The Egyptian Journal of Hospital Medicine (July 2025) Vol. 100, Page 3445-3451

Educational Intervention Program Regarding Proper Body Mechanics among Hospital Laundry Workers

***Sarah Mohamed Hesham Abd El-Wahed[1], Farida Kamel Yousef [1], Shaimaa A.A.M. Amer[2], Hanaa Abd El-Hakeem Ahmed[3]**

[1] Family and Community Health Nursing, Faculty of Nursing, Suez Canal University, Ismailia, Egypt
[2] Occupational Medicine, Faculty of Medicine, Suez Canal University, Ismailia, Egypt
[3] Community Health Nursing, Faculty of Nursing, Ain Shams University, Cairo, Egypt
***Corresponding author:** Sarah Mohamed Hesham, **Phone:** +2 01013786562, **Email:** saramohamed@nursing.suez.edu.eg

ABSTRACT

Background: Maintaining proper body mechanics is essential for achieving good posture. Certain tasks in laundry work necessitate that workers perform their duties in body positions that are not ergonomic, such as standing, sitting, bending, squatting, and walking. **Aim:** This study aimed to evaluate the effect of an educational intervention program about proper body mechanics on hospital laundry workers at Suez Canal University Hospitals.

Subjects and methods: At the Suez Canal University Hospitals in Ismailia city, a quasi-experimental design was utilized. The sample comprised all hospital laundry workers (63) in the aforementioned setting. Data were gathered through an observational checklist that contained questions about the workers' practices related to proper body mechanics.

Results: The total scores of the studied sample's practices concerning proper body mechanics across various domains in the pre-, post-, and follow-up phases exhibited differences that were highly statistically significant.

Conclusion: After the program's implementation and during follow-up, the studied sample's practice concerning appropriate body mechanics improved in comparison with before the program was implemented.

Keywords: Educational program, laundry workers, Proper body mechanics.

INTRODUCTION

Body mechanics constitutes a fundamental concept that encompasses the coordinated and synergistic movements of the musculoskeletal and nervous systems. This intricate coordination is essential for effectively maintaining physiological balance, optimal posture, and proper body alignment, ultimately leading to efficient and effective bodily functioning. Conversely, the adoption of suboptimal body mechanics significantly elevates the risk of injury to the musculoskeletal system. Furthermore, the term "body mechanics" fundamentally refers to the judicious and efficient utilization of the body's structure for executing a diverse range of movements and tasks, including but not limited to, the lifting of heavy objects or individuals, bending, stretching, as well as maintaining appropriate positions during sitting, standing, or lying down, while performing various activities [(1)]. The suboptimal application of ergonomic principles has been directly associated with an elevated risk for the development of work-related musculoskeletal disorders (WMSDs) [(2)]. Globally, WMSDs account for approximately 40% of all compensated occupational injuries and diseases, highlighting their substantial burden on the workforce [(3)]. Among various hospital departments, the laundry department is consistently ranked as one of the top environments presenting significantly higher risks for the incidence of WMSDs [(4)]. This heightened vulnerability among laundry workers is primarily attributable to the inherently strenuous and repetitive nature of their occupational tasks [(5)].

The numerous tasks performed within hospital laundry units present a multitude of ergonomic risks. A significant ergonomic hazard involves maintaining an awkward posture, specifically bending, when either loading or removing soiled linen from trolleys [(6)]. Such sustained non-neutral postures frequently culminate in the development of muscle pain or debilitating low back pain. Furthermore, the repetitive lifting of heavy laundry bags from carts constitutes a physically demanding occupational task that substantially elevates the risk of injury or the incidence of work-related musculoskeletal disorders (WRMDs) affecting both the upper extremities and the lower back [(7)]. Laundry workers additionally confront considerable hazards during the processes of sorting and washing substantial quantities of textiles, often exceeding 2,000 kg per shift, and particularly when pulling heavy, wet clothing. All of these physically demanding tasks significantly elevate the inherent risk for employees to develop repetitive motion injuries (RMIs) [(8)].

Furthermore, ironing stands out as one of the most physically exhausting and ergonomically perilous activities among the various work processes, with workers frequently reporting localized pain in the waist and upper extremities subsequent to engaging in this task [(9)].

The pervasive postural discomforts experienced by laundry workers during the ironing of clothes are primarily attributable to a confluence of physical factors. These include sustained repetitive motions, adoption of awkward or non-neutral postures, prolonged periods of standing, suboptimal workstation design, inadequate workspace dimensions, extended durations of work activity, excessive physical load, the sheer quantity of clothes processed, and the considerable heat emanating from the ironing equipment. Such persistent asymmetric body postures

Received: 20/03/2025
Accepted: 20/05/2025

induce undue contraction and strain on ligaments, muscles, tendons, and bones, which often culminates in severe musculoskeletal pain affecting the shoulder, knee, lower back (LBP), neck, wrist, and hand [10].

Consequently, a fundamental objective of ergonomics is to mitigate the incidence and severity of work-related injuries across diverse occupational settings. When ergonomic principles are judiciously applied to both the workplace environment and specific tasks, empirical evidence suggests a direct correlation with enhanced employee efficiency, augmented productivity levels, and, ultimately, a substantial contribution to the achievement of overarching organizational goals. Cultivating strong ergonomics awareness among employees and management facilitates the effective implementation of ergonomic interventions, thereby contributing significantly to human wellbeing and safety within the workplace [2].

Various strategic adaptations to laundry service operations have been proposed, each possessing the demonstrable potential to substantially improve working conditions and reduce occupational hazards for employees. For instance, comprehensive ergonomic training, specifically addressing physical risks and optimized lifting techniques, can markedly diminish the incidence of work-related injuries. Moreover, the adjustment of several environmental parameters within a facility can be implemented to maximize worker safety. These adjustments include, but are not limited to, the strategic deployment of step stools to minimize overhead reaching, the utilization of adjustable table heights to alleviate lumbar flexion, the systematic rotation of tasks to preclude exhaustion induced by prolonged execution of identical movements, and the consistent implementation of regular, brief breaks throughout the workday [7]. The primary aim of this study was to evaluate the effect of an educational intervention program regarding proper body mechanics among hospital laundry workers at Suez Canal University Hospitals.

MATERIAL AND METHODS

Research hypothesis: It is hypothesized that the implementation of an educational intervention program will lead to improvement in the practice of hospital laundry workers regarding proper body mechanics.

Research design: The present research employed a quasi-experimental design.

Research setting: The research took place in the Laundry Department of Suez Canal University Hospitals.

Sampling: All personnel actively engaged as laundry workers within the Suez Canal University Hospitals were included in this study, representing a comprehensive recruitment strategy. The precise total number of laundry workers employed at the previous mentioned setting prior to the commencement of data collection and the initiation of the study protocol was systematically identified as 72 individuals.

Tools of data collection:

Tool (1): A Structured interview questionnaire

A structured interview questionnaire was developed by the researcher specifically for this study. It was formulated in simple Arabic to ensure clarity and ease of understanding for all participants. This questionnaire was logically divided into two distinct parts:

Part (I): Socio-demographic characteristics: This section comprised a series of questions designed to gather essential socio-demographic information from participants. Data points collected included age, sex, and educational level.

Part (II): Job and workplace data: This section focused on collecting relevant information pertaining to the participants' job roles and workplace environment. Key data collected encompassed years of professional experience, average daily working hours, and the specific type of task performed.

Tool (2): Worker's practice observational checklist

This instrument was specifically developed by the researcher. It contains items designed to evaluate the practical application of proper body mechanics by hospital laundry workers across various work-related activities. The observational checklist was structured into five distinct sections, each designed to evaluate specific aspects of proper body mechanics practiced by hospital laundry workers during various laundry tasks as following:

Part (I): Collection of dirty laundry: This section included items to assess how hospital laundry workers apply proper body mechanics when collecting soiled linen.

Part (II): Sorting dirty laundry: Here, we evaluated the practices of hospital laundry workers concerning appropriate body mechanics while sorting dirty laundry.

Part (III): Washing and drying: This segment contained items to assess hospital laundry workers' adherence to proper body mechanics during the washing and drying stages of laundry processing.

Part (IV): Folding laundry: We assessed hospital laundry workers' practice of correct body mechanics during the task of folding laundry in this section.

Part (V): Pushing/pulling laundry cart: This final section investigated the application of proper body mechanics by hospital laundry workers when pushing or pulling laundry carts.

Scoring system: For each assessed item, the possible choices were binary: "done" or "not done." A score of one was assigned if an item was completed entirely and correctly. Conversely, if an item was either not performed or performed incorrectly, it received a score of zero. The cumulative total scores reflecting the workers' practices were subsequently categorized as follows:

- Good = 75% or more
- Satisfactory = 50 to less than 75
- Poor = less than 50%

Validity of the study tools: The research instruments utilized in this study underwent a rigorous validation

process, which was meticulously overseen by an expert jury. This jury comprised three specialists with established expertise in the fields of community health nursing and occupational health medicine. Their collective role was to critically revise the tools for optimal clarity, direct relevance to the study objectives, practical applicability, comprehensive coverage of the constructs, and overall understanding. Based on their expert opinions and recommendations, all necessary modifications were systematically applied to enhance the robustness of the data collection instruments.

Reliability of the study tools: The internal consistency reliability of the instrument was quantitatively assessed through the calculation of **Cronbach's alpha (α)**. The obtained Cronbach's alpha value was 0.902, which statistically indicates a high degree of reliability for the measurement tool employed in this study.

Pilot study: A pilot study was meticulously conducted on a subsample representing 10% (n=7) of the total projected sample size of hospital laundry workers. These specific hospital laundry workers participating in the pilot phase received the full educational program. Crucially, to mitigate any potential contamination or bias, these individuals were subsequently excluded from the actual study sample during the main data collection phase.

Field of work: Data collection carried out through three phases: Interviewing and assessment phase, implementation phase and evaluation phase.

- **Interviewing and assessment phase (Pre-test):**

During the interviewing and assessment phase, which served as the pre-test, the researcher was present at the hospital two days per week. These designated days included Wednesdays, on a rotational basis, from 9:00 AM to 1:00 PM, allowing for data collection from workers on the morning shift. Additionally, Thursdays, also on a rotational basis, from 3:00 PM to 6:00 PM, were allocated to collect data from workers on the afternoon shift. This schedule ensured comprehensive coverage of both main operational shifts within the hospital laundry unit.

The researcher interviewed each laundry worker individually using pre-test questionnaire (tool 1) to collect data about socio-demographic characteristics and job specific data. Then, the researcher wrote down their answers. During this phase of assessment, accurate observation has been done for hospital laundry workers. The researcher observed the workers practice regarding proper body mechanics in different work processes using (tool 2). The researcher marked on checklist if the step done or not done. It took 30-45 minutes. Every day from 3 to 4 workers were observed. This phase was conducted by the researcher during the period from the beginning of May 2023 to the mid of July 2023.

- **Implementation phase:** The implementation phase started from the beginning of August 2023 to the mid of October 2023. The program was designed by the researcher based on worker's needs obtained from initial assessment, in addition to reviewing the relevant literature in various aspects related to the study. The booklet consisted of parts that include; proper body mechanics of laundry workers during different work processes such as collection of dirty laundry, sorting dirty laundry, washing and drying, folding laundry and pushing/pulling laundry cart. It was written in simple Arabic language with different illustrated colored pictures to enhance learning process and facilitates workers' understanding.

Educational program implementation: The educational program was conducted at Suez Canal University Hospitals. For effective delivery and engagement, the participants were systematically divided into six smaller groups. Three of these groups comprised 10 workers each, while the remaining three groups each contained 11 workers.

The sessions: The educational program was systematically delivered through a structured series of three distinct sessions. Each participating group received all three sessions within a single week, with each session lasting approximately 30 to 45 minutes to ensure adequate content delivery. Cumulatively, the total allocated time dedicated for achieving the comprehensive objectives of the program across all six groups amounted to 13.5 hours, reflecting a significant investment in the educational intervention (6 groups × 2.25 hours per group).

The first session was an introductory session. The session has duration of 25 minutes and aimed to orient participants to the program's aim, objectives, and content. The session concluded with a summary to reinforce the material covered. During **the second session** the researcher took feedback about the previous session and introduced the objectives of the new session, which included objectives of proper body mechanics during collection of dirty laundry and sorting dirty laundry. The session took from 30 – 45 minutes.

The third session began with summary of the previous session and provided a detailed discussion about proper body mechanics and correct technique of body postures during washing, drying, folding laundry and pushing/pulling laundry cart. The session lasted 45 minutes. It concluded with a summary highlighting the key points.

Different teaching and learning methods were used during the sessions, which included; demonstration and re-demonstration, brain storming, and group discussion. Various teaching media were used as, pictures, videos, data show, power point presentation and printed handout. The program was presented in clear and concise form to be used as memorial reference.

Evaluation phase: Following the conclusion of the educational program sessions, a post-test assessment was systematically administered to evaluate the immediate effects of the intervention. This post-test was conducted precisely two weeks after the final educational session, employing the identical data collection instrument that was utilized during the initial pre-test phase, which commenced in early November

2023. To ascertain the longer-term sustainability of the observed changes, the entire study sample subsequently underwent a comprehensive follow-up examination conducted two months after the program's implementation.

Ethical Consideration: The study protocol underwent rigorous review and subsequently received approval from The Research Ethics Committee (REC) within the Faculty of Nursing, Suez Canal University, formally designated under approval No. 107. Official permission to proceed with the study was duly obtained from the relevant administrative authority at the institution. Each hospital laundry worker approached for participation was requested to provide written informed consent prior to inclusion in the study. This comprehensive consent process involved a full explanation of the study's nature, its primary aims, and the expected outcomes. Furthermore, each potential participant was explicitly informed of their complete autonomy to either participate or decline involvement in the study, and importantly, retained the unequivocal right to withdraw from the study at any point in time without providing any rationale. The researcher conscientiously assured all participants of the voluntary nature of their involvement, guaranteed their anonymity, respected their privacy throughout the data collection process, and maintained strict confidentiality of all collected data during the entire duration of the study. The study adhered to the Helsinki Declaration throughout its execution.

Statistical analysis

Following the collection of data, all acquired information was systematically coded and subsequently transferred into a specially designed digital format, optimized for direct computer entry and processing. Upon successful data entry, comprehensive statistical analysis was performed using the Statistical Package for the Social Sciences (SPSS) program, specifically version 20 (IBM SPSS Statistics, Chicago IL, USA). Continuous data that exhibited a normal distribution were expressed as the mean ± standard deviation (SD). Conversely, all categorical data were summarized and presented as absolute numbers and corresponding percentages. For the purpose of comparing variables comprising categorical data, the Chi-square test was employed; or, when appropriate, Fisher's exact test was utilized in instances where expected cell counts were low. $P \leq 0.05$ was deemed significant.

RESULTS

The results showed that the mean age of the studied workers was 42.7 ± 8.1 years, 42.9% of them were females. Regarding their educational level, 49.2% and 20.6% had primary education and secondary education respectively (Table 1).

Table (1): Frequency distribution of the studied sample according to their Socio-demographic characteristics

Items	N	%
Age (Years)		
< 35	9	14.3
35 –	32	50.8
45 –	16	25.4
55 - < 60	6	9.5
Mean ± SD	***42.7 ± 8.1***	
Sex		
Male	36	57.1
Female	27	42.9
Educational level		
Illiterate	19	30.2
Primary education	31	49.2
Secondary education	13	20.6

The results illustrated that 79.4% of the studied sample carried out collection and distribution tasks while, 20.6% of them carried out washing, drying, ironing and folding tasks. Their daily working hours ranged from 8 to 12 hours (mean 10.6 ± 1.9 hours). The workers years of experience ranged from less than 10 to more than 20 years (mean 17.7 ± 7.2 years) (Table 2).

Table (2): Frequency distribution of the studied sample according to their job- specific data (n = 63)

Item	N	%
Task performed		
Outside the laundry (collection and distribution of linen)	50	79.4
Inside the laundry, (washing, drying, ironing, folding, etc.)	13	20.6
Number of working hours		
8 hours	23	36.5
12 hours	40	63.5
Mean ± SD	**10.6 ± 1.9 hours**	
Experience years		
< 10 years	13	20.6
10 – 20 years	27	42.9
> 20 years	23	36.5
Mean ± SD	**17.7 ± 7.2**	

The results showed that 10%, 6%, 10%, 7.7%, 15.4% & 4% of the studied sample their practices regarding proper body mechanics were good at the points of collection of dirty linen: Laundry bins, collection of dirty linen (laundry bags, sorting of dirty linen, washing and drying), folding laundry and pushing/pulling laundry cart respectively at the pre-test phase. While, their practice improved and reached 76%, 78%, 76%, 76.9%, 76.9% & 74% respectively at the post-test phase and decreased slightly at the follow up phase and reached 72%, 72%, 70%, 61.5%, 69.2% & 70% respectively. Hence, there were statistical significant differences of the studied sample practice regarding proper body mechanics at different domains in pre-, post- and follow-up phases (Table 3).

Table (3): Comparison of practice regarding proper body mechanics at different domains between pre, post and follow up phases among the studied sample

Proper body mechanics domains	Pre – Intervention		Post – Intervention		Follow – up		Significance test 1	Significance test 2
	N	%	N	%	N	%		
Collection of dirty linen: Laundry bins#								
Poor practice	36	72.0	4	8.0	6	12.0	X^2=50.984, P<0.001**	X^2=44.926, P<0.001**
Satisfactory practice	9	18.0	8	16.0	8	16.0		
Good practice	5	10.0	38	76.0	36	72.0		
Collection of dirty linen: Laundry bags#								
Poor practice	37	74.0	3	6.0	5	10.0	X^2=59.979, P<0.001**	X^2=52.356, P<0.001**
Satisfactory practice	10	20.0	8	16.0	9	18.0		
Good practice	3	6.0	39	78.0	36	72.0		
Sorting of dirty linen#								
Poor practice	37	74.0	2	4.0	6	12.0	X^2=56.958, P<0.001**	X^2=44.907, P<0.001**
Satisfactory practice	8	16.0	10	20.0	9	18.0		
Good practice	5	10.0	38	76.0	35	70.0		
Washing and drying@								
Poor practice	9	69.2	1	7.7	2	15.4	X^2=13.963, P<0.001**	X^2=9.898, P=0.007*
Satisfactory practice	3	23.1	2	15.4	3	23.1		
Good practice	1	7.7	10	76.9	8	61.5		

Table (3) (cont.,): Comparison of practice regarding proper body mechanics at different domains between pre, post and follow up phases among the studied sample

Proper body mechanics domains	Pre – Intervention		Post – Intervention		Follow – up		Significance test 1	Significance test 2
	N	%	N	%	N	%		
Folding Laundry@								
Poor practice	8	61.5	1	7.7	2	15.4	X^2=10.977, P=0.004*	X^2=8.254, P=0.016*
Satisfactory practice	3	23.1	2	15.4	2	15.4		
Good practice	2	15.4	10	76.9	9	69.2		
Pushing\ Pulling Laundry Cart#								
Poor practice	38	76.0	1	2.0	5	10.0	X^2=66.694, P<0.001**	X^2=54.758, P<0.001**
Satisfactory practice	10	20.0	12	24.0	10	20.0		
Good practice	2	4.0	37	74.0	35	70.0		

#: sample size is calculated at 50, @: sample size is calculated at 13, $: sample is taken at pre – intervention only, Significance test 1: Chi – Square / Fisher's exact test (Pre – intervention / Post – intervention), Significance test 2: Chi – Square / Fisher's exact test (Pre – intervention / Follow – up)

The results showed that the total mean scores of the studied sample regarding proper body mechanic practices in the points of collection of dirty linen: Laundry bins, collection of dirty linen (laundry bags, sorting of dirty linen, washing and drying), folding laundry and pushing/pulling laundry cart improved after implementation of the program and reached (1.9 ±0.4, 4.5 ±0.8, 3.4 ±0.7, 4.3 ±0.9, 2.8 ±0.6 and 1.8 ±0.5 respectively). While, their total mean scores at the follow up phase reached 1.8 ± 0.5, 4.3 ± 1.0, 3.3 ± 0.7, 4.1 ± 0.9, 2.6 ± 0.7 and 1.7 ± 0.6 respectively), when compared to pre-implementation of the program, which was equal to 0.6 ± 0.3, 1.1 ± 0.5, 0.8 ± 0.4, 1.0 ± 0.4, 1.1 ± 0.5 and 0.7 ±0.3 respectively. Hence, there were statistically significant differences between the total mean scores of the studied sample practice regarding proper body mechanics at different domains in pre-, post-, and follow-up phases (P < 0.001) (Table (4).

Table (4): Comparison of total mean regarding proper body mechanic practices at different domains between pre, post and follow up phases among the studied sample

Items	Pre – Intervention	Post – Intervention	Follow – up	Significance test 1	Significance test 2
Collection of dirty linen: Laundry bins[#]	0.6 ±0.3	1.9 ±0.4	1.8 ±0.5	t=18.384, P<0.001**	t=14.552, P<0.001**
Collection of dirty linen: Laundry bags[#]	1.1 ±0.5	4.5 ±0.8	4.3 ±1.0	t=25.484, P<0.001**	t=20.238, P<0.001**
Sorting of dirty linen[#]	0.8 ±0.4	3.4 ±0.7	3.3 ±0.7	t=22.803, P<0.001**	t=21.926, P<0.001**
Washing and drying[@]	1.0 ±0.4	4.3 ±0.9	4.1 ±0.9	t=12.080, P<0.001**	t=11.348, P<0.001**
Folding Laundry[@]	1.1 ±0.5	2.8 ±0.6	2.6 ±0.7	t=7.847, P<0.001**	t=6.287, P<0.001**
Pushing\ Pulling Laundry Cart[#]	0.7 ±0.3	1.8 ±0.5	1.7 ±0.6	t=13.339, P<0.001**	t=10.540, P<0.001**

#: sample size is calculated at 50, @: sample size is calculated at 13, Significance test 1: Student's t – Test (Pre – intervention / Post – intervention), Significance test 2: Student's t – Test (Pre – intervention / Follow – up).

DISCUSSION

The current pre-test results revealed a significant prevalence of suboptimal practices among the hospital laundry workers, with less than three quarters exhibiting poor body mechanics in key operational areas. Specifically, deficiencies were observed during the collection of dirty linen, the processes of washing and drying, the sorting of soiled linen, and the critical stage of folding finished laundry. Importantly, a marked improvement in their body mechanics practices was observed in the subsequent post-intervention and follow-up phases, indicating the positive impact of the implemented program. In the same vein, a study conducted by **Masuluke** [(11)] assessing risk factors for musculoskeletal disorders among provincial laundry workers yielded consistent observations. It was reported that when offloading linen bags from delivery trucks, laundry workers frequently elevated their hands above shoulder level to access bags positioned at or above shoulder height within the truck's cargo area. During this demanding task, considerable forceful exertion was applied to pull the heavy bags onto the floor. Given that the weight of these bags often exceeded 20 kilograms, laundry workers were compelled to engage in excessive lumbar bending, while executing the pulling maneuver.

Furthermore, within the sorting stage, contaminated linen was often handled and sorted directly on the ground or floor, necessitating that laundry workers adopt excessively bent postures and utilize awkward body positions. Similarly, during the washing stage, workers were observed employing awkward postures, significant bending, and prolonged periods of standing while manually feeding linen into both washing machines and dryers. Moreover, in the folding stage, the linen was frequently processed on unadjusted tables and chairs, leading workers to maintain awkward postures, elevate their hands above shoulder level, endure prolonged standing, and engage in repeated bending. All these practices heighten the risk of musculoskeletal strain [(11)]. The findings of the current study are further corroborated by the results of an investigation conducted in Indonesia by **Chandrayana *et al.*** [(12)], titled "The Relationship between Work Attitudes and Complaints of Musculoskeletal Pain in Laundry Workers." This study indicated that all research subjects exhibited unnatural work postures, particularly during the movement of lowering objects from tables to the floor. The majority of subjects performed this specific movement with a bent back posture and frequently incorporated twisting motions while handling heavy loads.

In parallel, **Kamble and Kurane** [(13)], in their study assessing knowledge and self-reported practices regarding occupational health hazards among class-D workers, identified that more than three quarters of the respondents were not adhering to ergonomically sound techniques during the lifting of heavy objects. Conversely, the observations of the current study contrast with the results of a study conducted on 49 laundry workers in Indonesia by **Mulyati** [(14)], titled "The Relationship between Work Posture and Musculoskeletal Disorders (MSDs) In Laundry Workers in The Area of **Puskesmas Sukamerindu Bengkulu**." Mulyati's observations indicated that a substantial proportion, specifically three quarters of the laundry workers examined, exhibited ergonomic postures during their work activities.

The suboptimal practices observed in the studied sample during the pre-test phase of the current study, particularly concerning proper body mechanics, may be attributable to several contributing factors. These include a potential lack of systematic training regarding optimal body mechanics, the high quantity of clothes processed daily, the pace of work, the considerable

physical workload, and the prevalence of manual material handling activities. Additionally, the characteristics of task demands, coupled with equipment or workstations that are not appropriately aligned with worker's physical limitations and abilities, likely contribute to the adoption of poor postures. Conversely, the demonstrable improvement in workers' practices concerning proper body mechanics following the implementation of the educational program can be largely ascribed to the core content of the program, which placed a major emphasis on the provision of applied information complemented by extensive hands-on training sessions.

CONCLUSION

The results of the present study conclusively indicated a substantial enhancement in the adherence to proper body mechanics among the study participants across various operational domains. This marked improvement was evident in both the immediate post-intervention phase and the subsequent follow-up assessment, particularly when contrasted with the baseline practices observed prior to program implementation. Quantitatively, the analysis revealed highly statistically significant differences in the total practice scores pertaining to proper body mechanics at different domains for the studied sample across the distinct pre-implementation, post-implementation, and follow-up phases.

RECOMMENDATIONS

Regarding the findings of the present study, the following recommendations are suggested:

1- Replicating the program in other hospitals to improve hospital laundry worker's practices regarding proper body mechanics.

2- Distributing educational materials (pamphlets, posters, pictures, brochures and booklets) about proper body mechanics and its importance.

3- Providing ergonomically safe work environment for laundry workers in all hospital setting.

4- Developing training workshops and safety training to laundry workers in all hospital settings emphasizing on proper body mechanics. Training should be repeated at least annually.

5- Future research should be conducted using long-term intervention methods on a wide scale and another setting to assess effectiveness of intervention in improving proper body mechanics among hospital laundry workers.

ACKNOWLEDGMENT

The researchers would like to thank the directors of Suez Canal University Hospitals, as well as the workers in the hospital laundry department. They also extend their gratitude to everyone who directly or indirectly contributed to the completion of this research work.

Funding: None.

Conflict of interest: None.

REFERENCES

1. **Anand M, Vijayakumar K, Ratri P *et al.* (2018):** Study on prevalence of MSDs among ironing workers. TAGA J., 14: 1489-1499.
2. **Bolarinde S, Okwunna C, Olalekan A (2023):** Knowledge, attitude and practice survey on body posture among healthcare workers. J. Appl. Health Sci. Med., 3 (10): 1-9.
3. **Candra M, Ginting R, Huda L (2023):** Implementation of macro ergonomic participatory in physical work environment. J. Sist. Tek. Ind., 25 (1): 65-73.
4. **Chandrayana M, Widnyana M, Antari N *et al.* (2024):** Relationship between work attitudes and complaints of musculoskeletal pain in laundry workers. FISIO MU., 5 (2): 146-153.
5. **Suarjana I, Palilingan R, Salam I *et al.* (2025):** Work-related Musculoskeletal Disorders in the Laundry Workers: Gender, Age, Work Experiences, Work Duration, and Marital Status Differences Perspective, North Sulawesi Indonesia. *Malaysian Journal of Medicine & Health Sciences*, 21(1): 73:82.
6. **Evayanti L, Balikusuma I, Indonesiani S (2020):** Relationship between workload and fatigue level of laundry workers. Proc. 1st Semin. Emerg. Novel Corona Virus, 51 (60): 171-174.
7. **Kamble G, Kurane S (2021):** Knowledge and self-reported practices regarding occupational health hazards. Turk. Online J. Qual. Inq., 12 (8): 1411-1421.
8. **Madume A, Aaron F, Otokwala I *et al.* (2023):** Knowledge of proper body mechanics and ergonomics among hospital workers. Int. J. Multidiscip. Res. Growth Eval., 4 (3): 218-230.
9. **Masuluke T (2022):** Assessment of risk factors for musculoskeletal disorders amongst provincial laundry workers [Master's thesis]. Univ. Witwatersrand. Retrieved from: https://wiredspace.wits.ac.za/server/api/core/bitstreams/61a3c79f-49e7-4c0d-a6c1-b5f82b016b0a/content
10. **Mulyati S (2019):** Relationship between work posture and musculoskeletal disorders in laundry workers. Adv. Health Sci. Res., 14: 171-174.
11. **Priyanka, Ravneet K, Sakshi *et al.* (2021):** Knowledge and use of body mechanics practices among hospital attendants. Int. J. Health Sci. Res., 11 (9): 209-215.
12. **Sriagustini I, Rosmiati T, Fajri S (2023):** Musculoskeletal complaints based on work position in bamboo woven craftsmen. Indones. J. Occup. Saf. Health, 12 (3): 413-423.
13. **Stewart P, MacLellan M, Reed-Jones R (2021):** Assessment of the Effectiveness of a Laundry Cart Modification to Enhance Lifting Biomechanics. University of Prince Edward Island, bachelor thesis, https://islandscholar.ca/islandora/object/ir%3A24000.
14. **Zhafira N, Putra P, Rahmillah F *et al.* (2018):** Innovative design of ironing board based on Kansei Engineering. MATEC Web Conf., 154: 1-4.