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EFFECTIVENESS OF STRUCTURED TEACHING PROGRAM ON KNOWLEDGE AND PRACTICE OF ERGONOMICS AMONG STAFF NURSES

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ABSTRACT

Introduction: Occupational health, integral to public health, strives to enhance the physical, mental, and social well-being of workers across professions.[1] Musculoskeletal disorder (MSD) is prevalent among nursing personnel, identified as a high-risk group within the medical service industry, especially in the fast-paced Intensive Care Unit (ICU) environment.[5] Ergonomics is the "science of fitting workplace conditions and job demands to the capabilities of the working population.[6] Providing consistent and attentive care is important in caregiving settings, as many patients heavily depend on nursing staff to meet their daily health and personal needs. **Objectives:** To evaluate the effectiveness of a structured teaching program on the knowledge and practice of ergonomics among staff nurses working in the intensive care unit. **Method:** A quantitative quasi-experimental design with non-randomized control groups was utilized. Sixty staff nurses were chosen through convenience sampling and evenly distributed between the control and experimental groups. A pre-test was conducted prior to the structured teaching program, and a post-test was carried out on the sixth day to assess its impact. Descriptive and inferential statistics were employed for data analysis. **Result:** The experimental group improved significantly, with all participants reaching excellent post-test scores compared to 93.33% poor and 6.67% average in the pre-test. The control group showed minimal change. Poor ergonomic practices dropped from 36.67% to 3.33%, and REBA scores reduced from 7.53 to 5.60, indicating the effectiveness of the structured teaching program. **Conclusion:** The study highlights a significant improvement in knowledge and practice among ICU staff nurses following the structured teaching program on ergonomics. **Recommendation:** To improve ergonomic practices, future studies should focus on incorporating ergonomic training among staff nurses working in the ICU.

Keywords: Ergonomics, intensive care unit, Knowledge, Practice, Structured teaching Programme.

INTRODUCTION

Public health, as defined by the World Health Organization (WHO), is described as the art and science of preventing disease, prolonging life, and promoting health through organized societal efforts. Employment conditions and workplace environments play a crucial role in promoting health equity. Supportive work settings offer social security, recognition, and opportunities for both personal and professional growth, while also safeguarding individuals from physical and psychological risks. [1,4] According to the International Labour Organization (ILO), there are approximately 2.3 million deaths each year due to work-related causes, in addition to 340

million occupational accidents and 160 million cases of work-related illnesses globally.[2] Nurses, who are fundamental to healthcare systems, are frequently affected by work-related health issues caused by poor body mechanics, such as back injuries, pain, and muscular disorders. [3] Among them, critical care nurses—especially those working in intensive care units (ICUs)—face demanding environments that test both their emotional resilience and physical endurance. These settings expose them to numerous occupational risks, including physical strain, stressful work conditions, ergonomic challenges, biological hazards, and chemical exposures. The rising cases of musculoskeletal disorders among nurses stress the urgency of implementing preventive strategies and managing risks effectively [5] Ergonomics, the science of fitting workplace conditions and job demands to the capabilities of the working population, plays a crucial role in preventing work-related injuries and promoting overall well-being.[6] By adopting ergonomic practices and safe work techniques, healthcare institutions can significantly reduce musculoskeletal problems, boost staff efficiency, and maintain a safe and healthy work environment.[7]

NEED OF STUDY

Numerous studies have shown that musculoskeletal disorders (MSDs) significantly impact healthcare workers, especially nurses. A 2020 study by Shuai Yang, Li Li, Shu Chuan Lin, and colleagues used a cross-sectional descriptive design with stratified cluster sampling to examine MSD-related factors among 1,803 hospital nurses. The most affected areas were the right shoulder (85.8%), left shoulder (80.9%), neck (62.4%), right wrist (62.2%), and lower back (60.4%). Shoulder pain was significantly associated with department, exercise habits, and age ($p < .05$), while neck pain showed a significant link with job title, years of service in the current unit, and history of musculoskeletal disorders ($p < .05$). Age and length of time in the current role were key factors related to upper back pain ($p < .05$). [8,9] Larry BW (2016) evaluated the effect of a structured teaching program on ergonomics among 60 operation theatre nurses using a pre-test and post-test design. Data were collected over five days through questionnaires and checklists, with the intervention given to the experimental group. Post-intervention results showed an increase in knowledge scores from 6.6 to 14.1 and a reduction in poor practices from 3.5 to 1.9. The study concluded that structured teaching significantly improved nurses' ergonomic knowledge and practices.[10] Extensive research has indicated that musculoskeletal disorders (MSDs) are highly prevalent among nurses, making them one of the most affected professional groups. This issue leads to nursing workforce shortages and adversely affects the quality of patient care. According to the Global Burden of Disease report by the World Health Organization and data from the Institute for Health Metrics and Evaluation, MSDs consistently rank among the top causes of disability worldwide. These conditions significantly diminish both quality of life and workplace productivity. Proper implementation of ergonomic strategies has been proven to reduce musculoskeletal disorders, decrease absenteeism, and enhance the retention of healthcare personnel. [1]

AIM OF STUDY

To assess the effectiveness of a structured teaching program on ergonomics in enhancing the knowledge and practices of staff nurses working in the ICU.

RESEARCH METHODOLOGY

Research Type: Quantitative research Approach

Research Design: Quasi-experimental Non-Randomized Control Group design

Sample Size: 60 samples.

Sampling Technique: Non-probability Convenient sampling.

Tool Description:

The study tool comprised two sections: Section A included the consent form, while Section B with structured questionnaires to assess knowledge related to ergonomics and ergonomic practices were evaluated using a standardized REBA scale and a structured self-reported checklist.

Reliability:

The reliability of the tool was assessed using the test-retest method, and the correlation coefficient was calculated using Karl Pearson's formula. A reliability score of 0.80 indicated 80% consistency, demonstrating the tool's effectiveness.

Pilot Study:

A pilot study was carried out among staff nurses working in intensive care units, using a non-probability convenience sampling technique. The hospitals involved in the pilot study were excluded from the main data collection to avoid bias. The researcher approached each participant, provided a detailed explanation of the study objectives, and obtained informed written consent. A pre-test was conducted before the intervention, and a post-test was carried out on the sixth day to assess its effectiveness. The results demonstrated a statistically significant difference, thereby affirming the validity and effectiveness of the study design.

RESULTS AND FINDINGS

Table 4.6 The distribution of staff nurses according to their pre-test and post-test knowledge scores was analysed for both the control and experimental groups.

Knowledge Score	**Experimental Group**				**Control Group**			
	Pre-Test		**Post Test**		**Pre-Test**		**Post Test**	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Poor (1 to 5)	28	93.33%	0	0.00%	12	40.00%	15	50.00%

Average (6 to 10)	2	6.67%	0	0.00%	18	60.00%	15	50.00%
Good (11 to 15)	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Excellent16 to 20	0	0.00%	30	100.00 %	0	0.00%	0	0.00%

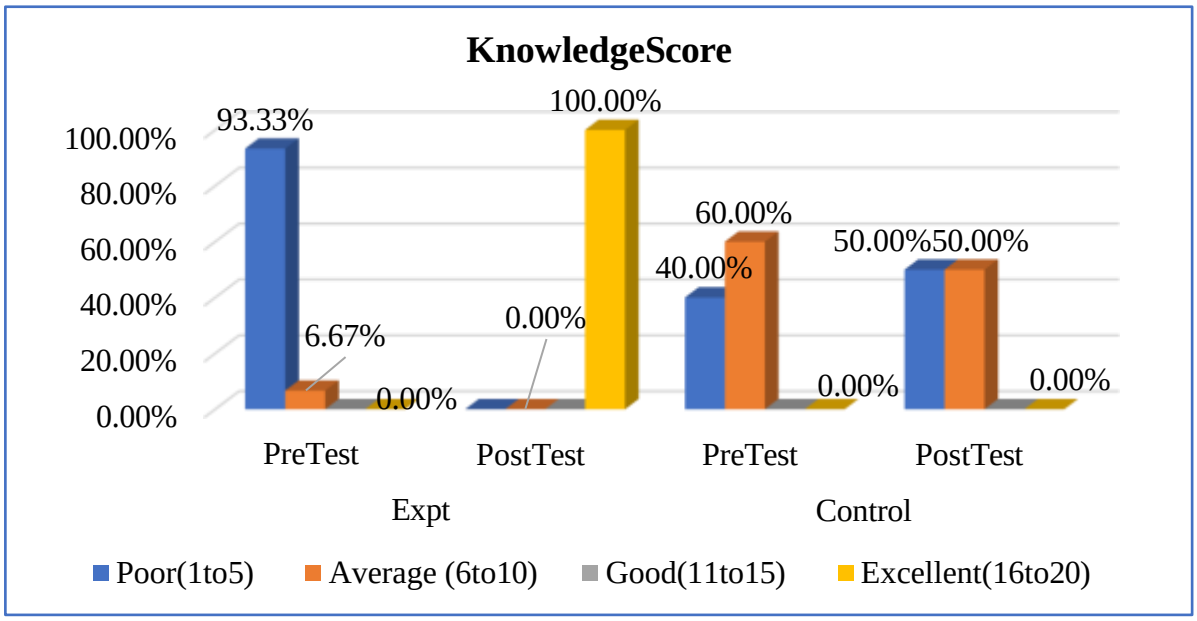

Fig. 4.15 A bar diagram illustrates the distribution of staff nurses based on their pre-test and post-test knowledge scores in the control and experimental groups.

Table 4.7 The distribution of staff nurses based on their pre-test and post-test practice scores assessed by structured self-reported checklist in both the control and experimental groups.

Practice Score	**Experimental Group**				**Control Group**			
	Pre-Test		**Post Test**		**Pre-Test**		**Post Test**	
	N	%	N	%	N	%	N	%
Poor (1 to 5)	11	36.67%	1	3.33%	2	6.67%	0	0.00%
Average (6 to 10)	19	63.33%	6	20.00%	28	93.33%	29	96.67%

Good (11 to 15)	0	0.00%	23	76.67%	0	0.00%	1	3.33%

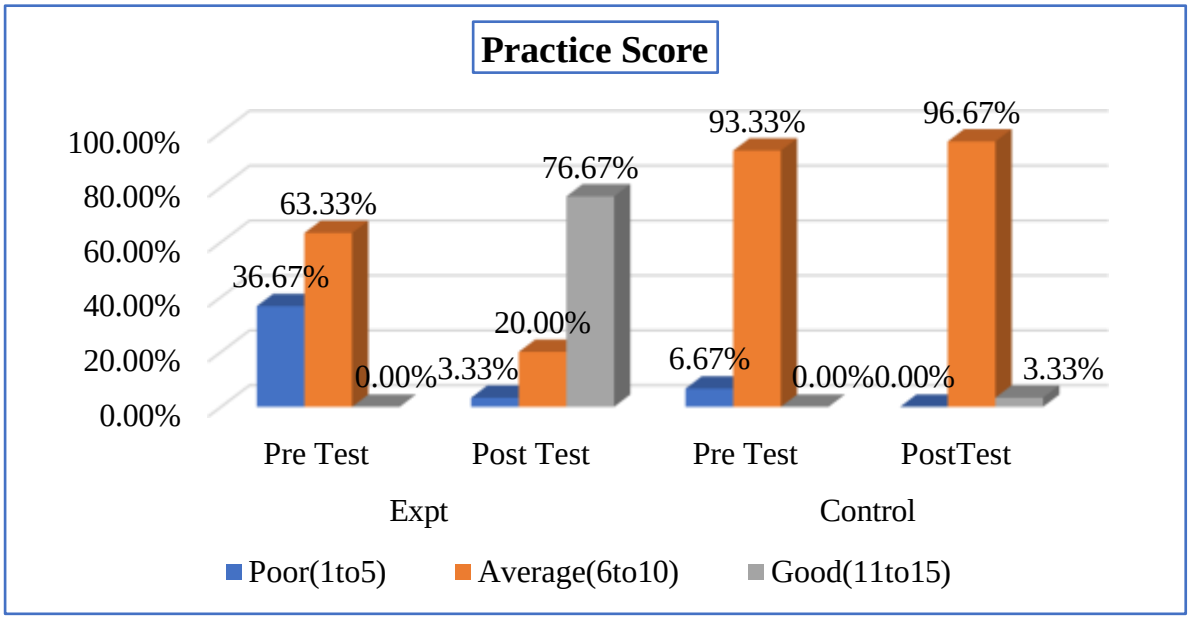

Fig. 4.16 A bar diagram illustrates the distribution of staff nurses based on their pre-test and post-test practice scores, assessed by structured self-reported checklist in both the control and experimental groups.

Table 4.8 The distribution of staff nurses based on their pre-test post-test practice scores, as assessed by the REBA Scale, in both the control and experimental groups.

REBA Scale	**Experimental Group**				**Control Group**			
	Pre-Test		**Post Test**		**Pre-test**		**Post Test**	
	Frequency	**%**	**Frequency**	**Percentage**	**Frequency**	**Percentage**	**Frequency**	**Percentage**
1 to 4 (Low Risk))	2	6.67 %	6	20.00%	2	6.67%	2	6.67%
5 to 8 (Moderate Risk))	19	63.33 %	22	73.33%	21	70.00%	21	70.00%

9 to 12 (High Risk))	9	30.00 %	2	6.67%	7	23.33%	7	23.33%

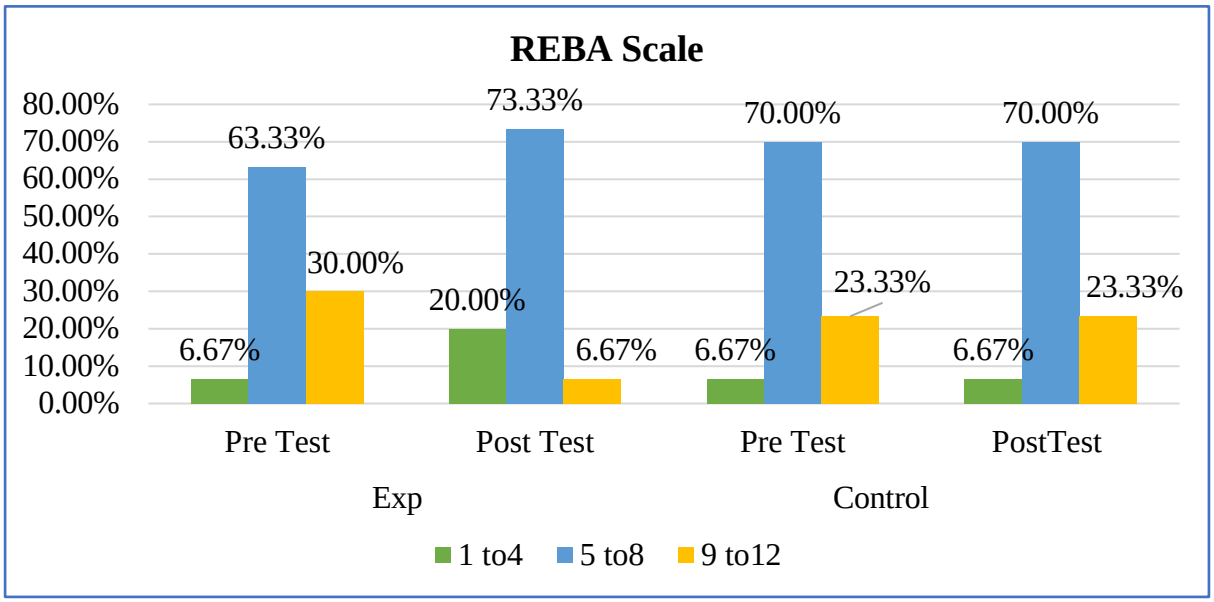

Fig.4.17 A bar diagram illustrates the distribution of staff nurses based on their pre-test and post-test practice scores, as assessed by the REBA Scale, in both the control and experimental groups.

DISCUSSION ON MAJOR FINDINGS OF THE STUDY

The research investigated how effective a structured teaching program was in enhancing the knowledge and practices of ergonomics among ICU nurses in selected hospitals within a particular city. A quasi-experimental approach, specifically a non-randomized control group design, was adopted. Sixty participants were selected using convenience sampling and equally divided into experimental and control groups. Both groups underwent a pre-test, followed by a structured teaching session for the experimental group, and post-tests were conducted on a sixth day for both groups.

Demographic variables included in the study were age, gender, educational qualification, ICU experience, awareness of ergonomics, previous participation in ergonomics-related workshops or lectures, presence of work-related musculoskeletal disorders, pain experience and its intensity, and current ergonomic practices during hospital duties. Initial assessment of ergonomic knowledge showed that in the experimental group, 93.33% had poor scores (1–5), while 6.67% scored in the average range (6–10). No participants scored in the good (11–15) or excellent (16–20) ranges. In contrast, the control group had 40% with poor scores and 60% with average scores, with no individuals scoring in the higher ranges.

Ergonomic practice scores, based on a structured self-reported checklist, revealed that in the experimental group, 36.67% had poor scores, and 63.33% scored in the average range. In the

control group, only 6.67% scored poorly, and 93.33% had average scores. Again, no participants achieved high scores in either group. The REBA (Rapid Entire Body Assessment) scale was used to assess ergonomic risks. In the experimental group, 6.67% were at low risk, 63.33% at moderate risk, and 30% at high risk. The control group showed 6.67% at low risk, 70% at moderate risk, and 23.33% at high risk.

After the intervention, the experimental group's post-test scores showed a dramatic improvement, with 100% of participants attaining excellent knowledge. Conversely, in the control group, 50% still had poor scores, and the remaining 50% were in the average range. To evaluate the effectiveness of the structured teaching intervention, mean scores, standard deviations, and t-tests were used. The experimental group showed a significant improvement in knowledge scores from a mean of 3.00 to 18.43, with a t-value of -43.932 and a p-value of 0.000, indicating a highly significant difference. The control group showed no meaningful change.

Regarding ergonomic practices, the experimental group’s pre-test results showed that 36.67% had poor practices and 63.33% had average practices. Post-intervention, only 3.33% had poor practices, 20% had average practices, and 76.67% demonstrated good ergonomic practices. The control group’s practice scores remained mostly unchanged, with 6.67% having poor and 93.33% average scores in the pre-test and 96.67% maintaining average practices in the post-test. The improvement in practice scores was statistically significant in the experimental group, with mean scores increasing from 6.00 to 11.60 (t-value: -10.548, p-value: 0.000), showing the effectiveness of the structured teaching program. No significant changes were observed in the control group.

The REBA scale also showed improvement in the experimental group. Pre-intervention, 6.67% were at low risk, 63.33% at moderate risk, and 30% at high risk. Post-intervention, 20% were at low risk, 73.33% at moderate risk, and only 6.67% at high risk. In the control group, post-test risk levels remained largely the same with 6.67% at low risk, 70% at moderate, and 23.33% at high risk. Statistical analysis revealed a significant drop in REBA scores for the experimental group from 7.53 to 5.60 (t-value: 7.136, p-value: 0.000), suggesting a reduction in musculoskeletal risk due to improved ergonomic practices. The overall t-value was 7.583 with a p-value below 0.05, confirming the significant difference in practice score improvements between the two groups.

CONCLUSION

The study demonstrated that a structured teaching program significantly improved the knowledge and practice of ergonomics among ICU staff nurses. Post-intervention results showed a marked shift from poor to excellent knowledge levels and a reduction in risky ergonomic practices. This highlights the importance of regular ergonomic training in high-risk healthcare environments. The research findings support to implementation of such programs into routine staff education to prevent musculoskeletal disorders and promote workplace safety. Further studies with larger samples are recommended to validate these findings.

CONFLICT OF INTEREST

The authors declare no conflict of interest with this research titled ‘’Effectiveness of structured teaching program on knowledge and practice of ergonomics among Staff nurses.’’

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