

Effect of Mind Mapping Strategy on Nurses' Performance and Maternal Satisfaction Regarding Intrapartum Nursing Management

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Abstract

Background: mind map is a visual representation that can be used as an effortless way to keep track of information. To maintain organization, it facilitates data organization in a single spot. Mind mapping can improve nursing care effectiveness and, as a result, mothers' satisfaction with the care they receive. **Purpose:** was to study the effect of mind-mapping strategy on nurses' performance and maternal satisfaction regarding intrapartum nursing management. **Method:** The current study was carried out using a quasi-experimental research design with a case-control design for the intrapartum women and a pre-post-test for the maternity nurses. The gynecology and obstetrics departments at Menoufia University Hospital and Shebin El-Kom Teaching Hospital were the sites of this study. **Sample:** A convenient sample of all population (48 maternity nurses) and a purposeful sample of 100 intrapartum women were gathered. **Instruments:** structured interviewing questionnaire for maternity nurses, a mind-mapping checklist for maternity nurses, and maternal satisfaction with the intrapartum care scale. **Results:** The mind-mapping knowledge scores of the maternity nurses significantly improved after the intervention compared to before. Moreover, they demonstrated competent performance in mind-mapping-based intrapartum nurse management after the intervention as opposed to before. In addition, intrapartum women who received mind mapping-based intrapartum nursing management reported being more satisfied, compared to those who did not receive it. **Conclusion:** Mind mapping was found to help maternity nurses learn and do a better job of managing care during labor and delivery. **Recommendations:** To enhance maternity nurses' intrapartum performance and subsequently the satisfaction of women, training programs about intrapartum care should be introduced.

Keywords: intrapartum nursing management, maternal satisfaction, mind mapping, nurses' performance

Introduction

Using mind maps to take notes is a very efficient method that helps with memory recall. Instead of teaching nurses how to think, this teaching-learning method teaches them how to actively connect new and old knowledge. This helps them understand better, do their jobs well, and make mothers happy with their intrapartum nursing care **Martinez et al (2021)**.

In the meantime, nurses play a significant role in providing nursing care for women who are in labor. Nurses must be knowledgeable and

skilled practitioners who are fully aware of their patients before, during, and after delivery **Leister & Riesco (2017)**. Nurses should continuously update their knowledge through active learning techniques. Such as problem-based learning, case-based teaching, didactic learning, and web-based teaching. Such techniques are proven methods to boost nurses' critical thinking abilities.

Moreover, these techniques help nurses receive on-the-job training and finally integrate information. These learning techniques fall under the same conceptual umbrella, which is the constructivist theory of learning, but they

vary in terms of effectiveness and applicability. According to this learning paradigm, students comprehend learning when they combine new knowledge with what they already know. Mind mapping and concept mapping, which are promising tools in the context of both medical and nursing education, are based on constructivism **Abdel Hamid (2017)**.

Like modern mind mapping, Tony Buzan developed it in its present form in the middle of the 1970s. It functions by pulling data from several sources and presenting it as key words in a vivid, colorful way. When used with written content, mind maps have been touted as an efficient study method. It is a way to teach that breaks up a lot of information into bite-sized pieces and helps a specific audience learn a lot of information **Chang & Hwang (2022)**.

It was created as a powerful technique for associative idea generation. Make an expanding diagram of keywords, phrases, concepts, facts, and statistics by starting in the center of the page with the main topic or idea and working outward in all directions. It can be applied to tasks and essay writing, especially in the beginning when it is the best "thinking" method to apply. It can be used to produce ideas, visualize them, organize them, take notes, solve problems, and make decisions **Hartanto et al (2021)**.

Because the nurses start from scratch and do not use a template or flowchart to guide their thinking, the map reflects the nurse's own understanding and synthesis of ideas, which makes learning more meaningful. A richer and deeper integration of information can foster both declarative (explicit) and implicit knowledge linked to critical thinking and long-term learning, which is elaborated by meaningful examples **Nyagblormase & Gyampoh (2021)**.

The experience of giving birth is remarkable because women will always remember it **Simkin (2016)**. The significant role of a nurse in facilitating this fortunate circumstance makes nursing students' preparation essential. Intrapartum nursing care is the care that nurses give to women during labor **Adams & Sauls (2017a)**.

The quality of intrapartum care is usually bad in low- and middle-income countries. This has been identified as one of the causes of the unacceptable high maternal mortality rate in low- and middle-income countries. Even though the main goal of the United Nations' Sustainable Development Goal (SDG3) is to reduce the global maternal mortality rate to less than 70 deaths per 100,000 live births **Adams & Sauls (2017a)**.

Adam and Sauls (2017b) found that 99% of all maternal deaths happen in low- and middle-income countries. The World Health Organization says that "more than 850 women die every day from causes that could have been prevented". It is becoming clearer that patient perceptions of service quality are important for maintaining and monitoring the quality of healthcare in Egypt, where there is a growing need for client-centered care **Tesfaye et al (2018)** and **Fisseha et al (2017)**.

Today, the word "satisfaction" has been singled out as the most important way to measure the quality of healthcare. Women in labor rate the quality of the care they get during labor based on how happy they are with the services. This affects how often they use the available medical facilities. The satisfaction of mothers with intrapartum nursing care is a good indicator of a service's ability to meet consumers' expectations. This means that a health facility is more likely to use it for labor and delivery services now and in the future **Rao et al (2018)** and **Lewis et al (2016)**.

Significance of the Study:

A mind map is an active teaching strategy to be used in providing nursing care for laboring women, promoting meaningful learning, and helping nurses learn how to integrate information. Nurses demand it rather than depending on conventional techniques that encourage recall and memory **Bazant and Koenig (2019)** and **Camacho et al (2022)**. This teaching-learning strategy does not teach nurses to think but helps them actively make a link between unknown and known information. Such link leads to deeper understanding, competent performance, and mothers' satisfaction with

intrapartum nursing management **Martin and Fleming (2021)**.

To deliver high-quality care, mind mapping implementation also tries to match clinical practice with advice from guidelines. This technique can support nurses' critical thinking in a challenging healthcare setting **Rudman et al (2019)**. However, there is a dearth of primary research studies in the literature on mind mapping in maternity care. Studies mostly made up of opinion-based pieces of work and descriptions of mind mapping implementation. The researchers were motivated to investigate how this strategy affected the performance of staff nurses and laboring women's satisfaction with intrapartum nursing care.

Purpose of the study:

To study the effect of mind mapping on nurses' performance and maternal satisfaction regarding intrapartum nursing management.

Research hypotheses

1- After the intervention, maternity nurses are expected to have a satisfactory level of knowledge about mind mapping compared to before.

2- Using mind mapping, maternity nurses are expected to handle intrapartum nursing care more competently than they did before the intervention.

3- Intrapartum women in the case group who get intrapartum nursing care based on mind mapping are expected to be more satisfied than women in the control group who get regular intrapartum nursing care.

Operational Definitions

Mind Mapping Strategy: In this study, it was an easy way maternity nurses used to organize and brainstorm their thoughts and ideas about intrapartum nursing management graphically without worrying about order and structure. It was measured using Instrument 2.

Nurses' Performance: In this study, it is defined as providing nursing care and all other related activities and processes to laboring women, including support, communication, and care during the early stage, second, third, and fourth stages of labor. It was measured using part 2 of instrument 1.

Maternal Satisfaction: In this study, it is the state of pleasure with intrapartum nursing management, including how satisfied women were with interpersonal care, information and decision-making, and the physical birth environment. It was measured using Instrument 3.

Intrapartum Nursing Management: In this study, nursing care is provided to laboring women, including support, communication, and care during the early stage, second, third, and fourth stages of labor. It was measured using instrument part two of instrument 2.

Method

Design: A quasi-experimental approach was used with a case-control design for the intrapartum women, and a pre-post-test for the maternity nurses.

Settings: The gynecology and obstetrics departments at Menoufia University Hospital and Shebin El-Kom Teaching Hospital were the sites of this study. These facilities were chosen because a lot of women who are about to give birth go to the hospitals listed above. Both institutions offer low-cost and free health care to women who have just given birth. In addition to serving a large part of the governorate. Moreover, hospital staff members are known for their collaboration and assistance. These factors always make it simple for researchers to carry out their studies.

Samples: 100 intrapartum women were selected for this study's sample. Two equal groups of intrapartum women were created: the case group, which consisted of 50 women, received an intrapartum intervention based on mind mapping. The control group, which consisted of 50 women, received standard intrapartum nursing care. All the maternity

nurses at both sites (convenient sample) were hired for the study as their number was already limited (48 nurses). Because it was challenging to split nurses into case and control groups due to their small numbers; evaluation of their intrapartum knowledge and practices were conducted before and after the main study intervention.

Size of the sample: With a power of 80%, a significance level of 0.05, and a 95% confidence interval, the sample size for women was calculated using the two-proportion formula. Considering the 30% of people who didn't answer, the minimum sample size needed was 100 women.

The following **inclusion criteria** were used in the recruitment of intrapartum women: Primigravida women who had a term pregnancy between 38 and 42 weeks admitted for giving birth vaginally without any complications for either the mother or the fetus and consented to participate in the study. All the staff nurses who worked in the labor room were considered as sample.

Instruments: Three different instruments were used to gather the data, which are as follows:

The first instrument is a structured interviewing questionnaire for nurses. It was used to evaluate the nurses' sociodemographic traits and their understanding of mind-mapping-based intrapartum nursing care. The researchers developed this instrument after reviewing related literature (Martinez, et al., 2021), which was then submitted to validity and reliability tests. It composed of two parts:

Part One: The sociodemographic details, including the nurses' ages, educational backgrounds, and years of experience.

Part Two: A questionnaire to gauge the maternity nurses' level of expertise in mind mapping-based intrapartum nursing management. It included questions about intrapartum nursing management, the importance of care, mind mapping's definition, uses, and advantages, as well as nurses'

responsibilities in its intrapartum implementation. This section received a score of 1 for correct responses and 0 for incorrect responses. If the knowledge score was below 60%, the degree of knowledge was unsatisfactory; if it was above 60%, it was satisfactory. This instrument was utilized both before and after the application of the main study intervention.

A mind-mapping checklist for maternity nurses is the second tool, it was used to evaluate how well nurses manage the intrapartum period. It consisted of two parts and was adopted from **WHO (2017)**.

Part One: A checklist used to compare how well maternity nurses handled intrapartum care before and after they started using mind mapping. There were twenty-four items, including the following: (1) support; (2) communication; (3) care during the early stage of labor, including evaluation (observation), pain treatment, fetal heart rate monitoring, information sharing with the women about typical labor and care, mobilization, diet, and hygiene precautions; (4) attention to the second stage of labor, including evaluation of the mother, pain management, fetal heart rate monitoring, administration of uterotonic drugs, mother's position, and pushing; (5) care of the fourth stage of labor, including observation and mother-newborn bonding; (6) Care of the third stage of labor, including assessment, active management, and physiological management. For the first section, the scoring system was as follows: 2 for adequately done, 1 for inadequately done, and 0 for not done. If the performance's score was 70% or higher, it was competent; if it was less than 70%, it was incompetent.

Part Two: A checklist was used to judge how well maternity nurses care for newborns during labor. It included a review of the newborn's medical treatment, including suctioning, cord care, eye care, measurements (Apgar score), taking the newborn's temperature, giving vitamin K, and identification. The scale for part two was 2 for adequate, 1 for inadequate, and 0 for not done. If the performance got a score of 70% or more, it was considered

competent. If it got less than 70%, it was considered incompetent.

Maternal satisfaction with the intrapartum care scale: It was used to measure women's satisfaction with intrapartum management. It was adopted from **Mohammad et al (2014)**. It had two components, the first of which assessed sociodemographic information about women. It included questions about the women's personal information, such as their age, education, and place of residence. Part 2: A collection of 14 items, broken down into three domains. One point represented strongly disagreeing with something, and five points represented strongly agreeing with something on a five-point Likert scale. With a score ranging from 5 to 25, the first domain evaluated how satisfied women were with five interpersonal care (IPC)-related items provided by healthcare professionals. The information and decision-making (IDM) process was the subject of the second domain, which had four elements with a score range of 4 to 20. Three items in the IDM domain, however, received reversed scores. The third domain, which had five items and a score range of 5 to 25, was concerned with the physical birth environment (PBE). The total maternal satisfaction score might be between 4 and 70.

Validity and Reliability: A jury of five experts in obstetrics and gynecological medicine and nursing faculty staff reviewed and evaluated instrument one for content validity; changes were made as needed. Test-retest reliability was employed. Using Cronbach's alpha coefficients, the instrument's internal consistency was calculated. The **WHO (2017) and Mohammad et al (2014)** conducted tests and confirmed the validity and reliability of the second and third instruments respectively. The jury then gave them a broad review because they would be applied to different samples.

Administrative and ethical design: The Menoufia University Faculty of Nursing's Research and Ethics Committee gave permission for the study to be carried out. After outlining the goals and methods of the study, the medical directors at the study sittings gave their written approval. Women and nurses were only

included in the study if they voluntarily agreed to do so. This was done by selecting the women and nurses, explaining the objective and methods of the study to them, then informing them of their right to withdraw from the study at any time. Women and nurses were told that their information would be kept confidential, used only for the study at hand, and not looked at in any other way. They were given numbers instead of their names.

Pilot study: 10 women and 5 nurses from the 10% sample made up the pilot study. It tested the applicability of the instruments, the time needed to fill-in them, the study method, the feasibility of fieldwork, and any potential hurdles that would stand in the way of the researchers' ability to collect data. The pilot study participants of laboring women were eliminated from the main study sample, but the sample of nurses was kept because the total sample size was small.

Fieldwork: The study was carried out through the following phases, from June 2022 till the end of January 2023:

Phase I: Preparatory

The study field was thoroughly reviewed, including digitized dissertations, readily available books and periodicals. It also included a survey of the literature to create a knowledge base pertinent to the subject field. The essential resources for the mind map formation and sessions were designed based on recommendations for intrapartum care from the World Health Organization **WHO (2018)** and the National Institute for Health and Care Excellence **NICE (2020)**. To ensure intervention fidelity and ensure that all nurses received the same information regardless of the presence of numerous researchers, researchers arranged a series of meetings to discuss the session contents and practice data collection.

Phase II: Implementation

Gathering information from laboring women: From 9.00 a.m. until 1.00 p.m., the researchers visited the labor rooms at both hospitals until the sample size reached 100 women. The data collection period was split as

follows: one researcher per day and one hospital per week. After introducing themselves, giving a brief explanation of the study, and obtaining their verbal agreement, the researchers questioned each eligible woman using part 1 of instrument 3 and following delivery part 2 of the same instrument. Regular intrapartum nursing care was provided to the control group, whereas mind mapping-based intrapartum nursing care was provided to the case group. Prior to offering nurses mind-mapping training sessions, the control group was initially interviewed, while data from the case group was gathered after the training sessions were put into practice. Women were interviewed first at the observation room of the labor unit then after delivery at her regular room at the obstetric department.

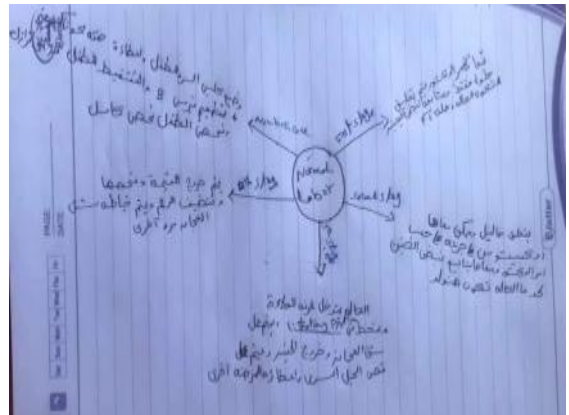
To get data from nurses, a series of training sessions were held to teach mind mapping and intrapartum nursing management using mind mapping. The nurses were assessed using instruments 1 and 2 as pre-test data. Small groups of five nurses were formed to conduct the sessions. The sessions were conducted by the researchers as a group discussion and brainstorming activities rather than a teaching session, and they were held during the nurses' break time. The sessions were conducted at the meeting room attached to the obstetrics and gynecology department at both hospitals after getting verbal approval from the department heads, both welcomed this issue. The head at the teaching hospital attended the first session as a way for encouraging his staff for on-job training. Meeting rooms at both hospitals had a data show device, white board and a large round table which facilitated brainstorming activity.

The following learning objectives were set for the sessions: **Knowledge:** a. define mind-mapping; b. list its advantages; c. list the elements of mind-mapping-based intrapartum nursing management. **Skills:** create a mind map for managing intrapartum nursing care. **Competence:** Recognize the benefits of employing a mind map when creating the protocol for women's intrapartum nursing care. Teaching strategies employed were lectures, group discussions, and brainstorming.

Session I: an overview of intrapartum nursing care; a discussion of mind mapping and

its applications; how intrapartum nurses can get started using it; what a mind map looks like; and the advantages of using and creating one.

Session II: intrapartum care using mind mapping: included physical and psychological assessment, application of intrapartum nursing care, e.g., walking, nutrition during labor, pain relief measures, positioning, pushing technique, placental examination, and drug administration, education, e.g., mother-newborn bonding, and a discharge plan. Women were advised to have skin-to-skin contact with their newborns as soon as possible after delivery. Newborn care included newborn assessment and early infant care such as Apgar score, cord care, eye care, measurements, temperature, identification, and encouraging mother-baby bonding. Nurses created a mind map during **session III**, which was an application session. Each nurse at this session designed a mind map, an example is shown in Figure 1.



After the session implementation, nurses started providing intrapartum care for each laboring woman based on mind-mapping. They draw a map, organize and brainstorm their thoughts and ideas about intrapartum nursing management graphically without worrying about order and structure. Researchers observed the provided nursing care in an overt way. At first, nurses felt a little bit upset due to the idea of evaluating the order and structure of care activities then the issue gone smoothly.

Phase III: Evaluation The evaluation's focus was on determining how mind-mapping affected nurses' performance and mothers' satisfaction with intrapartum nursing care. After

putting the suggested training sessions into practice, nurses' performance and knowledge were assessed using instrument 2 and instrument 1 (Part 2). Following their receipt of intrapartum nursing care, data of women in the case group were gathered using instrument 3. (Part 2).

Statistical Analysis

All statistical analyses were performed using SPSS for Windows version 20.0 (SPSS, Chicago, IL). The continuous data was normally distributed and expressed as the mean standard deviation (SD). Categorical data were expressed in numbers and percentages. The Chi-square test was used for comparison of variables with categorical data. The statistical significance of the results was explained as follows: $P \leq 0.01$ indicates highly significant, $P \leq 0.05$ indicates significant, and $P > 0.05$ indicates no significance.

Limitations: The workload of nurses due to the nurse-to-laboring woman ratio makes it hard to schedule the study sessions. This issue was overcome by giving more time for data collection and allocating researchers to the data collection sites (one researcher per day and one hospital per week).

Results

Table 1 shows that 56.2% of the studied nurses were aged between 20 and 29 years. In terms of the level of education of the studied nurses, 52.1% were graduates of technical institutes, and 16.7% had a bachelor's degree. As regards experience, 37.5% of them had more than 15 years, and 29.1% had between 5 and 10 years.

Table 2 reveals a statistically significant difference regarding nurses' degree of knowledge about definition, significance, components, and the nurse's role in intrapartum nursing management based on mind mapping ($P \leq 0.001$).

Figure 1 shows that after the intervention, the total knowledge scores were statistically higher than they were before the intervention. It shows that the maternity nurses' knowledge scores of mind mapping-based intrapartum nursing management went up from 10.4% to 70.8%, which is a good sign.

Table 3 demonstrates that, when comparing pre- and post-intervention, there was a highly statistically significant difference in the performance level of managing the first stage of labor based on mind-mapping ($P \leq 0.001$), while there was a statistically significant difference regarding fetal monitoring ($P < 0.05$).

Table 4 demonstrates that, when comparing pre- and post-intervention, there was a highly statistically significant difference in the level of nursing management based on mind-mapping for assessment, pain relief, woman positioning, and pushing technique ($P \leq 0.001$), but only a statistically significant difference for fetal monitoring ($P < 0.05$).

Table (5) demonstrates that at the third stage of labor, there was a highly statistically significant difference in the level of nursing management based on mind mapping regarding perineal care, placental examination, and perineal assessment when comparing pre- and post-implementation of intervention ($P \leq 0.001$), as well as a statistically significant difference regarding assessment and help during perineal repair ($P < 0.05$), but no difference regarding assessment and heparinization.

When comparing the pre- and post-intervention phases, Table (6) demonstrates that there was a highly statistically significant difference in the intrapartum nursing management performance level based on mind-mapping at the fourth stage of labor ($P \leq 0.001$). This difference concerned vital signs, uterine contractions and lochia assessment, emotional and psychological assessment, perineal assessment, and mother-newborn bonding.

Table 7 shows a highly statistically significant difference between the pre and post-implementation of the intervention in the performance level of newborn assessment (competent in 85.4 percent of the studied sample), as determined by the assessment of the newborn (97.9%), the APGAR score (70.8 %), the eye care (60.4 %), the anthropometric measurements (70.8 %), and the body temperature (72.9 %) ($P \leq 0.001$).

Figure 2 demonstrates that after the intervention, the intrapartum nursing management overall performance score was statistically greater than it was before. It suggests that after the intervention (79.2%), compared to before (27.1%), the maternity nurses demonstrated competent performance for

intrapartum nursing management based on mind mapping.

According to Table 8, there was a highly statistically significant difference between the groups in terms of how satisfied the mothers were with every aspect of interpersonal care ($P \leq 0.001$). This indicates that intrapartum women who received mind-mapping-based intrapartum nurse management experienced greater levels of satisfaction than those who did not.

Maternal satisfaction with all aspects of the nurses' information and decision-making was extremely statistically different from one group to the other, as shown in Table (9), and it was also significantly different between groups.

Figure 3 shows that 78% of the case group compared to 14% of the control group were satisfied with the intrapartum nursing management.

Table 1: The socio-demographic characteristics of the studied nurses (N = 48)

| Socio-demographic characteristics | No. | % |
|-----------------------------------|-----|------|
| Age (years): | | |
| 20-29 | 27 | 56.2 |
| 30-39 | 3 | 6.3 |
| 40-49 | 18 | 37.5 |
| Level of education: | | |
| Secondary school | 15 | 31.3 |
| Technical Institute of Nursing | 25 | 52.1 |
| Bachelor's degree | 8 | 16.7 |
| Years of experience: | | |
| Less than 5 | 13 | 27.1 |
| 5-10 | 14 | 29.1 |
| 10-15 | 3 | 6.3 |
| More than 15 | 18 | 37.5 |

Table 2: Maternity nurses' knowledge of intrapartum nursing management based on mind mapping before and after the intervention (N = 48)

| Knowledge | Time of assessment | | | | χ^2 test | P value |
|--|--------------------|------|-----------|------|---------------|--------------|
| | Pre-test | | Post-test | | | |
| | No. | % | No. | % | | |
| Definition of mind-mapping-based nursing management: | | | | | | |
| Incorrect answer | 46 | 95.8 | 11 | 22.9 | 52.90 | <0.001 HS |
| Correct answer | 2 | 4.2 | 37 | 77.1 | | |
| The significance of mind mapping in the care of women and their newborns: | | | | | 31.04 | <0.001 HS |
| Incorrect answer | 41 | 85.4 | 14 | 29.2 | | |
| Correct answer | 7 | 14.6 | 34 | 70.8 | | |
| Components of mind mapping: | | | | | 43.21 | <0.001 HS |
| Incorrect answer | 46 | 95.8 | 15 | 31.3 | | |
| Correct answer | 2 | 4.2 | 33 | 68.7 | | |
| The nurse's role in intrapartum nursing management based on mind mapping: | | | | | 73.63 | <0.001 HS |
| Incorrect answer | 46 | 95.8 | 4 | 8.3 | | |
| Correct answer | 2 | 4.2 | 44 | 91.7 | | |

Figure 1: Total maternity nurses' knowledge scores about intrapartum nursing management based on mind mapping before and after the intervention

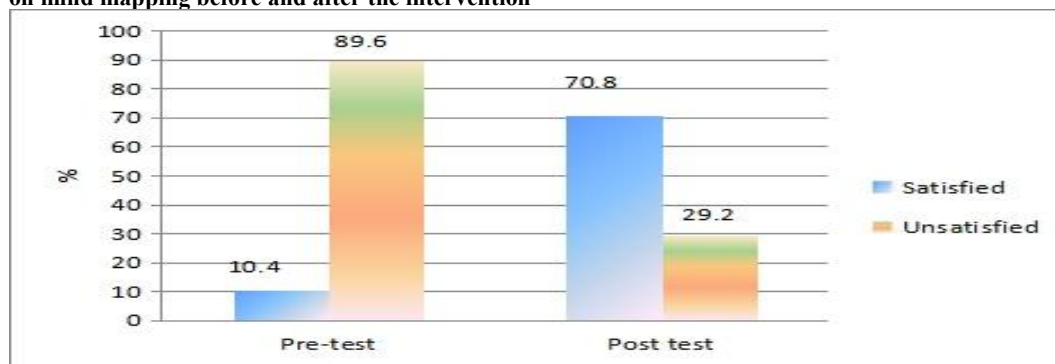


Table 3: Maternity nurses' performance of intrapartum nursing management based on mind-mapping at the first stage of labor before and after the intervention (N = 48)

| Performance of intrapartum nursing management (first stage) | Time of assessment | | | | χ^2 test | P value |
|---|--------------------|------|-----------|------|---------------|--------------|
| | Pre-test | | Post-test | | | |
| | No. | % | No. | % | | |
| Communication with women during intrapartum nursing management | | | | | | |
| Not done | 4 | 8.3 | 1 | 2.1 | 73.92 | <0.001 HS |
| Inadequately done | 41 | 85.4 | 2 | 4.2 | | |
| Adequately done | 3 | 6.3 | 45 | 93.7 | | |
| Physically and psychologically support women during labour and delivery: | | | | | | |
| Not done | 6 | 12.5 | 4 | 8.3 | 39.52 | <0.001 HS |
| Inadequately done | 35 | 72.9 | 7 | 14.6 | | |
| Adequately done | 7 | 14.6 | 37 | 77.1 | | |
| Assessment during the first stage: | | | | | | |
| Not done | 3 | 6.3 | 0 | 0.0 | 51.32 | <0.001 HS |
| Inadequately done | 39 | 81.2 | 7 | 14.6 | | |
| Adequately done | 6 | 12.5 | 41 | 85.4 | | |
| Pain relief measures during the first stage: | | | | | | |
| Not done | 24 | 50.0 | 4 | 8.3 | 45.41 | <0.001 HS |
| Inadequately done | 22 | 45.8 | 11 | 22.9 | | |
| Adequately done | 2 | 4.2 | 33 | 68.8 | | |
| Fetal monitoring during the first stage: | | | | | | |
| Not done | 1 | 2.1 | 0 | 0.0 | 13.98 | 0.002 S |
| Inadequately done | 23 | 47.9 | 7 | 14.6 | | |
| Adequately done | 24 | 50.0 | 41 | 85.4 | | |
| Mobilization and diet: | | | | | | |
| Not done | 39 | 81.2 | 5 | 10.4 | 54.97 | 0.001 HS |
| Inadequately done | 7 | 14.6 | 9 | 18.8 | | |
| Adequately done | 2 | 4.2 | 34 | 70.8 | | |
| Hygienic measures: | | | | | | |
| Not done | 33 | 68.7 | 9 | 18.8 | 29.02 | <0.001 HS |
| Inadequately done | 12 | 25.0 | 17 | 35.4 | | |
| Adequately done | 3 | 6.3 | 22 | 45.8 | | |

Table 4: Maternity nurses' performance of intrapartum nursing management based on mind-mapping at the second stage of labor before and after the intervention (N = 48)

| Performance of intrapartum nursing management (2 nd stage) | Time of assessment | | | | χ^2 test | P value |
|---|--------------------|------|-----------|------|---------------|--------------|
| | Pre-test | | Post-test | | | |
| | No. | % | No. | % | | |
| Assessment during the second stage | | | | | | |
| Not done | 4 | 8.3 | 3 | 6.3 | 60.53 | <0.001 HS |
| Inadequately done | 42 | 87.5 | 6 | 12.5 | | |
| Adequately done | 2 | 4.2 | 39 | 81.2 | | |
| Oxytocin administration and care during the second stage: | | | | | | |
| Not done | 0 | 0.0 | 0 | 0.0 | — | — |
| Inadequately done | 0 | 0.0 | 0 | 0.0 | | |
| Adequately done | 48 | 100 | 48 | 100 | | |
| Pain relief measures during second stage: | | | | | | |
| Not done | | | | | 65.23 | <0.001 HS |
| Inadequately done | 43 | 89.6 | 5 | 10.4 | | |
| Adequately done | 5 | 10.4 | 9 | 18.8 | | |
| | 0 | 0.0 | 34 | 70.8 | | |
| Fetal monitoring during the second stage: | | | | | | |
| Not done | 7 | 14.6 | 4 | 8.3 | 15.92 | 0.003 S |
| Inadequately done | 23 | 47.9 | 7 | 14.6 | | |
| Adequately done | 18 | 37.5 | 37 | 77.1 | | |
| Woman positioning: | | | | | | |
| Not done | 0 | 0.0 | 2 | 4.2 | 23.16 | <0.001 HS |
| Inadequately done | 3 | 6.3 | 16 | 33.3 | | |
| Adequately done | 45 | 93.7 | 30 | 62.5 | | |
| Pushing technique: | | | | | | |
| Not done | 2 | 4.2 | 1 | 2.1 | 28.65 | <0.001 HS |
| Inadequately done | 25 | 52.1 | 2 | 4.2 | | |
| Adequately done | 21 | 43.7 | 45 | 93.7 | | |

Table 5: Maternity nurses' performance of intrapartum nursing management based on mind-mapping at the third stage of labor before and after the intervention (N = 48)

| Performance of intrapartum nursing management (3 rd stage) | Time of assessment | | | | χ^2 test | P value |
|--|--------------------|------|-----------|------|---------------|--------------|
| | Pre-test | | Post-test | | | |
| | No. | % | No. | % | | |
| Assessment during the third stage: | | | | | | |
| Not done | 4 | 8.3 | 0 | 0.0 | 9.97 | 0.006 S |
| Inadequately done | 16 | 33.3 | 7 | 14.6 | | |
| Adequately done | 28 | 58.4 | 41 | 85.4 | | |
| Oxytocin administration and care during the 3rd stage: | | | | | | |
| Not done | 0 | 0.0 | 0 | 0.0 | — | — |
| Inadequately done | 0 | 0.0 | 0 | 0.0 | | |
| Adequately done | 48 | 100 | 48 | 100 | | |
| Perineal care: | | | | | | |
| Not done | 4 | 8.3 | 5 | 10.4 | 17.54 | <0.001 HS |
| Inadequately done | 25 | 52.1 | 6 | 12.5 | | |
| Adequately done | 19 | 39.6 | 37 | 77.1 | | |
| Placental examination: | | | | | | |
| Not done | 5 | 10.4 | 0 | 0.0 | 31.07 | <0.001 HS |
| Inadequately done | 42 | 87.5 | 24 | 50.0 | | |
| Adequately done | 1 | 2.1 | 24 | 50.0 | | |
| Perineal assessment during the 3rd stage | | | | | | |
| Not done | | | | | 15.83 | <0.001 HS |
| Inadequately done | 0 | 0.0 | 5 | 10.4 | | |
| Adequately done | 26 | 54.2 | 9 | 18.8 | | |
| | 22 | 45.8 | 34 | 70.8 | | |
| Help during perineal repair | | | | | | |
| Not done | 2 | 4.2 | 1 | 2.1 | 10.25 | 0.005 S |
| Inadequately done | 13 | 27.1 | 2 | 4.2 | | |
| Adequately done | 33 | 68.7 | 45 | 93.7 | | |

Table 6: Maternity nurses' performance of intrapartum nursing management at the fourth stage of labour before and after the intervention (N = 48)

| Performance of intrapartum nursing management (4 th stage) | Time of assessment | | | | χ^2 test | P value |
|---|--------------------|------|-----------|------|---------------|--------------|
| | Pre-test | | Post-test | | | |
| | No. | % | No. | % | | |
| Vital signs | | | | | | |
| Not done | 2 | 4.2 | 0 | 0.0 | 60.49 | <0.001 HS |
| Inadequately done | 46 | 95.8 | 11 | 22.9 | | |
| Adequately done | 0 | 0.0 | 37 | 77.1 | | |
| Uterine contractions and lochia assessment | | | | | | |
| Not done | | | | | 36.75 | <0.001 HS |
| Inadequately done | 5 | 10.4 | 2 | 4.2 | | |
| Adequately done | 41 | 85.4 | 16 | 33.3 | | |
| | 2 | 4.2 | 30 | 62.5 | | |
| Women's emotional and psychological condition assessment: | | | | | | |
| Not done | 40 | 83.3 | 5 | 10.4 | 58.59 | <0.001 HS |
| Inadequately done | 7 | 14.6 | 9 | 18.8 | | |
| Adequately done | 1 | 2.1 | 34 | 70.8 | | |
| Perineum assessment during the fourth stage: | | | | | | |
| Not done | | | | | 81.22 | <0.001 HS |
| Inadequately done | 46 | 95.8 | 2 | 4.2 | | |
| Adequately done | 2 | 4.2 | 16 | 33.3 | | |
| | 0 | 0.0 | 30 | 62.5 | | |
| Mother-newborn bonding: | | | | | | |
| Not done | 35 | 72.9 | 2 | 4.2 | 50.82 | <0.001 HS |
| Inadequately done | 13 | 27.1 | 34 | 70.8 | | |
| Adequately done | 0 | 0.0 | 12 | 25.0 | | |

Table 7: Maternity nurses' performance of newborn care before and after the intervention (N = 48)

| Newborn care | Time of assessment | | | | χ^2 test | P value |
|-------------------------------------|--------------------|------|-----------|------|---------------|--------------|
| | Pre-test | | Post-test | | | |
| | No. | % | No. | % | | |
| Assessment of newborn | | | | | | |
| Not done | 14 | 29.2 | 0 | 0.0 | 92.11 | <0.001 HS |
| Inadequately done | 34 | 70.8 | 1 | 2.1 | | |
| Adequately done | 0 | 0.0 | 47 | 97.9 | | |
| Suctioning | | | | | | |
| Not done | 0 | 0.0 | 0 | 0.0 | 2.70 | 0.112 NS |
| Inadequately done | 11 | 22.9 | 5 | 10.4 | | |
| Adequately done | 37 | 77.1 | 43 | 89.6 | | |
| Apgar score: | | | | | | |
| Not done | 39 | 81.2 | 3 | 6.3 | 58.30 | <0.001 HS |
| Inadequately done | 6 | 12.5 | 11 | 22.9 | | |
| Adequately done | 3 | 6.3 | 34 | 70.8 | | |
| Cord care: | | | | | | |
| Not done | 0 | 0.0 | 0 | 0.0 | 1.04 | 0.307 NS |
| Inadequately done | 3 | 6.3 | 1 | 2.1 | | |
| Adequately done | 45 | 93.7 | 47 | 97.9 | | |
| Eye care | | | | | | |
| Not done | 38 | 79.1 | 6 | 12.5 | 46.20 | <0.001 HS |
| Inadequately done | 7 | 14.6 | 13 | 27.1 | | |
| Adequately done | 3 | 6.3 | 29 | 60.4 | | |
| Anthropometric measurements: | | | | | | |
| Not done | 36 | 75.0 | 3 | 6.3 | 54.10 | <0.001 HS |
| Inadequately done | 9 | 18.7 | 11 | 22.9 | | |
| Adequately done | 3 | 6.3 | 34 | 70.8 | | |
| Body temperature: | | | | | | |
| Not done | 48 | 100 | 2 | 4.2 | 88.32 | <0.001 HS |
| Inadequately done | 0 | 0.0 | 11 | 22.9 | | |
| Adequately done | 0 | 0.0 | 35 | 72.9 | | |
| Vitamin K administration: | | | | | | |
| Not done | 0 | 0.0 | 0 | 0.0 | — | — |
| Inadequately done | 0 | 0.0 | 0 | 0.0 | | |
| Adequately done | 48 | 100 | 48 | 100 | | |
| Identification: | | | | | | |
| Not done | 0 | 0.0 | 0 | 0.0 | — | — |
| Inadequately done | 0 | 0.0 | 0 | 0.0 | | |
| Adequately done | 48 | 100 | 48 | 100 | | |
| Performance Level: | | | | | | |
| Competent ($\geq 70\%$) | 9 | 18.7 | 41 | 85.4 | 30.49 | <0.001 HS |
| Incompetent ($< 70\%$) | 39 | 81.3 | 7 | 14.6 | | |

Figure 2: Maternity nurses' total performance scores for intrapartum nursing management, based on mind-mapping before and after an intervention.

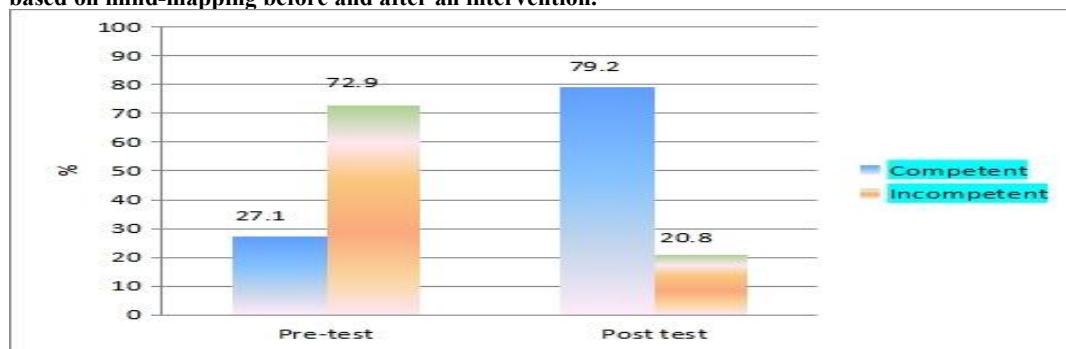
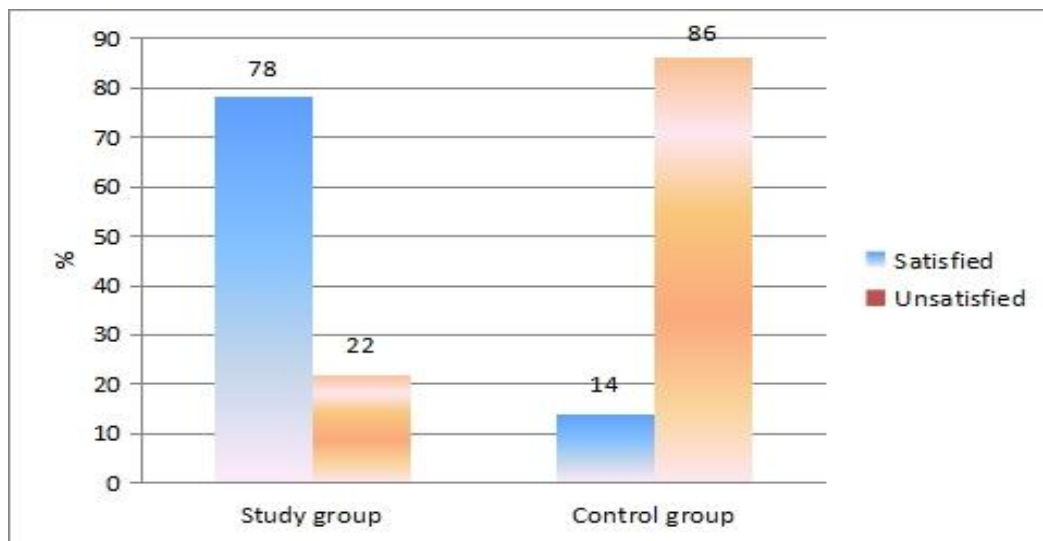


Table 8: Comparison between case and control groups regarding maternal satisfaction about interpersonal care (N = 100)

| Maternal satisfaction about nurses' interpersonal care | Time of assessment | | | | χ^2 test | P value |
|---|--------------------|------|---------------|------|---------------|--------------|
| | Case group | | Control group | | | |
| | No. | % | No. | % | | |
| Staff were friendly and welcoming | | | | | | |
| Strongly disagree | 0 | 0.0 | 0 | 0.0 | 25.28 | <0.001 HS |
| Disagree | 3 | 6.0 | 9 | 18.0 | | |
| Neutral | 12 | 24.0 | 31 | 62.0 | | |
| Agree | 28 | 56.0 | 8 | 16.0 | | |
| Strongly agree | 7 | 14.0 | 2 | 4.0 | | |
| Doctors and nurses were encouraging and reassuring | | | | | | |
| Strongly disagree | 2 | 4.0 | 6 | 12.0 | 42.33 | <0.001 HS |
| Disagree | 4 | 8.0 | 30 | 60.0 | | |
| Neutral | 13 | 26.0 | 8 | 16.0 | | |
| Agree | 17 | 34.0 | 6 | 12.0 | | |
| Strongly agree | 14 | 28.0 | 0 | 0.0 | | |
| During labour, nurses were helpful | | | | | | |
| Strongly disagree | 3 | 6.0 | 9 | 18.0 | 41.93 | <0.001 HS |
| Disagree | 2 | 4.0 | 5 | 10.0 | | |
| Neutral | 7 | 14.0 | 29 | 58.0 | | |
| Agree | 28 | 56.0 | 2 | 4.0 | | |
| Strongly agree | 10 | 20.0 | 5 | 10.0 | | |
| Overall care during labour was good | | | | | | |
| Strongly disagree | 2 | 4.0 | 5 | 10.0 | 18.42 | <0.001 HS |
| Disagree | 4 | 8.0 | 13 | 26.0 | | |
| Neutral | 7 | 14.0 | 16 | 32.0 | | |
| Agree | 25 | 50.0 | 9 | 18.0 | | |
| Strongly agree | 12 | 24.0 | 7 | 14.0 | | |

Table 9: Comparison between case and control groups regarding maternal satisfaction about information and decision making (N = 100)

| Maternal satisfaction about nurses' information and decision-making | Time of assessment | | | | χ^2 test | P value |
|---|---------------------|------|------------------------|------|---------------|--------------|
| | Case group (N = 50) | | Control group (N = 50) | | | |
| | No. | % | No. | % | | |
| Nurses and doctors were always keeping women informed about what was happening during labor. | | | | | | |
| Strongly disagree | | | | | | |
| Disagree | 6 | 12.0 | 28 | 56.0 | 44.65 | <0.001 HS |
| Neutral | 4 | 8.0 | 9 | 18.0 | | |
| Agree | 7 | 14.0 | 11 | 22.0 | | |
| Strongly agree | 29 | 58.0 | 2 | 4.0 | | |
| | 4 | 8.0 | 0 | 0.0 | | |
| Decisions made without taking the woman's wishes into account: | | | | | | |
| Strongly disagree | 0 | 0.0 | 31 | 62.0 | 59.89 | <0.001 HS |
| Disagree | 3 | 6.0 | 9 | 18.0 | | |
| Neutral | 12 | 24.0 | 0 | 0 | | |
| Agree | 28 | 56.0 | 8 | 16.0 | | |
| Strongly agree | 7 | 14.0 | 2 | 4.0 | | |
| Feeling pressed to have a baby soon: | | | | | | |
| Strongly disagree | 33 | 66.0 | 16 | 32.0 | 11.60 | 0.003 S |
| Disagree | 10 | 20.0 | 21 | 42.0 | | |
| Neutral | 7 | 14.0 | 13 | 26.0 | | |
| Agree | 0 | 0.0 | 0 | 0.0 | | |
| Strongly agree | 0 | 0.0 | 0 | 0.0 | | |
| Feeling like labor was taken over by strangers and / or machines: | | | | | | |
| Strongly disagree | 18 | 36.0 | 17 | 34.0 | 12.88 | 0.021 S |
| Disagree | 32 | 64.0 | 22 | 44.0 | | |
| Neutral | 0 | 0.0 | 5 | 10.0 | | |
| Agree | 0 | 0.0 | 4 | 8.0 | | |
| Strongly agree | 0 | 0.0 | 2 | 4.0 | | |

Figure 3: A comparison between the case and control groups regarding their satisfaction regarding intrapartum nursing management

Discussion

This study looked at how mind mapping affected how competent nurses performed and how satisfied mothers were with their intrapartum nursing care. The nurses in the labor unit were chosen for this study because they work directly with women who are giving birth. The nurses' familiarity with mind maps was one of the study's key findings. The findings in this study revealed that there was a statistically significant improvement in nurses' knowledge of mind mapping after the intervention when compared to before. From the researchers' point of view, this could be attributed to the idea that nurses didn't receive previous training about mind-mapping or diagramming intrapartum nursing management based on a mind-map. Moreover, nurses had no opportunity to expand their knowledge about such areas through ongoing education, such as reading journal articles or attending seminars.

In a comparable way, **Ahmed et al (2018)** studied the "efficacy of mind mapping as a genomic learning tool to revolutionize nursing thinking" among nursing students at the Technical Institute of Nursing, Mansoura University, Egypt. They found that after intervention and mind mapping training, the studied group's knowledge had improved. **Elasrag and Elsabagh (2020)** investigated "the effect of mind mapping on critical thinking skills among first-year nursing students at Menoufia University's Faculty of Nursing" and found similar improvements.

This result was like to what **Ibeid et al (2021)** found when they studied "assessment of knowledge and performance regarding infection control among nurses at obstetric and gynecological departments at Menoufia University Hospital." They found that the nurses' knowledge was statistically different before and after the intervention. To support the use of mind-mapping as a teaching strategy, **Bayumi et al (2022)** examined "the effectiveness of the mind-mapping strategy on nurses' knowledge and practice regarding infection control measures in the operating room" at Beni-Suef University Hospital. They found that there was a highly statistically

significant difference and improvement between the pre- and post-test results of the nurses' knowledge of infection control measures. A result that supports the use of mind-mapping in enforcing practices.

When comparing how well the nurses did before the intervention to how well they did after, there was a statistically significant improvement. Following the training, the nurses' mind-mapping-based intrapartum nursing management techniques significantly improved. This result is in line with a wide range of other research that has examined the effectiveness of mind mapping for nurses. **Ibrahim and Abdel-Menim (2016)**, who investigated "how to improve maternity nurses' performance regarding prevention and control of postpartum hemorrhage at Benha Teaching Hospital," agreed with the current study findings. They used mind-mapping as a foundation for care, and there were highly statistically significant differences between pre- and post-intervention in relation to nurses' practices during the fourth stage of labor.

In support of this finding, **Ahmed et al (2018)** found that there was a highly statistically significant improvement in the total performance score of nurses following intervention compared with the baseline total score. They studied applying standards for nursing care to improve the quality of nursing performance at labor among nurses at Minia Hospitals based on mind mapping. In a related line, **Ibeid et al (2021)** study, "Assessment of Knowledge and Performance Regarding Infection Control Using Mind Map Among Nurses at Obstetric and Gynecological Departments at Menoufia University Hospital," revealed that the nurses' performance had improved from the pre-intervention stage to the post-intervention stage. In order to determine the impact of a mind-mapping strategy on nurses' knowledge and practice of infection control measures in the operating room, **Bayumi et al (2022)** conducted a study at Beni-Suef University Hospital. They then published their findings, which revealed a highly statistically significant improvement when comparing the pretest and the posttest regarding nurses'

practice of infection control measures after using the mind-mapping approach.

On the other side, this result was contradicted with **Abd-Elhakam and Salama's (2018)** study of how well maternity nurses at Benha University Hospital handled a woman with heart disease during childbirth and how they used mind-mapping found that there was no statistically significant difference between the mean scores before and after the intervention. The contradiction can be rationalized by the sample difference, as the aforementioned study nurses previously received a series of training sessions about intrapartum management based on mind-mapping, so the pre-test score was already high, while the current study sample didn't receive any previous training or teaching about managing laboring women based on mind-mapping.

Laboring women's data were generated by comparing case and control groups. Maternal satisfaction about nurses' interpersonal care was found to be highly statistically different between the case and the control groups; this reflects the effectiveness of the study intervention. This result matched that of **Khammamy et al (2017)** study, "Mind-mapping and intrapartum care satisfaction at government hospitals in Xieng Khuang Province under the maternal and child health strategy in Lao," which found that women who had just given birth were incredibly happy with the personal care they got from nurses.

Abdelati et al (2019), who used mind-mapping and other techniques at a hospital connected to Mansoura University to study how women were satisfied with their cesarean deliveries and how good the nursing care was, supported the current finding and came to the same conclusion. This finding may be strengthened also by that of **Elagamy et al (2020)** study on how maternity nurses' performance affects women's satisfaction during childbirth at Tanta University Hospital found that there was a statistically significant difference between the case and control groups when it came to mothers' satisfaction with interpersonal care a finding that supports the use

of different modalities such as mind-mapping to endorse correct nursing practices.

In a similar line, **Chalise et al (2021)** found that women were more satisfied with the interpersonal care provided by nurses when they evaluated the effectiveness of labor and delivery services based on mind-mapping and the effect on maternal satisfaction at a tertiary hospital.

In contrast to this finding, **Mohammed et al (2014)** study titled "Women's satisfaction with hospital-based intrapartum care: A Jordanian study" reported that nurses' interpersonal care was unsatisfactory to women. The contradiction may be due to the language barrier, as the aforementioned study's nurses were not-Arabic speakers, which blocks the communication channel and affects satisfaction with nurses' interpersonal care.

Another parameter that can reflect the efficacy of intrapartum nursing management based on mind-mapping is maternal satisfaction with nurses' information and decision making. This point was found to be statistically significant when compared to the control group. In the same line with the current study, **Akca et al (2017)** investigated the impact of a mind-mapping-based training program on childbirth satisfaction at a tertiary training hospital in South Africa and discovered that women's satisfaction with their childbirth experiences was improved in relation to nurses' information and decision-making by enabling them to communicate with healthcare providers more effectively and to participate in decision-making during labor in the case group when compared to the control group.

In contrast to the current finding, a study by **Mohammad et al (2014)** titled "Women's satisfaction with hospital-based intrapartum care: A Jordanian study" discovered that the studied women were dissatisfied with the information and choices made by the nurses while providing intrapartum care. The contrast may be due to the language barrier, as the aforementioned study's nurses were non-Arabic speakers, which stands as a barrier against maternal satisfaction towards intrapartum care in general.

The physical birth may be a parameter that can't be totally controlled by nurses alone, as it includes infrastructures, supplies, and many other things irrelevant to nurses' modulation. Despite being out of the nurses' control, there was a highly statistically significant difference in the case group as compared to the control one. This result is seen as an outcome of the case group's total satisfaction with general intrapartum care based on mind mapping.

This result is comparable to that of **Atiya (2016)**, who, in a study titled "Maternal Satisfaction regarding the Quality of Nursing Care during Labor and Delivery," conducted in Sulaimani Teaching Hospital, reported the same satisfaction regarding the physical environment because of overall satisfaction. Additionally, the result is in line with **Meiranny et al (2021)**, who investigated how labor environmental settings affected mothers' comfort and satisfaction with nursing management at Bidan Praktik Mandiri West Bandung Regency and Cimahi. They found that there was an impact of labour environmental settings on maternal comfort and satisfaction as a result of general satisfaction about labour experience, and mothers in the control group have a higher risk of feeling dissatisfied. Overall, women's satisfaction with intrapartum care was found to be highly statistically different among case group participants compared to control ones. The finding was strong evidence supporting the effectiveness of intrapartum nursing management given to laboring women in the case group. This finding was supported by **Akca et al (2017)** study of the impact of a mind-mapping-based preparation program on childbirth satisfaction at a tertiary training hospital in South Africa which found that there was an increase in satisfaction with the childbirth experience following the intervention, which lends support to this conclusion. Congruent with the current study, the one conducted by **Floris et al (2018)**'s at the Geneva University Hospitals, "Comprehensive Maternity Support and Shared Care Based on Mind-Mapping in Switzerland: Comparison of Levels of Satisfaction," women in the case group reported higher levels of satisfaction with intrapartum care than women who received regular care (the control group).

Conclusion: The results of the current study showed that the maternity nurses knew more about mind mapping after the intervention than they did before the intervention; based on this finding, the first study hypothesis can be accepted. Moreover, compared to before the intervention, the maternity nurses were able to handle intrapartum nursing management competently with the help of mind mapping, so the second study hypothesis could be accepted. In addition, intrapartum women who got nursing care based on mind mapping expressed more satisfaction with it than those in the control group who got routine nursing care, this is supporting the third hypothesis. Because of this, the results of this study did not support the null hypothesis, but they did support the study hypotheses.

Recommendations: There should be training programs for maternity nurses about intrapartum care that use similar teaching modalities to improve nurses' performance during intrapartum care and, in turn, increase women's satisfaction. Moreover, more research should be done on a larger population to allow the results to be generalized.

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