

Assess the Clinical Variables and Effectiveness of Structured Teaching Programme on Knowledge Regarding Prevention of Pin Site Infection among Patients with External Skeletal Fixator in a Selected Hospital Bangalore

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Abstract

Background: External fixation is commonly used to correct bone and soft tissue deformities and fracture healing. Pin site infection is one of the most common and troublesome complication among patient with external skeletal fixator. It is important to impart knowledge on pin site care among external fixator patients. **Aim of the study:** To assess the effectiveness of structure teaching programme on knowledge regarding prevention of pin site infection among patient with external fixator. **Methods:** The study was conducted pre experimental –one group pre test and post test design was adopted .study was conducted in Hosmat hospital, Bangalore sample size was 60 by using non probability conveniences sampling technique. The structure questionnaire was used to collect the data. **Results:** The findings of the study revealed that the mean score of knowledge regarding prevention of pin site infection was 13.75 in pre test and 25.02 in post test the maximum score of 32. The paired t test was carried out and it was found to significant at $P<0.001$ level. **Conclusion:** The present study attempted to assess the effectiveness of structure programme on knowledge regarding prevention of pin site infection . it was found effective in improving the patient knowledge on regarding prevention of pin site infection among patient with external fixator

Keywords: Structured Teaching Programme; Pin Site Infection; External Skeletal Fixator.

Introduction

Pin site infection is a major concern for the orthopaedic nurse managing the patient with a skeletal traction pin or an external fixator. Prevention of pin site infection is an important nursing responsibility and pin site care is essential to avoid infection [1].

Broken bones have a remarkable ability to heal , but it is important that they are held in the correct during the healing process. An external skeletal fixator is a device consisting of multiple pins and external rings or bars which hols a fractured bone in place during the healing process. External fixator

are used primarily for too complex fracture such as comminuted or compound unstable to be managed by simple casting , limb reconstruction and ones in which external wounds are present [2].

A retrospective study was conducted determine the incidence of pin tract infection with the total of 285 external fixator with 285 fractures over a 4 year period out of 285 fractures, 32 (11.2%) were complicated by infection. The incidence of infection was 3.9% (3/77) for ring fixators, which was significantly different ($P<0.04$) from the 12.9% incidence (23/178) for unilateral fixators and 20% incidence (6/30) for hybrid fixator ($P=0.004$) . The results revealed that the patients with hybrid external fixators had a similar risk of pin tract infection as patients with unilateral fixators and the infection rate in the ring fixator group was significantly lower that the hybrid and unilatera fixator group [3].

The care of pin sites is mainly prophylactic and aims to prevent or minimize infection, and reduce the risk of skeletal pin reactions. Pin site care is one important part of the treatment by external fixation and includes the care of the wounds, where the pins

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or wires have been inserted, from the theatre dressing until the wounds are healed. The purpose of pin site care is to prevent infection. So researcher felt teaching patient with external fixator is vital role of nurse in preventing the infection [4].

Objectives of the Study

1. Identify the clinical variable among patients with external skeletal fixator
2. To assess the effectiveness of structured teaching programme knowledge regarding prevention of pin site infection among patients with external skeletal fixator.
3. To associate the pre test level of knowledge regarding prevention of pin site infection among patients with external skeletal fixator With their selected demographic variables and clinical variables.

Methodology

The conceptual model selected for this study is based on Imogene King's goal attainment model. Pre-experimental one group pre test -post test design was adopted for the present study [5]. The study was conducted on patients with external skeletal fixator. A sample size of 60. The tool consist of two section, Section -A: demographic variables of subjects 10 items Section -B: structure interview schedule was to assess the knowledge regarding prevention of pin infection among patients with external skeletal fixator . This includes 32 multiple choice was used as tool to collect the data. Content validity obtained from 8 experts in field of Nursing, Surgeon and Biostatistian. The reliability was established through split of method by using Spearman's Brown's Prophecy formula. The reliability score was $r=0.98$, the developed tools were found to be statistically reliable [6]. Pilot study was conducted in K.C. General Hospital, Bangalore, at among 6 patients and subjects were selected by using simple random sampling technique to find the feasibility of the study. The main study was conducted at Hosmat Hospital, Bangalore among 60 patients and the data collected was analyzed and interpreted based on descriptive and inferential statistics.

Results

The Table 1 shows the frequency and percentage distribution of patients with external skeletal fixator.

With regarding age 7 (11.7%) subjects belong to age of below 20 yrs, 21 (35%) subjects belong to 21-30 yrs, 15 (25%) subjects belong to age group 31- 40 yrs, and 17 (28.3 %) subjects belong to age group of above 41 yrs.

With regarding sex majority of the subjects 43 (71.7 %) were male and rest of them were 17 (28.3%) female. with regarding educational status 17 (28.3%) subjects had higher secondary education, 16 (26.7%) subjects had primary education, 13 (21.7%) subjects had secondary education, 9 (15%) subjects were graduate and 5 (8.3%) were illiterate.

In context to occupational status, 19 (31.6%) subjects were private employee, 16 (26.7%) subjects were government employee, 13 (21.7%) subjects were daily wages, 7 (11.7%) subjects were unemployed and 5 (8.3%) were doing business.

With regards to marital status majority of respondent 29 (48.3%) were married. 24 (40%) respondent were unmarried, 4(6.7%) respondents were widow/ widower and , 3(5%) respondents were divorced . with regarding family income per month 16 (26.7%) had income of below and equal Rs 3000, 17 (28.3) had income of Rs 3001- Rs 6000, 12(20%) had income of Rs 6001-Rs 9000 and 15(25%) had income of above Rs 9001.

Table 2 shows the clinical variables of patient with external skeletal fixator . with regard to types of fracture, majority of the subjects 55 (91.7%) had compound fracture whereas 5(8.3%) subjects had simple fracture. in context with the location of external fixator, majority of the subjects 49 (81.7%) had external fixator in lower extremities and 11 (18.3%) subjects had in lower extremities.

In relation to duration of application of external fixator, most of the subjects 23 (38.3%) had less than 1 month, 17 (11.7%) subjects had for 1-2 months , 13 (21.7%) subjects had 2-3 months and 7 (11.7%) subjects had more than 3 months. with regard to information about prevention pin site infection majority of subjects not heard information 52 (86.7%) and 8 (13.3%) had information . all the subjects had information from health personnel.

Table 3 shows the distribution of patients with external skeletal fixator according to level of knowledge regarding prevention of pin site infection before and after structure teaching programme. It revealed that is pre test , majority of the respondents 44 (73.33%) had inadequate knowledge, 13 (21.67%) had moderate knowledge and 3 (5%) had adequate knowledge regarding prevention of pin site infection. and in post test most of the respondents 42 (70%) had adequate knowledge and 18 (30%) had moderate knowledge regarding of pin site infection.

Table 1: Frequency and Percentage distribution of demographic variables of patients with external skeletal fixator. (n=60)

| S. NO | Demographic variables | Frequency | Percentage (%) |
|-------|--------------------------------|-----------|----------------|
| 1 | Age | | |
| | a. Below 20 yrs | 7 | 11.7 |
| | b. 21-30 yrs | 21 | 35.0 |
| | c. 31-40 yrs | 15 | 25.0 |
| | d. Above 40 yrs | 17 | 28.3 |
| 2. | Sex | | |
| | a. Male | 43 | 71.7 |
| | b. Female | 17 | 28.3 |
| 3. | Educational status | | |
| | a. Illiterate | 5 | 8.3 |
| | b. Primary education | 16 | 26.7 |
| | c. Secondary education | 13 | 21.7 |
| | d. Higher secondary education | 17 | 28.3 |
| | e. Graduate and above | 9 | 15.0 |
| 4. | Occupational status | | |
| | a. Unemployed | 7 | 11.7 |
| | b. Daily wages | 13 | 21.7 |
| | c. Government employee | 16 | 26.7 |
| | d. Private employee | 19 | 31.6 |
| | e. Business | 5 | 8.3 |
| 5. | Marital status | | |
| | a. Unmarried | 24 | 40.0 |
| | b. Married | 29 | 48.3 |
| | c. Divorced | 3 | 5 |
| | d. Widow / Widower | 4 | 6.7 |
| 6. | Family income per month | | |
| | a. Below and equal to Rs 3000 | 16 | 26.7 |
| | b. Rs 3001-Rs 6000 | 17 | 28.3 |
| | c. Rs 60001-Rs 9000 | 12 | 20.0 |
| | d. Above Rs 9001 | 15 | 25.0 |

Table 2: Frequency and percentage distribution of clinical variable of patients with external skeletal fixator (n=60)

| S. NO | Clinical variables | Frequency | Percentage (%) |
|-------|--|-----------|----------------|
| 1 | Types of fracture | | |
| | a. Simple | 5 | 8.3 |
| | b. Compound | 55 | 91.7 |
| 2. | Location of external fixator | | |
| | a. Upper extremities | 11 | 18.3 |
| | b. Lower extremities | 49 | 81.7 |
| 3. | Duration of application of external fixator | | |
| | a. Less than 1 month | 23 | 38.3 |
| | b. 1-2 months | 17 | 28.3 |
| | c. 2-3 months | 13 | 21.7 |
| | d. More than 3 months | 7 | 11.7 |
| 4. | Have you heard about prevention of pin site infection | | |
| | a. Yes | 8 | 13.3 |
| | b. No | 52 | 86.7 |
| | If yes sources of information (8) | | |
| | a. Health personnel | 8 | 100 |
| | b. mass media | - | 0 |
| | c. Family members | - | 0 |
| | d. Friends and relatives | - | 0 |

Table 3: Frequency and Percentage distribution of patients with external skeletal fixator according to the level of knowledge regarding prevention of pin site infection before and after structured teaching programme n=60

| S. No | Level of knowledge | Respondents knowledge | | | |
|-------|--------------------|-----------------------|------------|-----------|------------|
| | | Pre test | | Post test | |
| | | Frequency | Percentage | Frequency | Percentage |
| 1 | Inadequate (<50%) | 44 | 73.3 | - | - |
| 2 | Moderate (50-75%) | 13 | 21.67 | 18 | 30 |
| 3 | Adequate (>75%) | 3 | 5 | 42 | 70 |
| | Overall | 60 | 100 | 60 | 100 |

Table 4: Range, Mean, Standard deviation and Mean score percentage of knowledge regarding prevention of pin site infection among patients with skeletal fixator before and after structured teaching programme n=60

| S. No | Knowledge domains | Max score | Respondents knowledge | | | | | | | |
|-------|--|-----------|-----------------------|--------------|-------------|-------------|--------------|--------------|-------------|--------------|
| | | | Range | Pre test | | Mean % | Range | Post test | | Mean % |
| | | | | Mean | SD | | | Mean | SD | |
| 1. | General information | 7 | 2-6 | 3.07 | 1.07 | 40.7 | 4-7 | 5.47 | 2.63 | 78.0 |
| 2. | Pin site infection | 4 | 1-3 | 1.37 | 0.64 | 34.1 | 2-4 | 3 | 0.76 | 75 |
| 3 | Prevention of pin site care | 15 | 3-14 | 6.62 | 3.80 | 44.0 | 8-15 | 12.25 | 1.54 | 81.6 |
| 4 | General measures in prevention of pin site infection | 6 | 1-4 | 2.70 | 0.69 | 44.9 | 2-6 | 4.32 | 1.13 | 71.9 |
| | Overall knowledge | 32 | 8.27 | 13.75 | 4.83 | 42.9 | 16-31 | 25.02 | 3.94 | 78.31 |

The Table 4 shows Range, Mean, Standard deviation and Mean score percentage of knowledge regarding prevention of pin site infection among patients with skeletal fixator before and after structured teaching programme.

With regard to the general information about fracture and external fixation, out of maximum score of 7, the range was 2-6 in pre test and 4-7 in post, the mean score was found to be 3.07 in pre test and 5.47 in post test, with standard deviation of 1.07 and 2.63 and mean score percentage was 40.7 in pre test and 78.0 in post test.

In context with knowledge about pin site infection, out of maximum score of 4, the range was 1-3 in pre test and 2-4 in post test, the mean score was found to be 1.37 in pre test and 3 in post test, with standard deviation of 0.64 and 0.76 and mean score percentage was 34.1 in pre test and 75 in post test.

In relation to knowledge about prevention of pin site infection, out of maximum score of 15, the range

was 3-14 in pre test and 8-15 in post test, the mean score was found to be 6.62 in pre test and 12.25 in post test, with standard deviation of 3.80 and 1.54 and mean score percentage was 44.0 in pre test and 81.6 in post test.

With regard to knowledge about general measures in the prevention of pin site infection out of maximum score of 6, the range was 1-4 pre test and 2-6 in post test, the mean score was found to be 2.7 in pre test and 4.32 in post test, with standard deviation of 0.69 and 1.13 mean score percentage was 42.9 in pre test and 71.9 in post test.

The overall knowledge regarding prevention of pin site infection, out of maximum score of 32, the range was 8-27 in pre test and 16-31 in post test and mean score was found to be 13.73 in pre test and 25.02 in post test, with standard deviation of 4.83 and 3.94, mean score percentage was 42.9 in pre test and 78.1 in post test.

Table 5: Effectives of structured teaching programme knowledge regarding prevention of pin site infection among patients with external skeletal fixator n=60

| S. NO | Aspects of knowledge | Max score | Enhancement | | | | Paired 't' value | P-value |
|-------|--|-----------|-------------|-------------|-------------|-------------|------------------|-------------------|
| | | | Range | Mean | SD | Mean% | | |
| 1 | General information | 7 | 1-4 | 2.4 | 0.81 | 32.8 | 22.81* | P<0.001 |
| 2 | Pin site infection | 4 | 0-3 | 1.58 | 0.61 | 39.5 | 19.94* | P<0.001 |
| 3 | Prevention of pin site infection | 15 | 1-9 | 5.5 | 2.40 | 36.7 | 17.64* | P<0.001 |
| 4 | General measures in prevention of pin site infection | 6 | 0-4 | 1.62 | 0.99 | 26.9 | 12.60* | P<0.001 |
| | Overall knowledge | 32 | 5-16 | 11.1 | 3.49 | 35.2 | 24.49* | P<0.001 |

Table 5 shows the findings of the study showed that t value (24.49) was highly significant at 0.001 level. Hence, it is inferred that structured teaching programme was effective in improving knowledge regarding prevention pin site infection among patients with external skeletal fixator.

Discussion

The findings of the study showed that the mean change between the pre test and post test score was found to significant in improving the knowledge regarding prevention pin site infection among patients with external skeletal fixator. The study shows the clinical variables of majority of subjects had compound fracture and lower extremities. majority of subjects 52 (82.6) had no information regarding pin site infection. There was a significant association with demographic variables such as educational status, and family income. In the clinical variables duration of external fixator and previous information regarding pin site infection was associated other rest of the variables was not associated.

The findings of the study was supported by a study conducted to identify possible risk factors in the care of skeletal pin site in order to produce guidelines for cost effective care. Data was collected related to fractured, injury characteristics, pin site appearance, reaction, incidence, pin site care and physiological status. The study suggested that there is a correlation between infection and age, time of operation, patient who smoke and nutritional status. The highest correlation of infection risk with infected

pin site was low serum albumin, an indicator of poor nutritional status. The infection was 10.2% in patients with closed fractures and 10.7% in open or non union fractures [7].

Conclusion

The results of Present study showed that educating the patient with external skeletal fixator improve the knowledge regarding prevention of pin site infection. Its important educating the patient to prevent the complication and reduce the hospital stay.

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