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A study to evaluate the effectiveness of aloe vera gel versus zinc oxide on peristomal skin complications among children undergone colostomy surgery in pediatric surgical ward at govt. Rajaji hospital, Madurai.

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Abstract:

Introduction: Children are the future of a nation and their physical, emotional and intellectual growth is a crucial aspect of influencing society. **Aim**: The aim was to examine the effectiveness of aloe vera gel and zinc oxide in the prevention of peristomal skin complications in children with colostomy. **Methodology**: The current paper followed a quantitative evaluative design using a true experimental pretest- after test design. Sixty children were recruited and randomly divided into two groups namely Intervention Group I who received aloe vera gel and Intervention Group II who received zinc oxide. Analysis of data was done using descriptive and inferential statistics such as frequency, percentage, and chi-square test. **Results**: In Intervention Group I (aloe vera), the pretest mean score was 6.63 ± 2.297, which decreased to 1.33 ± 1.493 in the posttest, showing a mean difference of 5.30. The paired t-test result (t = 13.59, p = 0.0001) indicated a highly significant improvement after the intervention. In Intervention Group II (zinc oxide), the pretest mean score was 6.47 ± 1.94 and reduced to 3.27 ± 2.28 in the posttest, with a mean difference of 3.20. The paired t-test value (t = 10.77, p = 0.001) also showed a highly significant reduction in complications. **Conclusion**: The present study concluded that both aloe vera gel and zinc oxide were effective in reducing peristomal skin complications among children who had undergone colostomy surgery.

Keywords: Aloevera gel, zinc oxide, peristomal skin complications

INTRODUCTION

Children are the future of a nation and their physical, emotional and intellectual growth is a crucial aspect of influencing society. The population of children in India comprises a large segment of the population with Uttar Pradesh and Tamil Nadu having the highest concentration of children. In Madurai, children make 10.33 percent of the total population in the district. Growth of children physically is a necessary phenomenon. GIT defects, as well as other congenital anomalies, may have a detrimental impact on the health of the child. These deformities can be mild to severe and in most cases, surgical intervention is necessary.

The digestive tract is also pivotal in digestion, absorption and excretion. It encompasses the mouth, esophagus, stomach, small intestine, large intestine as well as the accessory organs. Any malfunction of this system may lead to severe complications. Common causes of intestinal obstruction in children include disorders like anorectal malformations, Hirsch sprung disease, and intussusception as most of them may need surgical intervention. Colostomy is a surgical intervention associated with diversion of stools in children with acquired or congenital gastrointestinal pathology. It is normally done to treat anorectal malformations and Hirschsprung.

Even though colostomy is a life-saving procedure, it has some complications, like prolapse, skin irritation, infection, and obstruction. Colostomy is a temporary event in most children, which needs prolonged home care. The role of parents and care givers is significant in the management of the diet, stoma and early Identification of complications. Colostomy in developing countries has social and financial implications to the family. Caregivers should be trained and supported in a proper way. The use of paediatric surgery has not eliminated complications, especially the peristomal skin issues. Thus, the purpose of the proposed study is to facilitate successful colostomy care and avoid skin complications, which will, in turn, enhance the quality of life of children with colostomy.

NEED FOR THE STUDY

Children with stomas can have some complications like peristomal dermatitis, prolapse, stenosis, retraction, hernia and stoma dysfunction although surgical intervention done is careful. The complications can be greatly avoided by using appropriate surgical practices, nursing care, collaboration, and evidence-based practice. Colostomy makes significant differences in voiding habits and children and caregivers are forced to adjust to a new life style. The management of stoma consists of the personal care planning and the ongoing training of the healthcare specialists.

Nonetheless, there are high complications of the pediatric colostomy with reported incidence of between 25.2 and 54.3, again depending on the type of stoma and quality of care. Congenital malformations, most commonly, anorectal malforms, are the most significant causes of colostomy in children occurring in approximately 1 in 5,000 live births, and were more common in India.

Millions of people across the world have stomas, and in India an annual colostomy of more than 50000 is performed. Madurai, Government Rajaji Hospital, 1520 pediatric colostomies are done in a month and the peristomal skin issues are frequent because of improper handling, mechanical trauma and fecal leakage. Thus, the proposed study will focus on comparing the efficacy of aloe vera gel and zinc oxide in the prevention of peristomal skin complications in children with colostomy.

MATERIALS AND METHODS

Design of Study and Study Population.

The current paper followed a quantitative evaluative design using a true experimental pretest- after test design. This research was done at Government Rajaji hospital, Madurai, in the surgical ward of the pediatric ward. The sample population included children who had colostomy surgery and were admitted to the children surgical ward at the time when the data was collected.

Sixty children were recruited and randomly divided into two groups namely Intervention Group I who received aloe vera gel and Intervention Group II who received zinc oxide.

Inclusion and Exclusion Criteria.

The children included in the story were those who had undergone colostomy surgery with a score of 3 and above on the DET test and were willing to give an informed consent to participate in the study as well as having parents that were willing to give an informed consent. Children with a history of skin allergy, those who were critically ill, or patients who were experiencing immunodeficiency disorders were not included in the study.

Tools

A structured demographic questionnaire and the DET Score Scale (Ostomy Skin Tool) were used to collect a set of data. Some of the variables incorporated in the demographic questionnaire were age, gender, family type, parental education and occupation, income, dietary habits, nutritional status, type of colostomy, and frequency of emptying the colostomy bag. The assessment of the severity of peristomal skin complications was done by the DET score. Child health nursing and pediatric surgery experts decided the tool, and its reliability was determined through the inter-rater technique ($r = 0.80$).

Ethical Clearance

The ethical clearance was made in the Institutional Ethics Committee of Madurai Medical College, Madurai. The Dean, Principal of the College of Nursing and Head of the Department of Pediatric Surgery, Government Rajaji Hospital also gave formal consent to participate. The caregivers of all the participants signed informed consent. Anonymity, confidentiality and right to exit the study whenever they wished were guaranteed.

Data Collection Procedure

The data collection was done between 24.02.2023 and 26.03.2023. Once the institutional permission was given, the investigator approached the caregivers and informed them about the purpose of the study. Simple random sampling was used to select the samples, according to the inclusion criteria. The DET score was used to test the peristomal skin complications pretest. Group I of Intervention was given 3 -5mg aloe vera gel, and Group II was given 2 -4mg 2%zinc oxide applied on five alternate days. On the 10 th day, posttest assessment was applied using the same tool.

Data Analysis

The data obtained was sorted, coded and analyzed through descriptive and inferential statistics Frequency, percentage, mean, standard deviation.

were descriptive statistics that were applied to summarize the demographic variables and the levels of peristomal skin complications. The relationships between peristomal skin complications and the chosen socio-demographic variables were determined with the help of inferential statistics, such as the chi-square test. The level of statistical significance was tested at the right moment.

RESULT

Table 1 shows the percentage distribution and frequency of socio-demographic variables of children in Intervention Group I and Intervention Group II (n = 60). In Group I, 40% children were under one year and 40% were 1-3 years old whereas in Group II, 50% were under one year and 20% were 1-3 years. In Group I and Group II, male children dominated (73.3% and 66.7% respectively). The parents were mostly in non-consanguineous marriages (60% in Group I and 83.3% in Group II). Most of the respondents were rural based (50% in Group I and 73.3% in Group II). In both groups (86.7% and 96.7% respectively), mothers were the main caregivers.

In respect of parental education, the higher secondary or diploma/degree education was completed by most fathers and mothers. The fathers were half group comprised of the employees of the company privately and majority of the mothers were housewives (53.3% in Group I and 76.7% in Group II). The family income was mostly between Rs. 5 001 and 15 000. Mixed diet was practiced by most of the families (86.7 percent in Group I and 96.7 percent in Group II). Possibly due to under-nutrition, Group II (73.3%) showed the highest rate of under-nutrition and half of children in Group I were under-nourished. The children in both groups had had double-barrel colostomy. The majority of the children had to be emptied of the colostomy bag 3 or more times a day. In general, the results show that the two groups could be compared in terms of their socio-demographic factors.

Level of peristomal skin complications

Table 2 shows that in the pretest, most children had moderate (53.3%) and severe (43.4%) complications, with very few having mild complications. In the posttest, improvement was observed, with 46.7% having mild complications and 36.7% having no complications, while no children had severe complications. The difference between pretest and posttest was highly significant ($\chi^2 = 16.68$, $p = 0.001$), indicating the effectiveness of aloe vera gel. Table 3 reveals that before intervention, most children had moderate (56.7%) and severe (40%) complications. After intervention, 43.3% had mild complications and 23.3% had no complications, with no severe cases. The difference was highly significant ($\chi^2 = 25.50$, $p = 0.001$), showing that zinc oxide was effective in reducing peristomal skin complications.

The mean comparison revealed a significant reduction in peristomal skin complications in both intervention groups after treatment. In Intervention Group I (aloe vera), the pretest mean score was 6.63 ± 2.297, which decreased to 1.33 ± 1.493 in the posttest, showing a mean difference of 5.30. The paired t-test result ($t = 13.59$, $p = 0.0001$) indicated a highly significant improvement after the intervention. (Table 4)

In Intervention Group II (zinc oxide), the pretest mean score was 6.47 ± 1.94 and reduced to 3.27 ± 2.28 in the posttest, with a mean difference of 3.20. The paired t-test value ($t = 10.77$, $p = 0.001$) also showed a highly significant reduction in complications. (Table 5)

When comparing posttest mean scores between the two groups, Intervention Group I had a lower mean score (1.33 ± 1.493) than Intervention Group II (3.27 ± 2.288), with a mean difference of 1.933. The independent t-test result ($t = 3.875$, $p = 0.001$) demonstrated a statistically highly significant difference, indicating that aloe vera gel was more effective than zinc oxide in reducing peristomal skin complications among children undergoing colostomy surgery. (Table 6)

Association

The association between the level of prevention of peristomal skin complications and selected socio-demographic and clinical variables in Intervention Group I was analyzed using the chi-square test. The results showed that none of the variables had a statistically significant association with the level of peristomal skin complications in this group.

In Intervention Group II, the chi-square analysis revealed significant associations between peristomal skin complications and certain socio-demographic variables. A significant relationship was found with the mother's educational status ($\chi^2 = 18.9$, $p = 0.01$), monthly family income ($\chi^2 = 17.8$, $p = 0.023$), and nutritional status of the child ($\chi^2 = 13.8$, $p = 0.008$).

Children whose mothers had higher secondary education, whose family income ranged between Rs. 5,001–10,000, and who were undernourished showed significant differences in complication levels. However, no statistically significant association was observed between peristomal skin complications and other socio-demographic variables in either group.

Table 1: Socio-Demographic variables. (n = 60)

S. No	Variables	Category	Group I (n=30) f (%)	Group II (n=30) f (%)
1	Age	< 1 year	12 (40)	15 (50)
		1–3 years	12 (40)	6 (20)
		3–6 years	3 (10)	7 (23.3)
		6–12 years	3 (10)	2 (6.7)
2	Gender	Male	22 (73.3)	20 (66.7)
		Female	8 (26.7)	10 (33.3)
3	Type of Marriage	Consanguineous	12 (40)	5 (16.7)
		Non-consanguineous	18 (60)	25 (83.3)
4	Place of Domicile	Urban	9 (30)	6 (20)
		Sub-urban	6 (20)	2 (6.7)
		Rural	15 (50)	22 (73.3)
5	Caregiver	Mother	26 (86.7)	29 (96.7)
		Father	1 (3.3)	1 (3.3)
		Grandparents	3 (10)	0 (0)
6	Father's Education	Non-formal	0 (0)	1 (3.4)
		Primary	3 (10)	4 (13.3)
		Secondary	7 (23.3)	7 (23.3)
		Higher Secondary	16 (53.3)	11 (36.7)
		Diploma/Degree	4 (13.4)	7 (23.3)
7	Mother's Education	Non-formal	0 (0)	1 (3.3)
		Primary	4 (13.3)	3 (10)
		Secondary	6 (20)	8 (26.7)
		Higher Secondary	9 (30)	6 (20)
		Diploma/Degree	11 (36.7)	12 (40)
8	Father's Occupation	Daily wages	7 (23.3)	7 (23.3)
		Self-employed	8 (26.7)	9 (30)
		Private employee	15 (50)	14 (46.7)
9	Mother's Occupation	Daily wages	3 (10)	1 (3.3)
		Self-employed	4 (13.3)	3 (10)
		Private employee	6 (20)	2 (6.7)
		Govt employee	1 (3.4)	1 (3.3)
		Homemaker	16 (53.3)	23 (76.7)
10	Monthly Income	< Rs.5000	1 (3.3)	2 (6.7)
		Rs.5001–10,000	9 (30)	11 (36.7)
		Rs.10,001–15,000	12 (40)	9 (30)
		> Rs.15,000	8 (26.7)	8 (26.6)
11	Dietary Habit	Vegetarian	4 (13.3)	1 (3.3)
		Mixed diet	26 (86.7)	29 (96.7)
12	Nutritional Status	Under-nutrition	15 (50)	22 (73.3)
		Normal	15 (50)	7 (23.3)
		Overweight	0 (0)	1 (3.4)
13	Type of Colostomy	Double-barrel	30 (100)	30 (100)
14	Bag Emptying Frequency	Two times	2 (6.7)	0 (0)
		Three times	13 (43.3)	17 (56.7)
		> Three times	15 (50)	13 (43.3)

Table 2: Frequency and Percentage Distribution of Pretest and Posttest Level of Peristomal Skin Complications in Intervention Group I (Aloe Vera) (n = 30)

Level of Complications	Pretest f (%)	Posttest f (%)	χ^2, p-value, Significance
No complications (0)	0 (0.0)	11 (36.7)	**χ^2 = 16.68 p = 0.001, HS*** **
Mild (1–3)	1 (3.3)	14 (46.7)	
Moderate (4–6)	16 (53.3)	5 (16.6)	
Severe (7–15)	13 (43.4)	0 (0.0)	

Table 3: Frequency and Percentage Distribution of Pretest and Posttest Level of Peristomal Skin Complications in Intervention Group II (Zinc Oxide) (n = 30)

Level of Complications	Pretest f (%)	Posttest f (%)	χ^2, p-value, Significance
No complications (0)	0 (0.0)	7 (23.3)	**χ^2 = 25.50 p = 0.001, HS*** **
Mild (1–3)	1 (3.3)	13 (43.3)	
Moderate (4–6)	17 (56.7)	10 (33.4)	
Severe (7–15)	12 (40.0)	0 (0.0)	

Table 4: Mean, Standard Deviation, and Mean Difference of Pretest and Posttest Scores in Intervention Group I (Aloe Vera) (n = 30)

Test	Mean	SD	Mean Difference	t-value	p-value	Significance
Pretest	6.63	2.297	5.30	13.59	0.0001	HS***
Posttest	1.33	1.493				

Table 5: Mean, Standard Deviation, and Mean Difference of Pretest and Posttest Scores in Intervention Group II (Zinc Oxide) (n = 30)

Test	Mean	SD	Mean Difference	t-value	p-value	Significance
Pretest	6.47	1.94	3.20	10.77	0.001	HS***
Posttest	3.27	2.28				

Table 6: Comparison of Posttest Mean Scores Between Intervention Group I and II (n = 60)

Group	Mean	SD	Mean Difference	t-value	p-value	Significance
Group I (Aloe Vera)	1.33	1.493	1.933	3.875	0.001	HS***
Group II (Zinc Oxide)	3.27	2.288				

DISCUSSION

The research results demonstrated that aloe vera gel and zinc oxide worked well in preventing the occurrence of peristomal skin complications in children who had colostomal surgery. Intervention group I (aloe vera) most of the children experienced moderate to severe complications in the pretest and in the posttest most of the children experienced mild or no complications. It was found statistically significant (2 = 16.68, p = 0.001; t = 13.59, p = 0.0001). Equally in Intervention Group II (zinc oxide), the majority of children were moderately to severely affected with complications, although, having undergone intervention; a high success count depicted minimal or absent complications. This difference was also very crucial (2 = 25.50, p = 0.001; t = 10.77, p = 0.001). Posttest scores of both groups were compared and revealed that, children who were in aloe vera group had lower mean complication scores compared to children in the zinc oxide group. This was statistically very important (t = 3.875, p = 0.001) which means that the aloe vera gel had a greater effect than zinc oxide in peristomal skin complications reduction.

CONCLUSION

The present study concluded that both aloe vera gel and zinc oxide were effective in reducing peristomal skin complications among children who had undergone colostomy surgery. Significant improvement was observed in both intervention groups after treatment. However, children treated with aloe vera gel showed greater reduction in complications compared to those treated with zinc oxide. This indicates that aloe vera gel is more effective in improving peristomal skin condition. Proper stoma care combined with appropriate topical management plays a vital role in preventing complications and enhancing the quality of life of children with colostomy.

RECOMMENDATIONS

It is recommended that aloe vera gel be used routinely in pediatric stoma care to prevent and manage peristomal skin complications. Nurses and caregivers should receive regular training in evidence-based stoma care practices. Parents should be educated on proper home care and early detection of complications. Hospitals should implement standardized stoma care protocols. Further studies with larger samples and longer follow-up are suggested to strengthen the evidence

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