

A Study to Assess the Effectiveness of Structured Instructional Program Regarding Body Mechanics on the Knowledge and Practice of Nursing Students Regarding Nursing Procedures in Pal College of Nursing & Medical Sciences, Haldwani, Nainital, Uttarakhand

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Abstract: ***Background:** The goal of nursing is healing the sick, so it is ironic that nursing as a profession sees some of the highest rates of musculoskeletal injuries and this might disrupt a nurse's career. Hospital workers, particularly ward nurses, are known to be at high risk for back injury, with patient handling tasks being implicated in most cases. It is widely accepted that chronic back pain can result in disability. Most low back pain follows injury to the back, poor physical conditions and inappropriate posture during activity. Pain in the back can restrict activities; reduce work capacity and quality of enjoyment in everyday living. **Objectives:** Research study was planned to assess the knowledge & practice of nursing students regarding body mechanics and determine the effectiveness of structured instructional program on the knowledge and practice regarding body mechanics. **Methods:** A quantitative approach & pre experimental (one group pre - test post - test) research design was selected for the research study after ethical clearance from the authority of the nursing institution. Population selected for the study was B. Sc. 'N' 4th year & GNM 3rd year nursing students from Pal College of Nursing & Medical Sciences, Haldwani, Nainital, Uttarakhand. An informed consent was taken from the participants. 80 nursing students were taken by non probability convenient sampling technique accordance with the inclusive criteria of the study. Data was collected using self structured questionnaire tools for knowledge and observational checklist tools for related nursing procedures of body mechanics for practice. **Results and Interpretation:** The study results revealed that, the extent of knowledge in 80 nursing students was, 10% Good, 63% Average, 27% Poor knowledge score in pre - test & post test knowledge score was, 52% Good, 44% Average & 4% Poor. Practice score was, 5 nursing procedure was performed, transferring patient from bed to stretcher, maximum 76% had inappropriate body posture in pre - test & in post - test 100% had appropriate body posture. Assisting patient from bed to wheelchair, majority 91% had inappropriate body posture in pre - test and 92% had appropriate body posture, in post - test. Moving helpless patient up in the bed, mostly 97% had inappropriate body posture in pre - test and in post - test 91% had appropriate body posture. Log rolling 100% had inappropriate body posture in pre - test, & in post - test, 70% had appropriate body posture. Bed making, 100% had inappropriate body posture, in pre - test & 97% had appropriate body posture in post test. Hence effectiveness of structured instructional program found to be statistically significance at the 0.05 level. The research hypothesis was accepted. **Conclusion:** The present study revealed that structured instructional program on body mechanics and related nursing procedures was found to be effective for the nursing students. Hence there was improvement in the knowledge and practice of students nurses regarding body mechanics.*

Keywords: Body mechanics, knowledge, practice, structured instructional program, nursing students, and effectiveness

1. Introduction

Today's nursing students are tomorrow's nursing personnel. So the student nurses can fulfill their roles as health personnel if they develop healthy practices such as body mechanics in their daily life. According to WHO "Body mechanics is a combination of posture, balance, and motion, all of which influence coordinated movement and stress placed on the body". Maintaining a good posture while standing or sitting is an acquired skill that requires practice and training. [1] Body mechanics" is a two - word phrase used to describe the movements we make each day during normal activities, including lying in bed, sitting, standing, lifting, pulling, pushing, and walking. [2] The use of proper body mechanics is an effective way to prevent further back injury and when it is incorporated into activities of daily living, body mechanics help decrease the amount of stress

on the spine. [3] Use of body mechanics in terms of posture and alignment helps in - reducing the risk of injury to the musculoskeletal system, facilitating body movement without muscle strain and excessive use of muscle energy, maintaining adequate muscle tone, thus contributing to balance of the body, preventing fatigue and deformities like kyphosis, lordosis, etc. [4] It is fundamental for nursing students early in their education to be aware of correct body mechanics. Clinical nursing requires a strong theoretical knowledge base, coordinated psychomotor skills, and physical endurance. Nurses assist clients to turn, walk, and increase their activity. [5] Correct body mechanics is the utilization of proper body movement and a result of the coordination of musculoskeletal and nervous systems in maintaining balance, posture, body alignment during activity performance. [6] In Hindustan Times newspaper on 5th January 2015, an article published informed that nearly 90%

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of nurses suffer from lower back pain and musculoskeletal disorders and said the study conducted by researchers at Nirmala Niketan College of Home Science in Mumbai. [7] Knowledge and practice of body mechanics protect the patients application of body mechanics enables the nurse to use correct muscle groups when positioning complaining care. The nursing students can position transfer and help patients ambulate safely and effectively. [8] Clinical nursing requires a strong theoretical knowledge base, coordinated psychomotor skills, and physical endurance. Nurses assist clients to turn, walk, and increase their activity. [9]

Nurses are in fifth ranked who use for manual lifting and transferring the patients and have musculoskeletal injuries. Good BM technique is moving, handling patients, and safely lifting a heavy object. Many of the nursing procedures are directly related to the utilization of muscles. [10] The knowledge and application of body mechanics enable the nurse to care safely for clients with varying levels of independent mobility throughout their lifespan. [11] All nursing students recognize the importance of clinical - practice education, but they experience stress from clinical practice as well as from their academic training. Stress and anxiety can increase due to difficulties in applying theoretical knowledge to a clinical - practice situation, through difficulties in interpersonal relationships with nursing clients, due to a feeling of helplessness stemming from their ambiguous role as nursing students at the practice site, or from the mere fact of having to do a lot of practice. [12] The prevalence of musculoskeletal problems (MSP) among nurses is high (7% - 85%). The most common being in the lower back (56% - 57%) and neck (52% - 56%) regions. 60% 61% of nurses experienced MSP in two or more body regions. [13]

2. Objectives

- To assess the knowledge of nursing students regarding body mechanics.
- To assess the nursing students practice of body mechanics during nursing care.
- To determine the effectiveness of structured instructional program on the knowledge and practice regarding body mechanics.

3. Materials and Methods

A quantitative approach with pre - experimental (one group pre - test post - test) research design was adopted for the research study after ethical clearance from the authority of the nursing institution. The study population consisted of B. Sc. 'N' 4th year & GNM 3rd year nursing students from Pal College of Nursing and Medical Sciences, Haldwani, Nainital, Uttarakhand. An informed consent was taken from all the participants in the study. 80 nursing students were taken by non probability convenient sampling technique. Data was collected by using structured questionnaire tools

for knowledge and observational checklist tools for related nursing procedures of body mechanics for practice. There was 5 different nursing procedures selected for the study -

- Transferring patient from bed to stretcher
- Assisting patient from bed to wheelchair
- Moving helpless patient up in the bed
- Log rolling
- Bed making

Data Collection Method

Structured knowledge questionnaire regarding body mechanics was developed consisted of 30 items. The maximum score was 30 and classified as arbitrarily score into good (21 - 30), average (11 - 20), and poor (0 - 10) knowledge. Each question was scored one (1) for correct answer & zero (0) for wrong answer. The practice checklist had dichotomous options like yes and no. Score of each step was, on 1 mark for (yes) correct performance and 0 for (no) wrong performance. The procedures were observed through concealed participatory observation.

Data Collection Process

Firstly knowledge and practice of the nursing students was measured by the structured knowledge questionnaire & observational practice checklist. Next day of data collection teaching & demonstration on body mechanics was administered to students. After 7 days of structured instructional program, post - test knowledge was measured by using the same structured knowledge questionnaire and observational practice checklist.

4. Results

About 80 nursing students were selected in the research study. Majority of students 54 (67.5%) belonged to the age group of 20 - 22 years, followed by 22 (27.5%) were belonged to the age group of 23 - 25 years and 04 (05%) were belonged to the age group of 26 - 28. Mostly 68 (85%) students were female and 12 (15%) students were male. Maximum 44 (55%) students were studying in GNM 3rd year and 36 (45%) students were studying in B. Sc. 'N' 4th year as shown in table 1.

Table 1: Frequency and percentage distribution of demographic variables of nursing students: $n=80$

| S. N | Demographic variables | Frequency (f) | Percentage (%) |
|------|---------------------------------|---------------|----------------|
| 1 | Age in years | | |
| | 20 - 22 | 54 | 67.50% |
| | 23 - 25 | 22 | 27.50% |
| | 26 - 28 | 4 | 5% |
| 2 | Gender | | |
| | Male | 12 | 15% |
| | Female | 68 | 85% |
| 3 | Educational | | |
| | GNM 3 rd year | 44 | 55% |
| | B. Sc. (N) 4 th year | 36 | 45% |

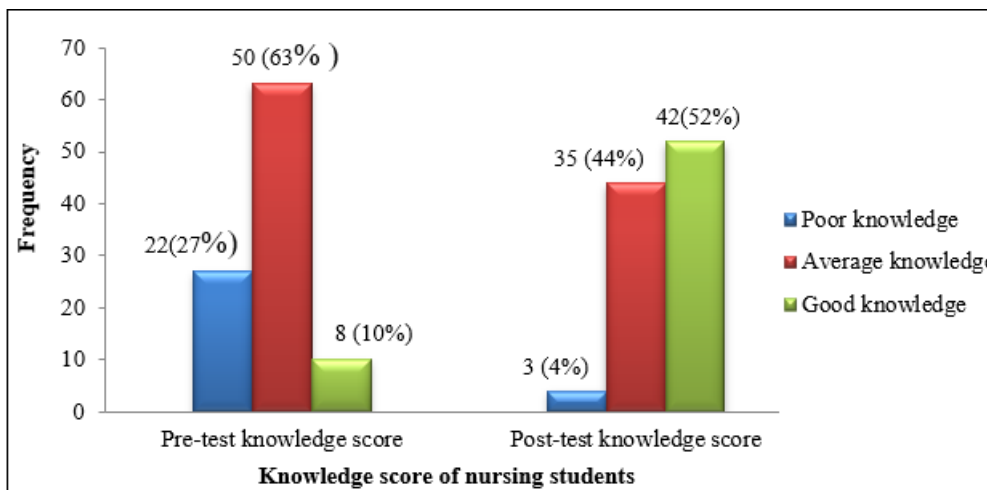


Figure 1: Histogram showing frequency and percentage distribution of pre - test and post - test knowledge score of nursing students

Fig.1 showed that out of 80 nursing students, majority 50 (63%) students had average knowledge and maximum 8 (10%) students had good knowledge in pre - test and in post - test maximum 42 (52%) students had good knowledge and 3 (4%) students had poor knowledge.

Table 2: Mean, mean% and SD distribution of pre - test and post - test knowledge score regarding body mechanics.

| S. N | Knowledge Questionnaire | Maximum score | Pre - test | | | Post - test | | |
|------|-------------------------|---------------|------------|-------|------|-------------|-------|------|
| | | | Mean | Mean% | SD | Mean | Mean% | SD |
| 1. | Knowledge questionnaire | 30 | 14.4 | 48.1% | 4.74 | 20.4 | 68% | 4.27 |

Table 2 describes that; pretest mean was 14.4 ± 4.74 with a mean percentage of 48.1%. Whereas in post - test, mean knowledge score was improved to 20.4 ± 4.27 with a mean percentage of 68% in the same area of knowledge

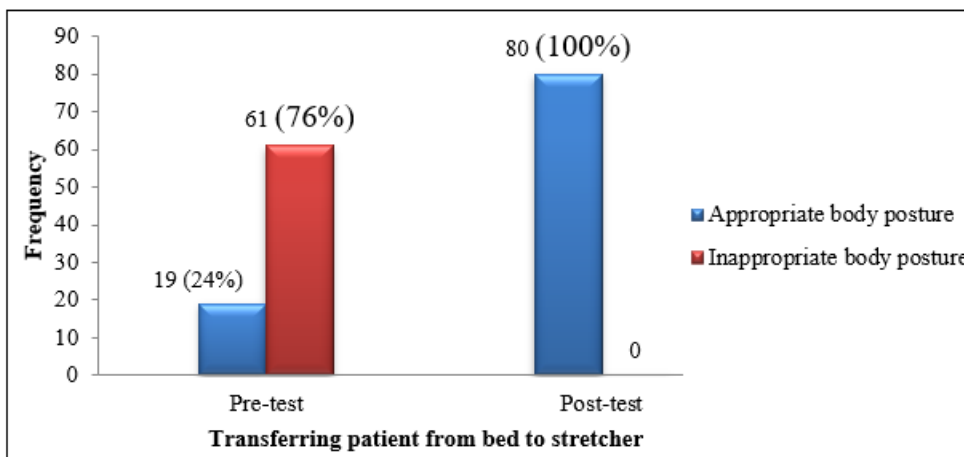


Figure 2: Histogram showing frequency and percentage distribution of pre - test and post - test practice score of transferring patient from bed to stretcher procedure

Majority of students 61 (76%) had inappropriate body posture during pre - test procedure and maximum 80 (100%) of student had appropriate body posture during post - test as shown in fig.2.

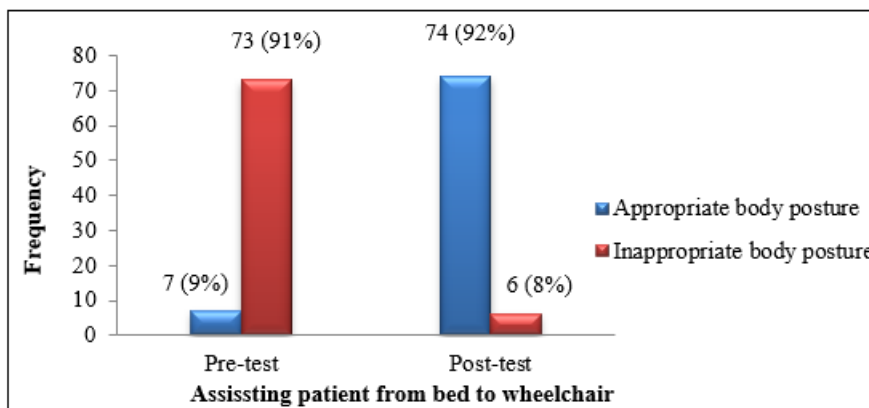


Figure 3: Histogram showing frequency and percentage distribution of pre - test and post - test practice score of assisting patient from bed to wheelchair procedure

In fig.3, the majority of students 73 (91%) had inappropriate body posture during pre - test procedure and maximum 74 (92%) of students had appropriate body posture during post - test.

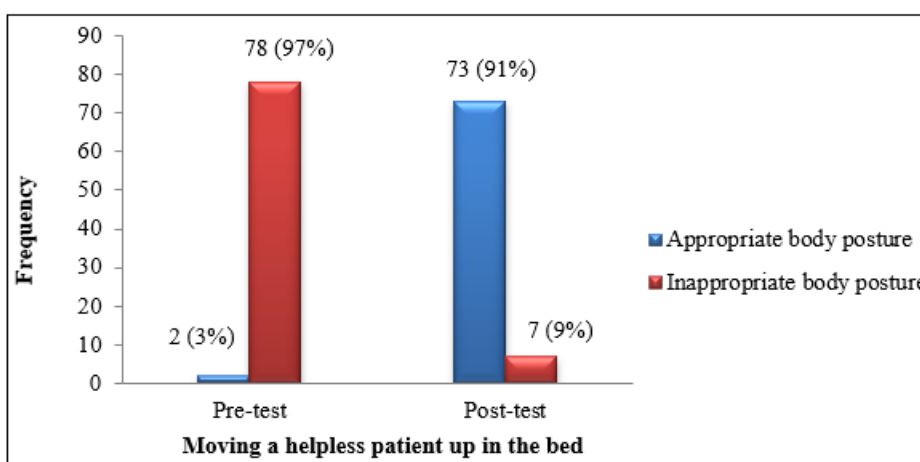


Figure 4: Histogram showing frequency and percentage distribution of pre - test and post - test practice score of moving a helpless patient up in the bed procedure

The majority of students 78 (97%) had inappropriate body posture during pre - test procedure and in post - test maximum students 73 (91%) had appropriate body posture as shown in fig.4.

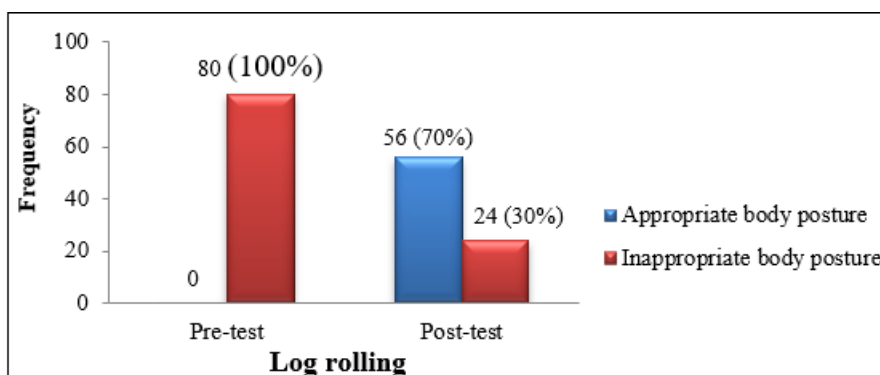


Figure 5: Histogram showing frequency and percentage distribution of pre - test and post - test practice score of log rolling procedure

Fig.5 showed that, the majority of students 80 (100%) had inappropriate body posture during pre - test procedures and maximum of students 56 (70%) had appropriate body posture during post - test.

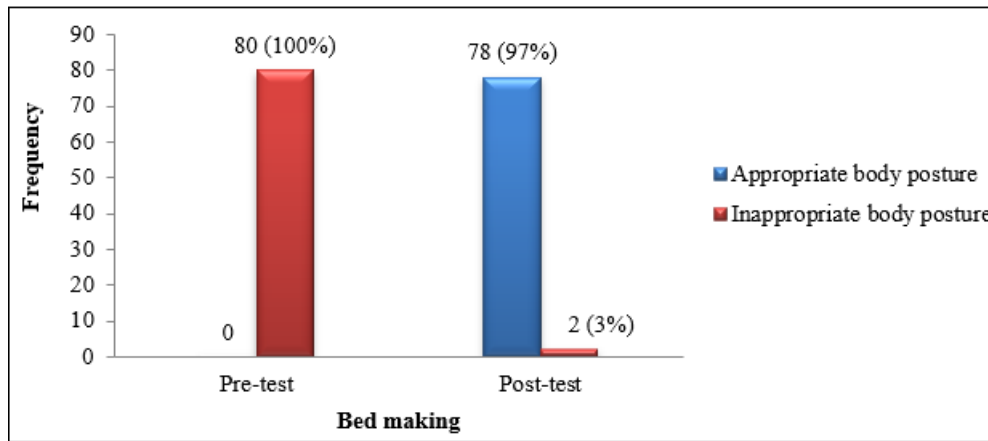


Figure 6: Histogram showing frequency and percentage distribution of pre - test and post - test practice score of bed making procedure

The above fig.6 showed that, the majority of students 80 (100%) had inappropriate body posture during pre - test procedure and maximum 78 (97%) of students had appropriate body posture during post - test.

Table 3: Mean, mean% and SD distribution and comparison of nursing students on pre - test and post - test practice score regarding selected nursing procedures

| Practice | Maximum score | Pre - test | | | Post - test | | |
|--|---------------|------------|-------|------|-------------|--------|------|
| | | Mean | Mean% | SD | Mean | Mean % | SD |
| Transferring patient from bed to stretcher | 10 | 4.9 | 49 | 0.82 | 6.9 | 69 | 0.66 |
| Assisting a patient from bed to wheelchair | 7 | 3.26 | 46.5 | 0.89 | 5.25 | 75 | 0.58 |
| Moving a helpless patient up in the bed | 7 | 3.17 | 45.2 | 0.56 | 4.98 | 71.1 | 0.64 |
| Log rolling | 7 | 2.35 | 33.5 | 0.59 | 4.8 | 68.5 | 0.60 |
| Bed making | 4 | 1.98 | 49.5 | 0.11 | 3.12 | 78 | 0.40 |

- In above table 3 shown that, pre - test mean was 4.9 ± 0.82 with mean percentage 49% and post - test mean was improved to 6.9 ± 0.66 with mean percentage of 69% practice score regarding transferring patient from bed to stretcher.
- Mean 3.26 ± 0.89 with mean percentage of 46.5% in pre - test and in post - test mean practice score was improved to 5.25 ± 0.58 with mean percentage of 75% practice score regarding assisting a patient from bed to wheelchair.
- Mean 3.17 ± 0.56 with mean percentage of 45.2% in pre - test and in post - test, mean practice score was improved to 4.98 ± 0.64 with mean percentage of 71.1% practice score regarding moving a helpless patient up in the bed.
- Mean 2.35 ± 0.59 with mean percentage of 33.5% in pre - test and in post - test mean practice score was improved to 4.8 ± 0.60 with mean percentage of 68.5% practice score regarding log rolling.
- Mean 1.98 ± 0.11 with mean percentage of 49.5% in pre - test, whereas during post - test, mean practice score was improved to 3.12 ± 0.40 with mean percentage of 78% practice score regarding bed making

Table 4: Mean, Mean %, Enhancement, Z value of effectiveness of structured instructional program on knowledge of nursing students n=80

| Knowledge score | Mean | Mean% | Enhancement | Enhancement % | 'p' value | 'z' value | Inference |
|-----------------------------|-------|-------|-------------|---------------|-----------|-----------|-----------|
| Pre - test knowledge score | 14.43 | 48.1 | | | | | |
| Post - test knowledge score | 20.48 | 68 | 6.05 | 19.9% | 0.001 | 8.17 | S |

*p significance at < 0.05 level

The above table 4 shows that, the pre - test and post - test mean knowledge score was 14.43 and 20.48 with mean percentage 48.1 and 68 respectively, there was enhancement of 19.9% and the calculated 'z' value obtained was 8.17 at $p=0.00001$ level of significance. Hence effectiveness of structured instructional program found to be statistically significance at the 0.05 level. The researcher hypothesis (H_1) was accepted.

Table 5: Mean, Mean %, SD, Enhancement, Z value of effectiveness of structured instructional program regarding transferring patient from bed to stretcher, n=80

| Practice score | Mean | Mean% | Enhancement | Enhancement % | 'p' value | 'z' value | Inference |
|----------------------------|------|-------|-------------|---------------|-----------|-----------|-----------|
| Pre - test practice score | 4.9 | 49 | | | | | |
| Post - test practice score | 6.9 | 69 | 2 | 20 | 0.0001 | 18.1 | S |

The above table 5 showed that, the mean percentage difference between pre - test and post - test practice score of student nurses showed 20% of enhancement with 'z' value 18.1 at $p=0.00001$ level of significance. Hence effectiveness of structured instructional program found to be statistically

significance at the 0.05 level. The researcher hypothesis (H₂) was accepted.

Table 6: Mean, Mean %, Enhancement, Z value of effectiveness of structured instructional program regarding assisting patient from bed to wheelchair, n=80

| Practice score | Mean | Mean% | Enhancement | Enhancement % | 'p' value | 'z' value | Inference |
|----------------------------|------|-------|-------------|---------------|-----------|-----------|-----------|
| Pre - test practice Score | 3.26 | 46.5 | 1.99 | 28.5 | 0.0001 | 18.0 | S |
| Post - test practice score | 5.25 | 75 | | | | | |

*p significant at < 0.05 level

The above table 6 showed that, the mean percentage difference between pre - test and post - test practice score of student nurses showed 28.5% of enhancement with 'z' value 18.0 at p=0.00001 level of significance. Hence effectiveness of structured instructional program found to be statistically significance at the 0.05 level. The researcher hypothesis (H₂) was accepted.

Table 7: Mean, Mean %, Enhancement, Z value of effectiveness of structured instructional program regarding moving a helpless patient up in the bed. n=80

| Practice score | Mean | Mean% | Enhancement | Enhancement % | 'p' value | 'z' value | Inference |
|----------------------------|------|-------|-------------|---------------|-----------|-----------|-----------|
| Pre - test Practice score | 3.17 | 45.2 | 1.81 | 25.9 | 0.001 | 20 | S |
| Post - test practice score | 4.98 | 71.1 | | | | | |

*p significant at < 0.05 level

The above table 7 showed that, the mean percentage difference between pre - test and post - test practice score of student nurses showed 25.9% of enhancement with 'z' value 20 at p=0.00001 level of significance. Hence effectiveness of structured instructional program found to be statistically significance at the 0.05 level. The researcher hypothesis (H₂) was accepted.

Table 8: Mean, Mean %, Enhancement, Z value of effectiveness of structured instructional program regarding log rolling n=80

| Practice score | Mean | Mean% | Enhancement | Enhancement % | 'p' value | 'z' value | Inference |
|----------------------------|------|-------|-------------|---------------|-----------|-----------|-----------|
| Pre - test Practice score | 2.35 | 33.5 | 2.45 | 27 | 0.0001 | 28 | S |
| Post - test practice score | 4.8 | 6.5 | | | | | |

* p significant at < 0.05 level

The above table 8 showed that, the mean percentage difference between pre - test and post - test practice score of student nurses showed 27% of enhancement with 'z' value 28 at p=0.00001 level of significance. Hence effectiveness of structured instructional program found to be statistically significance at the 0.05 level. The researcher hypothesis (H₂) was accepted.

Table 9: Mean, Mean %, Enhancement, Z value of Effectiveness of structured instructional program regarding bed making n=80

| Practice score | Mean | Mean% | Enhancement | Enhancement % | 'p' value | 'z' value | Inference |
|----------------------------|------|-------|-------------|---------------|-----------|-----------|-----------|
| Pre - test practice score | 1.98 | 49.5 | 1.14 | 28.5 | 0.0001 | 22.8 | S |
| Post - test practice score | 3.12 | 78 | | | | | |

* p significant at < 0.05 level

The above table 9 shows that, the mean percentage difference between pre - test and post - test practice score of student nurses showed 28.5% of enhancement with 'z' value 22.8 at p=0.00001 level of significance. Hence effectiveness of structured instructional program found to be statistically significance at the 0.05 level. The researcher hypothesis (H₂) was accepted.

Discussion

In the present study it was found that there was enhancement of 19.9% and the calculated 'z' value obtained was 8.17 which was found to be statistically significant at 0.05 levels (p=0.0001). Hence, it is inferred that research hypothesis (H₁) was accepted at 0.05 level of significance. This indicates that the instructional structured program was effective, as there was a significant gain in knowledge score.

All the 5 selected procedures was found to be statistically significant at 0.05 levels (p=0.0001). Hence, it is inferred that research hypothesis (H₂) was accepted at 0.05 level of significance. This indicates that the instructional structured program was effective, as there was a significant gain in post - test practice score.

Results of Iawim Rikupar, Dutta Bhanumati 2020, showed similar finding that structured teaching program will help to improve the practice of staff nurses and thereby prevented the staff nurses from developing musculoskeletal injuries.

Conclusion

The findings of the present study concluded that most of the students had had average knowledge and in practice maximum students had inappropriate body posture in pre - test and after administered structured instructional program on body mechanics, maximum students had good knowledge regarding body mechanics and in practice maximum

students had appropriate body posture regarding selected nursing procedures.

The structured instructional program has enhanced the knowledge of student nurses and thereby improved their skills, which is essential for performing the activities and preventing back injuries among student nurses. The student nurses expressed that the structured instructional program was very informative and it would help them to prevent back injuries and its complications. Hence the structured instructional program is instructionally effective, appropriate and feasible.

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