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# Barriers of Delivering Nursing Care to Children at Intensive Care Units: A Mixed Method Study

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**ABSTRACT**

**Objective(s):** To determine barriers for delivering nursing care for children at Intensive Care Units.

**Methods**: A mixed method research, employing (convergent parallel design) was used in this study. A non-probability (purposive) sampling of 60 nurses were employed, 15 of them were included in the qualitative part of the study. The data were collected from three different intensive care units from January 3rd to February 20th, 2024, using the performance obstacles assessment questionnaire for the quantitative part of the study. An official permission to use the study questionnaire was obtained from the corresponding author. A semi-structured interview technique was used to collect the data. It took about 45-60 minutes for each participant to complete interview and record their responses. Quantitative data analysis has been established by using SPSS version 23, and the qualitative data analysis have been established based on thematic analysis.

**Results:** Quantitative results presented barriers including all domains (environmental barriers, organization barriers, technological barriers, task barriers, and family barriers) in which the mean of all domains was 2.61 and higher. In addition, qualitative results showed that nurses who work at children intensive care unit were faced by several barriers during care delivery for children such as environmental barrier, technological barrier, task barrier, organizational barrier, and family barrier.

**Conclusions:** Pediatric nurses were confronting barriers during delivering care to children due to lack of family awareness about care, lack of appropriate resources and devices, nursing shortage, and absence of clear protocol.

**Recommendations:** Efforts should be prioritized toward finding solutions for all the barriers faced by pediatric nurses to ensure better quality of healthcare services.



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# معوقات تقديم الرعاية التمريضية للأطفال في وحدات العناية المركزة: دراسة ذات النهج المزيج


## المستخلص

**الأهداف**: لتحديد المعوقات التي قد تواجه تقديم الرعاية التمريضية للأطفال في وحدات العناية المركزة.
**المنهجية:** تم استخدام دراسة ذات النهج المزيج (تصميم موازٍ متقارب) في هذه الدراسة. تم تطبيق عينات غير احتمالية (هادفة) على 60 ممرض(ة) لاختيار عينة البحث، تم تضمين 15 منهم في جزء البحث النوعي من الدراسة. تم جمع البيانات من ثلاث وحدات عناية مركزة مختلفة من 3 كانون الثاني إلى 20 شباط 2024، باستخدام استبيان تقييم معوقات الأداء للجزء الكمي من الدراسة وتم الحصول على اذن رسمي لاستخدام استبيان الدراسة من المؤلف الأصلي. استخدم الباحثين تقنية مقابلة منهجية وشبه منظمة. استغرق جمع البيانات حوالي 45-60 دقيقة لكل مشارك لإكمال المقابلة وتسجيل استجاباتهم. تم تحليل بيانات الجانب الكمي باستخدام الإصدار 23 من برنامج الحقيبة الإحصائية وتم تحليل بيانات الجانب النوعي باستخدام نهج التحليل الموضوعي.
**النتائج** :أظهرت النتائج الكمية وجود معوقات تشمل جميع المحاور (معوقات بيئية، معوقات مؤسساتية، تمعوقات قنية، معوقات مهام ومعوقات عائلية) حيث كان الوسط المعياري 2،61 فما فوق لكل المحاور. وبينت النتائج النوعية أن الممرضين والممرضات اللذين يعملون في وحدة العناية المركزة للاطفال واجهوا عدة معوقات أثناء تقديم الرعاية للأطفال مثل المعوق البيئي، المعوق التكنولوجي، معوق المهام، المعوق التنظيمي، والمعوق الأسري.
**الاستنتاجات:** ممرضي الأطفال واجهوا معوقات أثناء تقديم الرعاية للأطفال المرضى بسبب نقص وعي الأسرة بالرعاية، ونقص الموارد والأجهزة المناسبة، ونقص الملاك التمريضي، وغياب بروتوكول العمل الواضح.
**التوصيات:** يجب أن تستهدف الجهود إيجاد حلول لجميع المعوقات المذكورة لضمان جودة أفضل لخدمات الرعاية الصحية.


**الكلمات المفتاحية:** معوقات، ممرضي الأطفال, الأطفال, وحدة العناية المركزة ,دراسة ذات النهج المزيج

## Introduction

Worldwide, hospitalized children representing 6.6% of all hospitalized patients across all age groups, with 73,529 hospitalized children [1]. Nurses play an outstanding role among all the health care professionals in healthcare settings. However, they may face challenges during providing care in terms of barriers and many barriers in delivering the required care. As a result, they become more likely to encounter conflicts [2]. It is imperative to direct and concentrate efforts toward studying nursing discipline in order to address problems that nurses may encounter, including workloads, working overtime, interacting with patients and their relatives, and interacting with the institution's managers [2,3]. The existence of these barriers creates a problem in providing the standard care and exhaust the nursing resources without any further benefit for the patients [4].

There is a lack of data in the literature to help pediatric healthcare professionals especially nurses to understand how to provide culturally competent care to their patients and families and understanding challenges they may face when providing nursing care or a diverse patient [5]. According to previous study, it was recommended to conduct further study to measure barriers that could face nurses at any discipline to deliver nursing care [6].

This study aimed to determine barriers that might face delivering the nursing care for pediatric patient at intensive care unit. According to Iraqi Ministry of Health (MOH) databases, there is no previous research project has been conducted to measure barriers that could face pediatric nurses work in intensive care units [7]. Moreover, conducting such a study will assist in highlighting barriers' which could face pediatric ICU nurses, providing research-based evidence about this phenomenon, and will assist in figuring out solutions with such barriers.

## Methods

### Study Design and Setting

A mixed method study (convergent parallel design) was carried out in order to obtain a more complete understanding from two data sets, corroborate and compare results from different methods and multiple levels consequently. [8] Nurses were working at PICU at Al Nasiriyah heart center, Bent al Huda Teaching Hospital, and Mohammed Al Mousawi Pediatric Hospital, all pediatric Hospital in Thi-Qar City.

### Study Sample and Sampling

The study sample was nurses working at PICU, with a total number of 78. A non-probability (purposive) sampling approach was applied to select the sample for the quantitative part of the study. The minimum sample size was calculated based on a creative research system site using sample size calculator considering (confidence level = 95 %, margin of error = 5 %, and total population size = 78). The minimum sample size was 65 nurses, and by subtracting five participants for conducting pilot study, the final sample size was 60 nurses. 15 nurses were included in the qualitative part of the study, so that no extra information can be gathered from participant over than 15.

### Data Collection and Study Instruments

Data collection procedure was achieved during the period from January 3rd to February 20th, 2024. All 60 nurses received the study questionnaire to answer. Nurses were included in the study if they are at least 19 years and older, voluntaries to participate, and at least have 1-year experience in pediatric ICU. Nurses excluded if they worked out of the PICU, had less than one year of experience, and those participated in the pilot study.

The official permission was obtained from the original author to use a previously published tool namely: "Performance Obstacles Assessment Questionnaire" prepared by Gurses & Carayon. [9] After getting the permission, the instrument was translated into Arabic language by authorized linguistic (bilingual) experts and then re-translated to English language to achieve back-to-back translation to ensure clarity of items. The study instrument consisted of nurses' socio-demographic characteristics, barriers faced pediatric Intensive Care Units' nurse, and a qualitative open-end question that measure barriers faced nurses in the pediatric intensive care units.

A five-point Likert scale was used for each factor: One implies strongly disagree and five implies strongly agree (strongly disagree= 1, disagree= 2, neutral= 3, agree= 4, strongly agree= 5). Assessment level of mean for sections and overall domains can be measured by subtracting the upper score (5) from the lower score (1) and then divide the result on the total number of the scale items which is (5). Results can be explained as (1-1.8, and 1.81-2.6 revealed no significant barriers), (2.61-3.4 and higher revealed significant barriers).

### The Validity and Reliability of Study Instrument

After the translation of the questionnaire, face validity was used by sending the questionnaire to a group of 18 experts, each possessed over five years of experience in their respective fields, deliberated on the questionnaire validity. The reliability was determined by distributed the questionnaire to five PICU nurses and used test re-test approach, by measure Pearson correlation coefficient (r= .88) which was acceptable to be used in this research.

### The Qualitative Phase

In the qualitative phase, data was gathered from 15 participants using semi-structured interview technique. It took about 45 - 60 minutes for each participant to complete interview and record their responses using interview electronic recording tool. Interviews continued until the data reach the saturation point with 15 nurses, so that no extra information can be gathered from participants.

**Methodological Rigor and Trustworthiness**

For the qualitative phase in this study, methodological rigor has been established. Although it can be challenging to evaluate, guarantee, and uphold the rigor of qualitative research, a rigorous research methodology is necessary to produce valid and dependable findings for readers. [10] Three steps were taken to ensure rigor: the stage of preparation, data collection technique, and analysis unit. This process aids in providing rigorous description, methodology, and findings. Credibility criterion, which is related to the internal are obtained by the participant. Transferability criterion is comparable to external validity. The term "transferability" describes how well research findings can be applied or generalized to different groups or environments. In order to fulfill this requirement for this study, a description of the goals, methods, and conclusions of the research were applied to help readers assessed whether the study's conclusions can be applied in different situations.

Authenticity bears similarities to credibility. It is the degree to which the researchers faithfully and fairly portray a variety of distinct realities. [10] Previously authentic and non-duplicate study and the data collected referred to the participants themselves.

**Ethical Considerations**

The Institutional Review Board approval number that was issued by the ethical committee was: UOB.CON. 2, 11/12/2023. The study protocol and questionnaire were sent to the Ministry of Planning (Central Statistical organization) and the Ministry of Health data and transcripts, defining units of analysis, developing categories and themes, determining the clarity of units, coding the data, drawing conclusions, and reporting findings. This process helped achieve validity of the quantitative research, ensuring the faithfulness of data management and interpretation. Emphasized how interconnected questions are with participants answers in order to ensure the credibility of the research. [11]

Confirmability was reached by checking the answers of the participants and make sure that there is no interfering with the researcher's point of view, then when another researcher poses the same questions later, the same answers

before beginning the data collection process. Moreover, all participants were received informed consent prior to participate in the research process to ensure their rights. All information and recorded data from the participants were obtained by the researchers and kept for research purpose only with no harm to the participants. Each participant received a numerical name instead of the real name to ensure participant’s privacy.

**Data Analysis**

**Quantitative Statistical Data Analysis**

The data were analyzed using Statistical Package for Social Sciences (SPSS) version 23 for quantitative data, including: descriptive data analysis and inferential data analysis.

**Qualitative Statistical Data Analysis**

By using qualitative content analysis, similarities among words, phrases, sentences, and concepts to answer the research question: “what the barriers about are delivering nursing care for pediatric patients at ICU” The qualitative analysis process included preparing the

saturation of all concepts including 15 participants interview to determine their thoughts, intentions, and beliefs such that no new category or themes were found.

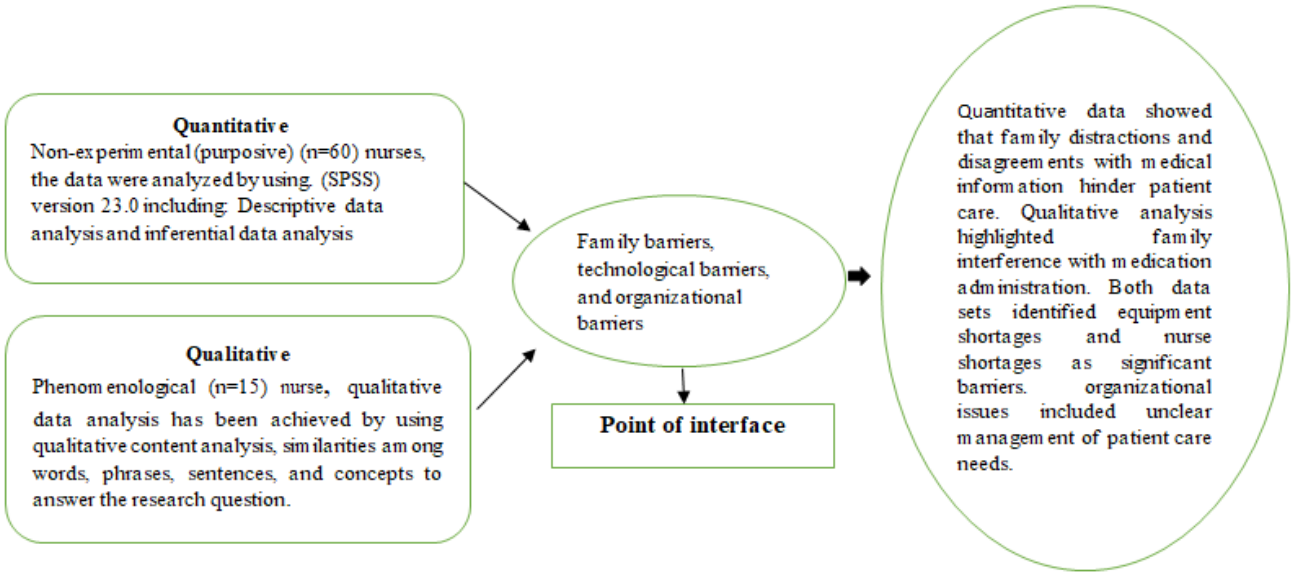


**Figure 1.** Study Protocol Algorithm

## Results

**Table 1.** Socio-demographic Characteristics of Nurses (No.=60)

| **Variable** | | **Results** | |
|---|---|---|---|
| **Age** (years) | **Minimum / Maximum** | 20 | 41 |
| | **Mean ± SD** | 27.11 ± 4.4 | |
| **Variable** | | **F** | **%** |
| **Sex** | **Male** | 16 | 26.7 |
| | **Female** | 44 | 73.3 |
| **Marital Status** | **Single** | 32 | 53.3 |
| | **Married** | 25 | 41.7 |
| | **Divorced** | 3 | 5 |
| **Educational level** | **Preparatory** | 2 | 3.3 |
| | **Diploma** | 16 | 26.7 |
| | **Bachelor's** | 36 | 60 |
| | **Higher education** | 6 | 10 |
| **Year of experience** | **Minimum / Maximum** | 1 | 18 |
| | **Mean ± SD** | 5.1±4.1 | |
| **Years of experience in ICU** | **Minimum / Maximum** | 1 | 14 |
| | **Mean ± SD** | 3.03±2.76 | |
| **Economic status** | **Weak** | 1 | 1.7 |
| | **Middle** | 27 | 45 |
| | **Good** | 29 | 48.3 |
| | **Excellent** | 3 | 5 |
| **Residency** | **Urban** | 43 | 71.7 |
| | **Rural** | 17 | 28.3 |

**F.= f**requency**, %=** percentage.

Table (1) indicates that the mean age of nurses were 27.11 years and the majority of them were female (73.3%). Also, 53.3% were single and 60% held bachelor's degree in nursing. Additionally, the mean of their nursing experience was 5.1 years, and the mean of years of experience in ICU was 3.03 years. 48.3% of nurses have good economic status and 71.7% lived in urban area.

**Table 2.** Barriers to Deliver Nursing Care at Pediatric Intensive Care Unit

| No. | Sections-Items / responses | Strongly disagree | Disagree | Neutral | Agree | Strongly agree |
|---|---|---|---|---|---|---|
| **Section 1: Environmental Barriers** | | **F (%)** | **F (%)** | **F (%)** | **F (%)** | **F (%)** |
| **1** | Visiting hours to the unit are not specified and too flexible | 5(8.3%) | 9(15%) | 8(13.3%) | 21(35%) | 17(28.3%) |
| **2** | Insufficient time to manage documentation | 3(5%) | 13(21.7%) | 13(21.7%) | 22(36.7%) | 9(15%) |
| **3** | Not satisfied with the help of colleagues. | 10(16.7%) | 28(46.7%) | 10(16.7%) | 10(16.7%) | 2(3.3%) |
| **4** | Patients' rooms are not close to each other | 11(18.3%) | 28(46.7%) | 8(13.3%) | 8(13.3%) | 5(8.3%) |
| **Mean ± SD** | | 2.96 ± .67 | | | | |
| **Section 2: Organizational Barriers** | | **F (%)** | **F (%)** | **F (%)** | **F (%)** | **F (%)** |
| **1** | Inadequate information from physicians | 8(13.3%) | 30(50%) | 8(13.3%) | 9(15%) | 5(8.3%) |
| **2** | The previous shift's nurse gave inadequate information during the shift change report | 8(13.3%) | 29(48.3%) | 9(15%) | 10(16.7%) | 4(6.7%) |
| **3** | Delay in getting medications from the pharmacy | 5(8.3%) | 18(30%) | 10(16.7%) | 23(38.3%) | 4(6.7%) |
| **4** | Delay in seeing new medical orders | 4(6.75%) | 28(46.7%) | 11(18.3%) | 14(23.3%) | 3(5%) |
| **5** | Change of shift report taking too long time | 9(15%) | 28(46.7%) | 6(10%) | 13(21.7%) | 4(6.7%) |
| **Mean ± SD** | | 2.63 ± .79 | | | | |
| **Section 3: Technological/ Tools Barriers** | | **F (%)** | **F (%)** | **F (%)** | **F (%)** | **F (%)** |
| **1** | Having to use equipment in poor condition | 5(8.3%) | 6(10%) | 8(13.3%) | 25(41.7%) | 16(26.7%) |
| **2** | Shortage of equipment | 6(10%) | 6(10%) | 5(8.3%) | 21(35%) | 22(36.7%) |
| **3** | Isolation rooms not well stocked | 5(8.3%) | 4(6.7%) | 9(15%) | 19(31.7%) | 23(38.3%) |
| **4** | Patient rooms are not well-stocked | 5(8.3%) | 6(10%) | 2(3.3%) | 28(46.7%) | 19(31.7%) |
| **5** | Unprofessional use of equipment | 6(10%) | 12(20%) | 11(18.3%) | 20(33.3%) | 11(18.3%) |
| **6** | storehouses for unit supplies are not well-stocked | 8(13.3%) | 11(18.3%) | 7(11.7%) | 17(28.3%) | 17(28.3%) |
| **Mean ± SD** | | 3.64 ± 1.11 | | | | |
| **Section 4: Task Barriers** | | **F (%)** | **F (%)** | **F (%)** | **F (%)** | **F (%)** |
| **1** | Accompanying a patient during intra-hospital transport | 2(3.3%) | 13(21.7%) | 10(16.7%) | 21(35%) | 14(23.3%) |
| **2** | Responsible for orienting a new nurse. | 3(5%) | 4(6.7%) | 8(13.3%) | 24(40%) | 21(35%) |
| **3** | Unanticipated and unscheduled admissions and discharge | 4(6.7%) | 11(18.3%) | 11(18.3%) | 19(31.7%) | 15(25%) |
| **Mean ± SD** | | 3.65 ± .66 | | | | |
| **Section 5: Family Barriers** | | **F (%)** | **F (%)** | **F (%)** | **F (%)** | **F (%)** |
| **1** | Receiving many phone calls from family members | 9(15%) | 21(35%) | 8(13.3%) | 14(23.3%) | 8(13.3%) |
| **2** | Distractions from family members due to excessive visiting | 3(5%) | 7(11.7%) | 8(13.3%) | 13(21.7%) | 29(48.3%) |

| | | | | | | |
|---|---|---|---|---|---|---|
| **3** | The family does not accept the possibility of a deterioration of the patient's condition | 1(1.7%) | 4(6.7%) | 5(8.3%) | 23(38.3%) | 27(45%) |
| **4** | The nurse has to deal with angry/distraught family members while still caring for the patient. | 6(10%) | 6(10%) | 5(8.3%) | 18(30%) | 25(41.7%) |
| **5** | Spending a considerable amount of time explaining to family members | 2(3.3%) | 7(11.7%) | 10(16.7%) | 11(18.3%) | 30(50%) |
| **6** | Family poor perception regarding different lifesaving measures. Like E.T tube & chest compression & CV line | 4(6.7%) | 7(11.7%) | 9(15%) | 16(26.7%) | 24(40%) |
| Mean ± SD | | 3.77 ± .77 | | | | |

**F**= frequency, **%**= percentage, **SD**= standard deviation, Assessment level of mean for sections (1-1.8, and 1.81-2.6 revealed no significant barriers), (2.61-3.4 and higher revealed significant barriers).

Table (2) presented responses of nurses about barriers to deliver nursing care at PICU. Responses of nurses about each item within barriers were distributed between strongly agree and strongly disagree. Results declared that mean and SD of the environmental barriers were 2,96 ± .67; mean and SD for organizational barrier were 2.63±.79; mean and SD of the technological/ tool barriers were 3.64 ±1.11, mean and SD for task barriers were 3.65 ± .66; and mean SD for family barriers were 3.77 ± .77. In addition, Results in this table reflected that all domains were contributed to barriers to deliver nursing care as means of all domains were higher than 2.6

**Table 3.** Thematic Analysis Findings of Qualitative Data

| R | Themes | Sub-Themes |
|---|---|---|
| 1 | Family related barrier | Interference with drug administration and intervention |
| | | Lack of awareness about care |
| | | Family members eating beside pediatric patients |
| 2 | Technological and tools related barrier | Lack of appropriate resources and devices |
| | | Lack of medications |
| 3 | Task barriers | Nursing shortage |
| | | Lack of required knowledge base to deliver care |
| | | Lack of cooperation between nurse and patient. |
| 4 | Organization barrier | Absence of real management and clear protocol |
| 5 | Opportunities and solutions for barriers | Using of organization protocol |
| | | Increasing number of nurses at PICU. |
| | | Availability of resources and drugs |
| | | Increase knowledge base for nurses |

**Family related Barrier:** Family related barrier was the first theme that emerged to express nurses‟ perceptions toward what facing them during delivering care for pediatric patients. This theme included three related subthemes:

**Interfere with drug administration and intervention:** the first sub theme under the umbrella of family related barriers was *interfered with drug and intervention*. Participant 4 stated:

> "One of the most important obstacles we face from parents is that they interfere in our work and ask many questions. For example, when giving treatment, they wonder why you stop treatment, why you give it quickly, and this is due to the lack of family health literacy".

Participant 14 agreed with this: "The active participation of the patient's parents in aspects of treatment and care, such as assisting with repositioning the patient, presents a notable obstacle for us as nurses."

**Lack of awareness about care:** the second sub theme under the umbrella of family related barriers was *Lack of awareness about care***.** participant 1 said:

> "Some parents refuse the CPAP device even though the child needs this device because they do not have sufficient knowledge. Likewise, when we give a patient plasma, we encounter a reaction from them, as they wonder what the reason for giving the patient plasma is, what the reason for giving the patient blood, knowing that it is in the best interests of the patient. I feel that our society is not health literate, as they do not deal with the nurse with respect."

Participant 15 added:

> "The presence of the patient's parents or any escort the workplace causes confusion for the nurse's work and taking time from the nurse can invest in the service of another patient, and this is due to lack of their awareness about the medical cases which are admitted at the units and how critical are they".

**Eating beside pediatric patients**: This is the third subtheme of the family barrier theme. Participant 4 declared: "Another problem is that the family eats near the patient, and this is a big mistake and is forbidden. We inform the family about this, but they do not pay attention to us, and this affects our patients."

While participant 11 stated: "Permanent presence of the parent at the intensive care unit even during meals they bring it to the PICU and eat beside their patient confuse our work. As a result, their patient become worse".

**2.Technological and Tools related Barrier:** The second major theme that emerged from nurses "responses about barriers facing them during delivering care for pediatric patients" was *Technological and tools related barrier*.

**Lack of appropriate resources and devices:** The first subtheme under the umbrella of the Technological and tools related barrier was lack of appropriate resources and devices. Participant 5 stated: "Because we deal with children, these children weigh a little bit, that is, so any mistake is unacceptable, we need special equipment and devices for children these devices are not available in most health institutions" participant 1 said: "Some devices are not widely available, for example, the micro drip device is not widely available, which we desperately need in order to control drug doses".

**Lack of drugs***:* The second subtheme associated with technological and tools related barrier was the lack of drugs

Participants 6 added: "The scarcity of medication poses a critical risk to patients' lives, and our hospital is currently experiencing a significant shortage of essential medications."

Participants 7 said:

"The barrier that faced us as a nurse at pediatric intensive care unit was lack of drugs, and with anger he adds, sometime we need to give the patient a certain drug urgently but the drug is not available in hospital, we have to ask the patient family to bring the medication from outside the hospital".

**3.Task Barrier:** The third major theme that emerged from nurses‟ responses about barriers facing them during deliver care for pediatric patients at ICU" was task barrier.

**Nursing shortage:** The first subtheme under the umbrella of the task barriers was the nursing shortage. Many of the study participants stated that there a real shortage in the nursing staff.

Participant 2 stated "We always suffer from a shortage, especially nursing" Participant 9 added: "Every nurse can face obstacles while working at ICU especially PICU, one of obstacles we faced is nursing shortage."

**Lack of required knowledge base to deliver care:** Is the second subtheme under the umbrella of task barriers. Participant 10 said:

Barriers are not all the staff work have the same scientific background and skills to deal with pediatric patients, dealing with pediatric patients needs experience, science and good practices so that the patient is discharged from the PICU in full peace. Participant 5 mentioned: There are obstacles for the worker in the health institutions represented by the inexperience of

nursing staff about dealing with children, working in this units needs special skills because you deal with children, these children weigh a little bit, that is, so any mistake is unacceptable.

**Lack of cooperation between nurse and patients:** The third subtheme under the umbrella of task barriers. Participant number 5 added: "the problem we are facing with pediatric patients was the excessive movement, the difficulty of controlling them, not complying with orders and constant crying so they need to have their parents in close proximity." While participant 7 mentioned "the pediatric patient is not cooperative with us because of his/her young age"

**4.Organization Barrier:** The fourth major theme that emerged from nurse's responses about barriers facing them to deliver care for pediatric patients at ICU.

**Absence of real management and clear protocol:** The absence of real management and clear protocol considered as challenges they faced by nurses during their work in ICU. Participant 4 stated:

"Each patient must come with only one escort, but what happens is that each patient is accompanied by two or three escorts. We are suffering from this problem that causes confusion at work. I have to work as a receptionist and give medicine to children whose condition is special, and this is beyond my ability."

Participant 9 declared "Simply mismanagement by direct officials, workload due to not organizing a correct work schedule is one of our barriers in work place".

**5.Opportunities and Solutions for the Challenges**: The last major theme that emerged from participants responses was the opportunities and solutions for the barriers that faces nurses during delivering care for pediatric patients at ICU

**Availability of organization protocol**: The first sub theme under the umbrella of opportunities and solutions for barriers facing nurses at ICU during delivering care for pediatric patients was availability of organization protocol. Participant 4 said: " Unit queries are present, but their role is neglected. So, the solution is to activate their role and organize a working protocol that will regulate escorts' entry into the unit." Participant 6 stated "Simple solutions are need, more flexible working hours by regulating a good working protocol".

**Increasing number of nurses at PICU:** The second sub theme under the umbrella of solutions of barriers was increasing number of nurses at PICU. Participant 4 stated: " The nursing staff must be increased." while, Participant 9 said: " Allocating an adequate number of nurses is essential to improve workflow organization and prevent staff from being overwhelmed by the nursing shortage."

**Availability of resources and drugs:** The third sub theme was availability of resources and drugs. Most of the study participants reflected that the administration should address the shortage of drugs and devices. Participant 1 stated: "The MoH must give more funding to provide and maintain the equipment. Maintenance of the equipment is available, but not sufficiently, especially the micro

drip device, because we need it in great numbers". Participant 2 stated: "The solution is that if the director cares about the patient's life more than (s)he cares about general things, (s)he can find a solution to these problems that we are exposed to."

**Increase knowledge base for nurses**: The fourth sub theme was increase knowledge base for nurses, many of the study participants stated that must set up training courses for ICU staff to explain how to deal with children and increase their knowledge about care. Participant 4 mentioned: "Providing scientific courses for nurses, as the current courses are routine courses that are largely useless, so more intensive courses and courses must be available in other hospitals". Participant 10 stated "The solution is intensive training for the nursing staff of the pediatric intensive care unit and testing them from time to time".

## Discussion

The current study results showed that (nurses') mean age was 27.11 years in which it reflected that most of them were in early adulthood. This finding is consistent with another study which found that the nurses' mean age was (26 + 4.056) years [12]. Since seniors oversaw the departments and units and handled administrative duties, the results were not surprising. In addition, females comprised the majority of the study sample, and the findings of the following studies supported this result: women were the majority of nurses representing more than two thirds [13]. A previous descriptive study conducted at Mosul Teaching Hospitals indicated that nearly two thirds of the sample were female [14]. These findings are consistent with the fact that women represent the majority of nurses worldwide. Moreover, more than half of the study sample were single. This result come in agreement with findings of a descriptive cross-sectional study on 89 nurses in trauma intensive care units, which showed that 48.7% of the nurses were single. [15] Nurses at this age are newly recruited so they are in a period of physical self-formation in preparation for marriage. Approximately two third of nurses in the study held a bachelor's degree in nursing. On the contrary, a descriptive analytical study was carried out in Al-Nasiriyah City Hospitals showed that half of the study participants have diploma degree in nursing. [16] This attribute to the Ministry of Health's decision in the appointment with college graduates and is exclusively hired them in the critical area, including intensive care. In addition, this study found that average years of nursing experience was around five years, and their average years of ICU experience was approximately three years. These results were supported by a pre-experimental study design conducted in the critical care units of Al Ramadi Teaching Hospital and Al Fallujah Teaching Hospital at Al-Anbar Governorate, in which 43.8% of the participants had one to five years of experience, and 87.5% had experience in intensive care units [17]. Another study showed that 55% of participants, had between one and five years of experience in the nursing field [18].

According to the results of recent study, the majority of the study sample had lived in an urban area and near half of them had a good economic status. In a quasi-experimental design conducted at Medical City hospitals in Baghdad City, the results indicated that all study participants lived in urban areas [19]. Most rural hospitals lack critical care units like ICUs. ICU nurses typically work four shifts and often take additional jobs during their rest days, leading to stable finances from multiple salaries.

The current study results reveal that the mean of the environmental barriers indicated the availability of higher revealed significant barriers, the mean for technological/ tool barriers also indicated higher revealed significant barriers. Similarly, the mean for task barriers. All of these domains, barriers

scores were over than 2.62, which reflected that all domains of barriers were presented in the work field of nurses.

According to a cross-sectional descriptive study the environmental barrier had an average score of 3.62 with a range of 2.0 to 5.0. The organizational barrier had a mean score of 3.40, with a range of 1.2 to 5.0. The technological/tools barrier had a mean score of 3.44, with a range of 1.0 to 5.0. The task barrier had a mean score of 3.70, with a range of 2.3 to 5.0. The family barrier had a mean score of 4.01, with a range of 2.5 to 5.0. The family barrier was the most common type of barrier in nursing care, according to the higher mean score for this type of barrier. Task, environmental, technological/tool, and organizational barriers were the next most common types of barriers [20]. From the researchers' point of view, the existence of environmental barriers, technological barriers, family barriers, tasks barriers, as well as family barriers have a direct impact on the type and effectiveness of care provided to children in these critical units.

Five themes were emerged from data analysis in the qualitative phase, with subthemes. Each theme reflected an aspect of barrier, while the last theme reflected the solution for barriers based on nurses' insights.

**1. Family-related barrier**

**Interference with drug administration and intervention**

The first subtheme emerged from family related barrier was *Interference with drug administration and intervention*: This concept was supported by a study found that care from family members is a "wonderful thing," but they have also had unfavorable experiences, such as when family members mute alarms, adjust ventilator settings, or move patients. Patient safety became a barrier due to the threat [21]. Family involvement in patient care can hinder nursing care by delaying necessary interventions and distracting nurses with questions, negatively impacting patient care.

**Lack of awareness about care**

This barrier finding supported by a study found that nurses expressed that "distracting" and "exhausting" to have the family by the bedside all the time, particularly if the family asked a lot of questions while the nurse was giving a critically-ill child hands-on care [22]. This ignorance can worsen the child's condition and increase the nurse's workload.

**Family members eating beside pediatric patients**

This theme supported by a study found that the PICU's physical layout did not meet the needs of parents, and that there were insufficient resources for parents to eat and sleep, making it more challenging for nurses to collaborate with parents [23]. Eating near patients in the ICU can impede movement, contaminate the area, and affect nurse performance. Maintaining cleanliness and sanitization is essential for high-quality care

**2. Technological and Tools related Barrier**

**Lack of Appropriate Resources and Devices**

This result supported by a shortage of medical supplies that may hinder the ability of the health system to operate and negatively affecting patients, the hospital, and the nursing profession [24]. The lack of medical equipment in ICUs, such as ventilators and oxygen masks, poses a significant challenge for nurses. This shortage results in reduced patient services or the use of less effective interventions.

**Lack of Medications**

Lack of Medications was supported by a study found that the world's medication shortage is a multifaceted, intricate problem. It has drawn a lot of attention in most high-income countries with the rise of multiple associations, governmental organizations, platforms, and policies [25]. Medication is crucial for treating ICU patients, who require immediate administration due to their critical

condition. Lack of medication can result in patient death.

**3. Task barriers**

**Nursing shortage**

The first subtheme for this concept was *nursing shortage.* According to previous study, one of the major factors that nurses face in providing care for patients in intensive care units is the shortage of nurses [(26)]. Nurse at ICU should match patient numbers and required effort. A shortage of nurses hinders work, exhausts staff, and lowers productivity.

**Lack of required knowledge base to deliver care**

This result supported by a study found that most nurses have a moderate level of understanding and application of the intensive care unit nursing care guide [(27)]. The ICU handles serious cases, requiring staff, especially nurses, to be well-versed in medical and scientific information. Lack of knowledge hinders proper action plans and negatively impacts patient care.

**Lack of cooperation between nurse and patients**

This was the third subtheme which was supported by findings of a previous study that found one of the biggest challenges for nurses working in pediatric settings is accounting for the unique needs that come with dealing with a range of age [(28)]. A challenge for critical care nurses is the lack of cooperation from young children, who often fear unfamiliar nurses and do not understand instructions. This results in the child not receiving full care.

**4. Organization Barrier**

**Absence of real management and clear protocol**

According to a descriptive study design involving 35 nurses, the majority of study participants reported that their place of employment lacks a clear organizational work plan [(29)]. A clear work protocol is essential for organizing staff responsibilities. Its absence causes confusion and uneven workload distribution.

**5. Opportunities and Solutions for the Barriers**

**Availability of organization protocol**

The first subtheme was *Availability of organization protocol***.** Establishing a clear and consistent working protocol, regulating the nurse's work thus improving the quality of care, are essential factors to assure quality patients outcome.

**Increasing number of nurses at PICU**

The second subtheme was *Increasing number of nurses at PICU*: According to a qualitative study on the quality of care given by ICU nurses, most study participants indicated that there is a need to recruit more nurses in the ICU. "Adequate and efficient human resources" are crucial for delivering high-quality care [(30)]. More nurses mean shared effort, leading to increased productivity.

**Availability of resources and drugs**

The third subtheme was *Availability of resources and drugs.* A study claims that the ongoing drug shortage problem in the US is essentially a form of health care rationing that affects clinicians and patients on a daily basis. Stakeholders and the Food and Drug Administration (FDA) are still searching for workable solutions [(31)]. Providing medical supplies and medication reduces nurses' time spent searching, enhancing patient care. Timely access to essential medicine speeds up recovery.

**Increase knowledge base for nurses**

The fourth subtheme was *Increase knowledge base for nurses*, which was supported by evidence of a previous study which, found that nurses must understand how social issues like poverty and environmental contamination may contribute to health issues, in addition to human psychology, behavior, and cultural mores and values [(32)]. Increasing awareness among parents and nurses resolves barriers. Educational materials for parents improve understanding and reduce resistance to interventions. Scientific training for nurses

enhances expertise in managing diverse cases, improving patient care.

**Interpretation of Integrated Concepts of both Quantitative and Qualitative Data Simultaneously.**

In relation to family barriers, quantitative data presented that most participants agreed that distraction from family members due to excessive visiting during work hours and delivering care and angry from family members were interfered with delivering care for patients. At the same time, qualitative data analysis reflected that family members interfere with drug and delivering care for patients. Corresponding to technological/tools barriers, the integration between qualitative and quantitative data reflected that most participants agreed with the concept that lack of equipment, resources, drugs, and poor infrastructure were all factors that considered as barriers to deliver the required care for patients. The integrated concepts from both qualitative and quantitative findings about task barriers reflected that shortage of nurses; lack of knowledge of newly employed nurses; and poor cooperation between patients and healthcare providers are all factors which considered as barriers to deliver care for patients .

Results also revealed that the integrated concepts about organizations' barriers reflected the agreement of participants about absence of clear organization's management about preparing required needs to deliver qualified care for patients .

Nurses in this study highlighted resented solutions for the aforementioned barriers as reflection about the importance of availability of organization's protocol, increasing and employing the required number of nurses, increasing the knowledge base and qualifications of nurses, and preparing all required resources to deliver care for patients.

**Conclusion**

Pediatric nurses were confronting barriers during delivering care to pediatric patients due to lack of family awareness about care, lack of appropriate resources and devices, nursing shortage, absence of real management and clear protocol. Several themes were emerged from nurses' responses including family related barrier, technological and tools related barrier, task barriers, organization barrier; and opportunities and solutions for barriers. Even with the presence of barriers, nurses' responses revealed solutions for barriers facing them during delivering care to pediatric patients including availability of organization protocol, increasing number of nurses at PICU, availability of resources and drugs; and increase knowledge base for nurses.

**Recommendations**

Accomplishing future studies on a large population to evaluate barriers facing nurses in Iraq during delivering care to pediatric patient. Of equal importance, the Iraqi Ministry of Health should concentrate its efforts on providing all the resources necessary to support the work of pediatric intensive care units. Finally, efforts should be targeted toward finding solutions for all mentioned barriers to ensure better quality of healthcare services.

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