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AN EXPERIMENTAL STUDY TO EVALUATE THE EFFECTIVENESS OF PERIPHERAL I/V CANNULA WITH SPLINT IN TERMS OF FUNCTIONAL DURATION AMONG THE CHILDREN BETWEEN 1 – 3 YEARS OF AGE ADMITTED IN SELECTED HOSPITAL OF NEW DELHI

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ABSTRACT

Vascular access is frequently required in hospitalized children for a variety of clinical indications.[2] This requirement may range from short-term or temporary needs to long-term or even permanent access. Therefore, An experimental study was conducted to assess the effectiveness of the functional duration of peripheral I/V cannula among the children between 1-3 years of age admitted in the selected hospital of New Delhi. The objectives of the study were: To assess the peripheral I/V cannula with the splint and without splint in terms of functional duration among the children between 1-3 years of age, To compare the effectiveness of peripheral I/V cannula with the splint and without splint in terms of functional duration of peripheral I/V cannula among the children between 1-3 years of age, To find out the association between the functional duration of peripheral I/V cannula with selected demographic variables of the experimental group, To find out the association between the functional duration of peripheral I/V cannula with selected clinical health data of experimental group. A total of sixty samples were randomly assigned into 2 groups (30 in the experimental group and 30 in the control group). Probability sampling technique (random sampling technique) was used to select the sample. A structured interview schedule was used to collect the demographic characteristics and clinic health data of the sample. Observation record to assess the functional duration of peripheral I/V cannula with VIP score for experimental and control group was tool used for the study. The mean difference post test score of duration of peripheral I/V cannula in experimental group and control group was 0.84. The calculated t value of 2.675 (p=2.000) which was significant at 0.05 level of significance which indicates that the peripheral I/V cannula with splint was more effective than the peripheral I/V cannula without splint among the children between 1-3years of age admitted in selected hospital of New Delhi. Thus, the finding of the study revealed that the peripheral I/V cannula with splint increases the functional duration of peripheral I/V cannula.

KEYWORDS: Evaluate, Effectiveness, Peripheral I/V cannula, intravenous splint, children.

INTRODUCTION

Vascular access in children is challenging to the most skilled therapist. Measures to prolong the functional duration of a peripheral I/V cannula may reduce the number of cannulations attempts and save neonates from pain and stress, as well as reduce the risk of infection.[1] Various options for vascular access are available to the physician who cares for children to meet the required treatment in order to minimize the number of attempts and the trauma to the child. Progressive venous sclerosis and thrombosis from multiple venous punctures cause physical and psychological trauma in children.[4] Maintenance of patency of these peripheral I/V cannulas is important for minimizing the patient's discomfort and need for replacement. Applying splints (arm boards) along with the peripheral intravenous (PIV) catheter is a common practice in pediatric wards. In order to prevent unnecessary repeated interventions, a suitable peripheral vein must be identified and stabilized before inserting a cannula, and the procedure must be skilfully performed.

Jeong et al. (2017) determined that the mean peripheral intravenous (PIV) catheter dwell time was 55.6 hours, mostly at 24–72 hours intervals, in 1596 pediatric patients.[10] The present study was designed to evaluate the effectiveness of peripheral I/V cannula with splint in terms of functional duration among the children Between 1 – 3 years of age.

REVIEWS OF LITERATURE

Funda Büyükyılmaz, Handan Eren (2019) Conducted a randomized control trial on the effectiveness of an Intravenous Protection Device in pediatric patients on catheter Dwell time and phlebitis score at the pediatric department of the public hospital in turkey. A total of 60 patients (30 in the experimental group and 30 in the control group) were selected through computer-based randomization for the study. In experimental group IV, ultra-house dressing was applied while in control group ultra-splint was applied. The degree of phlebitis was determined by the Visual Infusion Phlebitis scale and was recorded every 8 hours. The collected data were analyzed using descriptive and inferential statistics. The mean catheter dwell time for the experimental group was 2.10 with a standard deviation of 1.55. and in the control group was 1.27 with a standard deviation of 0.45. obtained 't' value 3.68 was found significant at $p \leq 0.01$ which suggests that the I.V. House Ultra Dressing is a useful device that can be used to increase catheter dwell time and protect and stabilize PIVCs in Pediatric patients.

Megha Raghavan, Praveen BK (2015)12 conducted a randomized control trial on the effect of joint immobilization on the life span of the intravenous cannula in the NICU of Father Muller Medical College. A randomized control trial design was used in this study. 390 samples were randomised in splint (n = 230) and no-splint group (n = 219). The data collected were analyzed using descriptive and inferential statistics. The analysis revealed that the mean duration in the splint group was 51.08 hours with the standard deviation 32.6 and in the no-splint group, the mean duration was 50.93 with the standard deviation 33.1 and the mean difference was 0.9 hours which found significant at $p \leq 0.05$. Hence the study concluded that the application of the limb splinting for intravenous cannulation only marginally prolongs the duration of the cannula.

PROBLEM STATEMENT

An experimental study to evaluate the effectiveness of peripheral I/V cannula with splint in terms of functional duration among the children between 1-3 years of age admitted in the selected hospital of New Delhi.

MATERIALS AND METHOD

Research approach: Quantitative Approach
Research Design: True-experimental post test only control group design
Setting: Pediatric care unit
Study population: Children between 1-3 years of age admitted in pediatric unit
Sample: Children between 1-3 years of age who were newly cannulated at the time of admission in selected Hospital, New Delhi
Sample size: 60
Sampling technique: Probability sampling technique
Data collection tool: Structured interview schedule, Visual infusion phlebitis scale, observation record

DESCRIPTION OF TOOL

SECTION I

Part A
Structured Interview Schedule to collect the demographic variables of selected sample.

Part B
Structured Interview Schedule to collect the Clinical Health Data of selected sample.

SECTION II

Visual Infusion Phlebitis score (VIP score) to assess the functional duration of peripheral I/V cannula.

SECTION III

Observation record to assess the functional duration of peripheral I/V cannula with VIP score for experimental and control group.

RESULT

Section 1: Description of selected variables
Demographic variables

• In the experimental group, most of the sample 16 (53.33%) were in the age group of 2-3 years, 14 (46.66%) in the age group of 1-2 years whereas in the control group, more than half of the sample 17 (56.66%) were in the age group of 1-2 years of age and 13 (43.33%) were in the age group of 2-3 years.
• In the experimental group, nearly 2/3rd of the sample 19 (63.3%) were male children 11 (36.7%) were female children whereas in the control group, majority of the sample 18 (60.0%) were male children, 12 (40%) were female children.

Clinical health data

• In the experimental group, nearly 1/3rd of the sample 9 (30%) were receiving twice I/V flush, 6 (20%) were receiving Q4h I/V flush, 5 (16.66%) were receiving 3 times I/V flush, 4 (13.33%) were receiving only one time I/V flush and the least 2 (6.66%) were receiving Q5h, Q6h, Q7h I/V flush whereas in the control group, more than 1/4th of the sample 8 (26.66%) were receiving twice I/V flush, 6 (20%) were receiving Q4h, Q6h I/V flush, 3 (10%) were receiving Q7h I/V flush, 2 (6.66%) were receiving once and Q5h I/V flush.
• In the experimental group, most of the sample 16 (53.3%) were receiving one medication, 7 (23.3%) were receiving three medication 6 (20%) were receiving two medication and the least 1 (3.3%) were receiving four medication whereas in the control group, more than 1/3rd

of the sample 11 (36.7%) were receiving three medication, 10 (33.3%) were receiving one medication, 9 (30%) were receiving two medication, and none of them were receiving four medication.

• In the experimental group, less than majority of the sample 21(70%) were receiving H2 receptor antagonist, 10(33.33%) were receiving antibiotics and antiemetics, 4(13.3 %) were receiving antipyretics and corticosteroids whereas in the control group 2/3rd of the sample 20 (66.66%) were receiving antibiotics, 19 (63.33%) were receiving H2 receptor antagonist, 14 (46.66 %) were receiving antiemetics, 3(10%) were receiving corticosteroids, and the least 2 (6.66%) were receiving antipyretics.

• In the experimental group, most of the sample 19(63.3%) were having above normal weight for age, 11(36.7%) have normal weight for age and none of them were below normal weight for age whereas in the control group, majority of the sample 24(80%) have normal weight for age, 6(20%) have below normal weight for age none of them were above normal weight for age.

• In the experimental group, almost all of the sample 29(96.66%) were receiving I/V fluid with medication, 1(3.33%) were receiving I/V fluid whereas in the control group 30 (100%) were receiving I/V fluid with medication.

• In both experimental group and control group 30(100%) sample were receiving hypotonic solution.

Section 2: Assessment of duration of peripheral I/V cannula site of experimental group and control group.

• In the experimental group 11 (36.7%) more than 1/3rd of the sample's duration of I/V cannula lasted for 37-48 hours, 10 (33.3%) sample's duration of I/V cannula lasted for 61-72 hours, 9(30%) sample's duration of I/V cannula lasted for 49-60 hours and none of their cannula lasted for 12-24 hours and 25-36 hours. whereas in the control group, nearly 1/3rd of the sample's 8 (26.7%) duration of I/V cannula lasted for 37-48 hours, 7(23.3%) duration of I/V cannula lasted for 12-24 hours and 61-72 hours, 6 (20%) sample's duration of I/V cannula lasted for 49-60 hours, and the least 2 (6.7%) sample's duration of I/V cannula lasted for 25-36 hours.

SECTION 3: Effectiveness of application of splint in terms of functional duration of peripheral I/V cannulation.

Group	Mean	Mean difference	Standard deviation	Standard error of mean difference	't' value	Significant value
Experimental group (n1 = 30)	4.97		0.850	0.155		
Control group (n2 = 30)	4.13	0.84	1.479	0.270	2.675	0.004

• In the experimental group mean was 4.97, standard deviation 0.850, standard error of mean difference was 0.155 whereas in control group, mean 4.13, standard deviation 1.479 and standard error of mean difference 0.270.

• The mean difference post test score of duration of peripheral I/V cannula in experimental group and control group was 0.84. The calculated t value of 2.675 (p=2.000) which was significant at 0.05 level of significance. Hence, null hypothesis was rejected and research hypothesis was accepted. The result indicated that there was a significant difference between the mean post – test score of functional duration of peripheral I/V cannula with splint and without splint in experimental and control group.

SECTION 4: Association between duration of peripheral I/V cannula with the selected demographic variables and selected Clinical health data

The calculated Chi-square value between the gender and functional duration of peripheral I/V cannula is ($\chi2$ = 0.098) and the calculated Chi-square value between the age and functional duration of peripheral I/V cannula is ($\chi2$ = 0.0683) was statistically not significant at 0.05 level of significance. The calculated Chi-square value between the weight for age and functional duration of peripheral I/V cannula is ($\chi2$ = 8.8), Chi-square between the frequency of I/V flush and functional duration of peripheral I/V cannula is value ($\chi2$ = 6.283), Chi-square value between the numbers of medications and functional duration of peripheral I/V cannula is ($\chi2$ = 5.9) which was statistically not significant at 0.05 level of significance. Hence the research hypothesis was rejected and null hypothesis was accepted.

DISCUSSION

The findings of the present study have been discussed in relation to the observation made by the other studies which the researcher reviewed. This study found that in the experimental group 11 (36.7%) more than 1/3rd of the sample's duration of I/V cannula lasted for 37-48 hours, 10 (33.3%) sample's duration of I/V cannula lasted for 61-72 hours, 9 (30%) sample's duration of I/V cannula lasted for 49-60 hours and no cannula was lasted for 12-24 hours and 25-36 hours. whereas in the control group, nearly 1/3rd of the sample duration of I/V cannula lasted 8 (26.7%) for 37-48 hours, 7 (23.3%) duration of I/V cannula lasted for 12-24 hours and 61- 72 hours, 6 (20%) sample's duration of I/V cannula lasted for 49-60 hours, and the least 2 (6.7%) sample's duration of I/V cannula lasted for 25-36 hours. The findings were similar to the study findings of Eskedar Birhane et. al[27] who reported that out of 178 sample majority 80 (44.9%)

reported the cannula lasted between 24 and 48 hours, 67 (37.6%) were having the cannula lasted up to 24 hours, 21 (11.8%) were having the cannula lasted between 48 and 72 hours. It was found in the present study that the mean post test score of experimental group (4.97) was higher than the mean post test score of control group (4.13) with the mean difference of 0.84 and the calculated 't' value 2.675 was found significant at $p \leq 0.05$ which indicated that the application of splint was effective in increasing the functional duration among the children between 1-3 years of age. The present study findings were consistent with the findings of Swati nema1 who found that the mean score of experimental group with splint is 3.4 with standard deviation 1.52, the mean score of group without splint is 6.35 with standard deviation 2.09 and mean difference is 2.95. The above findings were also consistent with the findings of Megha Raghavan, Praveen BK[26] who found that the median survival time of IVC in the splint group 51.08 hours with the standard deviation 32.6 and the median survival time of IVC of no-splint group 50.93 hours with the standard deviation 33.1 and the mean difference 0.9 hours. The present study found that there was no association between the duration of peripheral I/V cannula and selected variables such as gender and weight for age as the chi-square value 0.098, 8.8 respectively was found not significant at $p \leq 0.05$. The present study findings were consistent with the study findings of Parul Nagpal[20] who found that there was no significant difference in the grades of phlebitis with gender and body mass index for age at the level of $p \leq 0.05$. The present study findings also consistent with the study findings of Lorelle Malyon et.al[24] who found no statistically significant association between baseline data such as gender and the duration of peripheral intravenous cannula failure at $p = 0.59$. The present study findings also consistent with the findings of J. Phelps, S., & Helms34 who found no statistically significant association between gender and duration of peripheral IV cannula at $p = 0.97$. The present study found that there was no significant association between the duration of peripheral IV cannula and selected variables such as age as the chi-square value 0.098 was found not significant at $p \leq 0.05$. The present study findings were consistent with the study findings of Dalal, S. S.et. al[17] who found no statistically significant association between age and duration of peripheral I/V cannula at $p = 0.38$. The present study findings were also consistent with the findings of J. Phelps, S., & Helms[34] who found no statistically significant association between age and duration of peripheral I/V cannula at $p = 0.12$.

CONCLUSION

The findings of the study proved that the application of the splint was effective in improving the functional duration of I/V cannula among the children between 1-3 years of age and it can be implemented as a useful measure to increase the functional duration of peripheral I/V cannula.

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FUTURE SCOPE

A similar study can be conducted incorporating among various age group of children.

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