บทความวิจัย

การพัฒนาแบบจำลองเย็บแผลสำหรับนักศึกษาพยาบาล
Development of the Suturing Wound Model for Nursing Students

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Abstract

Introduction: One of the essential procedures required in clinical practice is suturing of simple wounds. Nursing students need to equip themselves in the nursing laboratory with basic skills and techniques in suturing in order to gain confidence and be well prepared before they apply this procedure to real patients in clinical setting. Skills gained in performing such a procedure further enhances student confidence, fosters a stress – free environment and saves cost.

Research objectives: This study was based on research and development research. The objective of the study was to develop a suturing and evaluation model based upon students' satisfaction levels. Students' satisfaction levels were used to determine the quality and value of the suturing model.

Research methodology: The study was conducted in two stages: (1) develop a suturing wound model and (2) evaluate satisfaction levels assigned to the suturing wound model. Thirty junior students participated in this study using a random sampling method. The questionnaire consisted of items pertaining to satisfaction levels of quality and value. The content validity of the questionnaire was evaluated by three experts. The reliability of the questionnaire was examined using Cronbach's coefficient alpha, resulting in 0.96. The data was collected and analyzed using paired t-test statistics once students sutured the wound model and after suturing meat.

Results: (1) the final suturing wound model was made from sponge and two silicone layers of tan skin, no foul odor, and was able to be used repeatedly. (2) Nursing students expressed higher

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satisfaction levels regarding quality and value of the suturing model compared to meat ($p<.05$). Students displayed high levels of satisfaction in relation to the convenience of storage and ease of movement ($\bar{X}$ = 4.90, SD = 0.31) when compared to using meat ($\bar{X}$ = 2.27, SD = 0.74). In terms of value, the suturing wound model can be used to practice repeatedly ($\bar{X}$ = 4.73, SD = 0.45) when compared with meat ($\bar{X}$ = 2.20, SD = 0.85). However, in regard to realistic properties of the skin, meat was closer to real skin ($\bar{X}$ = 4.07, SD = 0.79) when compared to the suturing wound model ($\bar{X}$ = 3.80, SD = 0.66).

Conclusions: The suturing wound model is a valuable and appropriate tool that can be utilized to enhance suturing skills in laboratory settings. Students can repeat suturing applications on the model, develop technical skills, and gain confidence in suturing prior to applications in a clinical setting.

Implications for practice: This suturing wound model may be used in scenarios that would require wound suturing, such as in primary medical care, in emergency nursing or even for medical students looking to improve on their suturing skills and techniques in clinical setting.

Keywords: nursing student, part-task trainers, suturing wound model, wound

บทคัดย่อ

บทนำ: หัตถการที่พยาบาลต้องสามารถทำได้อย่างหนึ่งคือการเย็บแผลที่ฉีดขาดแบบธรรมดา ซึ่งนักศึกษาพยาบาลต้องทำการฝึกทักษะการเย็บพื้นฐานในรูปแบบต่าง ๆ ในห้องปฏิบัติการพยาบาลจนมั่นใจก่อนการเย็บในผู้ป่วยที่มีแผลฉีกขาดแบบธรรมดาในโรงพยาบาล ซึ่งการฝึกจนชำนาญจะทำให้นักศึกษาพยาบาลมีความมั่นใจ ไม่มีความวิตกกังวลและประหยัดค่าใช้จ่ายในการซื้ออุปกรณ์ในการฝึก

วัตถุประสงค์การวิจัย: การศึกษานี้เป็นการวิจัยพัฒนาแบบจำลองการเย็บแผล โดยมีวัตถุประสงค์เพื่อพัฒนาแบบจำลองและประเมินความพึงพอใจในคุณภาพและคุณค่าของแบบจำลองการเย็บแผล

ระเบียบวิธีวิจัย: การวิจัยแบ่งออกเป็น 2 ระยะ คือ การพัฒนาแบบจำลองการเย็บแผล และประเมินความพึงพอใจของแบบจำลองการเย็บแผล กลุ่มตัวอย่างเป็นนักศึกษาพยาบาลชั้นปีที่ 3 จำนวน 30 คน โดยวิธีการสุ่มตัวอย่างแบบง่าย เครื่องมือที่ใช้คือแบบสอบถามความพึงพอใจในคุณภาพและคุณค่าของแบบจำลอง ตรวจสอบความตรงเชิงเนื้อหาของเครื่องมือโดยผู้ทรงคุณวุฒิจำนวน 3 คน และตรวจสอบความเที่ยงของเครื่องมือโดยคำนวณค่าสัมประสิทธิ์อัลฟาของครอนบาค ได้ค่าความเที่ยงเท่ากับ 0.96 โดยให้เย็บแบบจำลองหลังจากเย็บเนื้อจริงและวิเคราะห์ข้อมูลโดยการเปรียบเทียบค่าเฉลี่ยแบบจับคู่

ผลการวิจัย: (1) แบบจำลองการเย็บแผลพัฒนาจากฟองน้ำและซิลิโคน 2 ชั้น มีสีแทน ไม่มีกลิ่น และนำกลับมาใช้ซ้ำได้ (2) นักศึกษาพยาบาลให้คะแนนความพึงพอใจในคุณภาพและคุณค่าของแบบจำลองการเย็บแผลแตกต่างกันอย่างมีนัยสำคัญทางสถิติเมื่อเปรียบเทียบกับเนื้อสด ($p < .05$) เมื่อจำแนกเป็นรายข้อ ด้านความพึงพอใจ พบว่า การเก็บรักษาและเคลื่อนย้ายได้คะแนนเฉลี่ยมากที่สุด ($\bar{X}$ = 4.90, SD = 0.31) เมื่อเทียบกับเนื้อสด ($\bar{X}$ = 2.27, SD = 0.74) เมื่อจำแนกเป็นรายข้อด้านความมีคุณค่า พบว่า แบบจำลองมีค่าเฉลี่ยด้านการนำกลับไปฝึกซ้ำสูงกว่า ($\bar{X}$ = 4.73, SD = 0.45)

เมื่อเทียบกับเนื้อสด ($\bar{X}$ = 2.20, SD = 0.85) อย่างไรก็ตามความใกล้เคียงกับเนื้อจริง พบว่า เนื้อสดได้คะแนนเฉลี่ยมากกว่า ($\bar{X}$ = 4.07, SD = 0.79) เมื่อเทียบกับแบบจำลอง ($\bar{X}$ = 3.80, SD = 0.66)

สรุปผล: แบบจำลองการเย็บแผลที่พัฒนาขึ้น สามารถนำมาใช้ฝึกได้จริงในห้องปฏิบัติการ นักศึกษาพยาบาลสามารถนำมาใช้ฝึกทักษะการเย็บแผลในห้องปฏิบัติการได้จริง สามารถฝึกเย็บแผลได้บ่อยครั้ง เพื่อพัฒนาทักษะการเย็บแผลและก่อให้เกิดความมั่นใจในการเย็บแผลมากขึ้นขณะขึ้นฝึกปฏิบัติงานจริงในคลินิก

ข้อเสนอแนะ: สามารถนำแบบจำลองการเย็บแผลไปใช้ในการฝึกเย็บแผลในสถานการณ์จำลองที่ต้องการการเย็บแผลในวิชาต่าง ๆ เช่น การรักษาเบื้องต้น การพยาบาลฉุกเฉิน หรือนักศึกษาแพทย์ที่ต้องการพัฒนาทักษะและเทคนิคการเย็บแผลจริงในคลินิก

คำสำคัญ: นักศึกษาพยาบาล ทักษะหัตถการ แบบจำลองการเย็บแผล แผล

Introduction

In Thailand, clinical practice procedures in clinical settings are a significant part of training nursing students[1]. Most clinical skills are unique to each discipline and are required to perform a specific clinical practice to deliver competent patient care[2]. However, in the clinical setting, there are limited training fields for clinical practices and students are spending a lesser amount of time within the hospital due to the structure of the current educational system[3]. Moreover, some institutions do not have their own clinical setting. Hence, institutions send their nursing students to practice in other hospitals for a specialty within certain areas. When it comes to clinical settings, patient safety is of utmost importance. Therefore, students need to be well prepared from class before they provide clinical care for patients. In a clinical setting, nursing students need proper knowledge and practical skills that are required from each specialized area. Clinical laboratory practice is a good method to train nursing students for the practice[4]. Learned skill is retained beyond the practice period; it can be recalled and executed competently in a variety of clinical settings[2]. This clinical skill is tested before an actual clinical practice period.

Basic surgical skills practiced on models and simulators have been widely used in surgical education[5]. In a study done by Tjoflåt, Våga, and Søreide[6], simulation-based interventions contributed significantly to nursing education, especially when it comes to major effects on the psychomotor domain. The research of Chiannilkulchai and Sutti[7] developed a colostomy bag as a model for practice. After the study, the students were able to repeat the practice, leading to more developed skills and increased confidence in clinical care settings. A meta-analysis by Kim, Park, and Shin[8] show that simulation-based nursing education is effective in various learning domains, especially the psychomotor domain. From the study of the effectiveness of simulation-based education on satisfaction and learning outcomes in nurse practitioner programs by Warren, Luctkar-Flude, Godfrey, and Lukewich[9], the result showed that students were more satisfied with simulation-based teaching in comparison to other methods.

In clinical practice, one of the essential requirements in the procedure is the suture of a simple wound[10]. Nursing students need to practice in the laboratory before they perform this procedure with real patients. The suture procedure for students is used to close distinct types of wounds, using distinct types of stitching such as simple, running, interrupted mattress on subcutaneous, subcuticular, and dermal closure. The surgical technique used to close a given wound depends on the force and direction of tensions on the wound, the thickness of the tissues, and anatomic considerations[11]. Moreover, surgical knots are essential for hemostasis and synthesis. The knots should be firm but without tension on the tissue. The distinct types of suture procedures and surgical knots should be practiced repeatedly until they can be performed quickly, effectively, and automatically[12]. Teaching faculties are continuously challenged to find models that mimic both the human body and conditions that require treatments to provide realistic experiences for students.

In the past, Mission Faculty of Nursing used meat as a model for suturing because the tissue layers of meat nearly mimic of human tissue. But meat has a limitation. First, the layer of animal skin is tough. If we used all layers of meat, students would have to apply a greater pressure on the suture needle than required on human tissue. This reduces the accuracy required for suturing in the actual clinical setting. Second, before the practice, the instructors must prepare the meat at least one day in advance. When students are not able to complete their tasks within class hours, the meat rots, and smells. Therefore, meat can be used only once and within a limited period. A single training session is not sufficient to assure the level of the skill required before entering clinical practice. Hence, students need repetitive suturing practice themselves before performing the procedure with real patients[13]. Moreover, using meat requires repeated purchases of meat and additional expenditure. The students then need to spend more money if they want to practice again. Lastly, numerous companies tried to replicate skin for suturing, but the cheapest faux skin was too sticky and not created for anesthetic injection. The more realistic the skin, the more expensive the training model is[14]. The study of Daungrat et al.[15] shows that the suturing model was developed from latex and is not realistic in color. Kumaresan and Karthikeyan[16] produced a suturing model from a fresh orange. It was cost efficient but could not be stored for several days due to the dehydration of the orange. From all these stated limitations, the research goal was to develop and produce a suturing wound model for nursing students. This model may be placed in a box that can be carried. The model is developed from a tightly textured sponge that provides a similar feeling to real flesh. This model offers the possibility to insert artificial blood but may be subjected to air drying. The skin is made from a thin silicone layer whose texture mimics that of real skin. Nursing students can use this model to practice as often as needed. The more they practice, the firmer it becomes. They will be able to practice as often as they wish, until they gain the required confidence before training in the clinical setting. This model is a better alternative than using live animals which have the potential for infections. This also helps reduce expenditure for institution[12]. The suturing wound model will help students improve their surgical procedure performance under semi-realistic circumstances. It will also help them develop suturing skills in a stress-free environment and save costs.

Research framework

The suturing wound model was developed using the concept of Part-Task Trainers (PTTs). PTTs are simplified models designed and used to teach and introduce a specific skill or the performance of a whole task[17-20]. PTTs allow students to use specialized devices for repeated practice of a specific medical skill by gaining knowledge of the basic procedure[17,18,21]. The suturing wound model was developed for nursing students to improve suturing skills. They can make mistakes by suturing in a stress-free environment and at a reduced cost where instructors can openly give feedback. When students become familiar with a basic skill, they can be better prepared when suturing actual patients while undergoing procedure[17].

Research objectives

1. To develop and produce a suturing wound model for nursing students.

2. To evaluate students' satisfaction level on the quality and value of a suturing wound model.

Research methodology

Population and Sampling

1. The population consisted of ninety-two junior students.

2. The sample size of this research adhered to Burn & Grove's[22] principles for determining the appropriate sampling of the research. Power analysis is the best method to calculate the sample size if the information is available. However, this kind of research has never been done before. The recommendation of at least thirty subjects was followed in the study. After providing detailed information about the research project, 78 of the 92 junior students were interested in participating in the project. Then, 30 participants were selected by using a simple random sampling method from the 78 junior students that were the sample of this study.

Research Design and Method

This study used research and development design to develop a suturing wound model to enhance suturing skills among nursing students. This research was conducted in 2 stages.

Stage 1: Development of a suturing wound model.

Stage 2: Evaluation of students' satisfaction on the quality and value of a suturing wound model.

Stage 1: Development of a suturing wound model. This stage consisted of two parts.

Part 1: Designing the suturing wound model. This part consisted of six steps.

Step 1: Analysis of problems caused by traditional methods used in the past. This was achieved by interviewing thirty senior students. The identified problems were the smell of meat and its limited use (only once). After class, students needed to find a proper place to discard the pieces of used meat.

Step 2: Anatomical study of the skin layer to create the most realistic suturing wound model. The researcher studied a manikin model provided by a company. The following issues were identified: a) the manikin was very costly b) the cheapest manikin was too sticky. Hence, it caused students to apply greater pressure on the suture needle than required making students unable to get the right feel of suturing c) the manikin was not designed for anesthetic injection.

Step 3: Preparation of equipment needed to produce the suturing wound model includes the following:

1) Silicone for skin layer

2) Sponge for muscle 17 x 10 x 2.5 cm.

3) Artificial blood

4) Suture set

5) Plastic box

6) Skin color (yellow and tan)

7) Others (syringe, needle, weight scale, glass, wood)

Step 4: Production of the suturing wound model includes two steps:

1) Apply dye to the sponge to produce a red color. The red color makes the sponge look like muscles. (Figure 1)

2) Coat two layers of silicone onto the sponge. (Figure 2)

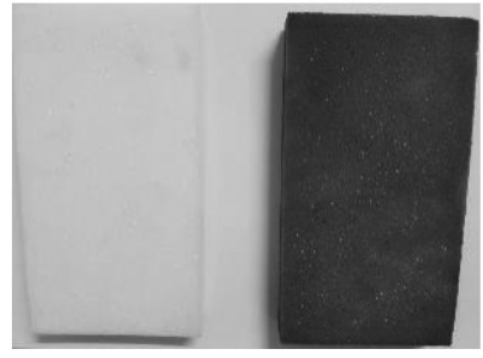


Figure 1 Dyeing the sponge to red.

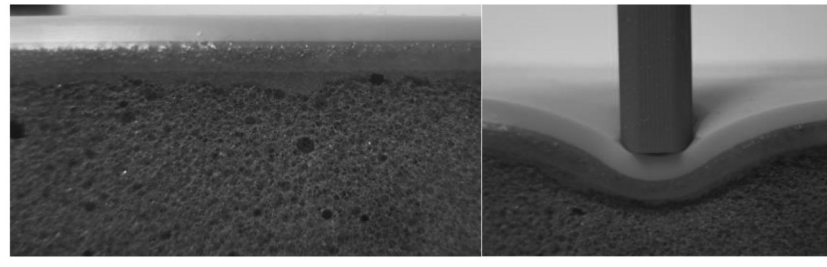


Figure 2 Skin of the model

Step 5: The suturing wound model was given to three experts: two surgeons and one nurse who have worked in the emergency department for more than ten years. Their task was to improve the model. All experts shared similar comments, the model was good for suturing; but the outer layer was a little bit sticky; and the color of the skin was too bright. The researcher changed the formula of the outer layer to soften it and gradually changed color. Each version was sent to three experts to be evaluated. Researchers developed the suturing wound model until the last version (Figure 3)

Step 6: Trial

1) The researchers prepared pieces of meat and the suturing wound model.

2) The researchers met with the junior students and informed them about the objectives, risks, and benefits of the research. Thirty participants were randomly selected from the junior class and sought permission before the trial.

3) Participants were asked to suture the meat followed by experimenting on the suturing wound model. (Figure 4)

4) After trying both types of suturing, participants were asked to answer the questionnaire.

All thirty participants indicated preference towards the suture wound model in contrast to meat. This was due to the lack of smell, convenience in carrying and storing of the model, and the possibility of multiple uses.



Figure 3 The skin color of the suturing wound model



Figure 4 Participants are suturing the wound model

Part 2: Creating and developing a questionnaire. This part consisted of three steps.

Step 1: The questionnaire for this research was based on the questionnaire developed by Chiannilkulchai and Sutti[7] and Daungrat et al.[15]. The questionnaire was divided into two sections: (1) satisfaction of the quality of the suturing wound model for suture practice and (2) value of the application of suturing wound model for suture practice. A five-point rating scale was utilized as follows: excellent, exceptionally good, good, fair, and poor.

Steps 2: Validity testing: The questionnaire was tested for Content Calidity Index (CVI) according to the ratings of three experts: two surgeons and one nursing instructor. The total value that experts gave to each item was divided by the number of experts and the overview which was 1.

Steps 3: Reliability testing: questionnaire reliability test conducted among thirty junior students. Cronbach's alpha coefficient was 0.96.

Stage 2: Evaluation of satisfaction and value of the suturing wound model:

1. The researchers prepared pieces of meat and the suturing wound model.

2. Contacted the instructor who was responsible for teaching Primary Medical Care and explained the project and asked for the available time needed for research.

3. The researcher met with the 92 junior students and informed them of the objectives, risks, and benefits of the research. Seventy-eight of the ninety-two junior students were interested in participating in the project. The thirty participants were randomly selected from 78 junior students, and permission was sought before the start of data collection.

4. The researcher prepared a surgical suture set: tray, needle, syringe, water, needle holder, forceps, scissors, gloves, silk, and suturing model (Figure 5)

5. The participants started to suture using a piece of meat (Figure 6) then followed by the suturing wound model. (Figure 7-8)

6. After both suturing experiments, participants were asked to answer the questionnaire.



Figure 5 Surgical suture set



Figure 6 Meat suturing



Figure 7 Injecting anesthesia



Figure 8 Nursing students are suturing the suturing wound model

Protection of human subjects

Research ethics approval was obtained from the Institutional Review Board of the Asia - Pacific International University (IRB) (AIU 151/2562-RRDC2019-48, April 25, 2019). Participants were provided detailed information of the study, risks, and benefits, including the right to refuse or withdraw at any time. They were informed that participation in the research would not affect their score in any of their subjects and were asked to sign a consent form.

Data analysis

After completing data collection, the descriptive statistics were used for general data. A paired t-test was used to compare the student's satisfaction in quality and value between the suturing wound model and meat ($p \leq .05$).

Results

Among the thirty participants, majority were female (90%) with an average age of 21.3 years (SD = 1.3). From the results of designing, producing, and developing the suturing wound model, the last version of the suturing wound model had tan skin and was made from sponge and two silicone layers. The model produced no foul odor, had the capability to inject anesthesia, and can be used repeatedly.

The mean of the satisfaction in the quality of the suturing wound model was higher than meat. Participants reported a high level of satisfaction for the suturing wound model in terms of convenience in storage and ease of movement ($\bar{X}$ = 4.90, SD = 0.31) when compared with meat ($\bar{X}$ = 2.27, SD = 0.74). Moreover, they were more satisfied with the lack of odor of the model ($\bar{X}$ = 4.77, SD = 0.68) in comparison to meat ($\bar{X}$ = 1.97, SD = 0.85). In terms of replicating the real skin, meat was closer ($\bar{X}$ = 4.07, SD = 0.79) than the suturing wound model ($\bar{X}$ = 3.80, SD = 0.66). Overall, the satisfaction in quality was higher with the suturing wound model when compared to meat. (Table 1)

Table 1 Mean and SD of student satisfaction levels in the quality of meat and the suturing wound model (n = 30)

Items	Meat		The suturing wound model	
	Mean	SD	Mean	SD
1. Convenience in practice and repeated use	3.67	0.76	4.67	0.48
2. Closer to the real skin	4.07	0.79	3.80	0.66
3. Appropriate equipment for practice	3.67	0.71	4.57	0.57
4. Appropriate size for practice	3.80	0.61	4.47	0.63
5. Ease of storage and movement	2.27	0.74	4.90	0.31
6. Durability for repeated use and practice	2.13	0.73	4.67	0.61
7. The smell of the model	1.97	0.85	4.77	0.68
8. Cost efficiency	2.50	0.68	4.30	0.79
Overall satisfaction with quality	3.01	0.87	4.52	0.30

Based on results of the satisfaction of value of the suturing wound model, the overall mean was higher than meat, especially on the ability to do repeat practices, the mean of the suture model ($\bar{X}$ = 4.73, SD = 0.45) was higher than meat ($\bar{X}$ = 2.20, SD = 0.85). (Table 2)

Highlights the results of paired t-test, there was a statistically significant difference in satisfaction scores in all aspects between meat and the suturing wound model ($p < .05$). The result indicates that the suturing wound model can be used to practice suturing. (Table 3)

Table 2 Mean and SD of student satisfaction levels in the value of the suturing wound model (n =30)

Items	Meat		The suturing models	
	Mean	SD	Mean	SD
1. The model can be used to practice for suturing	4.00	0.70	4.37	0.72
2. The model can be used to practice repeatedly	2.20	0.85	4.73	0.45
3. Met the objective for practicing	3.37	0.81	4.30	0.70
4. The model was a good medium for self-study	3.50	0.63	4.57	0.57
5. More understanding of suturing after using the model	3.87	0.63	4.37	0.76
6. More confidence after practicing using the model	3.70	0.70	4.20	0.66
Overall satisfaction in value	3.44	0.65	4.42	0.25

Table 3 Comparison of student satisfaction levels between meat and the suturing wound model (n = 30)

	Topic	Mean	SD	paired t- value	P value
1. Satisfaction of the quality	Meat	3.01	0.87	16.180*	.000
	The suturing wound model	4.52	0.30		
2. Satisfaction of valuable	Meat	3.44	0.65	8.366*	.000
	The suturing wound model	4.42	0.25		
3. Overall satisfaction	Meat	3.19	0.23	14.219*	.000
	The suturing wound model	4.48	0.25		

*$p < .05$

Discussion

The finding shows a statistically significant difference in satisfaction scores. The mean values obtained for satisfaction based on quality and value aspects of the suturing wound model were higher than meat. It suggests that the suturing wound model increases the opportunity for students to practice their surgical skills. Pertaining to the concept of PTTs, nursing students can use the suturing wound model for basic practice in preparation for more complicated suturing techniques. Trials and errors coupled with repeated practices will lead to better performance providing them with confidence when they must treat patients with simple wounds.[17-18] However, when they face complicated wounds, they can modify basic suturing techniques to help patients. The more experience, the more suture techniques can be created in special situations. The suturing wound model can help nursing students develop their psychomotor skills. These findings are consistent with the study by Chiannilkulchai and Nunthawong[23]. The result of the intramuscular injection model acts as a part-task trainer that is suitable for nursing students to repeat practice and develop more laboratory skills which will enhance their confidence within the clinical setting.

Regarding the quality of the model, the suturing wound model has a higher level of satisfaction based on quality when compared to fresh meat. The result shows a significant statistical difference in all aspects of satisfaction ($p<.05$). This result is similar to the study of Daungrat et al[15] which found that the latex model had higher quality, is more durable, and is reusable in comparison to fresh meat.

With regards to the comparison of smell, the mean values of both meat and the suturing model were different. It is not surprising because meat must be prepared one day before practice. When students could not complete their task within the same day, that piece of meat was kept for the next day. Hence, the meat became rotten and emitted a foul odor. The alternative for repeated practices is to keep purchasing fresh meat which can drain a student financially. In terms of durability, meat is nearly the same when compared to the study conducted by Kumaresan and Karthikeyanthat of a fresh orange that could be stored for only two or three days. After that, the skin got dried and lost its resilient nature[16]. Further, to cultivate psychomotor skills, a single training session is not sufficient to assure the level of required skill in a clinical setting. This model can help reduce expenditure related to clinical skills for students. This outcome is confirmed by the mean value for convenience of storage and ease of movement. The suturing model had a higher score ($\bar{X}$ = 4.90, SD = 0.31) when compared with meat ($\bar{X}$ = 2.27, SD = 0.74). The findings are consistent with the study by Chiannilkulchai and Sutti[7]. In the colostomy bag model, students were able to repeat practice, which led them to develop more skills and confidence while practicing in clinical care settings.

This study has especially significant implications due to the outbreak of the Coronavirus disease 2019 (COVID-2019) that has spread to more than 100 countries all over the world with more than 242,348,657 confirmed cases of COVID-19, and more than 4,927,723 deaths. Current knowledge on COVID-2019 indicates that this virus can be transmitted from animals to humans in live animal markets and from humans to humans[24]. This information still lacks reliable supporting data and use of this artificial suturing wound model can protect nursing

students from getting infected.

In terms of the value of this suturing model, the overall mean is higher than fresh meat, especially in the aspect of repeated practices. Meat can be used only once but suture procedure practices need to be repeated multiple times. The different types of suture procedures and surgical knots should be practiced repeatedly until they can be performed quickly, effectively, and automatically[12]. Our findings are supported by results from Chiannilkulchai and Nunthawong[23] where nursing students show a very high degree of satisfaction with the artificial pus wound model in terms of its worthiness.

Implications for practice

This model can be used in scenarios that require suturing such as primary medical care, emergency nursing to help nursing, or medical students looking to improve their suture techniques.

Implications for future research

Looking into the future, the simulation lab will play an important influential role in clinical practices. This will enable nursing students to focus on their performance skills and on their ability to independently practice in clinical settings. After much repeated utilization of this model, future research will be needed to identify the quality suturing method from within the actual clinical setting.

Conclusions

The suturing wound model had tan skin and was made from sponge and two silicone layers. The model was able to be used repeatedly with the capability to inject anesthesia. Nursing students reported a high level of satisfaction for the suturing wound model in terms of quality and value compared to fresh meat. Additionally, it provides an opportunity for repeated practices. The suturing wound model presented here, maybe instrumental in enhancing student confidence using appropriate skills and techniques in wound suturing. It is however recommended that frequency in using this model be increased to further build confidence and enhance suturing skills and techniques among nursing students. Furthermore, the result of this research may fill the existing gap in nursing education in general, and the student's readiness and lack of skills in clinical practice in particular.

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