Effect of Jigsaw Learning Strategy on Nursing Students' Understanding of Normal Labor Concept

Amera Bekhatroh Rashed[1], Amal S. Abu Almakarem[2], Eman Galal Mohamed Kahlil[3], Amany A. Ahmed[4]

1 Assistant Professor of Maternal and Newborn Health Nursing, Faculty of Nursing, Menoufia University

2 Department of Basic Medical Sciences, Faculty of Applied Medical Sciences, Al Baha University, Saudi Arabia

3 Lecturer of Police Authority Institute of Nursing, Lecturer of Obstetrics Nursing

4 Assistant Professor of Obstetrics, Gynecological, and Reproductive Health Nursing, Faculty of Nursing, Sohag University

Abstract

Background: Cooperative learning methods like the Jigsaw technique require the learner to teach some of the material to the group. Additionally, it improves learners' self-confidence, which aids in effective problem-solving and critical thinking skills. **Aim**: To determine the effect of Jigsaw learning strategy on nursing students' understanding of normal labor concept. **Subjects and method: Design**: A quasi-experimental research design was used to achieve this study (one group pre-test-post-test design). Setting: The study was applied at Faculty of Nursing at Sohag University Hospital. **Subjects**: The sample comprised of 100 nursing students was selected by purposive sampling technique involved in the study from the previously selected settings. **Two instruments were used:** instrument (1): A structured interviewing questionnaire, and instrument (II): Nursing students' knowledge regarding normal labor concept which was followed by the Jigsaw technique. **Results**: There was a significant difference in the knowledge score between pre and post-test results at (p value=<0.001). **Conclusion**: Both research hypotheses could be accepted; it was concluded that the Jigsaw learning strategy proved to be an effective educational learning strategy for nursing students and had a positive effect on enhancing nursing students' understanding of labor concept. Additionally, it was found that maternity nursing students had positive feedback about Jigsaw learning strategy after its application compared to before. **Recommendations**: Jigsaw learning strategy should be manipulated as an efficient learning strategy for nursing students to increase their comprehension and understanding of concepts. Engaging students in the manipulation of up-to-date teaching strategies to improve their cooperation skills Moreover, more research should be done on a larger population to allow the results to be generalized.

Keywords: Jigsaw learning strategy, Nursing students' understanding, Normal labor concept

Introduction

Learning is a never-ending process. As part of a cooperative learning strategy, students must work cooperatively in small, diverse groups to assist one another in learning a certain task. The development of society depends on the new generation having a top-notch education suitable for the requirements of the time. The choice of the instructional strategy that will maximize learning is now the teacher's to make under the modern educational philosophy. Modern educational institutions that place a strong emphasis on the needs of the student will enable students' knowledge to become permanent, enabling them to apply it to their daily lives (**Nur Hafizah, 2019**).

Every student's life includes learning and applying the material they studied for the exam, especially in nursing programs when the curriculum is condensed into 34 years. Enhancing the effectiveness of learning strategies for students has helped to keep their interest in learning and improve performance. One cooperative learning method is the jigsaw strategy, in which all students equally contribute, organize, and direct a group, learning for themselves as well as for their group (**Sumitra et al., 2020**).

At all educational levels, from elementary school to college, and across all subject areas, the use of cooperative learning has been growing quickly. The students' self-confidence is boosted through cooperative learning, which in turn aids their ability to think critically and solve problems.

enhanced engagement enhanced empathy in role-playing, and the propensity to attribute others' achievements and failures in the same way that they do for their own are all factors that contribute to interdependent classroom performance (**Aronson &Bridgeman, 1979).**

The education of nursing students includes a significant amount of contemporary and active learning techniques. They ensure that patients receive safe medical treatment and promote the growth of communication and critical thinking abilities. By incorporating active learning techniques into the study process, students may become more motivated to learn and develop their critical thinking and autonomous learning abilities (Parikh, 2016). Faculty should implement an active student-centered learning environment rather than continuing with conventional teacher-centered educational approaches because creating learning experiences that encourage reflection, knowledge building, problem-solving, inquiry, and critical thinking is highly significant (**Alexander et al., 2018.**

Today's nurses must be knowledgeable about a lot more material, acquire it quickly, and retain it for a long time before upgrades and advancements. Both nursing students and professors frequently feel overwhelmed by the amount of available content. Many teaching tactics are being presented and put into practice for this admirable goal as academic institutions come up with fresh solutions to this problem. The hiring of highly qualified nurses is one of the crucial prerequisites for healthcare systems to address the wide range of patient needs (**Ellenbecker et al., 2017**). Providing nursing students with a quality education and developing competent nurses to give patients with high-quality care is one of the major duties of nursing education systems in this regard (**Hofler & Thomas, 2016**).

A research-based form of cooperative learning, the jigsaw classroom or home group was developed by Elliot Aronson in 1970. It lessens stereotyping and other forms of discrimination in his four-decade educational experiment. Using the jigsaw method and encouraged group discussion both outside and inside of the classroom, it was suggested the following for use with jigsaw puzzles 1) Choose a size for the group that is between 5 and 7; 2) Name the leader of the group and the recorder. 3) Assign one topic per group member of students after segmenting the courses. 4) Enough time must be given for the students to collect, internalize, and understand the required data. 5) Students who share the same segment or topic must form a separate group called the expert group for that segment. 6) Students will go back to the group they were in for the first segment and present the concepts that the expert group had addressed. 7) complete the exercise and conduct an evaluation (**Mahmoud, 2019**).

Cooperative learning and problem-based learning are combined in the jigsaw method. An initial subject is established, which is composed of numerous "pieces" of knowledge or abilities. To fully answer a question or learn the content, students must comprehend all of its components. To complete this job, students collaborate in two different groups: a teaching group and an expert group. One method of integrated learning is the jigsaw technique, which encourages students to engage with their course materials, plan, take the lead present to their peers, and support one another's academic growth (**Killic, 2018**). The strategies is carried out with the help of the researchers and carried out under her supervision, enabling her to directly engage students' natural learning instincts. The students benefit from expanded critical thinking with their group members as well as peer support. It gives everyone an equal chance to think critically and solve problems (**Aronson, E. 1997; Aronson, 2018; and Aatay & demirciolu, 2019**).

The major goal of midwifery is to teach nursing students how to distinguish normal labor from abnormal labor so they may apply what they learn in their practice and become the greatest midwives in their field. Stages, requirements, physiological changes that occur during stages of labor, administration of drugs, and nursing care are all concepts related to normal labor. The main subject to learn is "normal labor" and its course, which is completely new to the students. Making the learning process engaging is therefore crucial if you want to remember the topics you've learned. The jigsaw technique sparks kids' interest, encouraging them to read for themselves and take on roles to ensure that everyone in the group

understands the principles to ensure that all teams learn the concepts under the facilitation of the teacher (**Church, 2018).** In the Jigsaw cooperative learning framework, each student is in charge of imparting some knowledge to the group, which improves cooperative learning. A cooperative learning method called the jigsaw technique requires the learner to be in charge of imparting some of the subject matter to the group. Additionally, it helps kids become more self-assured, which enhances their ability to think critically and solve problems. Innovative teaching and learning techniques support students' success, particularly in professional courses. A teacher-student-friendly approach aids in retaining students' attention and igniting their desire to learn more (**Rodger et al., 2017**).

In a traditional educational system, the student not only receives instruction or a diploma but also experience and skills that help throughout all stages of life. Working with professors and peers from different countries, backgrounds, cultures, and religions helps students hone verbal communication skills (**Schulmeister, 2017**), as well as the capacity to manage time by showing up to class on time. Teachers encouraged students by discussing their own life experiences during contact hours (**Zawacki-Richter et al., 2018**).

The primary goal of nursing education is to develop competent, self-assured nurses who have the knowledge, attitude, and abilities to sustain and advance maternity health. the primary goals of nursing education are to foster the development of critical thinking, creative thinking, reflective learning, professional skills, time management, self-esteem, and effective communication (**Zeydani et al., 2021**).

Significance of the study:

One area where there is room for improvement to get more students into the nursing field is nursing education. Numerous reports have highlighted the main challenges, emphasizing the improvement of quality and nursing-related issues (**Evans et al., 2019**).

Education relies solely on didactic teaching techniques and has an overly crowded curriculum. One of the causes of stress among nursing students, according to many research studies, was academic overload and subpar exam results (**Shukla et al., 2020**).

Every student's life includes learning and passing exams. Innovative techniques of instruction and learning help students succeed, particularly in nursing programs where the entire curriculum is condensed into three to four years. It has been shown that making teaching methodologies more student-cooperatively has helped to keep students' interest and motivate them to learn more. Adult learners in college who expect challenges are typically disappointed and disconnected by the routinely boring lectures, according to research studies. Nursing professors should design their lessons using more creative teaching techniques to ensure full student participation, which will encourage the students to pay closer attention. The more concepts a student grasps. The more attentive the student is, the more concepts are learned which improves their academic performance (**Sumitra et al., 2020**). So, the researchers aimed to determine the effect of the Jigsaw learning strategy on nursing students' understanding of the normal labor concept

Variables:

Independent Variable:
Jigsaw learning strategy

Dependent Variable:
Nursing students' understanding of normal labor concept

Aim of the study

The study aimed to determine the effect of the Jigsaw learning strategy on nursing students' understanding of normal labor concept through:

-Assessing nursing students' knowledge level of normal labor concept

-Planning and implementing the Jigsaw learning strategy

-Evaluating the effect of the Jigsaw learning strategy on nursing students' understanding of

normal labor concept through post-testing nursing students.

Research hypotheses:

After the application of the Jigsaw learning strategy, maternity nursing students are expected to have an increased level of knowledge and understanding of normal labor concept compared to before

After the application of the Jigsaw learning strategy, maternity nursing students are expected to have positive feedback about the strategy compared to before

Subjects and Methods:

Research design:
A quasi-experimental research design was used to achieve this study, (one group pre-test-posttest design).

Settings:
The study was applied at the Faculty of Nursing at Sohag University Hospital.

Sample:
The sample comprised of 100 nursing students was selected by purposive sampling technique involved in the study from the previously selected settings. Those who met the inclusion criteria were admitted into the study.

Sample technique:
The nursing students were chosen the nursing students started with A and M alphabetic litter to form the sample.

Inclusion criteria-
- Students agreed to participate in the study
- Students attended the lecture on normal labor
- Nursing students had no previous experience with Jigsaw strategy as a teaching method

Exclusion criteria-
Nursing students who are not present during data collection

Instruments of the study:

two instruments were used for data collection:

Instrument (1): A structured Interviewing Questionnaire:

It was developed by the researchers after reviewing the related recent national and international literature (**El-Said, 2019; Abd El Aliem et al., 2019; Shahri et al., 2017**). **The instrument was submitted to validity and reliability tests.** It consisted of two parts as the following:

Part 1: This section contained data about the demographics of nursing students, including their age, gender, and place of residence, etc..

Part 2: This section evaluated nursing students' feedback about the use of the Jigsaw learning strategy in the learning process, their familiarity with the Jigsaw learning strategy as a new teaching method, how it can be applied to learning, their prior use of the Jigsaw learning strategy in learning, and their preference for using the Jigsaw learning strategy in learning.

Scoring system:

• The students' feedback about the Jigsaw learning strategy after using to explain the concept of normal labor was given a score of five for excellent, four for very good, three for good, two for acceptable, and one for not acceptable.

• The use of the Jigsaw learning strategy in previous learning, rated as one for yes and zero for no.

• Preference for Jigsaw learning strategy in learning, one for yes and zero for no.

Instrument (II): Nursing students' knowledge regarding normal labor concept which was followed by the Jigsaw technique (pre/post): It was developed by the researcher after reviewing the national and international related literature (**Abdel-Mordy, et al., 2022; Nair et al., 2020; and Abd ElAliem, et al., 2019). Instrument was submitted to validity and reliability tests.** It included questions regarding hospital-associated infection and infection control precautions, it was designed to assess students' knowledge about the definition, physiology, labor preparation, mechanism of labor, vaginal delivery, management, and recovery period. As regards the Jigsaw learning strategy, it included questions related to the definition of a Jigsaw learning strategy, objectives, steps, benefits how Jigsaw learning strategy be used, and the advantages of Jigsaw learning strategy.

Scoring system of nurses' knowledge:
Each right response earned one point, while wrong replies got none. There were 30 points awarded for the knowledge. Two categories—satisfactory level of knowledge (equal and more than 70%) and unsatisfactory level of knowledge (less than 70%)—were created from the total knowledge score.

Validity of the instruments

The present study instruments' validity was confirmed by a panel of three experts from the Faculty of Nursing in the field of Obstetric Nursing with more than ten years of experience in the field. Every expert evaluated the study instruments for their content validity, coverage clarity, content, length, wording, format, and overall appearance. No suggested changes were made.

Reliability of the instruments
Cronbach's alpha reliability test was used to evaluate reliability. The results showed that the first instrument had reasonably homogenous items, as indicated by high reliability, and that the second instrument had reliable results (=, 883%).

A pilot study

A pilot study was done on 10% of the sample once the instrument was developed (10 nursing students). It was done to detect any ambiguity in the instrument and establish the time required for data gathering. The results of the pilot study were used to develop the final form of the instruments, which included the clarification and testing of the practicality of the research process. Students of the pilot study were included in the main study.

Administrative and ethical considerations:
Approval was obtained from the ethical committee of the Faculty of Nursing, at Sohag University to conduct this study. Before beginning the study, the researcher told the nursing students that the study was optional, that they might refuse to participate at any time, and that they were free to leave the study whenever they wanted without having to give a reason. The nursing students provided their verbal consent. Additionally, they were informed that their data would be kept private and only used for study. **Administrative approval from Sohag University Hospital was obtained.**

Fieldwork:

The research was done between the beginning of July 2023 and the end of October 2023. At the beginning of the interview, the researchers introduced themselves, welcomed each nursing student, and discussed the purpose and nature of the study. Data collection took place from 9:00 a.m. to 12:00 p.m. three days a week.

Phases of the study: The study was conducted through the following three phases:

Preparatory phase:
The process began with gathering all data about the Jigsaw strategy's concept, primary goal and technique. Based on current textbooks, references, research publications, and websites, the researcher created the study materials and tools. The evaluation instruments were created at this step by the researcher.

Implementation phase: -
Approval of the nursing students was obtained orally after explaining the purpose of the study - The researcher distributed the questionnaire to assess the students' data (instrument I). - The researcher assessed the nursing students' level of knowledge regarding normal labor using Pretest (instrument II). - The researcher informed the nursing students about the time of the post-test (after ten days of intervention).

Implementation phase for the nursing students included four teaching sessions along 3 weeks as the following consequence: **Session 1**: (orientation session)
Students attended an orientation session for an hour to learn about the Jigsaw strategy as a teaching strategy. - First, the researcher thoroughly described to them the Jigsaw as a learning approach, outlining its concept, goals, steps, and advantages. using an oral presentation. For the theoretical portion: - The researcher divided the class into 15 groups, with 6-7 students in each group. These were the "Jigsaw groups"; a student team leader was chosen for each group. The team leader was in charge of leading group discussions.

- The topic of the study, "normal labor," was broken down into 7 distinct subtopics, including "definition, physiology, labor preparation, mechanism of labor, vaginal delivery, management, and recovery period." - One sub-topic was given to each Jigsaw group member. - Next, "expert groups" were formed by the students who had been given an identical subtopic in each of the 15 Jigsaw groups.

		Jigsaw groups											
		(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)
Expert groups	G1	A1	B1	C1	D1	E1	F 1	G1	H1	I1	J1	K1	L1	M1
	G2	A2	B2	C2	D2	E2	F 2	G2	H2	I2	J2	K2	L2	M2
	G3	A3	B3	C3	D3	E3	F3	G3	H3	13	J3	K3	L3	M3
	G4	A4	B4	C4	D4	E4	F4	G4	H4	I4	J4	K4	L4	M4
	G5	A5	B5	C5	D5	E5	F5	G5	H5	I5	J5	K5	L5	M5
	G6	A6	B6	C6	D6	E6	F6	G6	H6	I6	J6	K6	L6	M6
	G7	A7	B7	C7	D7	E7	F7	G7	H7	17	J7	K7	L7	M7

– The task given to the students was to prepare the subtopics for discussion in their expert group.

To guide the students and assist them in the preparation of their themes, the researchers suggested resources (textbooks, research articles and websites). - The groups were instructed to read through the material thoroughly. - The researcher ensured that all information on the prepared subtopics by the students was accurate and could be corrected before the students started their discussion.

Session 2: (Expert groups discussion)
The expert groups worked together and discussed their topics. The students shared their additional knowledge and the researchers clarified any misunderstanding.

Session 3: (Jigsaw groups discussion)
To share their subtopic with others, the students went back to their Jigsaw group. Finally, they discussed topics together to improve their thinking ability, cooperation, interaction together, and active learning. The researchers floated between groups and facilitated the whole process.

Session 4:
The third week's final session lasted for two hours, during which a student from each "Jigsaw group" was chosen at random to present a specific subject to the entire class. The presenter also encouraged the students to ask any questions they might have had, and the researchers answered any queries that they had.

- Finally, the students' opinion sheet (instrument I, part 2) was distributed to assess students' opinion about the Jigsaw strategy as a teaching method.

Evaluation phase: - All the nursing students were assessed for their understanding regarding normal labor concept through a post-test using instrument (II). - A comparison between pre- and post- test was done to evaluate the effect of the Jigsaw strategy to test the research hypothesis.

Statistical Design:

A statistical package for social sciences (SPSS Version 23.00) was used to code and enter the gathered data. Quality control was done during the coding and data entry stages. While means and standard deviations were used to describe continuous quantitative variables, frequencies, and percentages were employed to describe categorical variables. The row and column variables were assumed to be independent, and the Chi-square ($X2$) test was employed to compare qualitative category data without disclosing the strength or direction of the link. Comparing qualitative variables was done using the chi-square, T-test, and F-test. Statistical significance was determined when the P-value was less than 0.05 and the difference was p 0.001.

Results:

Table (1): Illustrates that the studied nursing students' mean age was 20.11 ± 1.21 years and 60% of them were females.

Regarding their residence, (59%) of the studied nursing students were living in urban areas.

Figure 1 demonstrates that 100% of the nursing students who participated in the study reported never using the Jigsaw technique in their prior learning.

Table 2 shows that more than half of the nursing students who participated in the study gave an incorrect response when asked about normal labor before intervention. The majority of nursing students' knowledge was found to be increased after using the Jigsaw learning technique compared to before, and there was a highly statistically significant difference between their pre- and post-understanding of normal labor concept (P < 0.001). The post-test mean total knowledge score showed a highly significant improvement (F=43.6, p < 0.000) in the same table.

According to **Table 3**, there was a highly statistically significant difference between nursing students' pre- and post-application understanding of the Jigsaw learning technique (P < 0.001). The post-test mean total knowledge score showed a highly significant improvement (F=19.9, p < 0.000)

in the same table.

Figure (2) clarifies that on the pretest, 93% of the nursing students had an unsatisfactory level of knowledge about normal labor concept, whereas after using the Jigsaw learning technique, this level decreased to 6%.

Figure 3 illustrates that the majority (90%) of the nursing students preferred to use the Jigsaw technique in their learning.

Figure (4) portrays that (45%) of the nursing students reported excellent opinions after the application of the Jigsaw strategy in learning compared to only 3% of them considering it as not acceptable.

Based on the results shown at **table 2** and figure 2 the first study hypothesis could be accepted as it was found that the application of the Jigsaw learning strategy helped nursing students improve their understanding of normal labor concept.

Based on the results shown at **table 3** and figures 3 and 4 the second study hypothesis could be accepted as it was found that maternity nursing students had positive feedback about Jigsaw learning strategy after its application compared to before.

Table (1): Nursing students' data (n=100)

| Personal data	No.	%
Age/year	**Mean ± Stander deviation**	20.11 ± 1.21
Gender		
Female	60	60%
Male	40	40%
Residence		
Urban	59	59.0
Rural	41	41.0
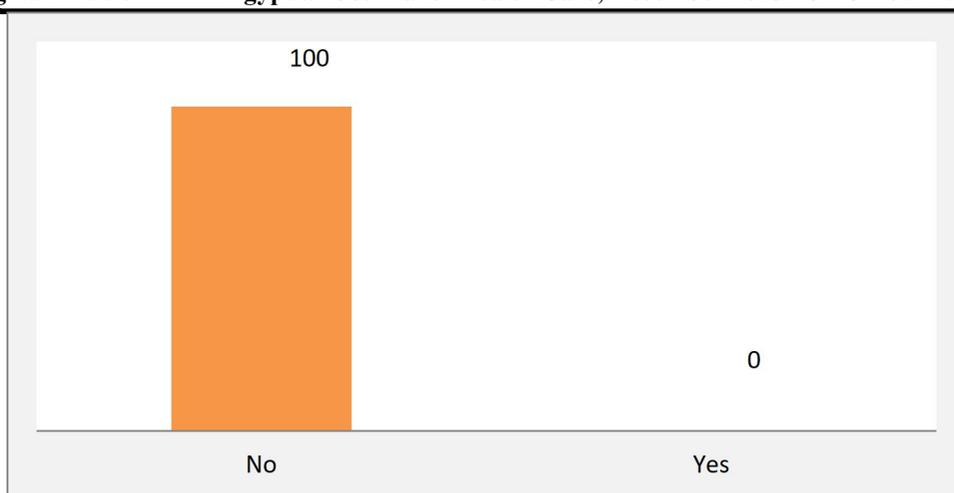
Figure 1: Nursing student's distribution regarding the previous application of the Jigsaw strategy in learning (N=100)

Table (2): knowledge score distribution about normal labor concept among the studied nursing students pre and post-Jigsaw strategy application (N = 100)

Nurses' knowledge of normal labor concept	Pre-Jigsaw strategy application		Post-Jigsaw strategy application		X2	P-value
	No	%	No	%		
Definition of normal labor concept						
• Incorrect.	80	80	10	10		
• Correct.	20	20	90	90	148.73	0.001
Physiology of normal labor					172.54	0.001
• Incorrect.	70	70	9	9		
• Correct.	30	30	91	91		
Labor Preparation					112.23	0.001
• Incorrect.	81	81	6	6		
• Correct.	19	19	94	94		
Mechanism of labor					143.38	0.001
• Incorrect.	79	79	10	10		
• Correct.	21	21	90	90		
Vaginal delivery						
• Incorrect	85	85	3	3	143.67	0.001
• Correct	15	15	97	97		
Management of normal labor					89.78	0.001
• Incorrect.	75	75	7	7		
• Correct	25	25	93	93		
Recovery period					89.78	0.001
• Incorrect.	82	82	7	7		
• Correct	17	17	93	93		
Mean Knowledge total score	5.5±2.3		13.4±1.6		F=43.6-P=0.000 HS	

Table (3): Knowledge score distribution of Jigsaw learning strategy among the studied nursing students pre and post-application (N = 100)

Nurses' knowledge of Jigsaw learning strategy	Pre-Jigsaw strategy application		Post-Jigsaw strategy application		X2	P-value
	No	%	No	%		
Definition of **Jigsaw Learning Strategy**						
• Incorrect.	100	100.0	10	10	118.43	0.0001
• Correct	0	0.0	90	90		
Objectives of **the Jigsaw Learning Strategy**						
• Incorrect.	100	100.0	8	8		
• Correct	0	0.0	92	92	129.06	0.001
Steps of **Jigsaw learning strategy**						
• Incorrect.	100	100.0	7	7		
• Correct	0	0.0	93	93	125.03	0.001
Benefits of **the Jigsaw Learning Strategy**						
• Incorrect.	100	100.0	9	9		
• Correct	0	0.0	91	91	126.02	0.001
How **Jigsaw learning strategy** be used						
• Incorrect.	100	100.0	3	3	146.59	0.001
• Correct	0	0.0	97	97		
Advantages of using **the Jigsaw learning strategy**						
• Incorrect.						
• Correct	100	100.0	0	0.0	195.84	0.001
	0	0.0	100	100		
Mean Knowledgetotal score	1.2±1.3		11.3±1.6		F=19.9-P=0.000	
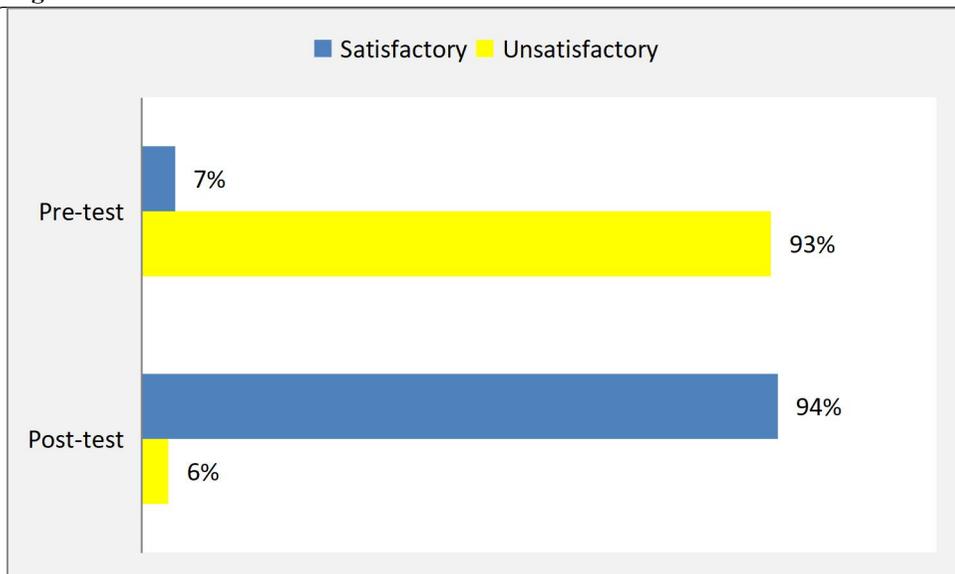
Figure (2): Distribution of total knowledge level about normal labor concept among the studied nursing students pre and post-Jigsaw learning strategy application (N = 100)
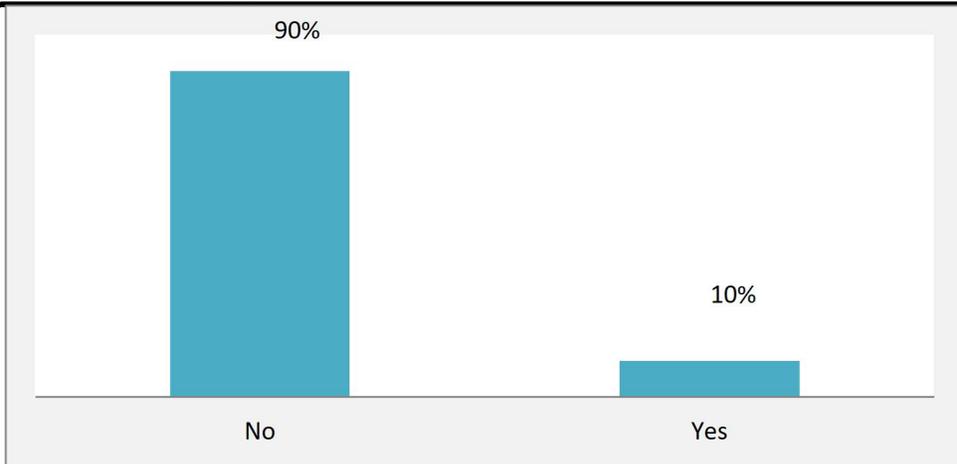
Figure 3: Nursing student's opinion distribution regarding preferring application of the Jigsaw strategy in their learning (N=100)
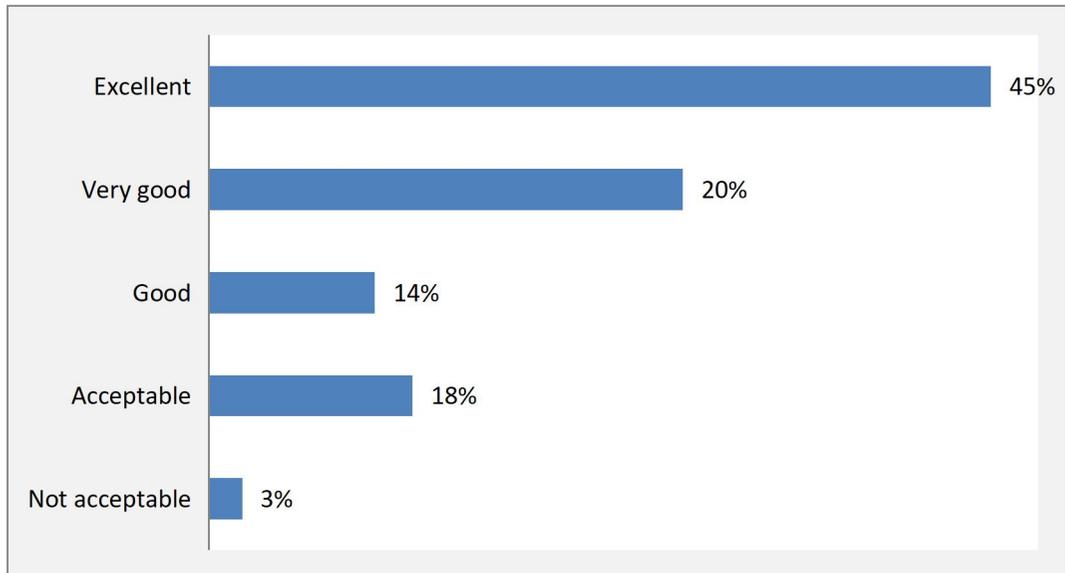

Figure 4: Nursing students' opinion distribution after the application of the Jigsaw strategy in learning (N=100)

Discussion

The main findings of the current study will be discussed in the following order: general data, data addressing the first study hypothesis: students' knowledge about normal labor concept pre- and post-Jigsaw strategy application, data addressing the second study hypothesis: students' knowledge about Jigsaw learning strategy pre- and post- its application and their feedback after the application of the Jigsaw strategy in learning.

Using a Jigsaw learning strategy in modern educational systems will help nursing students improve their critical thinking, problem-solving, and decision-making skills which can be reflected in clinical practice to provide high-quality care (**Abdullah & ABiyikli, 2017**). The jigsaw technique has more and more uses in the classroom today since it encourages students to listen, work together, and share ideas (**Abdel-Mordy et al., 2022**). The Jigsaw strategy is being used in academia more and more frequently these days since it encourages

students to pay attention, cooperate, and share ideas. Additionally, it enhances student results and performance (**Bagheri et al 2018**). Therefore, the present study aimed to determine the effect of Jigsaw learning strategy on nursing students' understanding of normal labor concept.

The current study included sample of both male and female students at their maternity nursing study, the selected group was previously studied for impact of many new teaching-learning modalities as it is a suitable media to manipulate new teaching strategies to empower them. Like a study conducted by **Abd ElAliem, et al., (2019),** who selected similar group of participants to evaluate "the impact of the cooperative jigsaw learning approach on the attitudes and performance of maternity nursing students at the Faculty of Nursing, Benha University" and reported a trustworthy finding. Later on, **Abdel-Mordy et al. (2022**) conducted a study using similar sample to assess the impact of the cooperative jigsaw learning strategy on community nursing students' attitudes and accomplishments at the Faculty of Nursing-Benha University and reported the positive findings.

As for the data addressing the first study hypothesis: students' knowledge about normal labor concept pre- and post-Jigsaw strategy application, the current study showed that nursing students' knowledge had increased after using the Jigsaw learning strategy compared to before, and there was a highly statistically significant difference in their knowledge level thus their understanding of labor concept after compared to before the main study intervention. This may be explained by the fact that traditional teaching strategies subject students to surface learning, whereas the cooperative Jigsaw learning strategy improved students' capacity to organize and control knowledge by encouraging in-depth information processing for understanding. This finding reflected that Jigsaw learning strategy proved to be an effective one for teaching nursing students major topics like normal labor.

This finding was in the same line with many other studied that manipulated the Jigsaw strategy for educating many fields of sciences. For example a study conducted by **Abdel-Mordy et al. (2022**) who conducted a study to assess the impact of the cooperative jigsaw learning strategy on community nursing students' attitudes and accomplishments at the Faculty of Nursing- Benha University and reported that there was a statistically significant differences between jigsaw and lecture groups regarding learning achievements immediately after intervention, and the jigsaw learning strategy was successful in improving community nursing students' attitudes and a sense of accomplishment. These parallels in the results could be attributable to the student's attention to detail in the preparation of the lecture content, which encouraged them to reflect on the information easily and helped them think critically.

Similar findings were reported by **Ibrahim et al., (2020**) about the "Effect of Jigsaw cooperative learning strategy on obstetric nurses' knowledge and information retention of emergency contraceptive methods" used a simple random sampling technique, by which 40 diploma nurses were selected and their pre-knowledge about emergency contraceptive was assessed. The same group was taught using the Jigsaw technique of learning and the knowledge was reassessed. There was a significant difference in the performance of the participants before and after the intervention.

Moreover; another study conducted by **Abd ElAliem, et al., (2019),** who evaluated "the impact of the cooperative jigsaw learning approach on the attitudes and performance of maternity nursing students at the Faculty of Nursing, Benha University" claimed that the use of the jigsaw learning method improved the performance of maternity nursing students in the maternal and newborn health nursing course.s The aforementioned study finding prove that such strategy not only improved the understanding of labor concept but also of all maternity course topic. Additionally, the current study supports **Abd El Aliem et al., (2019**) assertion that there is evidence linking the cooperative jigsaw learning technique to improving students' cognitive abilities through nursing education. The availability of each student as an essential component in completing the assignments assigned by the teacher is made

possible by the cooperative jigsaw learning technique. Students can also assess one another's thoughts and keep track of one another's efforts.

On the one hand; another study supporting the current finding was that conducted by **Church, (2018)** testing "the development and implementation of a method of collaborative learning for first-year philosophy tutorials used the jigsaw technique" and found that the strategy was an effective one in achieving study desired goals. On the other hand; **Aronson, (2018)** comparing "Jigsaw groups and the desegregated classroom: In pursuit of common goals" revealed that interdependent classrooms are made successful with increased participation, increased empathetic role-taking and the tendency to make the same kind of attribution for successes and failures to others as they do for themselves and such a result articulate with the current study and both endorse the importance and effectiveness of Jagsaw strategy.

In addition to the results reported by (**Kritpracha et al. 2018**) about "the development of cooperative learning using Jigsaw activities for learning achievement and self-directed learning behaviors of nursing students" which ensured the effectiveness of the Jigsaw strategy for achieving powerful learning outcomes. The current findings are moreover consistent with **Yemi et al.'s (2018)** study, titled "Jigsaw Approach of Group Instruction's Impact on Secondary Education Pupils' Math Achievement," which found that the Jigsaw method of instruction was superior to conventional teaching techniques in terms of effectiveness.

The current study findings can be more ascertained by the Australian researchers **Tran and Lewis, (2019)** examined the performance and information retention of 80 final-year Vietnamese maths students to ascertain the "effects of Jigsaw cooperative learning on those students' achievement and information retention, as well as reporting their views regarding this type of learning". It was discovered that students recalled

more knowledge while employing Jigsaw learning than when receiving instruction through lectures.

As for data addressing the second study hypothesis: students' knowledge about Jigsaw learning strategy pre- and post- its application and their feedback after the application of the Jigsaw strategy in learning.

The current findings showed that nursing students prefer the application of the Jigsaw strategy in their learning as reflected by their measurement results after the application compared to before. Such finding was supported by **Nair et al., (2020)**, who studied "evaluation of the Jigsaw learning methodology as an active teaching strategy for first-year Indian medical students" and found that the students reported positive feedback about the strategy in terms of better student-student interaction, better interaction with their teachers and better communication skills.

In the same line, **El-Said (2019)**, who discovered that Jigsaw cooperative learning strategy-trained students were more satisfied with the strategy than those who received instruction using conventional or typical teaching methods. Similar findings were reported by **Abd El Aliem et al. (2019)** who studied the impact of the cooperative jigsaw learning approach on the attitudes and performance of maternity nursing students at the Faculty of Nursing, Benha University" and indicated that students in the jigsaw group demonstrated higher satisfaction with the puzzle strategy compared to those in the lecture group.

A study conducted by **Nur Hafizah, (2019)** entitled "Effect of the Jigsaw-Based Cooperative Learning Method on Student Performance in the General Certificate of Education" endorsed the current study findings as it reprted that the participants enjoyed using the Jigsaw method and performed significantly better after the intervention. Another study conducted by **Mahmoud, (2019)** about "The effectiveness of Jigsaw strategy on the achievement and learning motivation of the 6th Primary grade students" included 53 female students, the majority of them reported positive experience after application of the strategy.

Moreover; the current findings were in the same line with **Kritpracha, et al., (2018**) who studied the development of cooperative learning using Jigsaw activities for learning achievement and self-directed learning behaviors of nursing students" and reported a very positive feedback from the sample about Jigsaw strategy as a new teaching modality. The current findings were also supported by **Shahri et al. (2017**), who studied "Effectiveness of teaching: Jigsaw technique vs. lecture for medical students' Physics course" and reported that the majority of participants agreed with every evaluation question measuring how satisfied they were with the Jigsaw class material versus lecture.

Conclusion:

Based on the results of the current study both research hypotheses could be accepted; it was concluded that the Jigsaw learning strategy proved to be an effective educational learning strategy for nursing students and had a positive effect on enhancing nursing students' understanding of labor concept. Additionally, it was found that maternity nursing students had positive feedback about Jigsaw learning strategy after its application compared to before.

Recommendations:

In the light of the findings of the study, the following recommendations are suggested:

Jigsaw learning strategy should be manipulated as an efficient learning strategy for nursing students to increase their comprehension and understanding of concepts.
Engaging students in the manipulation of up-to-date teaching strategies to improve their cooperation skills
Moreover, more research should be done on a larger population to allow the results to be generalized.

References:

- Abd ElAliem, S., R., Sabry, S, S., & Mohy, H., F. (2019). Utilization of Jigsaw Cooperative Learning Strategy on Maternity Nursing Students' Attitude and Achievement. *American Journal of Nursing Science*. Vol. 8, No. 6, 2019, pp. 361-370.

- Abdel-Mordy, M., Sabry, S., & Mahmoud, A., (2022). Effect of Cooperative Jigsaw Learning Strategy on Community Nursing Students' Attitude and Achievement. *International Egyptian Journal of Nursing Sciences and Research*, IEJNSR, 2(2): 487- 500, DOI: 10.21608/ejnsr.2021.107840.1133.

- Abdullah A., & ABiyikli F. (2017): The Effect of Jigsaw Technique on the Students' Laboratory Material Recognition and Usage Skills in General Physics LaboratoryCourse, Kastamonu University, Turkey, *Universal Journal ofEducational Research*, 5(7): 1073-1082.

- Alexander, B., Lindow, L., & Schock, M. (2018). Measuring the impact of cooperative learning exercises on student perception of peer-to-peer learning: a case study. *J Physician Assist Educ*;3:18–25.

- Aronson, E. (2018). Jigsaw Classroom: overview of the technique. Retrieved 2018, February 15, from http://www.jigsaw.org/overview.htm

- Aronson. E., & Bridgeman, D., L. (1979). Jigsaw groups and the desegregated classroom: In pursuit of common goals. Personality and Social Psychology Bulletin.1979:5(4):438-66.

- Bagheri, J. S., Habibzadeh, H., Mohammadpour, Y., & Khalkhali, H. (2018). Evaluating the impact of the jigsaw (Puzzle) cooperative learning model as a new model of education on clinical competency of nursing students. *Journal of Advanced Pharmacy Education & Research|* OctDec, 8(S2), 69.

- Çağatay, G., &Demircioğlu, G. (2019). The effect of jigsaw-i cooperative learning technique on students' understanding of basic organic chemistry concepts. *International Journal of Educational Researchers*, 4(2), 30-37.

- Church, H. (2018).Taking forward the Jigsaw Classroom: The development and implementation of a method of collaborative learning for first-year philosophy tutorials: 11(2).

- Ellenbecker, C., Fawcett, J., Jones, E.,

Mahoney, D., Rowlands, B., & Waddell, A. (2017). A staged approach to educating nurses in health policy. Policy Polit *Nurs Pract*.; 18(1):44– 56.

El-Said, A. E. (2015). Effect of Jigsaw instructional method on pre-service teacher teaching proficiency skills and perceptions toward working in small groups. *Journal of Applied Sports Science*, 5(2), 108-115.

Evans, C., Razia, R., & Cook, E. (2019). Building nurse education capacity in India: insights from a faculty development program in Andhra Pradesh. *BioMed Central Nursing*; 12(8):1– 29.

Hofler L, (2016). Thomas K. Transition of new graduate nurses to the workforce: challenges and solutions in the changing health care environment. *N C Med J*; 77 (2):133– 136.

Ibrahim, A., Gohar, I., & Fathallah, N., (2020). Effect of jigsaw cooperative learning strategy on obstetric nurses' knowledge and information retention of emergency contraceptive methods. *Egyptian Journal of Health Care, EJHC* Vol.11 No.4

Killic, D. (2018). The Effects of the Jigsaw technique on learning the concepts of the principles and methods of teaching.*World Applied Sciences Journal*:4(1);109-14.

Kritpracha C., Sae-Sia W., Nukaew O., Jittanoon P., Chunuan S., & Kaosaiyaporn O. (2018). The Development of Cooperative Learning Using Jigsaw Activities for Learning Achievement and Self-directed Learning Behaviors of Nursing Students, *International Journal of Information and Education Technology*, Vol. 8, No. 12, December 2018.

Mahmoud, J. (2019). The effectiveness of the Jigsaw strategy on the achievement and learning motivation of the 7th-grade students in Islamic education. *International Journal of Humanities and Social Science*. April:5(4).

Nair, D., Angesh H., Bagade, A., Bhonde, M., Patil, S., Shetty, P., Kini, S., (2020). Evaluation of Jigsaw Learning Methodology as An Active Teaching Strategy for First-Year Indian Medical Students. *European Journal of Molecular & Clinical Medicine (EJMCM) I*SSN: 2515-8260 Volume 07, Issue 10, 2020.

Nur Hafizah, A. (2019). Effect of the Jigsaw- Based Cooperative learning method on student performance in the General certificate of education advanced level psychology.*International Education Studies*:9(1).

Parikh, N. (2016). Effectiveness of teaching through mind mapping technique. *Int J Indian Psychol*; 3: 148–56.

Rodger. S, Murray. H & Cummings, A. (2 017). Gender differences in cooperative learning with University students.*The Alberta Journal of Educational Research*. :53(2);157-73.

Schulmeister, R. (2017). Presence and self-study in blended learning. Eleed, 12(1). Students' academic achievement performance and satisfaction in a flipped classroom in Saudi Arabia. *Int. J. Technology Enhanced Learning*, , Vol. 11, No. 1, 103

Shahri, M. J., Matlabi, M., Esmaeili, R., & Kianmehr, M. (2017). Effectiveness of teaching: Jigsaw technique vs. lecture for medical students' Physics course. *Bali Medical Journal*, 6(3), 529-533.

Shukla, A., Kalra, G., & Pakhare, A. (2020). "Understanding stress and coping mechanisms in Indian student nurses.Sri Lanka *Journal of Psychiatry* Vol 4(2).

Sumitra, A., Frincyfrancis, R., L Mariya, P., Shilpa, V. (2020). The Jigsaw Effect: Impact of Jigsaw learning technique on nursing students to learn the concepts of normal labor.*Asian Journal of Nursing and Educational Research.*

Tran, V. D., & Lewis, R. (2019). Effects of Cooperative Learning on Students at An Giang University in Vietnam. *International Education Studies*, 5(1), 86-99.

- Yemi, T. M., Azid, N. B., & Ali, M. R. (2018). Effect of jigsaw strategy of cooperative learning on mathematics achievement among secondary school students. *European Journal of Education Studies*, 4(2), 51-60.

- Zawacki-Richter, O., Bozkurt, A., U., & Aldraiweesh, A. (2018). What research says about MOOCs- An explorative content analysis. *International Review of Research in Open and Distributed Learning*, 19 (1), 1- 9.

- Zeydani, A., Atashzadeh-Shoorideh, F., Abdi, F., Hosseini, M., Zohari-Anboohi, S., Skerrett,V., (2021). Effect of community-based education on undergraduate nursing students' skills: a systematic review. *BMC Nursing* (2021) 20:233 https://doi.org/10.1186/s12912-021-00755-4.