

The Impact of the Jigsaw Learning Strategy on the Proficiency of Nursing Students regarding the Second Stage of Labour

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Abstract

Background: Jigsaw strategy gives students equal opportunities to ponder and solve problems while also fostering peer support, critical thinking, and cohort dynamics. **Aim of the study:** to evaluate effect of Jigsaw learning strategy on the proficiency of nursing students regarding the second stage of Labour.. **Setting:** The study was conducted at faculty of Nursing Benha University **Research design:** The investigation was carried out using a quasi-experimental design. **Sample:** Eighty nursing students made up the systematic random sample, which was split evenly into two cohorts: the control cohort and the study cohort. **Tools of data collection:** Three tools were used: **Tool (I):** A structured self- administrated questionnaire: **part one:** General characteristics of the nursing students. **Part two:** Student's knowledge assessment questionnaire. **Tool (II):** Observational checklist. **Tool (III):** Cooperative Jigsaw opinion sheet. **Results:** The current study's findings showed that the study cohort's mean theoretical and practical achievement scores were significantly higher than those of the control cohort following the use of the Jigsaw learning approach ($P < 0.05$). Additionally, over 75% of the study cohort expressed satisfaction with the Jigsaw learning method. **Conclusion:** The Jigsaw learning method was significantly more effective in improving theoretical and practical achievement of nursing students regarding the second stage of labour. **Recommendations:** Creating periodical awareness program for nursing students to improve their theoretical and practical understanding of the second stage of labor through the use of the jigsaw learning approach.

Keywords: Jigsaw Learning strategy, Nursing students, Proficiency, Second Stage of Labour.

Introduction

A crucial time in obstetric treatment is the second stage of labor, which lasts from full cervical dilatation to the baby's arrival. To ensure the safety of mothers and newborns, nursing students must have not only theoretical knowledge but also practical skills and critical thinking. Despite being fundamental, traditional lecture-based teaching approaches frequently fall short of actively involving students or developing the teamwork skills necessary for successful clinical practice (Johnson & Ramirez, 2024).

Lectures and other traditional didactic methods have long been the mainstay of nursing education. These approaches, however, frequently place a strong emphasis on passive learning, in which pupils absorb knowledge without actively participating. The development of critical thinking, problem-solving, and teamwork skills all necessary for successful

clinical practice may be hampered by this passive approach. Students may therefore find it difficult to apply their theoretical knowledge in dynamic clinical settings (Smith & Lee, 2023).

Active learning solutions have been created to encourage deeper involvement and knowledge in response to the shortcomings of traditional teaching approaches. Through tasks that call for analysis, synthesis, and evaluation, these tactics empower students to take ownership of their education. Active learning improves retention, encourages critical thinking, and gets students ready for real-world clinical situations. Additionally, it fosters critical abilities like problem-solving, cooperation, and communication all of which are necessary for efficient nursing practice. These approaches improve overall competency by actively integrating students and bridging the gap between theory and clinical application (Nurse-Clarke et al., 2022).

The Jigsaw learning method is one example of an active learning strategy. This cooperative learning strategy involves breaking students into small cohorts, each responsible for mastering a piece of the topic and subsequently teaching it to their classmates. Through peer education and cooperative problem-solving, this approach fosters greater comprehension, accountability, and active involvement. Additionally, it develops pupils' interdependence and communication abilities (Abobaker *et al.*, 2023).

The Jigsaw method significantly improves a number of educational outcomes for nursing students, according to empirical research. In particular, it has been linked to improved academic achievement since students who actively and cooperatively engage with material are more likely to remember and comprehend it. Apart from improving academic performance, the approach has been shown to have a favorable effect on critical thinking and communication skills, which are necessary for clinical decision-making and interdisciplinary healthcare teamwork (Luechai & Piyarak, 2025; Lin *et al.*, 2025).

Additionally, the Jigsaw method helps children develop their emotive qualities. According to research, students who participate in Jigsaw-based activities frequently report feeling more motivated, confident, and having more positive views about the classroom (Rehman *et al.*, 2024). These emotional advantages are especially important in nursing education since moving from the classroom to actual clinical practice requires self-assurance and a proactive mindset.

Promising outcomes have been shown when the Jigsaw learning technique is used in maternity nursing education. According to studies, this method increases students' self-confidence, theoretical achievement, and comprehension of typical labor topics. The Jigsaw method is a useful teaching tool in obstetric care because of its collaborative aspect, which fits in well with the teamwork needed in this field (Kang & Lee, 2023; Martinez & Lopez).

Although the Jigsaw learning technique has been shown to be beneficial in a number of

nursing disciplines, little research has been done on how well nursing students manage the second stage of labor. Examining instructional strategies that can improve students' readiness and performance in this area is essential given the intricacy and importance of this clinical phase. Closing this disparity could result in better teaching methods and, eventually, better outcomes for mothers and newborns (Chen & Park, 2024).

Given its crucial significance in deciding the health and wellbeing of both the mother and the newborn, nursing students must be proficient in managing the second stage of labor. This period, which is marked by the baby's descent and delivery, entails intricate physiological changes that call for a thorough comprehension of the reactions of both the mother and the fetus. Nursing students need to be proficient in identifying potential issues such fetal distress, extended labor, or mother weariness, as well as the symptoms of development. Timely and appropriate clinical treatments, including as monitoring vital signs, assisting mother pushing attempts, and getting ready for emergency neonatal care, are also necessary for effective management (Smith & Nguyen, 2023).

Additionally, in order to work effectively with obstetricians, midwives, anesthetists, and pediatric professionals, nursing students must acquire strong communication and teamwork skills due to the dynamic and high-pressure nature of this phase. Nursing students can make a substantial contribution to lowering unfavorable outcomes and guaranteeing a secure, satisfying delivery experience for mothers and their newborn by improving their competency in these areas. Therefore, a crucial part of nursing education in maternal health is developing these competences through evidence-based teaching methodologies (Johnson & Lee, 2020).

There are a number of advantages to teaching the second stage of labor using the Jigsaw learning approach. It stimulates critical thinking, active engagement, and cohort learning. The Jigsaw method helps improve students' comprehension and retention of difficult ideas by including them in the educational process. This can result in increased

clinical competencies and confidence in handling the second stage of labor (*Abobaker et al., 2023*).

Significance of the Study

This study is important because it tackles a crucial aspect of nursing education in Egypt: teaching nursing students how to effectively manage the second stage of labor, a crucial stage of childbirth that necessitates accurate information and clinical skills. Nursing personnel must be proficient in this area since improper management of the second stage of labor increases risks for both the mother and the newborn (*Smith & Brown, 2020*).

By encouraging active participation, teamwork, and deeper comprehension among nursing students, the Jigsaw learning strategy a cooperative and student-centered teaching approach has the potential to improve learning outcomes. This approach might offer a creative alternative to the conventional didactic teaching techniques, which might not adequately give students the confidence and practical abilities needed in clinical settings. As each student becomes an essential part of the cohort's learning process, it also cultivates a sense of responsibility. Furthermore, the method's interactive features improve critical thinking and communication, two crucial skills in clinical decision-making. (*Ozkan, & Uslusoy, 2024*).

The results will offer insightful information about how well interactive and collaborative learning strategies enhance nursing competencies. Improving maternal and neonatal outcomes through the use of such tactics can help nursing students become more proficient, which will assist healthcare objectives and efforts to lower maternal and newborn morbidity and death (*Alharbi et al., 2024*).

Additionally, the study's findings can help legislators and nursing educators implement evidence-based teaching strategies, which will ultimately produce a more capable and self-assured nursing workforce equipped to handle the difficulties of maternity care.

Purpose: This study aims to evaluate effect of Jigsaw Learning Strategy on the Proficiency of

Nursing Students regarding the Second Stage of Labour.

Research Hypotheses:

H1: The Nursing students who will use the Jigsaw cooperative learning strategy will perform better both theoretically and practically regarding second stage of labour than those in the control (lecture) group.

H2: The Nursing students who will use the Jigsaw cooperative learning strategy will have satisfactory opinions regarding second stage of labor.

Operational Definitions:

- A cooperative learning technique called the Jigsaw Learning Method asks cohorts of students to become "experts" on various facets of a subject before sharing what they have learned with their peers. Jigsaw also allows each student in a "basic" cohort to focus on a particular facet of a subject. Once they have mastered the handout, students return to the "basic" cohort and instruct the other members of their cohort after meeting with members of other cohorts that have been assigned the same feature. Using this method, every student in the "basic" cohort is a piece of the topic's puzzle, and when they collaborate as a cohort, they build the entire jigsaw puzzle.

Subjects and method:

Research design: To achieve this goal, a two-cohort quasi-experimental design (study and control) was used. Quasi is a prefix that implies "similar." Therefore, research that mimics experimental research but is not actual experimental research is known as quasi-experimental research (*Nianogo et al., 2023*). Participants are not randomly assigned to conditions or orders of conditions despite the manipulation of the independent variable.

Setting: This study was carried out at the Faculty of Nursing, Benha University.. Throughout the Obstetrics and Gynecology Nursing Course.

Sampling: From the aforementioned study context, a systematic random sample was

employed through choosing every 5th of the nursing students from (400) who were enrolled in the second semester of the third academic year (2024-2025) The current study involved 80 nursing students.

-Cohorts students attended the first half for the names list of the control (lecture) cohort (n = 40 students) who learn about the second stage of labor using the conventional method, while students attended the second half for the names list of the study (Jigsaw) cohort (n = 40 students) who learn about the second stage of labor using the cooperative Jigsaw method.

-Instruments: Three instruments were used for data collection:

Instrument (I): A structured self-administered questionnaire:

It was included the following two parts:

Part (1): General characteristics of nursing students. Four items were included: age, gender, marital status, and place of residence.

Part (2): Student's knowledge assessment questionnaire: After examining relevant literature, the researchers created it (*Bhandari et al., 2017; Ameiratrini et al., 2019; Aronson, 2019*). to evaluate nursing students' understanding of the second stage of labor. It was written in English and consisted of closed-ended questions designed to evaluate nursing students' theoretical understanding of the second stage of labor. There were 17 multiple-choice questions total, split into two sections: -

Section (1): - Knowledge regarding second stage of labor, which comprised nine multiple-choice questions like "definition of labor, definition of the second stage of labor, duration of the second stage of labor in primipara, duration of the second stage of labor in multipara, signs of the second stage of labor, mechanism of normal labor, proper position during labor, definition of crowning, and outcome of the second stage of labor.

Section (2): - Eight multiple-choice questions about episiotomy were included in the

knowledge section. These questions covered topics like the definition of episiotomy, fetal indications, maternal indications of episiotomy, contraindications of episiotomy, the best time for anesthesia, the best time for episiotomy, the type of surgical suture for perineal muscle repair after episiotomy, and the type of surgical suture for perineal skin repair after episiotomy.

Scoring system:

Every question received a score of (2) if the response was correct and (1) if it was incorrect or I don't know. The sum of the scores from each question was used to determine the student's overall knowledge evaluation score, which varied from 1 to 34. The following categories applied to the student's overall knowledge assessment score:

Adequate knowledge: $\geq 75\%$ of total score (25-34).

- Inadequate knowledge: $< 75\%$ of total score (1-24).

Instrument (II): Observational Checklist for the Second Stage of Labour

This instrument was created to evaluate the clinical performance of nursing students regarding second stage of labor. It covers important topics like planning, communicating, evaluating, helping during delivery, and providing immediate postpartum care. Current obstetric and midwifery standards and recommendations serve as the foundation for the checklist (*WHO, 2018; Oermann et al., 2019*). The sixteen items in the checklist are categorized into five primary domains: Preparation and Environment (3 items) evaluate privacy, hand hygiene, and student preparedness. Three questions in the Communication and Support category assess how students engage with and assist the laboring lady. Monitoring and Assessment (3 items) evaluates students' capacity to keep an eye on the health of mothers and fetuses. Assisting the Birth (4 items) assesses appropriate methods for delivery and crowning. Monitoring for problems and newborn care are included in the three items of immediate post-birth care.

Scoring System:

A 2-point rating system was used for each of the checklist's 16 items: 2 points were awarded for a correctly completed action and 1 point for an incorrectly completed or omitted action. The overall score is between 16 and 32. Performance was divided into two categories for analytical purposes: unsatisfactory performance (scores from 16 to 23, representing <75%) and satisfactory performance (scores from 24 to 32, representing $\geq 75\%$ of total score).

Instrument (III): Cooperative Jigsaw Opinion sheet:

It was adopted from *Abd El Aliem et al., (2019)* to assess the opinions of the study cohort regarding the Jigsaw learning strategy at the end of the study. It contained fourteen statements: (made the course material easy for students to understand; ensured that students' misinformation was corrected; made students learn better; increased the likelihood that the teacher would be interested in each student; lessened the students' reliance on the teacher; improved communication skills and self-confidence; improved teamwork cooperation; everyone in the cohort shared responsibility; improved critical thinking and decision making skills; facilitated applying knowledge into clinical practice; innovative teaching-learning method; overall students satisfied with learning method; and applied Jigsaw strategy as a learning method in nursing courses (theory and practice).

Scoring system:

A three-point Likert scale was used to rate each item; a score of three indicated agreement, a score of two indicated neutrality, and a score of one indicated disagreement. The total scores, which varied from 1 to 42, were determined by adding the total scores of each item; a greater score denoted agreement. The overall score was categorized as follows:

- Satisfied: $\geq 75\%$ of total score.
- Unsatisfied: < 75 % of total score.

Validity

The data collection instruments were shown to a panel of three obstetrics and gynecology nursing specialists in order to verify their validity. The board's comments about the sentences' clarity and the content's appropriateness led to changes.

Reliability:

Cronbach's Alpha test was used to assess the instrument's reliability, and the results showed that the tools' characteristics are consistent.

Ethical considerations:

Before the study began, the Scientific Research Ethical Committee of Faculty of Nursing Benha University granted approval that code is: REC-OBSN-P55. Additionally, official permission to carry out the study was acquired from the chosen research sites. The goal and advantages of the research were explained to each student prior to the interviews and during the research time. Before the data collection process started, each student gave their oral consent. The pupils received assurances that their information would be kept private and used only for study. They were allowed to leave the study at any moment without fearing any repercussions, and their autonomy and integrity were protected.

Pilot Study:

A pilot study was carried out on 10% of the entire sample size, or 8 students. in order to evaluate the usefulness and applicability of the research tools and calculate the time needed to finish them. The students that took part in the pilot study were also included in the full sample because no changes were made to the instruments.

Field work:

-The study was carried out for three months, starting in middle of February 2025 to the middle of May 2025, in order to apply a Jigsaw learning strategy.

-According to the third-year students' academic schedule table, the researchers visited the aforementioned location twice a week, on Saturday and Monday, from 9 a.m. to 2 p.m.

-Preparation, interviewing and assessment, planning, implementation, and

evaluation were the stages in which the study was conducted.

Preparatory phase

It was the initial stage of the research and involved an examination of the related local, national, and international literature. Additionally, utilizing books, papers, periodicals, magazines, and the internet to help the process of building tools for data collection, theoretical knowledge about many parts of the study is used. The researcher reviewed numerous reviews of the literature on the Jigsaw learning strategy in addition to teaching and training in it. Lastly, a pilot study was carried out by the researchers to assess the tools' content validity.

Interviewing and Assessment phase (Pretest):

-In order to gather basic data, the researchers introduced themselves, greeted the students, conducted interviews with each student, explained the study's goal, and obtained their oral agreement to participate.

-To evaluate the general characteristics of the nursing students, the researchers provided a structured self-administered questionnaire (tool I-part 1). In order to gauge the nursing students' theoretical proficiency with reference to the second stage of labor, the researchers gave them a knowledge assessment questionnaire (tool I-part 2 pre-posttest). Lastly, the researchers employed observational checklists (tool II-pre posttest) to evaluate the nursing students' practical performance with reference to the second stage of labor, and the tools were gathered at the end of the day.

Planning phase:

-For the control cohort, the conventional method of teaching "Lectures" was created. Students were given a "handout" with theoretical content created by researchers.

-It began with gathering all the data pertaining to the Jigsaw strategy's concept, goal, and method. The goals of the study participants in relation to the second stage of labor were established by the researchers.

-The study materials and resources were then created using current textbooks, research articles, websites, references, and magazines.

-Students were given a "handout" with theoretical content created by researchers. Both cohorts received lectures that were tailored to them.

-The number and substance of the session were decided based on the findings of the pretest evaluation of students' knowledge and experience about the second stage of labor.

Implementation phase:

-In order to prevent sample contamination, the researchers began the trial with the control cohort.

-The control cohort was instructed using the conventional manner (lecture).

-According to theoretical accomplishment, for the study cohort (Jigsaw cohort):

-As a result, the researchers conducted the study over the course of four sessions (two sessions per week):

Session 1: (orientation Session):

-Prior to beginning the second stage of labor, the study cohort participated in a two-hour orientation session where they learned how to use the Jigsaw model as a teaching tool.

-First, the researcher used PowerPoint presentations to give the students a thorough explanation of the Jigsaw as a learning approach, including its idea, goals, procedures, and advantages.

-Additionally, the researchers gave students an illustrated handout outlining the Jigsaw technique. The students were then split up into four cohorts by the researcher, with ten students in each cohort. The "Jigsaw cohorts" were these.

-Each cohort was given a student team leader. Facilitating cohort conversations and sharing was the role of a team leader.

-Ten distinct subtopics were covered in the lectures on the second stage of labor, including the following: definition of labor and normal labor, stages of labor, definition and

timing of the second stage, diagnosis of the second stage of labor, evaluation of uterine contraction, mechanism of the second stage, signs of maternal distress, signs of fetal distress, complications, and episiotomy.

-Each student in the Jigsaw cohort was given a card with their assigned subtopic and some leading questions to assist them learn more about the subject.

-The students assigned to the same subtopics in each of the four Jigsaw cohorts then came together to form "expert cohorts."

-The subtopics for the expert cohort discussion in the following session were to be prepared by the students. Researchers gave the study cohort the same handout about the second stage of labor as was given to the control cohort.

-Additionally, the researchers recommended resources (textbooks, research articles, and websites) to guide and assist students with topic preparation.

-The cohorts were told to read thoroughly, prepare the topic thoroughly, and read more than what was provided.

-Before the students began discussing the supplied subtopics in front of cohorts, the researcher made sure that all of the information was correct and could be clarified.

Session 2: (Expert cohorts discussion):

-The cohort of experts collaborated and discussed many subjects.

-Every student explained what they had learned about the subjects. The others made notes and clarified any questions they had for the researchers.

Session 3: (Jigsaw cohorts discussion):

-The students went back to the Jigsaw cohort to introduce the pupils to the subtopic.

-Lastly, students engaged in cohort discussions to enhance critical thinking, collaboration, communication, and active learning.

-The researchers assisted the entire process while hopping between cohorts.

Session4: (cooperative learning):

-During the last lesson, one student from each "Jigsaw cohort" was chosen at random and requested to teach the class on a specific subject.

-The pupil was allowed to use the board. since every subject might be covered.

-Additionally, students were encouraged to ask questions of the researcher and presenter if they had any inquiries

Evaluation phase (Post test):

In order to examine the impact of the Jigsaw learning approach on nursing students' theoretical and practical achievement with relation to the second stage of labor, the assessment phase was conducted as a posttest using the same instruments as the pretest. Following the study, all students in both cohorts were evaluated for their theoretical and practical accomplishments related to the second stage of labor using tool (I) part two (students' knowledge assessment questionnaire) and tool (II) (observational checklist).

-Lastly, the study cohort's opinions regarding the Jigsaw technique as a learning strategy were evaluated using the cooperative Jigsaw opinion sheet (tool III).

IV. Statistical design:

-Before being entered into a computer, the data was checked. SPSS version 20.0, the Statistical Package for Social Sciences, was utilized. We used descriptive statistics, such as mean, standard deviation, frequency, and percentages. The study hypothesis was tested using a significance test (chi square, Fisher exact test, independent t test, Pearson correlation, and coefficient test).

Results:

Table (1) demonstrates how the analyzed sample was distributed according to general characteristics in both the study and control cohorts; no statistically significant differences were found between the cohorts ($p>0.05$). In terms of age, 62.5% of the study

cohort and 67.5% of the control cohort reported being 19 years old. The study cohort's mean age was 19.52 ± 0.78 years, while the control cohort's was 19.42 ± 0.63 years ($t=0.626$, $p=0.533$). Gender-wise, women made up 57.5% of the study cohort and 67.5% of the control cohort. 85.0% of research participants and 95.0% of control individuals were single. In terms of place of residence, 55.0% of the control cohort and 62.5% of the study cohort were urban dwellers. These findings support the validity of additional comparative study by showing that the two cohorts were demographically comparable.

Table (2) demonstrates that prior to the intervention, all knowledge questions pertaining to the second stage of labor did not differ statistically significantly between the study and control cohorts ($p > 0.05$). However, following the intervention, the study cohort showed significantly higher levels of correct answers than the control cohort in the majority of knowledge areas, including the definition, duration, diagnosis, mechanism, nursing interventions, and complications of the second stage of labor ($p \leq 0.05$). This suggests that the intervention had a beneficial effect on participants' increased knowledge.

Figure 1. demonstrates that prior to the intervention, only 17.5% and 12.5% of participants in the study and control cohorts, respectively, had sufficient knowledge about the second stage of labor. However, the study cohort showed a significant improvement after the intervention, with 90% of them achieving adequate knowledge as opposed to 75% in the control cohort. This demonstrates how the intervention improved participants' levels of knowledge.

Table (3) shows that during the pre-implementation phase, both cohorts performed comparably poorly on the majority of questions relating to the second stage of labor, and there were no statistically significant differences between them ($P > 0.05$). Rather than cohort-specific variation, this consistent pattern across domains—preparation, communication, monitoring, help, and immediate care—highlights a widespread lack of adherence to established therapeutic

practices. The statistics unequivocally show that organized intervention is required to enhance overall performance and guarantee the constant administration of evidence-based care during this crucial phase.

Table (4) shows, with P-values ≤ 0.05 in the majority of categories, a statistically significant improvement in performance across almost all tested items after the implementation period. Both cohorts' participants showed significant improvement, especially in crucial areas like aseptic technique, fetal monitoring, emotional support, and hand hygiene. The intervention had a quantifiable and beneficial effect on clinical practice during the second stage of labor, as seen by the steady increase in accurate performance percentages, which reached over 80% in many domains. These results demonstrate how targeted training can improve adherence to standardized care protocols and raise the standard of care for expectant mothers and newborns.

Figure 2. shows that the study cohort's clinical performance significantly improved after the intervention, with satisfactory performance climbing sharply from 15.0% to 86.7%. The control cohort, on the other hand, experienced a more gradual rise from 17.5% to 67.5%. This striking difference implies that the study cohort's clinical competence was significantly improved by the intervention that was put in place. The study cohort's decline in subpar performance from 85.0% to 13.3% further supports the training's efficacy. The comparatively higher post-implementation unsatisfactory rate (32.5%) in the control cohort highlights the added value of structured educational interventions and suggests that ordinary clinical exposure alone may not be adequate to assure competency.

Table (5): represents the overwhelmingly favorable views that students have of the Jigsaw teaching method. The majority expressed gains in learning experience (97.5%), misperception correction (92.5%), communication skills and self-confidence (95%), and a perfect 100% felt that the course material became easier to understand. Additionally, high percentages showed improved knowledge application in

clinical situations (92.5%), increased teamwork (92.5%), and shared accountability (97.5%). Remarkably, 90% of students said they were generally satisfied with the approach, and 92.5% suggested that it be used in additional theoretical and practical nursing courses. These results demonstrate the Jigsaw strategy's efficacy and acceptability as a cutting-edge and captivating teaching method in nursing education.

Figure (3): explains that only a tiny percentage of the study cohort's pupils (12.5%) showed unhappiness with the Jigsaw learning technique, while a sizable majority (87.5%) expressed satisfaction. This suggests that the strategy is effective as a student-centered teaching approach because of the students' high level of acceptance and favorable view of it.

Table (6) shows that at the pre- and post-implementation stages, there was a statistically significant positive connection ($p = 0.000^{**}$) between the study and control cohorts' total knowledge and total practices scores. Particularly in the study cohort, where the correlation coefficient reached $r = 0.591$ post-implementation compared to $r = 0.489$ pre-implementation, the strength of the association rose following the intervention. With $r = 0.493$ after and $r = 0.431$ before implementation, the correlation was marginally lower in the control cohort. These results demonstrate the Jigsaw learning strategy's efficacy in fostering integrated learning by suggesting that it strengthened the connection between students' knowledge and its practical application.

Table (1): Distribution of the studied sample in both cohorts according to general characteristics (n= 80).

General characteristics	Study cohort n=40		Control cohort n= 40		X2/FET	p-value
	No	%	No	%		
Age in (years)						
19-	25	62.5	27	67.5	4.224 €	0.236
20-	10	25.0	12	30.0		
21-	4	10.0	0	0.0		
22	1	2.5	1	2.5		
Mean ± SD	19.52 ± 0.78		19.42 ± 0.63		t= 0.626	0.533
Gender						
Male	17	42.5	13	32.5	0.853	0.356
Female	23	57.5	27	67.5		
Marital status						
Un married	34	85.0	38	95.0	2.222	0.136
Married	6	15.5	2	5.0		
Residence						
Rural	15	37.5	18	45.0	0.464	0.496
Urban	25	62.5	22	55.0		

Table (2): Distribution of the studied sample in both cohorts according to knowledge regarding the second stage of labour at pre and post implementation (n=80).

Knowledge items	Pre-implementation					Post-implementation				
	Study cohort n=40		Control cohort n=40		X2 p- value	Study cohort n=40		Control cohort n=40		X2 p- value
	No	%	No	%		No	%	No	%	
Definition of the second stage of labour										
Correct answer	6	15.0	9	22.5	0.738	36	90.0	27	67.5	6.05
Incorrect answer	34	85.0	31	77.5	0.390	4	10.0	13	32.5	0.01*
Duration of the second stage of labour										
Correct answer	13	32.5	11	27.5	0.238	38	95.0	31	77.5	5.16
Incorrect answer	27	67.5	29	72.5	0.626	2	5.0	9	22.5	0.02*
Diagnosis of the second stage of labour										
Correct answer	5	12.5	7	17.5	0.392	37	92.5	30	75.0	4.50
Incorrect answer	35	87.5	33	82.5	0.531	3	7.5	10	52.0	0.03*
Mechanism of normal labour										
Correct answer	3	7.5	5	12.5	0.556	35	12.5	27	67.5	4.58
Incorrect answer	37	92.5	35	87.5	0.456	5	87.5	13	32.5	0.03*
Position that is most beneficial for the mother during the second stage of labour										
Correct answer	13	32.5	9	22.5	1.003	39	97.5	36	90.0	1.92
Incorrect answer	27	67.5	31	77.5	0.317	1	2.5	4	10.0	0.166
Factors that can delay the progress of the second stage of labour										
Correct answer	11	27.5	18	45.0	2.650	35	12.5	28	70.0	3.66
Incorrect answer	29	72.5	22	55.0	0.104	5	87.5	12	30.0	0.05*
The most appropriate nursing intervention during the second stage of labour?										
Correct answer	6	15.0	8	20.0	0.346	37	92.5	29	72.5	5.54
Incorrect answer	34	85.0	32	80.0	0.556	3	7.5	11	27.5	0.01*
Definition of crowning										
Correct answer	8	20.0	10	25.0	0.287	38	95.0	35	12.5	1.40
Incorrect answer	32	80.0	30	75.0	0.592	2	5.0	5	87.5	0.235
The role of the nurse when crowning										
Correct answer	9	22.5	7	17.5	0.313	36	90.0	29	72.5	4.02
Incorrect answer	31	77.5	33	82.5	0.576	4	10.0	11	27.5	0.04*
Definition of episiotomy										
Correct answer	10	25.0	9	22.5	0.069	37	92.5	34	85.0	1.127
Incorrect answer	30	75.0	31	77.5	0.793	3	7.5	6	15.0	0.288
Indications of episiotomy										
Correct answer	8	20.0	11	27.5	0.621	35	12.5	27	67.5	4.58
Incorrect answer	32	80.0	29	72.5	0.431	5	87.5	13	32.5	0.03*
A key complication that can arise during the second stage is										
Correct answer	4	10.0	7	17.5	0.949	37	92.5	28	70.0	6.64
Incorrect answer	36	90.0	33	82.5	0.330	3	7.5	12	30.0	0.01*
Outcome of the second stage of labour										
Correct answer	9	22.5	12	30.0	0.581	35	12.5	28	70.0	3.66
Incorrect answer	31	77.5	28	70.0	0.446	5	87.5	12	30.0	0.05*

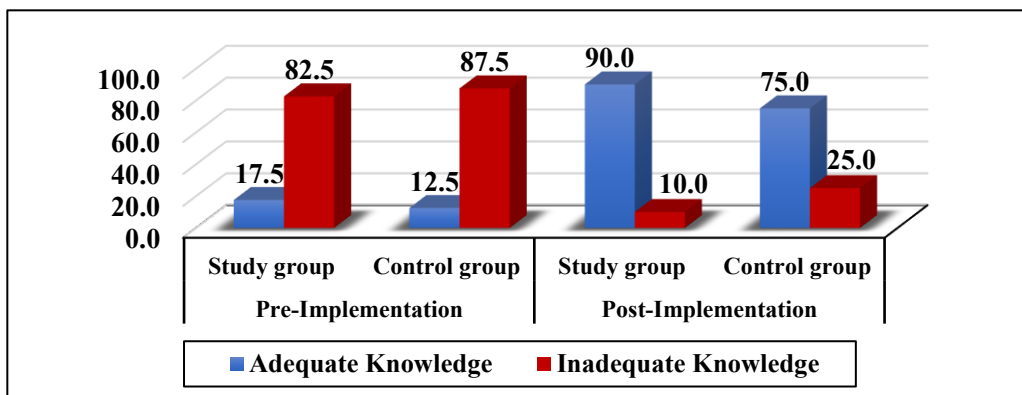
**Figure (1):** Distribution of the studied sample in both cohorts according to total knowledge regarding the second stage of labour at pre and post implementation (n=80).

Table (3): Distribution of the studied sample in both cohorts according to performance regarding the second stage of labour at pre implementation phase (n=80).

Performance Items	Pre-implementation phase (n = 66)								X ² P-value
	Correctly performed		Incorrectly performed		Correctly performed		Incorrectly performed		
	No	%	No	%	No	%	No	%	
Preparation and Environment									
Performed hand hygiene before procedure	6	15.0	34	85.0	10	25.0	30	75.0	1.250 0.264
Ensured privacy for the mother	10	25.0	30	75.0	8	20.0	32	80.0	0.287 0.592
Ensured necessary equipment is ready and functional	4	10.0	36	90.0	6	15.0	34	85.0	0.457 0.499
Communication and Support									
Explained the procedure to the mother	6	15.0	34	85.0	11	27.5	29	72.5	1.867 0.172
Provided emotional support and reassurance	5	12.5	35	87.5	3	7.5	37	92.5	0.556 0.456
Encouraged the mother to adopt a comfortable and effective position	9	22.5	31	77.5	6	15.0	34	85.0	0.738 0.390
Monitoring and Assessment									
Assessed fetal heart rate regularly	5	12.5	35	87.5	4	10.0	36	90.0	0.125 0.723
Monitored uterine contractions	7	17.5	33	82.5	6	15.0	34	85.0	0.092 0.762
Observed for signs of crowning	10	25.0	30	75.0	8	20.0	32	80.0	0.287 0.592
Assisting the Birth									
Guided the mother in effective pushing	8	20.0	32	80.0	11	27.5	29	72.5	0.621 0.431
Applied gentle perineal support	4	10.0	36	90.0	7	17.5	33	82.5	0.949 0.330
Followed aseptic technique throughout	10	25.0	30	75.0	9	22.5	31	77.5	0.069 0.793
Notified the doctor or midwife in time if needed	6	15.0	34	85.0	5	12.5	35	87.5	0.105 0.745
Immediate Post-Birth Care									
Checked for signs of complications (e.g., bleeding)	9	22.5	31	77.5	7	17.5	33	82.5	0.313 0.576
Assisted with newborn care and APGAR scoring	7	17.5	33	82.5	10	25.0	30	75.0	0.672 0.412
Ensured maternal comfort and documented care	5	12.5	35	87.5	8	20.0	32	80.0	0.827 0.363

Table (4): Distribution of the studied sample in both cohorts according to performance regarding the second stage of labour at post implementation phase (n=80).

Performance Items	Post-implementation								X ² P-value
	Correctly performed		Incorrectly performed		Correctly performed		Incorrectly performed		
	No	%	No	%	No	%	No	%	
Preparation and Environment									
Performed hand hygiene before procedure	36	90.0	4	10.0	29	72.5	11	27.5	4.021 0.04*
Ensured privacy for the mother	34	85.0	6	15.0	26	65.0	14	35.0	4.267 0.03*
Ensured necessary equipment is ready and functional	35	87.5	5	12.5	28	70.0	12	30.0	3.660 0.05*
Communication and Support									
Explained the procedure to the mother	32	80.0	8	20.0	24	60.0	16	40.0	3.810 0.05*
Provided emotional support and reassurance	37	92.5	3	7.5	30	75.0	10	25.0	4.501 0.03*
Encouraged the mother to adopt a comfortable and effective position	36	90.0	4	10.0	27	67.5	13	32.5	6.050 0.01*
Monitoring and Assessment									
Assessed fetal heart rate regularly	35	87.5	5	12.5	27	67.5	13	32.5	4.588 0.03*
Monitored uterine contractions	33	82.5	7	17.5	25	62.5	15	37.5	4.013 0.04*
Observed for signs of crowning	31	77.5	9	22.5	23	57.5	17	42.5	3.647 0.05*
Assisting the Birth									
Guided the mother in effective pushing	34	85.0	6	15.0	26	65.0	14	35.0	4.267 0.03*
Applied gentle perineal support	37	92.5	3	7.5	29	72.5	11	27.5	5.541 0.01*
Followed aseptic technique throughout	36	90.0	4	10.0	26	65.0	14	35.0	7.168 0.007*
Notified the doctor or midwife in time if needed	35	87.5	5	12.5	25	62.5	15	37.5	6.667 0.01*
Immediate Post-Birth Care									
Checked for signs of complications (e.g., bleeding)	37	92.5	3	7.5	28	70.0	12	30.0	6.642 0.01*
Assisted with newborn care and APGAR scoring	35	87.5	5	12.5	28	70.0	12	30.0	3.660 0.05*
Ensured maternal comfort and documented care	33	82.5	7	17.5	24	60.0	16	40.0	4.943 0.02*

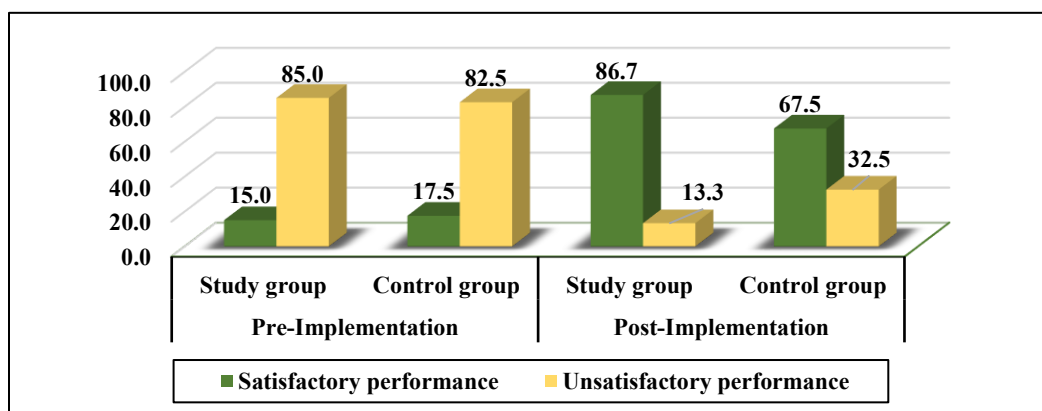
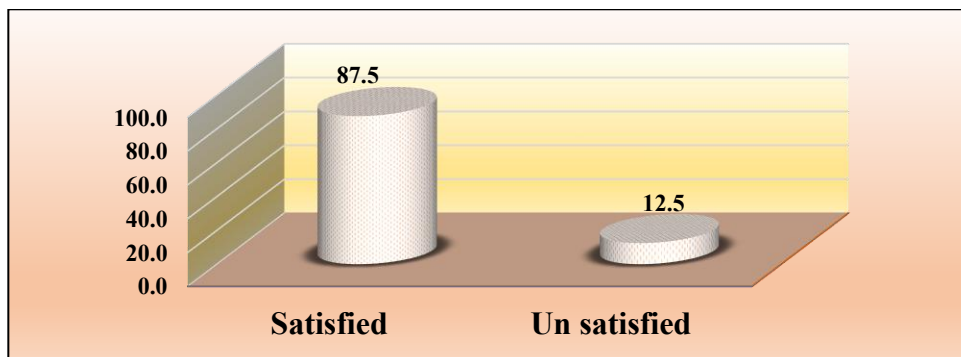
**Figure (2):** Distribution of the studied sample in both cohorts according to total performance regarding the second stage of labour at pre and post implementation (n=80).

Table (5): Distribution of the students in study cohort according to opinions regarding Jigsaw learning strategy (n=40).

Students' opinions	Agree		Neutral		Disagree	
	No	%	No	%	No	%
The course content became easier to comprehend.	40	100.0	0	0.0	0	0.0
It improved the overall learning experience.	39	97.5	1	2.5	0	0.0
It helped correct misconceptions effectively.	37	92.5	3	7.5	0	0.0
It increased the likelihood of teacher engagement with each student.	37	92.5	2	5.0	1	2.5
Students became less dependent on the teacher.	33	82.5	3	7.5	4	10.0
It boosted communication skills and self-confidence.	38	95.0	2	5.0	0	0.0
It strengthened teamwork and collaboration.	37	92.5	2	5.0	1	2.5
Every cohort member took shared responsibility.	39	97.5	1	2.5	0	0.0
Cohort discussions became more constructive and positive.	36	90.0	2	5.0	2	5.0
It enhanced critical thinking and decision-making abilities.	35	87.5	3	7.5	2	5.0
It supported the application of knowledge in clinical settings.	37	92.5	2	5.0	1	2.5
It represented an innovative approach to teaching and learning.	34	85.0	4	10.0	2	5.0
There was overall satisfaction with this teaching strategy.	36	90.0	2	5.0	2	5.0
The Jigsaw method is recommended for use in other nursing courses, both theoretical and practical.	37	92.5	1	2.5	2	5.0

**Figure (3):** Distribution of the students in study cohort according to total opinions regarding Jigsaw learning strategy (n=40).**Table (6):** Correlation coefficient between total knowledge and total practices scores among study and control cohort at pre and post implementation phase (n=80)

Cohorts Variables	Total knowledge score							
	Study cohort n= 40				Control cohort n= 40			
	Pre implementation		Post implementation		Pre implementation		Post implementation	
	r	P-value	r	P-value	r	P-value	r	P-value
Total practices score	0.489	0.000**	0.591	0.000**	0.431	0.000**	0.493	0.000**

Discussion

The fetus is expelled during the second stage of labor, which starts with full cervical dilatation and concludes with full delivery of the fetus. Minutes to hours may pass during the second phase. Usually occurring every two to three minutes, the contractions last 60 to 90 seconds and are palpably forceful (*Cheng and Caughey, 2022*).

It was anticipated that using the Jigsaw learning approach during labor would improve labor outcomes and raise nursing students' levels of satisfaction, confidence, knowledge, and practice. Additionally, the demands of caring for women, which call for a high level of confidence and skill, make nursing a demanding career (*Giacomino et al., 2020*).

The goal of the current study was to evaluate the effect of Jigsaw learning strategy on the proficiency of nursing students regarding the second stage of Labour.

In terms of the general characteristics of the studied sample, the results of this study revealed that over two thirds of the control cohort and over three quarters of the study cohort were in the 19-year-old age cohort, with mean ages of 19.52 ± 0.78 and 19.42 ± 0.63 years, respectively; nearly three quarters of the studied sample were from urban areas; and over half of the studied sample were female. Additionally, there was no discernible change in general characteristics between the study and control cohorts. This is because both male and female students in the study sample had the same curriculum activities and were exposed to the same learning environment and educational possibilities.

This outcome is consistent with a study conducted by *Abd El Aliem et al. (2019)*, which found no statistically significant variations in the sociodemographic features of the cohorts under examination ($P > 0.05$). Furthermore, this outcome is almost identical to that of *Abo Baker and Abdel Rahman (2019)*, who discovered that there was no statistically significant difference between the two cohorts in terms of demographic data, where (P -value >

0.05). Additionally, this outcome is almost identical to that of *EL-Refaie et al. (2023)*, who discovered that almost two thirds of the students under study were female. The majority of the students in the study were single, and there was no discernible difference in sociodemographic traits between the intervention and control cohorts.

Regarding the studied sample's knowledge of the second stage of labor before and after the Jigsaw learning strategy was implemented, the current study's findings showed that there was no statistically significant difference between the study and control cohorts for any of the knowledge items pertaining to the second stage of labor prior to the Jigsaw learning strategy's implementation. ($p > 0.05$). Following the use of the Jigsaw learning technique, all knowledge items pertaining to the second stage of labor showed a statistically significant difference between the study and control cohorts ($P < 0.05$). Additionally, following the use of the Jigsaw learning technique, more than three quarters of the study cohort scored higher on total knowledge related the second stage of labor and episiotomy than more than two thirds of the control cohort.

This outcome might be the result of the Jigsaw learning strategy's beneficial effects, the learning sessions, and the students' straightforward explanations. Thus, during the learning sessions, nursing students showed a great deal of interest and satisfaction.

This outcome is comparable to a study conducted by *Abd El Aliem et al. (2024)*, which found that there was no statistically significant difference between the lecture and Jigsaw cohorts prior to the study (p -value was $P > 0.05$), but that there was a statistically significant difference between the two cohorts right after the study (p -value ≤ 0.05). Additionally, *Ahmed and Mostafa's (2022)* findings, which showed that there was a statistically significant difference in both cohorts' post-tests and no statistically significant difference between the control and study cohorts' theoretical achievement prior to intervention, corroborated the current finding.

Additionally, these findings are consistent with *Wilson et al.'s (2020)* study, which found a statistically significant difference between the pre- and post-test interventions. In comparison to pre-intervention, the majority of maternity nursing students scored well on the Jigsaw technique after the intervention. Additionally, pupils said the approach helped them learn more effectively.

The Jigsaw cooperative learning model is a novel approach to teaching nursing clinical competency that is successful in increasing students' understanding.

According to *Wong's (2020)* findings, the experimental cohort outperformed the control cohort in the knowledge domain. Therefore, the final findings of that peer cohort activity-based learning showed that the Jigsaw technique was more successful for teaching nursing students than the conventional lecture method at the university educational level.

This outcome is also in line with the findings of *Farrag et al. (2022)*, who discovered that the study cohort outperformed the control cohort on the midterm and final maternity nursing in labor exams. However, it was clear that there was a highly significant difference between the two cohorts' knowledge scores on the midterm and final exams. Furthermore, this outcome is consistent with *EL-Refaie et al. (2023)* finding that there were no statistically significant differences in theoretical achievement between the two cohorts prior to intervention. The study cohort received a higher rate of outstanding grades on the immediately posttest exam, despite the fact that there were highly statistically significant discrepancies between the two cohorts' theoretical achievement at the posttest.

Furthermore, this result supports the findings of *Rashed et al.*, who demonstrated that the knowledge score differed significantly between the pre- and post-test results at (p value= <0.001). These outcomes may be similar because students were focused on preparing the lecture material, which encouraged them to think critically, feel more motivated, and readily apply what they learned about maternity care.

However, *Jadhav (2022)* found that adopting cooperative learning Jigsaw did not just improve academic achievement, which contradicts this outcome. Additionally, *Doymus et al. (2023)* discovered that using Jigsaw did not improve learning. This method's inefficiency could be attributed to students' unfamiliarity with it as well as their incapacity to apply contemporary teaching techniques (like Jigsaw).

The goal of nursing students' performance in the second stage was to guarantee the greatest possible outcome for both the mother and the baby. Therefore, the main goals of nursing care should be to build a meaningful, open connection, ascertain the fetal state, assist the woman and her family during labor and delivery, and encourage the woman's self-direction. Additionally, supporting a woman's natural physiological changes and anticipating prompt action in the event of difficulties like postpartum hemorrhage are important aspects of second stage care (*Benfield et al., 2019*).

When it comes to nursing students' performance during the second stage of labor, the results show that there was no statistically significant difference between the study and control cohorts prior to the Jigsaw learning method's implementation. This indicates a general lack of adherence to standard clinical practices in the areas of preparation, communication, monitoring, assistance, and immediate care. ($p > 0.05$). However, following the application of the Jigsaw learning method, there was a statistically significant difference between the study and control cohorts in terms of aseptic technique, hand hygiene, emotional support, and fetal monitoring. ($P < 0.05$). Additionally, the current study's results showed that, in comparison to the majority of the study cohort, less than 10% of the control and study cohorts had satisfactory handling procedures at pre-implementation, and more than two thirds of the control cohorts had satisfactory handling procedures at post-implementation with statistically significant differences. ($P \leq 0.05$).

This outcome can be the consequence of nursing students' enthusiasm for the course and the advantages of the Jigsaw learning approach.

Additionally, the students had the opportunity to experience real-world scenarios during the training sessions, which helped them better understand the clinical responsibilities. As a result, the Jigsaw learning approach would assist students in choosing the appropriate course of action for pregnancy nursing assistance. Additionally, this outcome suggests that the Jigsaw learning technique and ongoing instruction for nursing students are crucial for enhancing second stage labor practices. Additionally, the Jigsaw method works well for changing nursing students from passive to active learners. The students were able to improve their clinical performance because to this active learning approach.

This outcome is consistent with a study by *Karacop and Diken (2024)* titled "The effects of Jigsaw technique based on cooperative learning on prospective science learners' science process skill," which found that the Jigsaw-based laboratory approach had a greater impact on the development of students' scientific process skills than the confirmatory laboratory approach.

The earlier results were also in line with *Walad et al. (2021)* study, "Implementing Jigsaw Type of Cooperative Learning Model to Improve Students' Cognitive, Affective and Psychomotor Domains in Learning Natural Science at Grade IX.1 Smp Negeri 7 Sawahlunto," which found that using the Jigsaw type of cooperative learning model in classroom action research can enhance students' psychomotor domain competencies.

Dhull and Verma (2021), who investigated "Jigsaw Learning Technique for Learning Science" at the University of Rohtak, corroborated these findings and proposed that the Jigsaw method is useful for learning practical parts of science. Additionally, this outcome is comparable to that of a study conducted by *Bagheri et al. (2020)* titled "Evaluating the impact of Jigsaw (Puzzle) cooperative learning model as a new model of education on clinical performance of nursing students." The findings showed that the Jigsaw cooperative learning approach is successful in raising students' proficiency levels.

This outcome is comparable to the study conducted by *El-Refaie et al. (2023)*, which discovered that there was a significant difference between the two cohorts with regard to practical achievements because students' practical achievement scores were higher in the study cohort than in the control cohort at post-evaluation ($p\text{-value} \leq 0.01$).

Regarding students' perceptions of the Jigsaw learning strategy in the study cohort, the findings showed that the great majority of the study cohort agreed that the course material became easier to understand and that there were improvements in the learning experience, including the correction of misconceptions, communication skills, and self-confidence. High percentages also indicated improved teamwork, shared responsibility, and better application of knowledge in clinical settings. Interestingly, the majority of students in the research cohort said they were generally satisfied with this approach and suggested that it be used in other theoretical and practical nursing courses. These results demonstrate the Jigsaw strategy's efficacy and acceptability as a cutting-edge and captivating teaching method in nursing education

According to the study, the Jigsaw method works well for changing nursing students from passive to active learners. Additionally, because cooperative learning strengthened peer relationships, reduced cohort conflict, and increased self-esteem, students participating in cooperative learning cohorts valued cooperative activities. Additionally, students in the cooperative learning cohorts reported feeling less nervous and more eager to learn. Additionally, this tactic reduces tension, worry, and forgetfulness.

This result is consistent with *El-Said, (2019)* study, "Effect of Jigsaw instructional method on pre-Service teacher learning proficiency skills and perceptions toward working in small cohorts," which discovered that students who received instruction in physical education using the Jigsaw cooperative learning strategy were more satisfied with it than those who received instruction using standard or typical learning techniques. Additionally, this result corroborated the

findings of *Tran and Lewis, (2020)* study, "Effects of Cooperative Learning on Students at a Giang University in Vietnam," which found that students who worked in cooperative learning cohorts valued cooperative activities. Additionally, students in the cooperative learning cohorts reported feeling less nervous and more eager to learn.

Additionally, this study is consistent with *Nair et al. 2020* study, "Evaluation of Jigsaw Learning Methodology as An Active Learning Strategy for First Year Indian Students," which found that students using the Jigsaw learning method had improved communication skills, improved student-student interaction, and improved learner interaction. Additionally, *Ibrahiem and Gohar, (2020)* study, "Effect of Jigsaw cooperative learning strategy on obstetric nurses' knowledge and information retention of emergency contraceptive methods," which found that the Jigsaw strategy boosted self-confidence, is consistent with the current findings.

Furthermore, Jigsaw as a cooperative approach improved peer interaction, fostered critical thinking abilities, and encouraged teamwork, according to *Kritpracha et al. (2020)* study, "The Development of Cooperative Learning Using Jigsaw Activities for Learning Achievement and Self-directed Learning Behaviors of Nursing Students." This outcome is also consistent with the findings of *Farrag et al. (2022)*, who discovered that most members of the Jigsaw cohort were highly satisfied with the strategy's execution. Furthermore, the majority of the Jigsaw cohort reported that everyone in the cohort shared responsibility and that the Jigsaw method improved teamwork and cooperation. Additionally, the majority of the study cohort stated that the Jigsaw Learning approach enhances critical thinking and decision-making skills.

Furthermore, this outcome is consistent with the findings of *El-Refaie et al. (2023)*, who stated that the Jigsaw technique improved self-confidence, teamwork, communication, and critical thinking abilities.

The current study found a statistically significant positive correlation ($p = 0.000^{**}$)

between total knowledge and total practices scores in both the study and control cohorts during the pre- and post-implementation phases. This could be because the pupils who engaged in a lot of cooperative learning had advanced knowledge and skills.

This outcome is comparable to that of *EL-Refaie et al. 2023* study, "Effect of Jigsaw Learning Strategy on Maternity Nursing Students' Theoretical and Practical Achievements," which involved 150 students and found a highly statistically significant positive correlation ($P \leq 0.000$) between total knowledge scores and total practices scores in both cohorts before and after the intervention.

Conclusion

Based on the results of the current study, it was determined that the Jigsaw learning strategy was more successful than the traditional teaching method (lecture) in raising nursing students' theoretical and practical achievement with regard to the second stage of labor, supporting hypothesis one. Furthermore the majority of students had satisfactory opinions regarding Jigsaw learning strategy both theoretically and practically of second stage of labor consequently validate hypothesis two. Additionally, following the application of the Jigsaw learning strategy, there was a very statistically significant positive association between the overall knowledge score and the total practices scores. As a result, the goal was accomplished and the research hypotheses were validated.

Recommendations

In the light of the present research findings, the following recommendations are suggested:

- Creating a periodic awareness program for nursing students to improve their theoretical understanding of the second stage of labor through the use of the jigsaw learning approach.
- Creating an In service training program for nursing students that uses a jigsaw learning strategy to improve practical achievement with reference to the second stage of labor.

- Using the jigsaw learning approach, instructional directions are provided to help nursing students achieve the second stage of labor both theoretically and practically.

Further research needs to be performed:

- Using the Jigsaw learning approach to design obstetrics and gynecology nursing curricula.
- To improve the findings' generalizability, the study should be repeated with a bigger sample size and in various care facilities

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