

A Study To Determine The Occurrence Of Back Pain And Its Relationship With Knowledge And Performance Of Body Mechanics Among The Staff Nurses Working In The Critical Care Unit Of Selected Hospital At West Bengal

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Abstract-

Back ground: Nurses who work prolonged period in critical care unit most commonly express their discomfort of back pain. The purpose of this study was to assess the occurrence of back pain among the critical care nurses (CCN) and to determine the relationship between the occurrence of back pain and the knowledge-performance of body mechanics. And thereby help the critical care nurses to be aware about the back pain that may occur due to hazardous working posture while performing nursing procedures. **Materials and methods:** a correlative survey approach was found appropriate with descriptive co-relational research design. The survey was conducted on the all-critical care nurses i.e., 75 numbers for assessing back pain occurrence and among of them 30 samples were selected by using the convenience sampling technique. Data collection was done by using a validated self-administered Demographic proforma on history of back pain, Back pain checklist, Structured observation checklist on bed making and back care procedure to assess the practice of body mechanics and Structured knowledge questionnaires on body mechanics & selected nursing procedures. **Results:** Among the 75 critical care nurses majority of the subjects 57.3% have history of back pain. The findings of the present study also showed that very high negative correlation existed between back care performance scores 8.15 and back pain scores -0.839 with $t(28) = 2.05$ $P < 0.05$ which was indicative of highly significant relationship that means the nurses who have high back pain scores also have low back care performance scores. The maximum percentage i.e., 70% of CCN scored in bed making procedure between 12 – 17 range, whereas maximum possible score was 22. The maximum percentage i.e. 73.3% of CCN scored in back care procedure between 4-7 range whereas maximum possible score was 10. The mean and median of bed making scores were nearly close to each other i.e. 12.7 and 13.2 between the range of 12 – 17 score. The mean and median of back care procedure were also nearly close to each other i.e. 6.6 and 5.9 within the range of 4 – 7. In the knowledge scores only 40% of the nurses scored in the range of 12-17 and in the back pain scores maximum nurses 63.3% scored in the range of 6-11. Whereas maximum possible score was 25. the mean and median of knowledge scores are fallen near the same point that is 15.3 and 15.5, between the range of 12-17 scores. The mean and median of back pain scores are also closed to each other that is 9.5 and 8.97 between the range of 6-11. The results depict that of the study participants might not had good knowledge regarding body mechanics with a mean score of 15.3. It is also possible that the staff nurses were not sufficiently motivated to practice the body mechanics during performing nursing procedures. **Conclusions:** The study findings were important in the awareness about prevalence of low back pain among the nurses and prevention of occupational low-back pain, among them.

Keywords: Back pain, Body Mechanics, Critical Care Nurses.

INTRODUCTION:

We are the nurses dealing with different patient related physical activities in our job environment like shift the patient from bed to trolley, bed to wheel chair; lift up the patient towards head end, one side to another side of the bed and so on, for this maintenance of proper body mechanics is essential. Nurses are responsible to meet the health needs of the patient at the same time be healthy by themselves. Therefore, they had to have their healthy back so that they can maintain health of others. The purpose of this study was to assess the occurrence of back pain among the critical care nurses and to determine the relationship between the occurrence of back pain and the knowledge-performance of body mechanics. And thereby help the critical care nurses to be aware about the back pain that may occur due to hazardous working posture while performing nursing procedures.

One out of 10 serious work-related back injuries involve nursing personnel, and about 12 percent of nurses leave the profession because of back injuries. Workers compensation costs for back injuries among health care workers are an estimated \$1.7 billion annually. These statistics would not surprise Robin Bunch, RN, who seriously injured her back during an emergency situation, pushing a bed locked in the low position; or Kathy Jones, RN, who suffered two fractured discs struggling with a confused patient; or Nancy Schwab-Ketner, RN, who herniated a disc while helping to pull up a 300-pound patient in bed. These nurses had to leave hands-on patient care behind them. Nurses are most likely to suffer a back injury where there are unpredictable responses from patients during ambulation or transfer, situations in which patients require constant lifting and turning, and in situations that require awkward positions while moving patients. These areas include:

- intensive care units,
- operating rooms, post-anaesthesia recovery,
- orthopaedic & rehabilitation units and
- convalescent homes

Staff must understand principles of safe lifting, and there must be enough people to do it Correctly. Said by M. Kathleen, MSN, NP, member of the Board of Directors of the American Association of Occupational Health Nurses.

Nurses who work prolonged period in critical care unit most commonly express their discomfort of back pain. In general, most of the nursing personnel do not practice body mechanics while performing patient care and related procedure in nursing. So, researcher felt that there may be relationship between occurrence of back pain and improper body mechanics. Researcher also felt that this study will help the nursing personnel to be aware about maintaining their proper body mechanics to prevent back pain.

Objectives of study

1. To find out the occurrence of back pain among the staff nurses as expressed by them.
2. To identify the staff nurses knowledge regarding body mechanics related to bed making and back care of patient in critical care unit as determined by knowledge score.
3. To assess the performance of body mechanics during selected nursing procedures (bed making and back care by staff nurses' working in critical care unit) as measured / evidenced by performance score.
4. To find out the correlation between knowledge and performance of body mechanics with the occurrence of back pain.

RESEARCH METHOD:

A correlative survey approach was found appropriate with descriptive co- relational research design. The schematic representation of study design is given below:

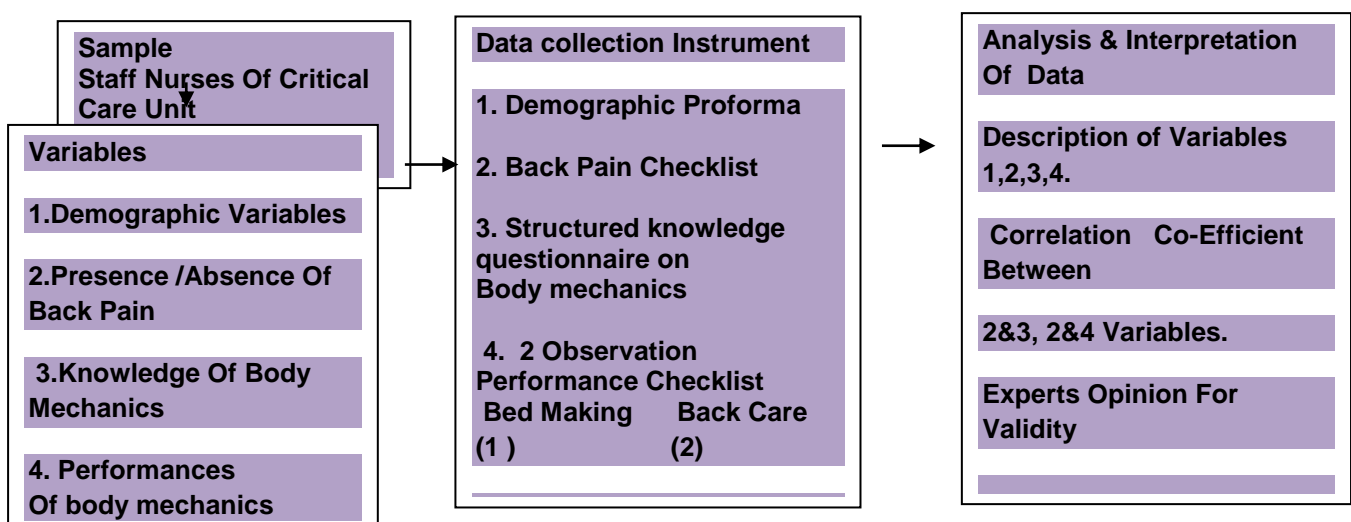


Figure 3: Schematic Representation of The Research Design

Research Setting: The study was conducted in the critical care unit of the B. M. Birla Heart Research Centre, situated near the CMRI hospital, Kolkata – 700027, West Bengal, India.

Population

In this study the population consisted of the nursing staff of critical care unit between 20-45 years of age, at B. M. Birla Heart Research Centre Kolkata, West Bengal.

Sample and Sampling Technique

In the present study 30 nursing personnel were chosen as the samples who were fulfilling the sampling criteria by using convenience sampling technique.

Criteria set for sample selection were:

- staff nurses who were registered under W.B.N.C. or I.N.C.
- staff nurses who were experienced in critical care unit more than 6 months.
- staff nurses who were willing to participate under the study.

Exclusion Criteria

Staff nurses who have back pain associated with

- orthopaedic problems (spinal cord injury, spondylosis)
- pelvic infection (like salpingitis, endometritis etc.).

Data Collection Tools and Techniques

Data collection was done by using a validated self-administered Demographic proforma on history of back pain, Back pain checklist, Structured observation checklist on bed making and back care procedure to assess the practice of body mechanics and Structured knowledge questionnaires on body mechanics & selected nursing procedures.

Pretesting Of The Tools

After obtaining formal administrative permission the tools were administered to 5 critical care nurses of CMRI hospital. This was to determine the simplicity and clarity of the items and the time taken to complete the questionnaire. It was estimated that the average time taken to complete the questionnaire was 30 minutes. The items were found to be clear and understandable to the staff.

Reliability

Back Pain Checklist And Knowledge Questionnaire

The structured back pain checklist and knowledge questionnaires were administered to a group of 20 ICU nurse of CMRI hospital. The tools were administered on 12th October, 2007 after seeking administrative permission.

The reliability of back pain checklist was calculated by using the Kuder-Richardson formula. The obtained correlation-coefficient for the structured back pain checklist was $r = 0.96$. The reliability of the structured knowledge questionnaire was calculated by split half method followed by spearman – Brown prophecy formula. The obtained correlation coefficient for the structured knowledge questionnaire was $= .79$

Observation Checklist

The structured observation checklists were administered to a group of 15 ICU nurse of CMRI Hospital by participatory concealment observation.

The reliability of the structured observation checklist was found by using the interrater reliability. The reliability coefficient was $r = .84$

Pilot Study

Initially permission was obtained from the C.O.O. (Chief Operating Officer) of CMRI Hospital, Kolkata for conducting the pilot study from 26-30th October, 2007. The purpose of the pilot study was to find out the feasibility and practicability of the study design. 10 critical care nurses of HDU (High Dependency Unit) were selected conveniently who are willing to participate for the study. First collect the demographic information about back pain and back pain score. Next observe the performance of body mechanics on selected nursing procedures by participatory concealment observation for 3 observation in separate days.

Next knowledge questionnaire was administered on 29th and 30th October. The design was found feasible. The plan of data analysis was drawn out.

Problem: All nurses could not be observed on the same day, sometime. Therefore, it is possible that some nurses became aware about the procedures.

RESULTS

Sample Characteristics

The data obtained from 75 critical care nurses to describe sample characteristics which were: age, body weight, marital status, history of gynaecological obstetrical problems, chronic, acute abdominal pain, abdominal, pelvic, orthopaedic operations experience in critical care unit and history of back pain and were also described in terms of frequency percentage & distribution.

Table – 1

Frequency and percentage distribution of critical care nurses

		N=75	
<i>Sl. No.</i>	<i>Sample characteristics</i>	<i>Frequency</i>	<i>Percentage</i>
1.	Age in years		
	1.1 20- 24 years	34	45.3
	1.2 25 – 29,	31	41.3
	1.3 30 – 34,	7	9.4
	1.4 35- 39,	3	4
	1.5 40 – 44	0	0
2.	Body weight in kgs.		
	2.1 40 – 49	37	49.3
	2.2 50 – 59	30	40
	2.3 60 – 69	7	9.4
	2.4 70 – 79	1	1.3
3.	Marital status		
	3.1 unmarried	59	78.7
	3.2 married	16	21.3
4.	History of any significant gynaecological and obstetrical problems	5	6.7
	4.1 yes	70	93.3
	4.2 no		
5.	History of any chronic or acute abdominal pain		
	5.1 yes	5	6.7
	5.2 no	70	93.3
6.	History of any previous abdominal, pelvic, orthopaedic operations	4	5.3
	6.1 yes	71	94.7
	6.2 no		
7.	Experience in I.C.U.		
	7.1 > 6 months < 5 years	55	73.3
	7.2 > 5 years	20	26.7
8.	History of back pain present		
	8.1 yes	43	57.3
	8.2 no	32	42.7

The data presented in the table - 1 shown that the majority of the subjects 57.3% have history of back pain and only 42.7% didn't have any history of back pain.

the majority of the critical care nurses 45.3 % were in the age group between 20 – 24 years and 41.3 % between 25 – 29 years and only 9.4% were between 30 - 34years, 4 % between 35– 39 years.

The data on body weight indicate maximum 49.3% nurses had the body weight between 40 – 49 kgs; 40% had between 50 – 59 kgs; 9.4 % had 60 – 69 kgs and only 1.3% had between 70 – 79kgs.

Data also shown that only 21.3% nurses are married women where as 78.7% are unmarried women. Majority 93.3% of the subjects did not have any significant gynaecological or obstetrical problems. Only 6.7 % have the ovarian cyst.

Majority of nurses 93.3% did not have any chronic or acute abdominal pain. Only 6.7% have Stomach pain & gastritis problems.

Majority of nurses 94.7% did not have any abdominal, pelvic, orthopaedic operation. Only 5.3 % have intervertebral disc prolapsed and lithoclast operations.

Majority of the nurses (73.3%) were experienced in ICU more than 6 months but less than 5 years and 26.67% were > 5 years' experience.

Table – 2

Frequency and percentage distribution of knowledge scores and back pain scores of critical care nurses on body mechanics and selected procedures.

N=30

Class interval	Knowledge scores		Back pain scores	
	Frequency	Percentage %	Frequency	Percentage %
0-5	0	0	4	13.3
6-11	7	23.3	19	63.3
12-17	12	40	5	16.7
18-23	11	36.7	2	6.7
>23	0	0	0	0

Maximum possible scores = 25

The data presented in table 2 shown that under the knowledge scores majority of the nurses 40% scored in the range of 12-17 and in the back pain scores maximum nurses 63.3% scored in the range of 6-11. Highest knowledge scores gained by 36.7% nurses in the range of 18-23 and highest back pain scores only (6.7%) in the range of 18-23.

The knowledge scores and back pain scores are also depicted in Fig:4 in the form of line diagram. The line diagram represents the distribution of knowledge scores and back pain scores of critical care nurses.

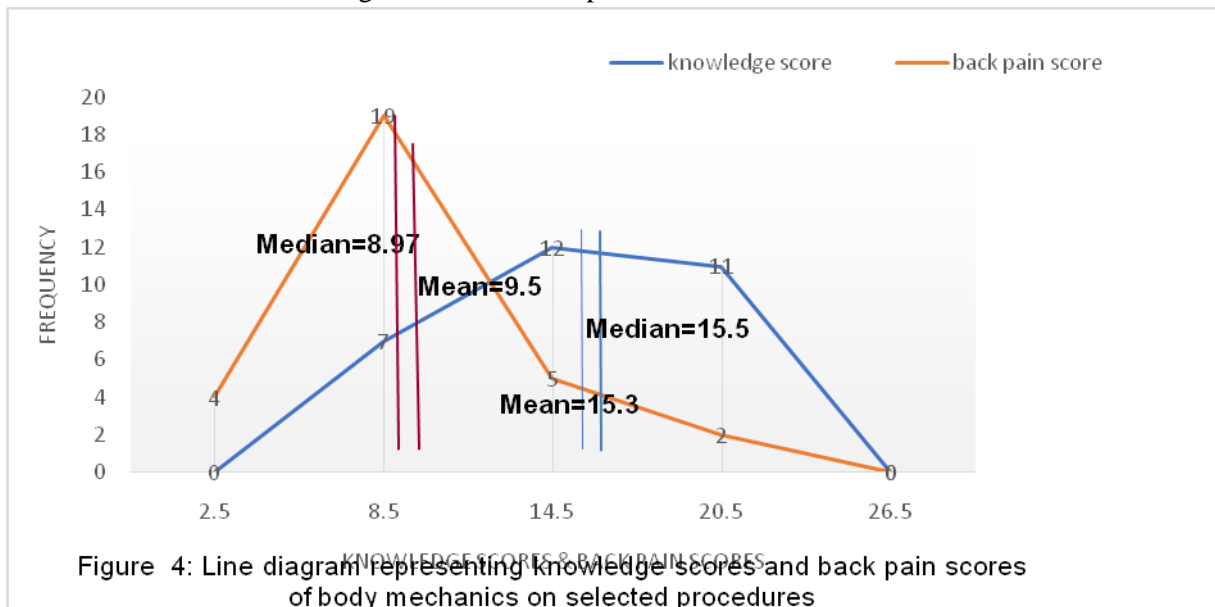


Table 3

Distribution of knowledge scores and back pain scores on body mechanics and selected procedures by Range, Mean, Median. N = 30

Sl. No	Range	Mean	Median
1. knowledge scores	12-17	15.3	15.5
2.back pain scores	6-11	9.5	8.97

Maximum possible scores = 25

The data presented in table 3 indicate that the mean and median of knowledge scores are fallen near the same point that is 15.3 and 15.5, between the range of 12-17 scores. The mean and median of back pain scores are also closed to each other that is 9.5 and 8.97 between the range of 6-11.

It also represented in Fig: 4, line diagram that mean in relation to the median lies close to each other in both the knowledge and back pain scores.

Table – 4

Frequency and percentage distribution of bed making performance scores of critical care nurses N= 30

Class interval	Frequency	Percentage %
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0 – 5	0	0
6 – 11	9	30%
12 – 17	21	70%
>18	0	0

Maximum possible scores = 22

The data presented in the table – 4 indicate that the maximum percentage that is 70% of CCN scored in bed making procedure between 12 – 17 range, and about 30% are scored between 6 –11 range whereas maximum possible score is 22.

Table -5 Distribution of performance scores by Range, Mean, Median, on bed making procedure.
N = 30

Range	Mean	Median
12 – 17	12.7	13.2

Maximum possible score = 22

The data presented in the table- 5 indicate that mean, median of bed making scores are nearly close to each other that is 12.7 and 13.2 between the range of 12 – 17 score.

Table – 6

Frequency and percentage distribution of performance scores of critical care nurses on back care procedure.
N = 30

Class interval	Frequency	Percentage %
0 – 3	0	0
4 – 7	22	73.3
8 – 11	8	26.7

Maximum possible scores = 10

The data shown in the table – 6 depicted that the maximum percentage that is 73.3% of CCN scored between 4-7 range whereas maximum possible scores is 10 and about 26.7% nurses scored between 8 – 11 range .

Table – 7

Distribution of back care performance scores by Range, Mean, Median .

N = 30

Range	Mean	Median
4 -7	6.6	5.9

Maximum possible score = 10

The data presented in table - 7 indicate that the mean and median of back care procedure are nearly close to each other that is 6.6 and 5.9 within the range of 4 – 7 score.

Relationship between occurrence of back pain and knowledge - performance scores of body mechanics in selected procedures

Table – 8

Correlation co-efficient between knowledge, performance scores, and back pain scores of critical care nurses.

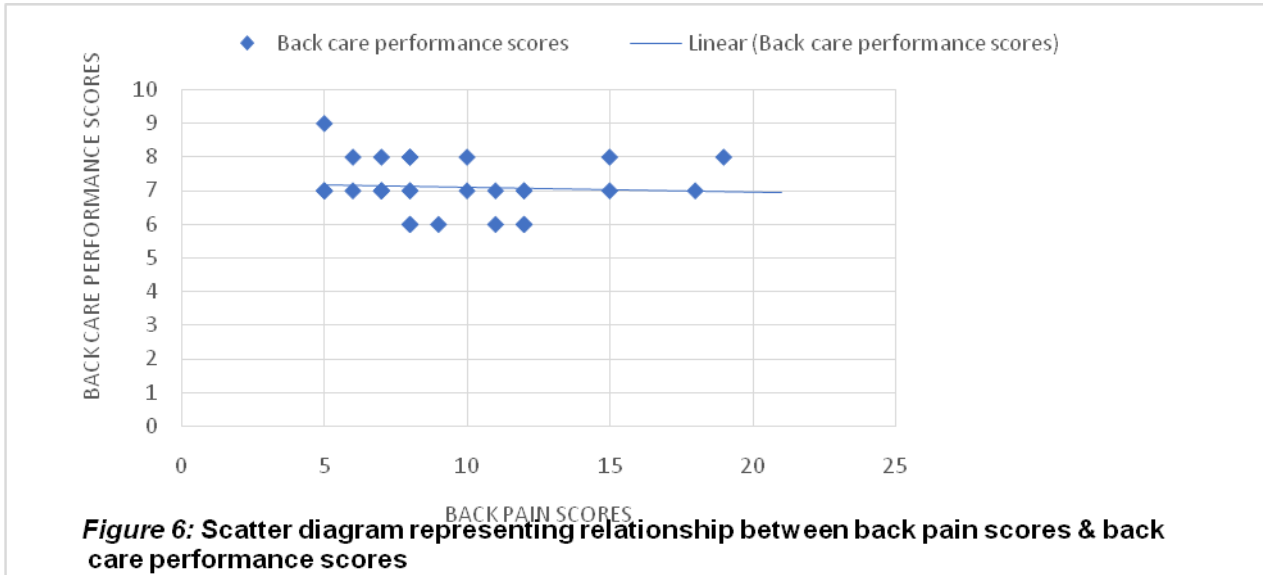
N = 30

Serial no.	Back pain scores	(r)	t	Remarks
1.	bed making performance scores	0.049	0.259	Not significant
2.	back care performance scores	-0.839	0.361	Significant
3.	knowledge scores	-0.350	1.976	Not significant

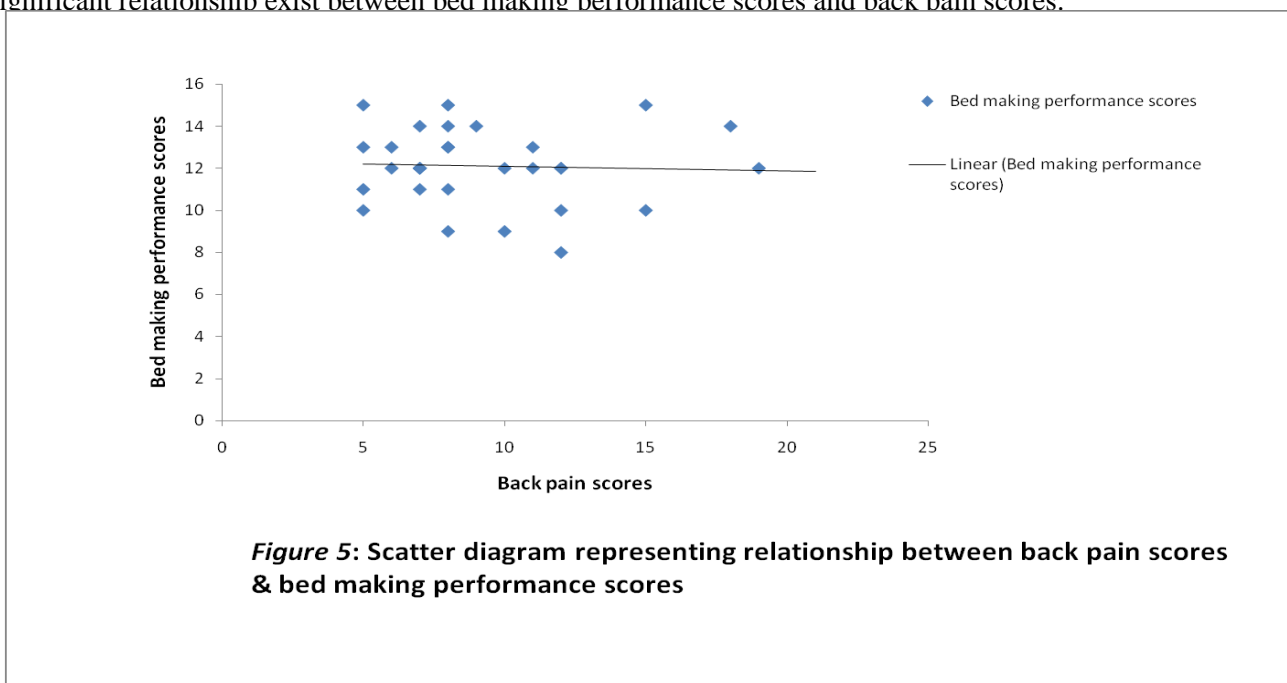
$t_{(28)} = 2.05$ $P < 0.05$

The data presented in the table- 8 shows that there is very high Significant negative correlation exists between back care performance scores 8.15 and back pain scores -0.839 among the critical care nurses. And there is no significant relationship exists between bed making performance scores 0.259 and back pain scores and also between knowledge scores 1.976 and back pain scores.

The relationship between back pain scores & back care performance scores are also depicted in Figure 6: in the form of scatter diagram. In the scatter diagram the trend line is started from upper right-hand side and end at lower left-hand side. So, it indicates there is significant negative relationship exist between back care performance scores and back pain scores i.e., nurses who have high back pain scores also have low back care performance scores.



The relationship between back pain scores & bed making performance scores are also depicted in Figure 5: in the form of scatter diagram. In the scatter diagram the trend line is just parallel to horizontal axis. So, it indicates there is no significant relationship exist between bed making performance scores and back pain scores.



DISCUSSION:

Among the 75 critical care nurses majority of the subjects 57.3% have history of back pain. The findings of the present study also showed that very high negative correlation existed between back care performance scores 8.15 and back pain scores -0.839 with $t_{(28)} = 2.05$ $P < 0.05$ which was indicative of highly significant relationship that means the nurses who have high back pain scores also have low back care performance scores. The maximum percentage

i.e., 70% of CCN scored in bed making procedure between 12 – 17 range, whereas maximum possible score was 22. The maximum percentage i.e. 73.3% of CCN scored in back care procedure between 4-7 range whereas maximum possible score was 10. The mean and median of bed making scores were nearly close to each other i.e. 12.7 and 13.2 between the range of 12 – 17 score. The mean and median of back care procedure were also nearly close to each other i.e. 6.6 and 5.9 within the range of 4 – 7. In the knowledge scores only 40% of the nurses scored in the range of 12-17 and in the back pain scores maximum nurses 63.3% scored in the range of 6-11. Whereas maximum possible score was 25. the mean and median of knowledge scores are fallen near the same point that is 15.3 and 15.5, between the range of 12-17 scores. The mean and median of back pain scores are also closed to each other that is 9.5 and 8.97 between the range of 6-11. The results depict that the study participants might not had good knowledge regarding body mechanics with a mean score of 15.3. It was also possible that the staff nurses were not sufficiently motivated to practice the body mechanics during performing nursing procedures.

CONCLUSIONS:

The study findings were important in the awareness about prevalence of low back pain among the nurses and prevention of occupational low-back pain, among them.

The study results also highlighted the urgent need for the development of effective training program for the prevention of low-back pain by maintaining correct body mechanics during performing nursing procedures.

Implications

Back injury and subsequent back pain are highly prevalent among nurses. Specific intervention like body mechanics helps to reduce the high risk of back injury and also to reduce the amount of absenteeism among the nursing personnel. One method of reducing the risk of back injury is by keeping the nurses informed about the practice of proper posture, body mechanics and proper lifting techniques during the performance of nursing activities. In this context nurses have a major role to play in helping the nursing population to prevent the occurrence of back pain.

The findings of the present study have implications to nursing practice, nursing education, nursing administration and nursing research.

Nursing practice

Literature and study reveal that nurses are more prone to develop back pain due to workload, long working hours and inappropriate body posture. So, it is essential to aware the nurses about importance of maintaining proper body mechanics during in all areas of nursing irrespective of a single area. Thus, it enables the nurse to improve her own health, provide high quality care to their clients as well as family members.

Nursing Education

Nursing Curriculum may be responsible for improving nurses knowledge and improving skill on body mechanics but nurse educator or nurse supervisor have a better and additional responsibility to update the knowledge of body mechanics and motivate them to practice in work place. This can be achieved by conducting in-service education programme in collaboration with nursing administrators, with prior planning. All nurses can be encouraged to teach other nurses on importance of body mechanics in daily activities to prevent back pain. Different innovative teaching strategies need to be adopted in teaching preventive measures for reducing back pain.

Nursing Administration

Nurse administrator is the right person to identify the nature of the problem and / or organize programme related to health promotion among the nursing personnel. Administrators need to provide safety equipment for nurses to lift, transfer the patients from bed to wheel chair/ trolley, adjustable bed with different modes to change the height, etc. to maintain body mechanics while performing certain nursing activities. Nurse administrators need to conduct weekly back strengthening classes and information on ergonomics for the workers. It is also necessary to have nursing supervisors to ensure that body mechanics is practiced in the working situation. The administrators need to plan, organize and conduct various programmes for the nursing personnel in order to encourage for improving their knowledge about body mechanics and to take active leadership in identifying and using the principles of body mechanics in their day-to-day activities. thus, it will help the nurses to be free of long-term complications of back injury.

Nursing research

A similar study can be conducted in large population in different hospital settings. A survey can be done to compare the prevalence of back pain among working as well as non-working women and the practices for reducing back pain.

Limitations

Limitations of the study were as follows:

1. The study was conducted among critical care nurses of B.M. Birla Heart Research Centre; hence generalization is limited to the population under study.
2. Researcher cannot control the environment to prevent mixing of the observed subject.
3. Extraneous variables like prolonged journey, heavy house hold activities, stress etc. were the beyond the control of researcher.

Recommendation

On the basis of the findings in the present study, following recommendations are made:

A similar study can be replicated on a large population taken from different specialized units like obstetric unit, orthopaedic unit, neurological unit in different Hospitals.

1. A survey study can be done to compare the prevalence of back pain among working as well as non-working women.
2. An awareness programme about the importance of exercise can be conducted among the nurses.
3. A follow up study can be done to determine the effectiveness of teaching programme in terms of practice of body mechanics in the daily activities.

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