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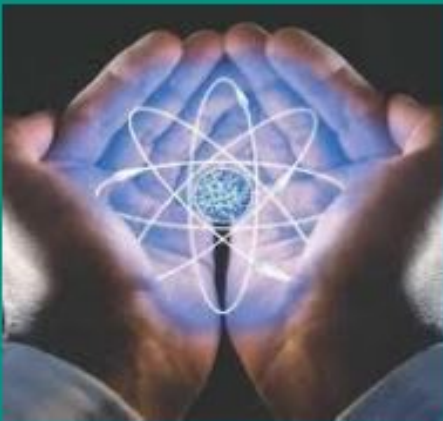
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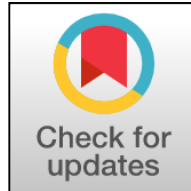
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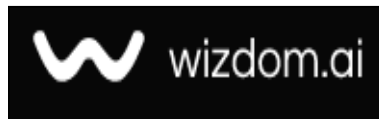
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Moderate Proficiency in Suture Techniques Among Nurses: A Cross-Sectional Study

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Abstract

This study aimed to evaluate the knowledge of healthcare providers, specifically nurses, regarding suturing skills, methods, and types at Al-Basrah Teaching Hospital. A descriptive cross-sectional approach was adopted from January 1, 2023, to July 30, 2023. A purposive sample of 100 nurses, representing both genders and various wards, participated. Preliminary validation was conducted through a pilot study involving ten healthcare providers, and Cronbach's Alpha assessed the survey's reliability. Data analysis was executed using SPSS version 26, focusing on descriptive statistics (mean, SD, frequency) and inferential statistics (chi-square). The demographic profile showed an equal distribution in age (50% aged 20-35), a slight female predominance (52%), and a majority holding diplomas (56%). Results indicated a moderate level of knowledge and proficiency in suturing skills and techniques among the participants. These findings suggest a need for enhanced training and education in suturing to improve patient care outcomes in clinical settings.

Highlights :

- **Moderate Suturing Proficiency:** Nurses displayed a medium level of knowledge and skill in suturing techniques.
- **Demographic Diversity:** Sample included a balanced age distribution, slight female predominance, and majority diploma holders.
- **Training Implications:** Results highlight the necessity for improved suturing education to enhance patient care quality.

Keywords : Suturing Skills, Nurse Education, Healthcare Training, Cross-Sectional Study, Clinical Competency

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Introduction

The most popular surgical implants are sutures, which represent 57% of the worldwide market for surgical equipment. They may be categorized as multifilament, monofilament, braided, or twisted fibers that are biocompatible and can be natural or manufactured. Surgical sutures have a significant susceptibility to microbial colonization and the development of biofilms, in addition to the potential to cause a foreign body response. The possibility of spreading a microbial infection exists with surgical sutures used to seal injured tissues [1].

Surgery uses specialized medical threads called "sutures" to stop bleeding. They might tighten blood vessels to provide hemostasis or keep the tissues close to a wound together [2]. The wound healing device has to be very elastic and flexible for treating soft tissues including skin, muscles, tendons, and ligaments. The following qualities should be present in the perfect suture: (1) It must be able to retain a sufficient level of strength during the healing process, as well as extend to accommodate wound dropsy and contract back to its initial length upon wound retraction; (2) The wound should have the capacity to deteriorate and absorb itself after healing, leaving no foreign body behind; (3) Absence of swelling No irritants or carcinogens; (5) Simple dyeing, sterilization, disinfection, and other treatments; (6) Can f (7) Scalable, inexpensive, and easy to develop production [3], [4].

Surgical Site Infections (SSI) resulting from wound infections have increased in frequency, increasing the expense of therapy, hospitalization rates, length of treatment, severe morbidity, and fatality rates [5]. Implanting foreign entities like surgical sutures into a patient's body invariably results in tissue responses that might cause inflammation and other issues . The culprits are the microbes that cause a bacterial biofilm to form in the wound. When a bacterial surface develops a thick, adhesive membrane layer known as bacterial biofilm and is encircled by fibrin produced by the bacteria, a bacterial colony is created. Such biofilms are often seen on both biological surfaces like surgery sites, wounds, and other tissue regions as well as non-living surfaces like hospital walls, medical equipment, and implants. Bacterial biofilms exist that stop the development of microbes that may cause a persistent wound infection [7], [8]. The difficulties of treating chronic wounds are made worse by the inability to use traditional antibiotics , According to reports, 20,000 fatalities linked to Methicillin-resistant Staphylococcus aureus (MRSA), one of the leading causes of infection-related mortality, occurred in the United States alone in 2017 . Hospitals frequently harbor gram-positive (Staphylococcus epidermidis) and therefore, it is extremely important to develop surgical sutures with great performance and efficient antibacterial and anti-inflammatory capabilities, such as Pseudomonas aeruginosa and Escherichia coli. In terms of their qualities and functional capabilities, such as the delivery of medication and wound healing, nanofibers may be significant in the development of new types of sutures to replace conventional threads .

Method

Healthcare providers' knowledge toward skills, methods, and types of sutures at Al-Basrah Teaching Hospital from January 1, 2022, to March 30, 2022, using a descriptive cross-sectional research methodology. For the study's aim, a non-probability (purposive) sample of (100) nurses from the Al-Basrah Teaching Hospital who worked in various hospital wards was chosen. For the goal of gathering data, a closed-end questions questionnaire was utilized. There are five sections to the questionnaire, Age, gender, educational attainment, place of employment, years of employment, and any training in wound suturing are among the six items that make up the first part of the questionnaire. The second part of the questionnaire consists of twelve questions that are related to the fundamental principles of wound suturing. In this part, a three-point Likert scale was used (YES, NO, and NOT ALWAYS). The third part of the questionnaire is made up of four questions that represent well-known suturing techniques. Statistical Package for Social Sciences (SPSS) version 26 was used to analyze statistical data. The terms percentage (%), arithmetic mean, standard deviation (Sd), and mean of scores are all used in descriptive and inferential data analysis.

Results and Discussion

Results

Results indicated that age groups of 20 to 35 years were represented by 50%, 35 to 50 years by 46%, and beyond 50 years by 4%. Gender was also represented by 52%. In terms of education, the sample had a 56% female-to-male ratio, with 48% of the males and 34% of the females having attended diploma. Years of work were divided into three categories: 1-9 years were 45%, 10-20 years were 44%, and more than 20 years were 11%. In terms of employment, 32% of the sample worked in the operating room and emergency room, 23% in the ICU, CCU, and surgical ward, and 45% in other wards. While 13% of people had taken a training course in wound suturing, whereas 87% had not.

According to the study's findings, respondents' understanding of suturing techniques was indicated by their responses. 92% of nurses are aware that wounds must be cleaned before sutures are placed, and 96% know that sanitary instruments should be sterilized before use. Only 66% of people are aware that sutures may be opened in

infected wounds. Only 22% of people are aware of the method of sterilizing you utilize for suturing equipment. While 99% of people are aware of the substance used to clean the wound before suturing. Only 20% of people are aware of how to clean the wound before suturing. Only 20% of people are aware of which wounds need to be sutured. Priorities are known by 86% of people before suturing. While 41% of people are aware of the time needed for a face wound to heal, 61% are aware of the time needed for an arm wound to heal, 53% are aware of the time needed for a joint wound to heal, and 34% are aware of the time needed for wound sterilizing and bandaging.

The responses provided by respondents to questions concerning their suturing knowledge were shown in the study's findings using a mean of scores. Good understanding of the need to cleanse wounds before suturing and the sterilization of suturing equipment before use. moderate familiarity with removing stitches from an infected lesion. Lack of understanding about the process you employ to sterilize suture equipment. Good familiarity with the substance used to clean the wound before suturing. lack of expertise in cleaning the wound before suturing. Lack of expertise on the sorts of wounds that need suturing. previous awareness of the priorities is essential before stitching. Medium understanding of the time needed for a face wound to heal, the time needed for an arm wound to heal, the time needed for a joint wound to heal, and the time needed for wound sterilizing and bandaging. Therefore, the researchers discovered that the suturing abilities were rated as medium in terms of knowledge overall.

According to the study's results, 76% of respondents said they were familiar with interrupted suturing, 19% said they were familiar with figure 8 suturing, 32% said they were familiar with basic buried suturing, and 42% said they were familiar with continuous suturing.

According to the results of the current study, respondents had medium knowledge of interrupted suturing, weak knowledge of figure 8 suturing, weak knowledge of simple buried suturing, and medium knowledge of continuous suturing when asked about suturing techniques. The overall rating of suturing technique expertise was mediocre.

According to the study's findings, 74% of the sample are familiar with polyglactin, 38% are familiar with polydioxanone, 33% are familiar with polyglycolic acid, 79% are familiar with nylon, 33% are familiar with polypropylene or Prolene, 69% are familiar with silk, and 35% are familiar with polyester ethibond.

According to the study's findings, healthcare providers had a mean score of excellent knowledge of Polyglactin, medium knowledge of Polydioxanone, poor knowledge for Polyglycolic Acid, excellent knowledge for Nylon, poor knowledge of Polypropylene or Prolene, good knowledge of Silk, and medium knowledge for the polyester Ethibond suture structure component. Overall, it was determined that there was a medium level of awareness of the sutures' structural component.

Demographic Data			
Demographic Data	Classes	Frequency	%
Age	20 – 35	50	50
	35 – 50	46	46
	More than 50	4	4
	Total	100	100
Gender	Male	48	48
	Female	52	52
	Total	100	100
Level of Education	Diploma	56	56
	Baccalaureate	34	34
	Postgraduate	10	10
	Total	100	100
Years of employment	1 – 9 years	45	45
	10 – 20 years	44	44
	More than 20	11	11
	Total	100	100
Workplace	1	32	32
	2	23	23
	3	45	45
	Total	100	100
Training Course	No	87	87
	Yes	13	13
	Total	100	100

Figure 1. *Distribution of Demographic Characteristics of The Sample*

Healthcare Providers Knowledge of Suture Skills				
	Items	Answers	Frequency	%
1	Should suturing equipment be sterile before use?	Incorrect	4	4%
		Correct	96	96%
		Total	100	100%
2	Do you wash the wound before suturing	Incorrect	8	8%
		Correct	92	92%
		Total	100	100%
3	If an abscess develops from the incision beyond the allotted time, may the suture be removed?	Incorrect	34	34%
		Correct	66	66%
		Total	100	100%
4	What method of sterilizing do you use for suturing equipment?	Incorrect	78	78%
		Correct	22	22%
		Total	100	100%
5	How do you clean the wound before stitching it up?	Incorrect	1	1%
		Correct	99	99%
		Total	100	100%
6	How should the wound be cleaned before to suturing?	Incorrect	80	80%
		Correct	20	20%
		Total	100	100%
7	What types of wounds should be sutured?	Incorrect	80	80%
		Correct	20	20%
		Total	100	100%
8	Priority before suturing is	Incorrect	14	14%
		Correct	86	86%
		Total	100	100%
9	For a face wound, the recovery time is	Incorrect	59	59%
		Correct	41	41%
		Total	100	100%
10	For the arm wound, the recovery time is	Incorrect	39	39%
		Correct	61	61%
		Total	100	100%
11	The time needed for a joint region wound to heal is	Incorrect	47	47%
		Correct	53	53%
		Total	100	100%
12	Sterilize and bandage the wound within	Incorrect	66	66%
		Correct	34	34%
		Total	100	100%

Figure 2. Knowledge about Suture Skills

Suture Skills							
	Item	N	Min	Max	Mean Score	Sd	Ass.
1	Should suturing equipment be sterile prior to use?	100	0	1	0.96	0.197	Good
2	Before stitching up the wound, do you wash it?	100	0	1	0.92	0.273	Good
3	If an abscess develops from the incision beyond the allotted time, may the suture be removed?	100	0	1	0.66	0.476	Medium
4	What method of sterilizing do you use for suturing equipment?	100	0	1	0.22	0.416	Weak
5	How do you clean the wound before stitching it up?	100	0	1	0.99	0.100	Good
6	How should the wound be cleaned before to suturing?	100	0	1	0.20	0.402	Weak
7	What kinds of wounds need suturing?	100	0	1	0.20	0.402	Weak
8	Priority before suturing is	100	0	1	0.86	0.349	Good
9	For a face wound, the recovery time is	100	0	1	0.41	0.494	Medium
10	For the arm wound, the recovery time is	100	0	1	0.61	0.490	Medium
11	The time it takes for a joint region wound to heal is	100	0	1	0.53	0.502	Medium
12	Sterilize and bandage the wound within	100	0	1	0.34	0.476	Medium
	Total Assessment	100	0	1	0.57	0.588	Medium

Figure 3. *Suture Skills*

suture methods			
suture methods	Answers	F	Percent
Interrupted suturing	Incorrect	24	24%
	Correct	76	76%
	Total	100	100%
figure 8	Incorrect	81	81%
	Correct	19	19%
	Total	100	100%
Simply buried suture	Incorrect	68	68%
	Correct	32	32%
	Total	100	100%
continuous suturing	Incorrect	58	58%
	Correct	42	42%
	Total	100	100%

Figure 4. *Suture Methods Domain for the Sample*

Suture Methods						
Item	N	Min	Max	Mean Score	Sd	Ass.
Interrupted suturing	100	0	1	0.76	0.429	Medium
figure 8	100	0	1	0.19	0.394	Weak
Simply buried suture	100	0	1	0.32	0.469	Weak
continuous suturing	100	0	1	0.42	0.496	Medium
Total Assessment	100	0	1	0.42	0.247	Medium

Figure 5. *Suture Methods*

Surgical Suture Type			
Types of suturing	Answers	Frequency	%
Polyglactin (Vicryl)	Incorrect	26	26%
	Correct	74	74%
	Total	100	100%
Polydioxanone (PDO)	Incorrect	62	62%
	Correct	38	38%
	Total	100	100%
Polyglycolic acid (PGA)	Incorrect	67	67%
	Correct	33	33%
	Total	100	100%
Nylon	Incorrect	21	21%
	Correct	79	79%
	Total	100	100%
Polypropyleneor Prolene	Incorrect	67	67%
	Correct	33	33%
	Total	100	100%
Silk	Incorrect	31	31%
	Correct	69	69%
	Total	100	100%
Polyester Ethibond	Incorrect	65	65%
	Correct	35	35%
	Total	100	100%

Figure 6. *Results of Surgical Suture Type*

Surgical Suture Type						
Domain of Surgical Suture Type	N	Min	Max	Mean Score	Sd.	Ass.
Polyglactin (Vicryl)	100	0	1	0.74	0.441	Good
Polydioxanone (PDO)	100	0	1	0.38	0.488	Medium
Polyglycolic acid (PGA)	100	0	1	0.33	0.473	Weak
Nylon	100	0	1	0.79	0.409	Good
Polypropyleneor Prolene	100	0	1	0.33	0.473	Weak
Silk	100	0	1	0.69	0.465	Good
Polyester Ethibond	100	0	1	0.35	0.479	Medium
Total Assessment	100	0	1	0.51	0.201	Medium

Figure 7. Surgical suture type

Discussion

In the context of general practice, being able to seal a wound effectively is a significant and essential skill, and improper suturing technique and high suture tension are directly associated with inadequate wound healing and increased scarring. Suturing must thus be taught to both freshmen graduates and undergraduates [13].

The results of this showed that most of the nurses at the age interval 20 -35 were (50%). According to the researcher, the youthful age of the healthcare providers was positive since it showed a higher motivation on their part to learn new material than did the older healthcare providers.

The findings of this study showed most of the healthcare providers' gender (52%) were female. The majority of healthcare providers globally (especially nursing), from the researcher's perspective, are women. The nursing institutions and colleges in Iraq admit more female students than male students.

The results of the present showed most of the healthcare providers' education level (56%) of the sample was diploma. According to the researcher, healthcare providers with postgraduate work in specialized units (critical wards) are few compared to other healthcare providers, while hospital wards rely on healthcare providers with a diploma or baccalaureate degree.

The outcomes of the present study reveal most of the healthcare providers' years of employment (1 - 9) years were (45%). The majority of healthcare providers who work in surgical fields, from the researcher's perspective, are young since this task takes greater physical effort. In terms of employment settings, (32%) of the sample worked in the operating room and emergency department, (23%) in the surgical ward, ICU, or CCU, and 45% in other wards.

The results of this study showed most of the study sample (87%) had no training course in wound suturing. These results agree with a study [13] which stated most of the study sample aged between 22-30 years and most of the study sample had no training course.

The findings of this research indicated that the general evaluation of knowledge about suturing abilities was medium. These results agree with a study [14] conducted in Brazil shows that most of the sample has moderate knowledge about suturing skills. The total evaluation of knowledge regarding suturing techniques, according to the results of the present research, was medium.

According to the researcher, there are many reasons why healthcare providers' knowledge of the suture's skills, methods, and structure components of the sutures, may be lacking. For example, healthcare providers may not have studied and practiced suturing methods and skills at all levels of healthcare providers' education, they may not have access to training courses about these topics, and they may not regularly update their knowledge. Measurement of the degree of nurses' suturing procedure knowledge will need more research.

Conclusion

The majority of the research sample's participants were female, between the ages of 20 and 35, with nursing school as their highest degree of education and 1 to 9 years of work. Suturing skills were rated as having medium overall knowledge. The general level of knowledge about suturing techniques was rated as medium. The general level of knowledge of the sutures' structural component was rated as medium.

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