

Effect of Mind Mapping Application on Nurses' Performance regarding Colostomy at Pediatric Surgical Units

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Abstract

Background: Through surgery, a colostomy is a method of redirecting the flow of stool from the colon to a stoma by making an incision in the abdominal wall. When caring for children undergoing colostomy surgery, both pre-and post-operatively, nurses can have a clinically significant role to perform. An effective teaching tool for dividing a lot of material into digestible bits is a mind map. **The aim was to** determine the effect of mind mapping application on nurses' performance regarding colostomy at pediatric surgical units. **Subjects and method: Design:** A quasi-experimental research design was utilized to fulfill the aim of this study. **Setting:** the study was conducted in the pediatric surgical unit at Sohag University Hospital. **Subjects:** A convenient sample technique of a total of 50 nurses caring for children with colostomy who are working in the Pediatric Surgical Unit was recruited in the study. **Three tools** were used for data collection: Tool (1): A structured interview questionnaire which consisted of two parts; part (I) nurses' personal data; and part (II) nurses' opinion regarding the use of the mind map in training. Tool (2): Nurses' knowledge about colostomy (pre/post), Tool (3): Observational checklist regarding colostomy (pre/post). **Results:** Based on the study results, nurses' knowledge and practice related to colostomy had improved and differed in a highly statistically significant way between the pretest and posttest. Overall mind mapping knowledge and nursing performance about colostomy were significantly different, with a statistically significant difference. **Conclusion:** In pediatric surgical units, the current study found that using mind-mapping applications improved nurses' knowledge and practice. **Recommendations:** According to the study, mind mapping applications should be included as a useful tool for nurse education.

Keywords: Colostomy, Mind Map, Nurses' performance, pediatric surgical units

Introduction:

A colostomy is a medical operation that involves making an incision in the abdomen. It is possible to generate a stoma—a portion of the large intestine moved outside the abdominal wall—through this hole. This stoma allows for the passage of partially digested food, which is then collected via an external pouching device (**Wound, Ostomy Continence Nurses Society, 2022**). Numerous pediatric surgical disorders in low-income nations require ostomies. Intestinal malformations (ARM) and Hirschsprung's disease (HD) are examples of congenital illnesses. Acquired disorders include intestinal perforation caused by gangrenous ileocolic intussusception and typhoid (**Abd-Elhay et al., 2019**).

To eliminate colon blockages caused by congenital defects, such as colostomies, which

are common. Tumors and rectal perforations are occasionally treated with colostomies. Surgeons most commonly perform two types of ostomy procedures: ileostomy and colostomy. However, other modifications, such as the less common jejunostomy, can be made to release pressure, cleanse, and reroute the contents of the gastrointestinal system (**Massenga, et al., 2019**).

In the abdominal wall, stomas of different kinds are formed; some are transient, while others are permanent. Colostomies are stomas that originate in the colon; the terms "colostomies" refer to different parts of the colon that are involved, such as transverse or sigmoid descending colostomies. We refer to stomas that come from the small intestine as ileostomies or jejunostomies. A stoma made to drain urine is referred to as a urostomy, whereas a stoma created for feeding the patient through the

stomach is known as a gastrostomy (Uddin et al., 2019 & Peter et al., 2019).

There were numerous difficulties observed, some of which resulted from errors made during the surgical operation and others from inadequate counseling provided by the parents. The patients were split into two groups based on the type of colostomy performed and the rationale for the procedure (Kurpad et al., 2019 & Nasar, 2019). In addition, Malik et al. (2019) conducted a clinical investigation at a tertiary facility wherein 33 cases of pediatric colostomies in newborns and children were reviewed. The two most frequent consequences among these individuals, according to the study, were skin excoriation and wound infection. Researchers in Mumbai examined the value of planned nurse interventions for parents of children in colostomy care by Uslu et al., (2023), Empirical studies have demonstrated that caregivers' lack of understanding regarding proper stoma care led to infections and other difficulties for children with colostomies, which in turn resulted in readmissions, particularly due to skin scratches.

The study also highlighted difficulties such as the inability to recognize signs of skin degradation and the presence of ribbon-like stools, which are often ignored but rarely reported. Stoma prolapse is an extra risk factor for children with colostomies. A stoma's telescoping or protrusion over the skin's surface is referred to as a stoma prolapse. Due to this, it could be more difficult to maintain the colostomy appliance's closure, which increases the risk of leaks, skin irritation, and perhaps infection. To repair the prolapsed stoma and guarantee normal functioning, surgical intervention may be required in severe cases of stoma prolapse (Tan Tanny et al., 2019).

These issues stem from tissue death brought on by inadequate blood supply to the stoma. Quick detection and action are necessary to prevent further damage and potentially harmful complications. According to Martynov et al. (2019), surgical correction might be necessary to stop more tissue necrosis and restore blood supply to the damaged area.

Rather than analyzing and applying concepts ("meaningful learning"), educators were

concerned that children were more inclined to memorize information ("rote learning"). Problem-based learning involves a variety of techniques, including brainstorming, idea organization, note-taking, group learning, presentation, and research. Moreover, a variety of instructional strategies for applying critical thinking have been produced, as it is becoming a more crucial component of nursing education and training (Elkin et al., 2019).

In recent years, there has been a rise in the publication of learning strategies used in medical education that may aid nurses in learning and information integration. This is due to the growing popularity of understanding how to support paramedical members in their learning journey through various teaching and learning strategies (Wilson and Chris, 2019). While these learning tactics differ in their effectiveness and suitability, they are all grounded in the constructivist theory of learning. This learning theory states that when students integrate new information with what they already know, they are learning with comprehension. Constructivism is the foundation of both mind mapping and idea mapping as learning approaches, and both provide promise for medical education (Abd El-Hamid, 2019).

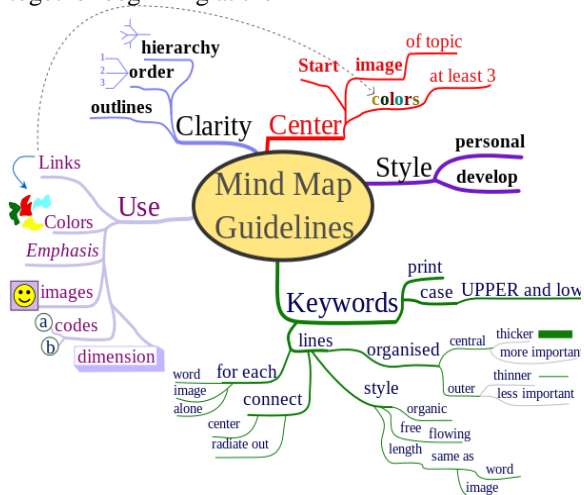
It is the responsibility of nurse educators and trainers to provide learning environments that support critical thinking and improve learning outcomes for nurses. With the use of mind mapping, nurses can participate in a novel kind of learning that can improve their memory recall and foster new ways for them to process information. This approach was developed in the early 1980s (Phillips et al., 2019).

In educational materials intended to enhance memory, the use of "mind maps" to illustrate facts in medical information has recently gained popularity. The purpose was to determine the mind map's efficacy as a tool for independent study. Mind maps are a powerful metacognitive tool that may be used to assess and promote critical thinking since they help people acquire knowledge through meaningful learning (Abdel Hamid, 2019).

The mind map (MM) is an effective visual aid that can be used to enhance comprehension and learning. The mind map is an effective self-study tool that helps make complex ideas easier

to understand. In medical education, MM is a learning approach that is not used enough. MMs are multimodal resources that could aid in the organization, integration, and memory retention of knowledge for medical students (**Buzan & Buzan 2010**).

According to Buzan and Buzan (2010), when mind mapping, the following suggestions are made: <http://www.mindmapexample.com/examples.html>. 1. Use a minimum of three colors to place a picture or theme in the center. 2. Include dimensions, codes, images, and symbols all over your mind map. 3. Make a list of keywords and print them in capital or lowercase. 4. Every phrase or image is on its own, perched on its line. 5. Join the lines together beginning at the



www.mindmapper.com/knowledge-base/mind-map-elements/

Using mental maps, nurses establish connections between previously learned and unknown information, resulting in increased understanding. It helps with the recall of past experiences and is a very efficient way to take notes. This method of instruction helps pupils actively acquire knowledge rather than teaching them how to think. The nurse's interpretation and integration of ideas are represented in the mind map, which leads to meaningful learning because they are not guided by a template or flow chart. Critical thinking and long-term learning are linked to the development of declarative (explicit) and implicit knowledge, which can be achieved through a richer and deeper integration of information (**Wilson and Chris, 2019**).

To guarantee patients' safety and well-being, pediatric nurses play a vital role. Among the many jobs that nurses perform in an operating room are making sure that the right tools and procedures are in place for checking instruments, changing sheets, giving medications, and getting ready for scraping. To allay anxiety and give an explanation of the surgical procedures, the nurse must give the patient precise information regarding the process (**Goodman & Spry, 2019**).

An essential part of the nurse's care for colostomy patients starts long before the procedure. Lowering the chance of difficulties entails evaluating and readying the kids, managing appliances, maintaining stoma hygiene, identifying risk factors, and continuously monitoring any potential complications. The best evidence-based colostomy techniques must be used by pediatric nurses to prevent these problems. The nurses also have to handle post-colostomy duties including paperwork and evaluation, which will improve the standard of care and the children's results (**Carmel et al., 2019**).

There may be a discrepancy between conventional practice and scientific understanding, as evidenced by the numerous instances in which nurses perform treatments traditionally or customarily. Not to mention that the kids could get hurt if the process is done poorly. According to **Powell et al. (2019)**, pediatric nurses who provide care for patients with colostomies must therefore have the skills and knowledge that are backed by reliable scientific evidence.

Significance of the study

Evidence-based practice shows that colostomy teaching before surgery is more beneficial than education after surgery. When a coordinated EBP approach was used preoperatively for colostomy care, 75% of patients became independent of their colostomy in 5 days or less (**Bryan & Dukes, 2019**). According to **Muzira et al., (2019)**, the implementation of preoperative colostomy nurse education programs increases the possibility of improved outcomes for pediatric colostomy patients. In addition, whereas pediatric nurses have

produced less information, adult colostomy surgeries, and outcomes have been widely studied.

The onus is on nurse educators to produce trainees who can use colostomy care principles in a variety of clinical practice settings by thinking critically, working hard, being more creative, and solving issues. They need active teaching strategies to create meaningful learning, as opposed to relying just on conventional methods that encourage memorization and recall. Based on a comprehensive analysis of the current research on mind mapping, nurse educators can utilize this instructional approach to assist students develop critical thinking skills in the complex world of healthcare (Abdel Hamid, 2019). Therefore, the researcher wanted to determine the effect of mind mapping applications on nurses' performance regarding colostomy at pediatric surgical units.

Aim of the study

The study aimed to determine the effect of mind mapping application on nurses' performance regarding colostomy at pediatric surgical units through:

- Assessing nurses' knowledge regarding colostomy by using mind map strategy.
- Assessing nurses' practice regarding colostomy using mind map strategy.
- Determine the effect of using a mind map strategy to improve nurses' performance regarding colostomy at pediatric surgical units.

Research hypothesis:

Using mind mapping will have a positive effect on improving nurses' performance regarding colostomy at pediatric surgical units

Subjects and Methods:

Research design:

A quasi-experimental research design was utilized to fulfill the aim of this study.

Settings:

The study was conducted in pediatric surgical units at Sohag University Hospital. These settings were chosen because they serve the largest portion of the population and have a high patient prevalence.

Sample:

A convenient sample technique of a total of 50 nurses caring for children with colostomy who are working in the Pediatric Surgical Unit was recruited in the study.

Three tools were used for data collection:

Tool (I): A structured Interview Questionnaire:

It was developed by the researcher after reviewing the national and international related literature which consisted of two parts;

Part I: nurses' personal data: This part included data about nurses' personal data as nurses' age, gender, education, and years of experience.

Part (II) Nurses' opinion regarding the use of the mind map in training. Information on mind maps was included, following a lecture on the subject and the benefits of using mind maps for colostomy and training (Abdel Hamid, 2019; Wilson and Chris, 2019).

Scoring system:

Five marks was the overall result for nurses' satisfaction. One mark was awarded for each reported yes response, and zero for no response.

Tool (II): Nurses' knowledge about colostomy (pre/post):

It was developed by the researchers after reviewing the national and international related literature (Nabeel, et al., 2013). A multiple-choice knowledge questionnaire was used to gauge the nurses' understanding of colostomy care before, immediately after, and after two months. It involved 20 questions concerning the care of colostomies, including the following.

- Definition of the colostomy, indications, normal
- appearance of the stoma, risk signs, types of pouches, complications
- Role of the nurse regarding colostomy care
- Role of the nurse to prevent the complications of colostomy

Scoring system of nurses' knowledge:

-zero score for an incorrect response.

-One point for the right response

The following scoring system for the nurse's knowledge was divided into two groups: knowledge that was deemed satisfactory and knowledge that was deemed unsatisfactory. A nurse's knowledge was deemed unsatisfactory if

their score was less than 75%, and satisfactory if their score was greater than 75%.

Tool (III): Observational checklist regarding colostomy (pre/post): This sheet was filled by the researcher, it was adopted from (Potter, et al., 2016), it consists of four items for evaluating nursing practice about colostomy care such as domain assessment of the stoma and peristomal skin including (7) steps, Applying new ostomy appliance including (25) step, irrigation of the stoma including (27) step, and emptying of the pouch including (8) steps.

Scoring system

The following was the scoring system for the observational checklist: correctly completed (2), incompletely completed (1), and not completed (0). **Alfar et al., (2020)** state that all nursing practices were divided into two groups: practices that were deemed competent and practices that were deemed incompetent. A nurse's practice was deemed incompetent if their score was less than 80%, and competent if their score was greater than 80%.

Fieldwork:

Data collections were done in five months from the beginning of March 2023 to the end of August 2023. The sample was divided into small subgroups of 4 to 6 nurses during the shifts. Firstly the researcher has clarified the aim and the objectives of the study to nurses gain the oral acceptance of participants in the study.

The Sessions was developed through the following four phases:

Assessment and Preparatory phase:

Using textbooks, articles, journals, and websites, this phase started with a review of previous and current local and international literature about the various aspects of the study's subjects in order to prepare and guide educational sessions as well as acquire an understanding of the study's scope.

During the first week, the researcher talks about the purpose of the study (1st day). Simplified Arabic was used to collect the data, and nurses were given a structured interview questionnaire to complete during their work lunch break. After gathering and analyzing the data, the researcher identified the subjects' requirements and knowledge gaps. All nurses were evaluated by the conclusion of the first week.

During the training session, the nurse's performance was assessed in part. Before the application was implemented, nurses were interviewed to gauge their knowledge (pretest) using tools 1 and 2. This was done after explaining the purpose of the study and receiving their consent to participate. Not long after receiving approval, this phase began. During their early shift, nurses complete the questionnaire. It may take 10 to 15 minutes to complete the questionnaire. There was also a close examination of the nurses' protocols.

Using a tool (I) part (1), each nurse was interviewed before the program to obtain information about their personal data. The knowledge and skills of nurses about colostomy care were assessed using Tool (I) part (2), Tool II, and Tool III.

Tool Validity:

A panel of three experts in pediatric plastic surgery and nursing evaluated the questionnaire and the intervention for face and content validity, and they examined the validity for content validity to determine completeness and relevance. No changes were made despite reviewing their feedback.

Tool Reliability:

A test-retest reliability analysis was conducted. The internal consistency of the instruments was assessed using Cronbach's alpha coefficients. The dependability of the knowledge questionnaire tool was demonstrated by its Cronbach's alpha of 0.86 and the observational checklist tool's Cronbach's alpha of 0.96.

Ethical considerations

An official permission to carry out the study was obtained from the ethical committee of the faculty of nursing. A letter from the dean of Sohag University's nursing faculty served as official authorization. To clarify the goal of the study and obtain their consent and cooperation for carrying it out, the researchers met with the administrators of the Pediatric Surgical Unit. Nurses were informed about the purpose and advantages of this study before giving their consent to participate. The nurses under investigation were informed by the researchers that they could opt out of the study at any point. They also received assurances regarding the

confidentiality of their information.

Pilot study:

Five nurses, or 10% of the sample, participated in a pilot study. The pilot study's objective was to confirm that the measurements were accurate and relevant and that the tools could be finished in a reasonable amount of time. Nurses who took part in the pilot study were included in the sample because the methods for collecting data were left unchanged.

Planning phase

In addition to reviewing pertinent literature, the researcher developed the training sessions based on the findings from the observational checklist and interview sheet (from the pilot project and assessment phase). Based on the identified demands, requirements, and weaknesses, the mind mapping application's goal and objectives were developed. The selection of the content was based on the identified needs. Theory and practice were covered in the sessions through the use of laptop lectures, group discussions, demonstrations, colored posters, and a handout with the contents of the design mind map together with the researcher's photographs.

Based on the outcomes of the preceding phase, goals, priorities, and anticipated outcomes were established to address the nurses' practical requirements and knowledge gaps regarding colostomy care. For the nurses under study, the researchers designed five sessions: two theoretical and three practical.

Implementation phase:

To facilitate learning, nurses participated in five instructional sessions where they were split into small groups of nine to 10 nurses. Depending on the topic and the nurses' responses, each session had a different duration. It took place in a half hour to an hour. The first lesson addressed mind-mapping techniques.

1. Colostomy was the topic of the second and third sessions, while the topics of the fourth and fifth sessions were using mind maps as a teaching tool and in infection control instruction. Every session started with an overview of the previous one, followed by an explanation in Arabic and basic English language suitable for the educational level of the nurse of the goals for the upcoming session. Using encouragement and

reinforcement during sessions helped nurses perform better.

2. - The application of mind mapping was meant to enhance nurses' performance with regard to colostomy at the pediatric surgical unit over the course of five sessions, comprising two theoretical and three practical sessions (each lasting roughly thirty to forty-five minutes).
3. * The researchers asked for comments on the previous session before each one, and they gave a summary after each.
4. - * The researchers were available in the study settings two days a week from 9 a.m. to 1 p.m. All of the nurses were interviewed one-on-one using the study instruments mentioned above.
5. -*Every subgroup that was formed from the nurses that were studied contained five nurses.
6. An Arabic-language simplified booklet encompassing all aspects of knowledge and practice related to colostomy care was given to nurses as supportive material following a review of pertinent literature in light of the evaluation of the actual needs of the nurses under study.
7. Additional methods of instruction included talks, brainstorming sessions in small groups, the use of drawings, and repeated demonstrations with the necessary tools. Flipcharts, PowerPoint, figures, handouts, and animated animations regarding colostomy care were among the many teaching aids used.
8. In the first session, the researcher discussed teaching techniques and mind maps as a cutting-edge training tool (what a mind map is, what resources are needed to use one, how to use it in training for infection control applications, and advantages of using it). About 45 minutes will pass throughout this lesson (11.00 am to 11.45 am).
9. - Using a mind map to discuss colostomy is the topic of the second session.
 - Second week (first day): from 11.45 a.m. to Beginning at 12:45 p.m. in the pediatric-surgical department lecture room, questions on the goals of the new topic (mind mapping) and the previous sessions' presentations were asked, bearing in mind that all nursing levels could

understand the straightforward language. To demonstrate the mind map method, the researcher utilizes paper, colored pens, and printed samples. After that, for thirty minutes, the nurses displayed a mental map made using paper and colored pens.

- In the second week (second day), the researcher conducted focus groups with nurses in a lecture hall, using paper, colored pens, and a laptop to project a PowerPoint presentation. The focus groups also included feedback on the objectives of the new topic, which was infection control topics. Subsequently, the nurses reiterated the process of applying infection control principles to a mind map using colored pens and paper. A theoretical and practical posttest is administered by the researcher after each session. The method was repeated in the third and fourth weeks to make sure all sample subjects were covered.
- On the first day of the third week, in the pediatric surgical department, use mind maps for colostomy difficulties.
- The researcher uses mind maps to apply colostomy themes to each sample group's topics through the conclusion of the third week (2nd day).
- During the first four days of the fourth week, the researcher uses colored pens and paper to create a mind map with colostomy-related topics for each group of nurses. She also responds to their inquiries regarding colostomy and how to apply principles while addressing issues like a shortage of supplies, a lack of facilitators, an increase in patient flow, and a shortage of nursing staff, all of which can cause session durations to increase.

The educational program

An educational program was designed and revised. It included theoretical and practical sessions regarding colostomy care.

The general objective of mind mapping intervention sessions:

The nurses were expected to leave the sessions with new skills and knowledge that would enhance their performance regarding colostomy care at the pediatric surgical unit.

Specific objectives of the program:

- Define colostomy.
- Enumerate the indication of the colostomy.

- List the types of colostomy.
- Identify the normal appearance of the stoma
- List the risk signs of the colostomy
- List the types of pouches
- Demonstrate the care of the colostomy.
- Identify the most common complications of colostomy
- Perform the appropriate documentation

The theoretical and practical sessions

were carried out as the following

The first session (Theoretical): The researchers began this session by introducing themselves, extending a warm welcome to the nurses, expressing gratitude for their participation in the study, and outlining the goals of these training sessions. The following topics were covered in the first session: definition, goal, types, indications, typical stoma appearance, five risk indicators, pouch types, and colostomy complications.

Second session (Theoretical): These sessions addressed topics about the nurse's role in providing care for patients with colostomies and in preventing complications from developing

Third session (Practical): these sessions: included training the studied nurses on the preparation and assessment of the stoma and peristomal skin colostomy.

Fourth session (Practical): these sessions: included training the studied nurses on how to apply mind mapping.

Evaluation phase:

In this phase, the researcher determines the effect of mind mapping application on nurses' performance regarding colostomy at pediatric surgical units using the same pretest tools (two and three) as a post-test –tools by the posttest after one-month educational sessions implementation using the same pretest tools and observational checklist.

Supportive materials:

To educate infection control, the researcher used CDC instructions, papers and colored pens, a laptop, colored posters, PowerPoint, and a handout of the design mind map.

Statistical Design:

An application for statistical analysis in social science (SPSS Version 23.00) was used to code and enter the gathered data. Quality control took

place during the coding and data entry phases. In the case of continuous quantitative data, means and standard deviations were employed in descriptive statistics, whereas frequencies and percentages were utilized for categorical variables. The hypothesis that the row and column variables are independent was tested using the Chi-square (χ^2) test, which prevented the degree and direction of the relationship from being disclosed. The test was used to compare qualitative category data. We compared qualitative variables using the chi-square test, T-test, and F-test. It was determined that statistical significance existed when the P-value was less than 0.05 and the difference was $p < 0.001$.

Results:

Table (1) shows that (60%) of the studied nurses were aged ≤ 25 years with a mean of (24.8 ± 5.7 years), and 72% of them were females. Concerning the qualifications of the studied nurses (70%) of them were technical nurses. Regarding years of experience, (46%) of them had experience from 6 to 14 years.

Table (2) portrays that (36%) of nurses' opinions about mind mapping used in training before an explanation was reported as acceptable opinions regarding colostomy care. Also, (96%) of them did not use mind maps in their previous training, and 94% of them preferred mind mapping after explanation.

Table (3) illustrates that there was a highly statistically significant difference between nurses' knowledge mean scores regarding colostomy pre and post-mind mapping application at ($P < 0.001$). Also, the same table illustrated a significant improvement in the post-mind mapping application ($F = 44.7$, $p < 0.000$) in the mean total score of knowledge.

Figure (1) shows that 90% of the studied nurses had an unsatisfactory level of knowledge about colostomy in the pre-mind mapping application but post-mind mapping application, level of knowledge increased and (92%) of them had a satisfactory level of knowledge.

Table (4) illustrates that there was a highly statistically significant difference between nurses' practice mean scores regarding all principles applied in various activities in pediatric-surgical units about colostomy pre and post-mind mapping application at ($P < 0.001$).

Also, the same table illustrated a significant improvement in the post-mind mapping application in the mean total score of knowledge.

Before and after mind mapping, the nurses' overall practice scores are displayed in **Figure (2)**. It was found that, before the mind mapping program, 78% of the nurses at the pediatric surgical unit had inadequate colostomy practice; following the application, this number dropped to 4%. Notwithstanding, a month later, 96% of nurses in the research improved their practice score with a statistically significant difference, compared to 22% of nurses who had competent practice before the mind mapping program.

Table (5) demonstrates that there is no statistically significant relationship between the examined nurses' pre- and post-mind mapping application demographic traits and total knowledge. The pre-mind mapping program revealed a substantial association ($p = 0.001, 0.03, 0.02$) between the knowledge, gender, qualification, and years of experience of nurses.

There is a slight association between the examined nurses' colostomy practice and their age, gender, and years of experience both before and after mind mapping was applied, as **Table 6** illustrates. As for gender, there is a substantial correlation ($p > 0.05$) in the pre-mind mapping application, and a somewhat significant correlation ($p > 0.05$) exists in the post-mind mapping application regarding the education of nurses.

The total score of nurses' knowledge and practices before and after the mind mapping application is correlated in **Table (7)**; there was a substantial positive connection with statistically significant differences ($p < 0.05$) between the knowledge and practice scores.

Table (1): Demographic characteristics among the studied nurses at pediatric surgical units (N = 50)

Demographic characteristics	N0.	%
Age (Years)		
≤ 25 years	30	60
26 -36 years	20	40
Mean ± SD	23.8 ± 5.7	
Gender:		
Male	14	28
Female	36	72
Qualifications:		
Technical	35	70
High qualified nurse	15	30
Years of experience:		
≤ 5 years	17	34
6 – 14 years	23	46
15 - 25 years	10	20

Table 2: Nurses' opinion regarding the use of mind mapping after training (N=50)

Nurses' opinion	N0.	%
Nurses' opinion about mind mapping use in training before explanation		
Excellent	3	6
Very Good	14	28
Good	15	30
Acceptable	18	36
Previous use of Mind Mapping in their studies:		
Yes	2	4
No	48	96
Preferring using this training after explanation?		
Yes	47	94
No	3	6

Table (3): Differences in the knowledge mean scores about colostomy among the studied nurse's pre and post-mind mapping application (N = 50)

Knowledge about colostomy	Study Group (n= 50)				X2	P-value
	Pre-mind mapping application		Post-mind mapping application			
	No	%	No	%		
Mean Knowledge total score	8.22±2.1		12.4±1.8		F=44.7	P=0.001HS

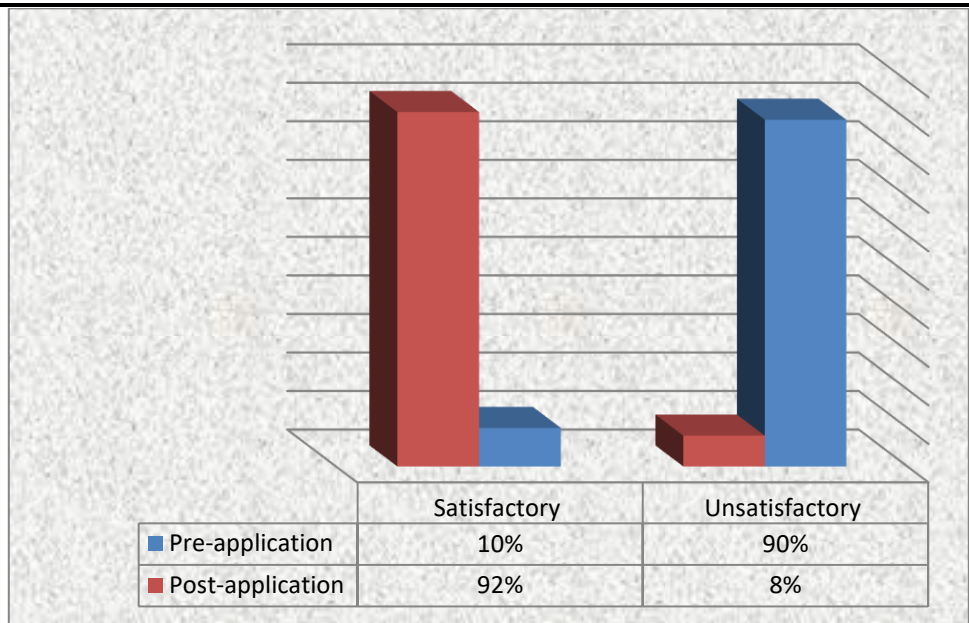


Figure (1): Total knowledge level about colostomy among the studied nurse's pre and post-mind mapping application (N = 50)

Table (4): Differences in the practices mean scores about colostomy among the studied nurse's pre and post-mind mapping application (N = 50)

Nurses' practices about colostomy	Study Group (n= 50)		t-test	P-value
	Pre-mind mapping application	Post-mind mapping application		
Assessment of stoma and peristomal skin (7) steps	3.42±1.1	5.4±1.4	=44.7	P=0.001
Applying new ostomy appliance including (25) step	10.33±1.3	18.4±2.8	=56.4	P=0.001
Irrigation of the stoma including (27) steps,	13.23±1.2	23.6±1.5	=67.7	P=0.001
Emptying the pouch including (8) steps	4.40±1.1	6.4±1.3	=64.6	P=0.001

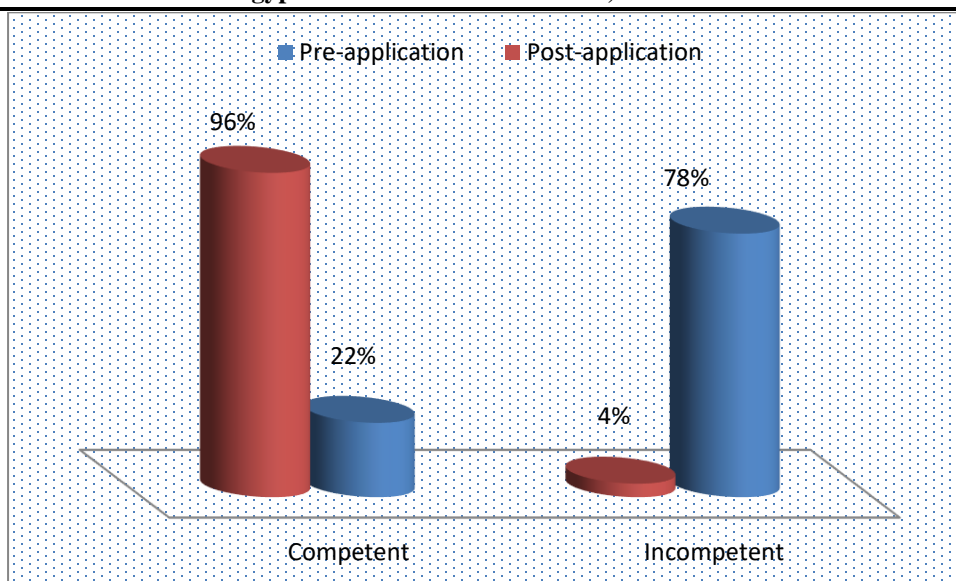


Table (5): Correlation between demographic Characteristics and total knowledge among the studied nurses(n=50)

Demographic characteristics	Total knowledge			
	Pre		Post	
	R	P	R	P
Age (years)	-0.004	0.8	-0.01	0.8
Gender	-0.48	0.001*	-0.24	0.03*
Qualification	0.37	0.03*	0.38	0.02*
Years of Experience	0.36	0.04*	0.35	0.02*

Table (6): Correlation between demographic Characteristics and total colostomy practice among thestudied nurses (n=50)

Demographic characteristics	Total infection control practice			
	Pre		Post	
	R	P	R	P
Age (years)	0.32	0.05	-0.27	0.1
Gender	-0.47	0.001*	-0.23	0.2
Qualification	-0.20	0.2	0.03	0.7
Years of Experience	0.33	0.04	0.04	0.7

Table (7): Correlation Co-efficient between the knowledge scores and practice scores pre andpost-mind map using

Correlation	Practice scores	
	R	P
Knowledge score		
Pre-mind mapping application	0.177	0.372
Post-mind mapping application	0.359	0.047*

Correlation is significant at the 0.05 level **.

Discussion:

A colostomy is a medical operation that involves making an incision in the abdomen. It

is possible to generate a stoma—a portion of the large intestine moved outside the abdominal wall—through this hole. This stoma allows for the passage of partially digested food, which is then collected via an external pouching device

(Wound, Ostomy Continence Nurses Society, 2022).

Education is a crucial aspect of life, and it's important to learn as much as you can in the least amount of time. They also have retention problems because they have to read a lot of material in their area of specialization. To aid with this, nevertheless, several new technologies have appeared in the contemporary era. Therefore, using mind mapping as a study aid to create distinct connections and interconnections across subjects may help instructors become more proficient teachers (Eshwar et al., 2019). Thus, the purpose of the current study is to ascertain how mind-mapping applications affect the colostomy performance of nurses working in pediatric surgical facilities.

The study's findings about the characteristics of the nurses under investigation indicate that, with a mean age of 24.8 ± 5.7 years, three-fifths of the nurses were under the age of 25, and less than three-quarters were technical nurses. Less than half of them have experience ranging from six to fourteen years. This result may be explained by the fact that nursing is typically associated with women, especially in our culture. Furthermore, **Betty Lebona et al. (2019)** discovered that women made up the bulk of the sample under analysis.

Khalifa et al., (2020) report that fewer than half of nurses have less than five years of experience, and over half are under the age of twenty-five. The majority of the nurses evaluated were female, between the ages of 20 and 30, from technical nursing institutes, and had less than five years of experience. This conclusion was consistent with that of **Mohammed et al. (2019)**. This statement appears to contradict the findings of **Ponikowski et al. (2019)**, who stated that older nurses were more suited for their chosen roles in terms of performance. Hashem and Abusaad (2019) were confirmed in their conclusions by the outcome. Over 50% of the nurses possessed a nursing diploma.

Even so, **Betty Lebona et al. (2019)** disagreed with this result, stating that most of the sample group studied BSc. This could be explained by the fact that a smaller portion of

faculty graduates held positions in the Ministry of Health Facilities and hospitals connected to the university. The large proportion of female students in the current study may be explained by the fact that, until a few years ago, nursing was only offered to girls in Egyptian institutions. This finding was in line with a study conducted by **Ahmed, (2019)** who discovered that more than one-third of the study samples of nurses had more than ten years of experience in the industry.

According to the study's findings, the majority of the nurses who were examined preferred using mind maps that came with an explanation, and none of them had ever used mind mapping during their prior training. This, in the opinion of the researchers, reflects the critical necessity to apply the findings.

Regarding the nurses' knowledge of colostomy, the findings indicated that there was an improvement in their mean scores before and following the mind mapping application, as well as a highly statistically significant difference. According to researchers, this might be because there were not enough nurses, there was no pre-employment orientation program, or there were no instructions given to the nurses. The fact that fundamental education was left out of both diploma and degree programs may also be the source of the absence of current information. Conversely, the lack of nurses in Egypt leads to an overworked nursing workforce, especially for those who provide bedside care. As such, they are constrained in their ability to further their education in critical care.

According to a study (**Pearson & Helistrom, 2020**), after three months, more than half of the study sample in the post-educational program had good and high knowledge regarding colostomy care. This finding is consistent with that observation. **Betty Lebona et al. (2019)** found that a sizable percentage of participants were aware of colostomy care; these findings are in direct opposition to the findings of the current study. Furthermore, according to **Duruk and Ucar's (2019)** study conducted in Albania, the majority of participants knew colostomy care before the exam. The nurses' participation in a mind-mapping application setting may have contributed to this since it allowed them to gain experience, polish their

knowledge and abilities, form reliable clinical judgments, get feedback, and practice until they attained a particular level of adequacy.

According to the findings, the majority of the nurses in the study had inadequate knowledge about colostomies before mind mapping, but thereafter, their level of understanding rose and the majority had satisfactory knowledge. According to the researcher, this supported the beneficial impacts of mind-mapping software in enhancing the knowledge of the nurses under study. Parallel to this, A. **Abdel Hamid (2019)** studied "Mind Maps as a New Teaching Strategy for medical students" and found that mind maps help students in medical school assimilate material and organize it more effectively. Better information recall is the outcome of this.

In line with earlier findings, **Bawaneh (2019)** examined "The Effects of Herrmann Whole Brain Teaching Method on Students' Motivation towards Science Learning" and suggested the use of mind mapping. Most respondents suggested incorporating mind maps into training and workshops, as well as incorporating them into clinical work. A smaller percentage of the sample suggested using engaging teaching techniques to retain information.

These outcomes agree with the findings of a few other investigations. The effects of note-taking in science education through the mind mapping technique on students' attitudes, academic achievement, and concept learning were studied by **Akinoglu et al., (2019)** in their study, "Use of technology-assisted techniques of mind mapping and concept mapping in science education: a constructivist study," which emphasized the value of mind maps in improving the achievement and conceptual understanding of the studied sample.

The study results demonstrated a statistically significant difference between the mean scores of nurses' practices about all the principles utilized in different tasks related to colostomy pre and post-mind mapping application in pediatric-surgical units. After using a mind map to teach nursing staff about infection control applications, the researcher felt that there had been a noticeable gain in their knowledge. To direct individuals and practitioners in providing safe and effective care, each organization and profession must establish standards and

objectives, as described by (**King & Shell, 2019**).

The current study's findings demonstrated that the majority of the nurses under investigation had competent post-mind mapping application skills. This is seen by how well mind maps work. This result deviates from **Kabir's (2019)** findings. The nurses were said to have a great degree of experience. This demonstrated that mind maps are a useful tool for rapidly planning staff and patient education and assessing how well learners have understood important material (**Khalfia et al., 2020**). **Richard et al. (2019)** discovered in a study carried out in Jordan that ostomy care nurses with advanced training and experience can enhance patient outcomes.

According to **Spoothi et al. (2019)**, the majority of trainees in their study "Mind Mapping- an Effective Learning Adjunct to Acquire a Tsunami of information" felt that the technique had aided in their understanding of scientific concepts and ideas. This finding corroborated the previous one. Through patterns, keywords, or symbols, it helps teachers and students connect tales. Additionally, mind mapping can be applied to self-learning; it helps close the gap between theory and clinical competence, integrates concepts, and makes it easier to conduct a conceptual grasp of a vast amount of data. Problem-based learning can incorporate it. Not very long ago, it was even employed in biological research and systematic review conducting as well as related software programs. (**Wilson et al., 2019**)

In a similar vein, **Farrand et al. (2020)** discovered that when compared to favored study methods, spider diagrams—which are akin to mind maps—had a substantial impact on undergraduate students' memory recall. For individuals in the diagram group, this progress was only strong after a week, and their desire significantly decreased in comparison to their preferred note-taking techniques. "Reading text passages, attending lectures, and participating in class discussions" are less effective than mind mapping, according to a meta-study on the subject.

Mind mapping is marginally more successful "than other constructive activities such as writing summaries and outlines," according to

the same study by **Tee et al., (2020)** on "Buzan mind mapping: An efficient technique for note-taking." Inconsistent results were observed, nevertheless, as the authors noted that "significant heterogeneity was found in most subsets". Furthermore, it was determined that pupils with lower ability levels could gain more from mind mapping than those with higher ability levels.

Additionally, **Abdel Hamid (2019)** found that mind maps help medical education students assimilate material more effectively and organize it more effectively. As a result, information is more easily remembered. In line with earlier findings by **Bawaneh, (2019)**, who examined the validity of the mind-map assessment rubric in a group of medical students and suggested using mind mapping, most respondents suggest incorporating mind maps into their training, using them in workshops, and incorporating them into clinical work. A smaller percentage of the sample suggests using engaging teaching techniques to retain information.

According to **Buzan & Buzan (2010)**, mind mapping encourages the application of radiant or central thinking to strengthen the brain's multiplicity. The idea and its important linkages were explored with the use of mind mapping in an orderly, vivid, colorful, and logical way. As the mind maps were being created, it became clear that the process was delving into the idea of critical thinking by considering how clinical settings make judgments regarding patient care.

Additionally, mind maps arrange the connections and relationships between concepts and data. This facilitates the investigated sample's ability to retain concepts and knowledge for both short-term success and long-term retention. **Hariyadi et al. (2019); Al-Otaibi & Wadha, (2019)**. Mind maps, in the same context, help students understand the big picture of the subject and improve their memory of concepts and details. These maps also contain a plethora of illustrations, images, and forms in a variety of eye-catching hues. As a result, mind maps provide the most effective means of disseminating and retaining information. The brain receives 90% of its inputs from visual sources, where symbols and images trigger an instinctive reaction in the brain that has a significant influence on recalling ideas and information (**Awajan,**

2019).

These findings align with those of **Akinoglu & Yasar's (2019)** study, "The Random-Map Technique: Enhancing Mind-Mapping with a Conceptual Combination Technique to Foster Creative Potential," which highlighted the value of mind maps in raising study participants' conceptual understanding and achievement.

According to **Harkirat's (2019)** study, mind mapping is a valuable tool for improving and educating studied samples' perceptions and their capacity to organize and synthesize information and ideas in a thorough, coherent, and orderly manner. **Ackerman et al., (2019)** demonstration of the function of mind mapping in the tested sample's information assimilation, application of delivered concepts, and long-term learning retention supported this. **Wickramasinghe (2019)** found no statistically significant differences between mind mapping and the conventional method for medical students at the University of Colombo in Sri Lanka. However, the researchers who studied mind mapping suggested that mind mapping was a helpful way to summarize and remember information as the sample was different. This outcome was in some ways in line with what **Farrand et al. (2020)** found. According to their findings, the study sample that used mind mapping to study did not like it at all, which runs counter to the current study's conclusions that adopting it is more difficult given the high significance of the satisfaction levels. Their lower desire to learn as opposed to those who studied conventionally served as proof of this.

In the same context, the result was not consistent with that of **Trevino (2019)** aimed to investigate the effect of the use of mind maps. The results indicated that there were no statistically significant differences between the mind maps strategy and the traditional method while mind mapping was its flexibility. The researchers' observations indicated that it can be used to help an individual trainee, group of nurses, and nursing supervisors to improve work activity such as topics of the current study (infection control which is a very broad topic). It can be used in any type of activity or any stage of work; thus, maps can be narrow or broad in scope, depending on the time of work or the topic of the activity. When needed staff nurses can construct the maps in a very short

period (an average of 15 to 20 min.), with little instruction and they can receive feedback, either from the head nurse or other staff members, on the spot very quickly.

According to findings of the current study showed that there is no statistically significant correlation between demographic data and total knowledge among the studied nurses at pre and post-mind mapping application. There was a significant correlation between nurses' knowledge, gender, qualification, and years of Experience respectively at the pre-mind mapping application. This outcome could be explained by the fact that a high degree of knowledge has a beneficial impact and is reflected in practice. The study's findings, according to the researchers, demonstrated how well the application of mind mapping improved the practice of the nurses under investigation and raised their clinical practice level scores. This result was in agreement with the study done by **Eshwar et al., (2019)** conducted a study entitled "Comparison of mind mapping and lecture-based teaching-learning method among dental undergraduates using solo taxonomy in Bangalore" The study mentioned that active learning methods and models are frequently used in educational sciences. Although the use of these methods in nursing education has increased recently, the number of studies is insufficient.

The current study showed that age and gender, years of Experience there is mild correlation between pre and post-mind mapping applications as well regarding the qualification of nurses there is a mild significant correlation at post- mind mapping application, as the nurse's practices of previous bachelor degree of nursing who work as high qualified nurse or nursing supervisor using mind mapping method exceeded those of previous nursing technical institute of nursing education and work as bedside nurse who exposed to the same training strategy. This result was in the same line with **Considine et al., (2019)** which means when the nurses' experience and qualification increase or if the nurses had a training course their favorable knowledge also improves. The study of **Ahmad, (2019)** is not matched with the current results and reported no relationship between knowledge or practice regarding infection control and age, years of experience, and training course of the studied group. In this regard, **Abdel**

Hamid et al (2019), indicated that factors such as age and years of experience did not contribute to the acquisition of knowledge about colostomy.

The results of the current study showed the correlation between the total score of nurses' knowledge and practices pre- and post-the-mind mapping application; there was a significant positive correlation between the score of knowledge and the score of practices with statistically significant differences. This association explains the fact that increasing information leads to increased practices. In addition, the nurses in the study were able to practice effectively when they got enough knowledge. The results agree with **Davies, (2020)** concerning the relationship between knowledge regarding mind mapping and staff nurses' performance, that the performance of the study sample that has theoretical knowledge about mind mapping was highly statistical significance. It could be explained by that well understanding of mind mapping strategy provides an opportunity for the active involvement of nurses in their training process.

Conclusion

From the findings of the present study, it can be concluded that the mind mapping application had a positive effect on improving nurses' knowledge & practice in the pediatric surgical unit.

Recommendations

Based on the current study findings, it can be recommended that:

- The study recommended that the mind mapping application should be integrated as an effective method of nurses' training.
- The establishment of written guidelines, administrative policy, and procedures for nursing measures in colostomy care need to be reviewed and updated regularly. These materials should include clear instructions, diagrams, and step-by-step guides on various care procedures.
- Develop and implement a standardized evidence-based nursing education program for nurses caring for children undergone colostomy surgery.
- The study suggested integrating the mind map strategy as a useful technique for teaching nurses.
- It is critical to provide an initial workshop on

the theoretical and technical aspects of mind mapping as well as regular formative and summative feedback.

Further studies need to be performed:

-Provide pre-service and in-service training programs using mind mapping for newly appointed nurses to improve their competency level.

-To generalize the findings, more research is needed, including a replication of the current study with a broader sample of nurses in various situations.

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