while enhancing physical performance, proprioception, and muscle thickness (Alonso-Sal *et al*., 2024). Strengthening exercises specifically target the core muscles, thereby enhancing spinal stability. Stretching exercises help lengthen tight muscles, increase range of motion, and reduce mechanical stress on the lumbar discs and joints. Lumbar stabilization exercises focus on training the deep trunk muscles to respond effectively to movement and loading demands. An exercise program that combines strengthening, stabilization, and stretching exercises can yield the best functional outcomes. In the current study, the integration of this comprehensive exercise approach along with ergonomic education emerged as an effective method for addressing LBP.

The study was confined to a small sample size and sample drawn for the study was only from one educational institution, hence possibility of wider generalization of the findings was limited. Randomization and use of a control group was not possible due to the limited number of housekeeping employees. Further research can be conducted on larger and diverse occupations and also long-term studies to determine the sustained impact of video-based instructional program on functional improvement, and workplace safety. Comparative studies and cost effectiveness analysis are also recommended to identify the effective strategies to promote occupational health and safety.

Conclusion

Low back pain (LBP) is a predominant global health issue that significantly alters productivity and quality of life of workforce. The present study demonstrated the beneficial role of video-based training program in reducing LBP and functional disability among housekeeping employees. This finding indicates that the adoption of visual educational tools combined with structured exercise program can greatly enhance the health outcomes of employees in physically demanding jobs. Implementation of accessible and cost-effective training programs helps to build a healthy and resilient workforce.

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