

Patients' Perceptions Towards the Participation of Medical Students in Their Care

Rasha N. Ahmed¹, Dhelal A. Aljumaily², Nu'as W. Ahmed³, Kawther A. Ismael³, Yasmeeen N. Abdullah³, Noor A. Mahmood³.

¹Department of surgery, Ninevah University- College of Medicine, Mosul, Iraq.

²Department of family and community medicine, Ninevah University- College of Medicine, Mosul, Iraq.

³Ninevah University-College of Medicine, Mosul, Iraq.

* Corresponding author: rasha.ahmed@uoninevah.edu.iq

ABSTRACT

Article information:

Received 21 May, 2025
Received in revised form 21 August, 2025
Accepted 26 August, 2025
Final Proofreading 24 December, 2025
Published 31 December, 2025

DOI Online:

<http://doi.org/10.64554/nujms.2025.1.2.1>

Keywords:

Clinical training; Patients care; Patients' perception; Medical education; Teaching Medical students.

© THIS IS AN OPEN ACCESS ARTICLE UNDER THE CC BY LICENSE.

<http://creativecommons.org/licenses/by/4.0/>

Background: Patients Examination is an essential part of the medical education, through interaction with real patients, medical students learn most important skills like critical thinking, diagnosis, management of many diseases, in addition to leadership, empathy, communication, and professionalism. These skills are needed for the medical student to become an efficient physician.

Objectives: Is to determine patient's perception towards involvement of students in their medical care.

Methods: An observational cross-sectional multicentric study was conducted in five major teaching hospitals in Mosul between February and April 2023. A convenience sampling method was used to recruit 206 patients from internal medicine, surgery, obstetrics and gynecology, and pediatrics departments. Data were collected through a validated structured questionnaire administered via face-to-face interviews.

Results: A total of 219 patients were approached, and 206 agreed to participate (response rate: 94%). The median age was 27 years (range: 4 days to 87 years). Of the participants, 128 (62.1%) were female and 78 (37.9%) were male. Patients' perceptions varied: on average, 90.3% agreed to medical student involvement for history taking, attending in the operating room, and performing examinations. However, only 58.7% approved interventional procedures performed by students. Overall, 88.3% approved history taking and clinical examination under supervision, while 66% agreed to these activities without supervision.

Conclusion: Patients have positive perception towards medical students, the agreement levels affected by the nature of interaction, presence of a supervision, gender, and the department they admitted in.

Introduction

Patients Examination is an essential part of the medical education, through interaction with real patients, medical students learn most important skills like critical thinking, diagnosis, management of many diseases, in addition to leadership, empathy, communication, and professionalism. These skills are needed for the medical student to become an efficient physician [1].

In the modern medicine good doctor –patient relationship is the center-stone. Patient's compliance to the treatment, disease outcomes and patient satisfaction all depend on how strong this relationship is. [2] Such good relationship is needed to be built between the student and patient as well, to get the maximum benefit from clinical training [3].

Focusing on patient's rights increasingly cause difficulty in clinical teaching, a conflict can rise between patients' needs and requirements of medical education [4]. Although, in teaching hospitals patients have to make students observe and share in their care, however they still have the right to refuse students involvements in their care once they feel uncomfortable. Patient even has the right not to give consent to allow medical student to attend their consultation [5].

Many Literatures studied the comfort level of patients towards medical students [6][7][8]. Different specialties with student gender were shown to affect patient's comfort, for example in gynecological and obstetric department patient showed higher acceptance level to female students, while in urology department, patients' acceptance level was higher to male students [6]. In the UK, most of the studied patients were happy to have medical students attending their consultations of chest infection, sore throat or emotional problems. The majority however, refused this when the discussion was about sexual problem, or when internal examination had to be done to them [9].

In addition to the above mentioned difficulties, there are problems in our city made the students clinical training is increasingly difficult, the city occupation by the terrorists followed by the aggressive war (2014-2017) caused destruction to most of the hospitals resulting in the limited number of working teaching hospitals [10] and consequently large students to patients ratio in the remaining limited health institutions which was already overcrowded by patients and have limited number of beds, a situation that reflected on patients acceptance and compliance with clinical training on them. The aim of our study is to explore the opinion of patients, how they feel and the degree of their comfort upon examination done by students. To our knowledge this is the 1st study that addresses this problem in our locality.

Methods

Study design and setting:

An observational descriptive and analytic cross sectional multicentric study, held in Mosul city between February 2023 and April 2023, in the Five major teaching hospitals in the city, including: Al-Salam Teaching Hospital (multispecialty), Al-Khansa Teaching Hospital (gynecology, obstetric and pediatric), Al-Jomhori Teaching Hospital(surgical), Ibn Al-Atheer Teaching Hospital(pediatric), Ibn Sina Teaching Hospital (Medicine).

Data collection:

A convince, non-probability sampling method was adopted. The study included patients of any age group who were willing to participate, after explanation of the aims of the study, a written questionnaire was used to collect information, direct face-to-face interviews were conducted, in case of pediatric patients or patients' inability to answer question, data were obtained from their caretakers.

To maximize the variation of medical conditions, patients' age and gender. Participants from different departments were included (Internal Medicine, Surgery, Obstetrics and Gynecology, and Pediatrics).

Patients who were unwell to participate or those with impaired judgement were excluded from the study. Patients from departments other than the above mentioned four departments were excluded as well.

A questionnaire used is the one that developed and validated by Marwan et al [11]. The questionnaire is composed of two main sections, first section included sociodemographic data (age, gender, marital status, educational level...etc.). The education level was divided in three levels as follow: No formal education (have a school degree or less), Basic education (have a Bachelor's Degree). High education (have a Master's degree or higher). The Type of care for patients included was divided into two levels: Inpatient (those who were receiving medical care in a hospital) and the Outpatient (those who were receiving medical care from outpatient clinics).

The second section included 10 questions about patients’ compliance regarding the involvement of students in their medical care. To each question, the participant had to choose between permitting (male students only”, “female students only”, “or both genders of students”, or “not to permit either gender of students”.

Sample size calculation:

The sample size was calculated by using Epi Info™ software, at confidence interval of 95% and a margin of error of 5%, the sample size was calculated to be 161 patients, the total number is adjusted to 206.

Ethical consideration:

An ethical approval was obtained from ethical committee of college of medicine, Ninevah university, an informed consent was obtained from all the participants, for patients under 15 years old, a consent were obtained from a caretaker, the participants were all assured that their participation and the collected data would not affect quality of medical care provided to them, and their information will be used only for purpose of study.

Statistical analysis:

Data were saved by using a Microsoft Excel 2020 and the statistical analysis was conducted using SPSS (Version 17). For descriptive analysis, the continuous data were tested by using Shapiro test for normality, range and median were used for non-normally distributed continuous data, while mean and standard deviation were used if data were normally distributed. the categorial data were described in frequency and percent, to study the association between patient’s sociodemographic characteristics a Chi-squared test was used.

Results

A total of 219 patients were approached, of whom 206 agreed to participate (response rate of 94%). The median age was 27 years and the range is (4 days– 87 years old), 128 of them were females (62.1%) with 78 males (37.9%), the full socio-demographic characteristics demonstrated in **Table 1**.

| Table 1 Socio-demographic characteristics of the patients | | |
|---|----------|-------------------|
| Characteristics | N | Percentage |
| Age | | |
| ≤ 15 years | 55 | 26.7 |
| 16-25 years | 40 | 19.4 |
| 26-45 years | 67 | 32.5 |
| ≥ 46 years | 44 | 21.4 |
| Gender | | |
| Male | 78 | 37.9 |
| Female | 128 | 62.1 |
| Marital Status | | |
| Married | 125 | 60.7 |
| Unmarried | 81 | 39.3 |
| Educational Level | | |
| Non Formal Education | 159 | 77.2 |
| Basic Education | 29 | 14.1 |
| High Education | 18 | 8.7 |
| How many times did the patient visit the hospital for the same illness | | |
| 0-3 times | 177 | 85.9 |
| ≥ 4 times | 29 | 14 |
| how long did the patient stay in the hospital | | |
| 0-5 days | 183 | 88.8 |
| ≥ 6 days | 23 | 11.2 |
| Department | | |

| | | |
|-------------------|----|------|
| Internal medicine | 55 | 26.7 |
| Surgery | 51 | 24.8 |
| Obstetric | 58 | 28.2 |
| Pediatric | 42 | 20.4 |

Patients' Perceptions towards the Participation of Medical Students

Acceptance of medical students care in general:

Of the 206 participants, 197 (95.6%) would permit both genders to read their medical files, and 156 (75.7%) agreed for both genders to be present when they have consultation in outpatient clinic, while 152 (73.8%) permit attendance in the operating room, regarding history taking and sharing their medical history 195 (94.7%) would allow it with supervision of the senior doctor and 182 (88.3%) without supervision,

Of the 141 (68.4%) participants agreed to allow the students from both genders to be present when the doctor examining them and 130 (63.1%) accepted to permit the student to do the examination with the supervision of the attending doctor, and 94 (45.6%) without supervision. Regarding procedures, the majority of patients agreed for both genders to observe the procedures 193 (93.7%) while 113 (54.9%) would allow the students to perform procedures.

Regarding permitting female students only to share patient care, 30 (14.6%) patients agreed to females only to be present in outpatient clinic, and 35 (17%) agreed to females in the OR. For examination 49 (23.8%) allow the female students to take an observational part while the doctor examining them, and 52 (25.2%) preferred females to do the examination with presence of the doctor, while 42 (20.4%) preferred females to do the examination without a doctor, while there was no preference to the “males only” students from all participants to all questions. The results of the questions according to the gender of medical student preference are shown in **Table 2**.

The overall agreement rate for interventional procedures done to the patient by a medical student was (58.7%), while the agreement rate with other questions was (90.3%).

Table 2: Patients' Perceptions Towards The Participation Of Medical Students In Their Care

| Questions | Answers N(%) | | | |
|--|--------------|--------------|------------|-----------|
| | Males only | Females only | Both | Neither |
| Would you permit medical students to read your medical file? | 0 (0) | 3 (1.5) | 197 (95.6) | 6 (2.9) |
| Would you permit medical students to be present in the outpatient clinic if you were having a consultation with your doctor? | 0 (0) | 30 (14.6) | 156 (75.7) | 20 (9.7) |
| Would you permit medical students to be present in the operation room if you were having a surgery? | 0 (0) | 35 (17) | 152 (73.8) | 19 (9.2) |
| Would you permit medical students to take your medical history and personal details from you with the presence of a doctor? | 0 (0) | 7 (3.4) | 195 (94.7) | 4 (1.9) |
| Would you permit medical students to take your medical history and personal details from you without the presence of a doctor? | 0 (0) | 7 (3.4) | 182 (88.3) | 17 (8.3) |
| Would you permit medical students to be present while your doctor examining you? | 0 (0) | 49 (23.8) | 141 (68.4) | 16 (7.8) |
| Would you permit medical students to examine you with the presence of a doctor? | 0 (0) | 52 (25.2) | 130 (63.1) | 24 (11.7) |
| Would you permit medical students to examine you without the presence of a doctor? | 0 (0) | 42 (20.4) | 94 (45.6) | 70 (34) |
| Would you permit medical students to be present while you're having diagnostic/other procedures (e.g. drawing blood, inserting catheter, etc?) | 0 (0) | 9 (4.4) | 193 (93.7) | 4 (1.9) |
| Would you permit medical students to perform diagnostic/other procedures on you (e.g. drawing blood, inserting catheter... etc.) | 0 (0) | 8 (3.9) | 113 (54.9) | 85 (41.3) |

1. Medical files reading:

Regarding medical files reading by medical students in presence or absence of supervision by a senior doctor, the patients' socio-demographic characteristics have no statistically significant association except for the age (p value=0.028), as shown in **Table 3**.

| Table 3: patients' attitude toward reading their medical files (*statistically significant) | | | | | |
|--|---|------------------------|-------------|----------------|----------|
| | Would you permit medical students to read your medical file? | | | | |
| | N (%) | | | | |
| | Male Students | Female Students | Both | Neither | P |
| Age | | | | | |
| ≤ 15 years | 0 (0) | 0 (0) | 53 (96.4) | 2 (3.6) | 0.299 |
| 16-25 years | 0 (0) | 1 (2.5) | 38 (95) | 1 (2.5) | |
| 26-45 years | 0 (0) | 2 (3) | 65 (97) | 0 (0) | |
| ≥ 46 years | 0 (0) | 0 (0) | 41 (93.2) | 3 (6.8) | |
| Gender | | | | | |
| male | 0 (0) | 0 (0) | 73 (93.6) | 5 (6.4) | 0.028* |
| Female | 0 (0) | 3 (2.3) | 124 (96.9) | 1 (0.8) | |
| Marital Status | | | | | |
| Married | 0 (0) | 3 (2.4) | 118 (94.4) | 4 (3.2) | 0.353 |
| Unmarried | 0 (0) | 0 (0) | 79 (97.5) | 2 (2.5) | |
| Educational Level | | | | | |
| Non Formal Education | 0 (0) | 3 (1.9) | 151 (95) | 5 (3.1) | 0.824 |
| Basic Education | 0 (0) | 0 (0) | 28 (96.6) | 1 (3.4) | |
| High Education | 0 (0) | 0 (0) | 18 (100) | 0 (0) | |
| How many times did the patient visit the hospital for the same illness | | | | | |
| 0-3 times | 0 (0) | 3 (1.7) | 168 (94.9) | 6 (3.4) | 0.819 |
| ≥ 4 times | 0 (0) | 0 (0) | 29 (100) | 0 (0) | |
| how long did the patient stay in the hospital | | | | | |
| 0-5 days | 0 (0) | 3 (1.6) | 176 (96.2) | 4 (2.2) | 0.146 |
| ≥ 6 days | 0 (0) | 0 (0) | 21 (91.3) | 2 (8.7) | |
| Department | | | | | |
| Internal medicine | 0 (0) | 1 (1.8) | 52 (94.5) | 2 (3.6) | 0.38 |
| Surgery | 0 (0) | 0 (0) | 48 (94.1) | 3 (5.9) | |
| Obstetric | 0 (0) | 2 (3.4) | 56 (96.6) | 0 (0) | |
| Pediatric | 0 (0) | 0 (0) | 41 (97.6) | 1 (2.4) | |
| Site | | | | | |
| Al-Salam H. | 0 (0) | 2 (2.4) | 80 (97.6) | 0 (0) | 0.02 |
| Ibn Sina H. | 0 (0) | 1 (2.4) | 36 (85.7) | 5 (11.9) | |
| Ibn Al-Atheer H. | 0 (0) | 0 (0) | 28 (96.6) | 1 (3.4) | |
| Al-jomhori H. | 0 (0) | 0 (0) | 29 (100) | 0 (0) | |
| Al-Khansa H. | 0 (0) | 0 (0) | 24 (100) | 0 (0) | |

2. Presence in outpatient clinic and operating room:

Regarding the presence of medical students in out-patient clinics, all the sociodemographic characteristics (age, gender, marital status, frequency of visits to hospital, and department) show significant association P value is (< 0.001, < 0.001, < 0.001, 0.041, < 0.001) respectively, while there is no association with the educational level and the time of stay in the hospital with P value (0.05, 0.069) respectively. As to the presence in the operating room all the sociodemographic characteristics (age, gender, marital status, and department) show significant association P value is (< 0.001, < 0.001, < 0.001, < 0.001) with no statistically significant association with the educational level, frequency of

visits to hospital, and the time of stay in the hospital with P value (0.304, 0.756, 0.078) respectively. as shown in **Table 4**.

Table 4: patients' attitude toward students attending in the outpatient clinics and in the operating room (*statistically significant).

| | Would you permit medical students to be present in the outpatient clinic if you were having a consultation with your doctor? | | | | |
|---|--|-----------------|------------|-----------|---------|
| | N (%) | | | | |
| | Male Students | Female Students | Both | Neither | P |
| Age | | | | | |
| ≤ 15 years | 0 (0) | 1 (1.8) | 51 (92.7) | 3 (5.5) | <0.001* |
| 16-25 years | 0 (0) | 7 (17.5) | 28 (70) | 5 (12.5) | |
| 26-45 years | 0 (0) | 21 (31.3) | 40 (59.7) | 6 (9) | |
| ≥ 46 years | 0 (0) | 1 (2.3) | 37 (84.1) | 6 (13.6) | |
| Gender | | | | | |
| male | 0 (0) | 0 (0) | 73 (93.6) | 5 (6.4) | <0.001* |
| Female | 0 (0) | 30 (23.4) | 83 (64.8) | 15 (11.7) | |
| Marital Status | | | | | |
| Married | 0 (0) | 28 (22.4) | 84 (67.2) | 13 (10.4) | <0.001* |
| Unmarried | 0 (0) | 2 (2.5) | 72 (88.9) | 7 (8.6) | |
| Educational Level | | | | | |
| Non Formal Education | 0 (0) | 19 (11.9) | 125 (78.6) | 15 (9.4) | 0.05 |
| Basic Education | 0 (0) | 6 (20.7) | 22 (75.9) | 1 (3.4) | |
| High Education | 0 (0) | 5 (27.8) | 9 (50) | 4 (22.2) | |
| How many times did the patient visit the hospital for the same illness | | | | | |
| 0-3 times | 0 (0) | 21 (11.9) | 136 (76.8) | 20 (11.3) | 0.041 |
| ≥ 4 times | 0 (0) | 9 (31.1) | 20 (68.9) | 0 (0) | |
| how long did the patient stay in the hospital | | | | | |
| 0-5 days | 0 (0) | 30 (16.4) | 134 (73.2) | 19 (10.4) | 0.069 |
| ≥ 6 days | 0 (0) | 0 (0) | 22 (95.7) | 1 (4.3) | |
| Department | | | | | |
| Internal medicine | 0 (0) | 3 (5.5) | 45 (81.8) | 7 (12.7) | <0.001* |
| Surgery | 0 (0) | 2 (3.9) | 43 (84.3) | 6 (11.8) | |
| Obstetric | 0 (0) | 25 (43.1) | 26 (44.8) | 7 (12.1) | |
| Pediatric | 0 (0) | 0 (0) | 42 (100) | 0 (0) | |
| Site | | | | | |
| Al-Salam H. | 0 (0) | 20 (24.4) | 56 (68.3) | 6 (7.3) | <0.001* |
| Ibn Sina H. | 0 (0) | 0 (0) | 33 (78.6) | 9 (21.4) | |
| Ibn Al-Atheer H. | 0 (0) | 0 (0) | 29 (100) | 0 (0) | |
| Al-jomhori H. | 0 (0) | 2 (6.9) | 24 (82.8) | 3 (10.3) | |
| Al-Khansa H. | 0 (0) | 8 (33.3) | 14 (58.3) | 2 (8.3) | |

3. Taking history with/without supervision:

Taking history with/ without a senior doctor, the only statistically significant association is marital status (P= 0.03) with the presence of the doctor, and the department that patient admitted in without senior doctor (P= 0.029). as shown in **Table 5**

| Table 5: patients' attitude toward the students for Taking history with or without supervision (*statistically significant). | | | | | |
|---|----------------------|------------------------|-------------|----------------|--------------|
| Would you permit medical students to take your medical history and personal details from you without the presence of a doctor? | | | | | |
| <i>N</i> (%) | | | | | |
| | Male Students | Female Students | Both | Neither | P |
| Age | | | | | |
| ≤ 15 years | 0 (0) | 0 (0) | 51 (92.7) | 4 (7.3) | 0.659 |
| 16-25 years | 0 (0) | 2 (5) | 34 (85) | 4 (10) | |
| 26-45 years | 0 (0) | 4 (6) | 58 (86.6) | 5 (7.5) | |
| ≥ 46 years | 0 (0) | 1 (2.3) | 39 (88.6) | 4 (9.1) | |
| Gender | | | | | |
| male | 0 (0) | 0 (0) | 71 (91) | 7 (9) | 0.108 |
| Female | 0 (0) | 7 (5.5) | 111 (86.7) | 10 (7.8) | |
| Marital Status | | | | | |
| Married | 0 (0) | 7 (5.6) | 105 (84) | 13 (10.4) | 0.03* |
| Unmarried | 0 (0) | 0 (0) | 77 (95.1) | 4 (4.9) | |
| Educational Level | | | | | |
| Non Formal Education | 0 (0) | 6 (3.8) | 137 (86.2) | 16 (10.1) | 0.33 |
| Basic Education | 0 (0) | 0 (0) | 28 (96.6) | 1 (3.4) | |
| High Education | 0 (0) | 1 (5.6) | 17 (94.4) | 0 (0) | |
| How many times did the patient visit the hospital for the same illness | | | | | |
| 0-3 times | 0 (0) | 5 (2.8) | 157 (88.7) | 15 (8.5) | 0.161 |
| ≥ 4 times | 0 (0) | 2 (6.9) | 25 (86.2) | 2 (6.9) | |
| how long did the patient stay in the hospital | | | | | |
| 0-5 days | 0 (0) | 7 (3.8) | 161 (88) | 15 (8.2) | 0.839 |
| ≥ 6 days | 0 (0) | 0 (0) | 21 (91.3) | 2 (8.7) | |
| Department | | | | | |
| Internal medicine | 0 (0) | 1 (1.8) | 51 (92.7) | 3 (5.5) | 0.137 |
| Surgery | 0 (0) | 1 (2) | 44 (86.3) | 6 (11.8) | |
| Obstetric | 0 (0) | 5 (8.6) | 47 (81) | 6 (10.3) | |
| Pediatric | 0 (0) | 0 (0) | 40 (95.2) | 2 (4.8) | |
| Site | | | | | |
| Al-Salam H. | 0 (0) | 5 (6.1) | 73 (89) | 4 (4.9) | 0.234 |
| Ibn Sina H. | 0 (0) | 1 (2.4) | 35 (83.3) | 6 (14.3) | |
| Ibn Al-Atheer H. | 0 (0) | 0 (0) | 27 (93.1) | 2 (6.9) | |
| Al-jomhori H. | 0 (0) | 0 (0) | 28 (96.6) | 1 (3.4) | |
| Al-Khansa H. | 0 (0) | 1 (4.2) | 19 (79.2) | 4 (16.7) | |

4. Clinical examination with/without supervision:

Regarding Patients acceptance of clinical examination in the presence of, or by a medical student with or without senior doctor supervision, the sociodemographic of the patients were all showing a

statistically significant association with patient’s attitude except for the educational level and duration of hospitalization that showed no statistically significant association, the P value of the mentioned associations are shown in **table 6**.

the overall average rate of approval of taking history and clinical examination with supervision was 88.3%, and 66% approved without supervision.

| Table 6: patients’ attitude toward clinical examination (*statistically significant). | | | | | |
|--|---|------------------------|-------------|----------------|-------------------|
| | Would you permit medical students to examine you with the presence of a doctor? | | | | |
| | <i>N</i> (%) | | | | |
| | Male Students | Female Students | Both | Neither | P |
| Age | | | | | |
| ≤ 15 years | 0 (0) | 1 (1.8) | 50 (90.9) | 4 (7.3) | <0.001* |
| 16-25 years | 0 (0) | 22 (55) | 11 (27.5) | 7 (17.5) | |
| 26-45 years | 0 (0) | 26 (38.8) | 31 (46.3) | 10 (14.9) | |
| ≥ 46 years | 0 (0) | 3 (6.8) | 38 (86.4) | 3 (6.8) | |
| Gender | | | | | |
| male | 0 (0) | 0 (0) | 70 (89.7) | 8 (10.3) | <0.001* |
| Female | 0 (0) | 52 (40.6) | 60 (46.9) | 16 (12.5) | |
| Marital Status | | | | | |
| Married | 0 (0) | 42 (33.6) | 64 (51.2) | 19 (15.2) | <0.001* |
| Unmarried | 0 (0) | 10 (12.3) | 66 (81.5) | 5 (6.2) | |
| Educational Level | | | | | |
| Non Formal Education | 0 (0) | 38 (23.9) | 106 (66.7) | 15 (9.4) | 0.118 |
| Basic Education | 0 (0) | 10 (34.5) | 15 (51.7) | 4 (13.8) | |
| High Education | 0 (0) | 4 (22.2) | 9 (50) | 5 (27.8) | |
| How many times did the patient visit the hospital for the same illness | | | | | |
| 0-3 times | 0 (0) | 37 (20.9) | 117 (66.1) | 23 (13) | 0.006* |
| ≥ 4 times | 0 (0) | 15 (51.7) | 13 (44.8) | 1 (3.5) | |
| how long did the patient stay in the hospital | | | | | |
| 0-5 days | 0 (0) | 50 (27.3) | 112 (61.2) | 21 (11.5) | 0.169 |
| ≥ 6 days | 0 (0) | 2 (8.7) | 18 (78.3) | 3 (13) | |
| Department | | | | | |
| Internal medicine | 0 (0) | 9 (16.4) | 43 (78.2) | 3 (5.5) | <0.001* |
| Surgery | 0 (0) | 9 (17.6) | 34 (66.7) | 8 (5.7) | |
| Obstetric | 0 (0) | 34 (58.6) | 13 (22.4) | 11 (19) | |
| Pediatric | 0 (0) | 0 (0) | 40 (95.2) | 2 (4.8) | |
| Site | | | | | |
| Al-Salam H. | 0 (0) | 28 (34.1) | 42 (51.2) | 12 (14.6) | <0.001* |
| Ibn Sina H. | 0 (0) | 7 (16.7) | 30 (71.4) | 5 (11.9) | |
| Ibn Al-Atheer H. | 0 (0) | 0 (0) | 28 (96.6) | 1 (3.4) | |
| Al-jomhori H. | 0 (0) | 6 (20.7) | 21 (72.4) | 2 (6.9) | |
| Al-Khansa H. | 0 (0) | 11 (45.8) | 9 (37.5) | 4 (16.7) | |
| | Would you permit medical students to examine you without the presence of a doctor? | | | | |
| | <i>N</i> (%) | | | | |
| | Male Students | Female Students | Both | Neither | P |
| Age | | | | | |
| ≤ 15 years | 0 (0) | 1 (1.8) | 37 (67.3) | 17 (30.9) | <0.001* |
| 16-25 years | 0 (0) | 18 (45) | 9 (22.5) | 13 (32.5) | |
| 26-45 years | 0 (0) | 19 (28.4) | 24 (35.8) | 24 (35.8) | |

| | | | | | |
|---|-------|-----------|-----------|-----------|---------|
| ≥ 46 years | 0 (0) | 4 (9.1) | 24 (54.5) | 16 (36.4) | |
| Gender | | | | | |
| male | 0 (0) | 0 (0) | 58 (74.4) | 20 (25.6) | <0.001* |
| Female | 0 (0) | 42 (32.8) | 36 (28.1) | 50 (39.1) | |
| Marital Status | | | | | |
| Married | 0 (0) | 35 (28) | 45 (36) | 45 (36) | <0.001* |
| Unmarried | 0 (0) | 7 (8.6) | 49 (60.5) | 25 (30.9) | |
| Educational Level | | | | | |
| Non Formal Education | 0 (0) | 30 (18.9) | 76 (47.8) | 53 (33.3) | 0.031* |
| Basic Education | 0 (0) | 10 (34.5) | 13 (44.8) | 6 (20.7) | |
| High Education | 0 (0) | 2 (11.1) | 5 (27.8) | 11 (61.1) | |
| How many times did the patient visit the hospital for the same illness | | | | | |
| 0-3 times | 0 (0) | 29 (16.4) | 84 (47.5) | 64 (36.2) | <0.001* |
| ≥ 4 times | 0 (0) | 13 (44.8) | 10 (34.5) | 6 (20.7) | |
| how long did the patient stay in the hospital | | | | | |
| 0-5 days | 0 (0) | 40 (21.9) | 81 (44.3) | 62 (33.8) | 0.127 |
| ≥ 6 days | 0 (0) | 2 (8.7) | 13 (56.5) | 8 (34.8) | |
| Department | | | | | |
| Internal medicine | 0 (0) | 7 (12.7) | 29 (52.7) | 19 (34.5) | <0.001* |
| Surgery | 0 (0) | 8 (15.7) | 28 (54.9) | 15 (29.4) | |
| Obstetric | 0 (0) | 27 (46.6) | 7 (12.1) | 24 (41.4) | |
| Pediatric | 0 (0) | 0 (0) | 30 (71) | 12 (28.6) | |
| Site | | | | | |
| Al-Salam H. | 0 (0) | 26 (31.7) | 35 (42.7) | 21 (25.6) | <0.001* |
| Ibn Sina H. | 0 (0) | 5 (11.9) | 17 (40.5) | 20 (47.6) | |
| Ibn Al-Atheer H. | 0 (0) | 0 (0) | 21 (72.4) | 8 (27.6) | |
| Al-jomhori H. | 0 (0) | 4 (13.8) | 17 (58.6) | 8 (27.6) | |
| Al-Khansa H. | 0 (0) | 7 (29.2) | 4 (16.7) | 13 (54.2) | |

5. Interventional medical procedures:

Regarding to perform a minor medical procedure, there is no demonstrated association with any characteristic except for the age of the patient (P=0.006). as shows in table 7.

Table 7: patients' attitude toward minor medical procedures (*statistically significant).

| | Would you permit medical students to perform diagnostic/other procedures on you (e.g. drawing blood, inserting catheter... etc.) | | | | |
|--------------------------|--|-----------------|-----------|-----------|--------|
| | N (%) | | | | |
| | Male Students | Female Students | Both | Neither | P |
| Age | | | | | |
| ≤ 15 years | 0 (0) | 0 (0) | 27 (49.1) | 29 (50.9) | 0.006* |
| 16-25 years | 0 (0) | 5 (12.5) | 22 (55) | 13 (32.5) | |
| 26-45 years | 0 (0) | 3 (4.5) | 43 (64.2) | 21 (31.3) | |
| ≥ 46 years | 0 (0) | 0 (0) | 21 (47.7) | 23 (52.3) | |
| Gender | | | | | |
| male | 0 (0) | 0 (0) | 45 (57.7) | 33 (42.3) | 0.078 |
| Female | 0 (0) | 8 (6.3) | 68 (53.1) | 52 (40.6) | |
| Marital Status | | | | | |
| Married | 0 (0) | 6 (4.8) | 73 (58.4) | 46 (36.8) | 0.229 |
| Unmarried | 0 (0) | 2 (2.5) | 40 (49.4) | 39 (48.1) | |
| Educational Level | | | | | |
| Non Formal Education | 0 (0) | 5 (3.1) | 86 (54.1) | 68 (42.8) | 0.287 |

| | | | | | |
|---|-------|----------|------------|-----------|-------|
| Basic Education | 0 (0) | 3 (10.3) | 17 (58.6) | 9 (31) | |
| High Education | 0 (0) | 0 (0) | 10 (55.6) | 8 (44.4) | |
| How many times did the patient visit the hospital for the same illness | | | | | |
| 0-3 times | 0 (0) | 6 (3.4) | 94 (53.1) | 77 (43.5) | 0.253 |
| ≥ 4 times | 0 (0) | 2 (6.9) | 19 (65.5) | 8 (27.6) | |
| how long did the patient stay in the hospital | | | | | |
| 0-5 days | 0 (0) | 8 (4.4) | 101 (55.2) | 74 (40.4) | 0.651 |
| ≥ 6 days | 0 (0) | 0 (0) | 12 (52.2) | 11 (47.8) | |
| Department | | | | | |
| Internal medicine | 0 (0) | 2 (3.6) | 25 (45.5) | 28 (50.9) | 0.059 |
| Surgery | 0 (0) | 2 (3.9) | 26 (51) | 23 (45.1) | |
| Obstetric | 0 (0) | 4 (6.9) | 40 (69) | 14 (24.1) | |
| Pediatric | 0 (0) | 0 (0) | 22 (52.4) | 20 (47.6) | |
| Site | | | | | |
| Al-Salam H. | 0 (0) | 6 (7.3) | 53 (64.6) | 23 (28) | 0.051 |
| Ibn Sina H. | 0 (0) | 1 (2.4) | 18 (42.9) | 23 (54.8) | |
| Ibn Al-Atheer H. | 0 (0) | 0 (0) | 13 (44.8) | 16 (55.2) | |
| Al-jomhori H. | 0 (0) | 1 (3.4) | 14 (48.3) | 14 (48.3) | |
| Al-Khansa H. | 0 (0) | 0 (0) | 15 (62.5) | 9 (37.5) | |

Discussion

The participation of patients in undergraduate medical education is fundamental for developing competent physicians. Direct patient contact allows students to acquire essential skills in communication, empathy, history taking, clinical examination, and procedural competence. Our study demonstrates that most patients in Mosul expressed positive attitudes toward medical student involvement, particularly in non-invasive aspects of care such as history taking and observation. Acceptance rates were consistently higher when supervision by a senior physician was present, indicating that oversight provides reassurance and fosters patient trust [12][13].

Notably, the lowest approval rates were observed when students were asked to perform interventional procedures. This finding is consistent with international literature [5][11][14][15][16][17][18][19][20], which shows that patients are generally more cautious about permitting invasive procedures by students, largely due to concerns regarding safety, comfort, and privacy. In contrast, higher acceptance rates were reported for supervised history taking and physical examination, highlighting that patients distinguish between types of student involvement based on the perceived risk and intimacy of the procedure.

Sociodemographic factors also influenced patient attitudes. Female patients demonstrated a preference for female students in obstetrics and gynecology, reflecting cultural norms and privacy concerns. Conversely, in pediatric settings, guardians generally showed high levels of acceptance, possibly due to the perceived educational value for students and the expectation of long-term societal benefit. These findings align with regional and international studies, suggesting that gender dynamics and clinical specialty strongly shape patients' willingness to engage with medical students [17][18].

Conclusion

Patients' perception towards medical students appeared to be overall positive but affected by the nature of interaction, presence of a supervision, gender, and the department they admitted in. the highest approval rate was observed in Pediatrics, and the lowest were in Obstetrics, Gynecology.

Limitation

Several limitations should be acknowledged. First, the study employed a cross-sectional design, which restricts the ability to infer causality. Patient attitudes were assessed at a single point in time and may not reflect changes over time or across different healthcare settings. Second, the use of a questionnaire-based method introduces the potential for response bias, particularly social desirability bias, as participants may have provided answers they considered more acceptable. Third, the study was conducted in five major teaching hospitals in Mosul, which may limit the generalizability of the findings to other regions or to non-teaching hospitals with different patient populations. Fourth, the study relied on convenience sampling, which may not fully capture the diversity of patients' perspectives. Finally, while supervision was a key variable, the study did not explore the quality of supervision, which could significantly influence patient acceptance.

These limitations suggest that while our findings provide valuable insights, they should be interpreted with caution. Future studies using randomized sampling, qualitative interviews, and multi-center designs across different regions would provide a more comprehensive understanding of patients' perceptions.

Regarding effect of age group:

In this current study, the elderly and pediatric patients were shown to have higher acceptance to medical students' involvement with presence in outpatient clinics and operating room, taking medical history, examination and observing medical procedures with highest rate of acceptance for general practice. regarding pediatric patients it's probably because consent is usually taken from children's guardians. While the young age group patients were more concerned with the involvement of medical students, this might be that both of students and the patients nearly at the same age group. In comparison with other studies, the same findings were observed in Iqbal et al [21] study.

Gender:

Gender seems to have significant association with patient's attitude, in comparison with the previous study of Marwan et al [11] that showed males only preference was 4.22% as an average to all the questions. while in our study no male preference could be noted, this may be attributed to fact that there were no participants from departments that necessitate male internal examination, especially the urology department.

Specialties:

In our study, the level of acceptance differed across the four specialties, the highest refusal rate was observed in obstetrics / gynecology patients with a higher preference for "females only" which could be attributed to cultural norms, this high refusal rate is most likely related to privacy concerns, as patients in obstetrics/gynecology may routinely require the exposure and examination of the female pelvic region. this finding is in agreement with that previously obtained by Ben Salah A et al [5].

Educational level:

The educational level in our study, showed no significant relation with the agreement of the patients towards the medical student's involvement. Same was found by Saeed et al [22].

Recommendations

1. Patient education: Hospitals should develop strategies to educate patients on the importance of clinical training for future physicians, emphasizing the safeguards in place to ensure patient safety and quality of care.
2. Gender-sensitive assignments: Medical educators should consider patient preferences for student gender, particularly in specialties such as obstetrics and gynecology, where privacy concerns are more pronounced.
3. Simulation-based training: Before involving students in interventional procedures, training should be reinforced through simulation-based programs that allow skill development in a controlled, risk-free environment.

4. Enhanced supervision: Structured supervision should be ensured during student-patient interactions to build patient trust and enhance the learning experience.
5. Policy development: Medical education authorities should develop guidelines balancing patient rights with educational needs, ensuring ethical standards while facilitating effective clinical training.

Acknowledgments

The authors would like to express their deep appreciation to the University of Ninevah, College of Medicine, for its continuous support, as well as to the staff of the affiliated teaching hospitals (Al-Salam Teaching Hospital, Al-Khansa Teaching Hospital, Al-Jomhori Teaching Hospital, Ibn Al-Atheer Teaching Hospital, and Ibn Sina Teaching Hospital) for their cooperation and assistance during the study period.

Conflicted interest

Financial support and sponsorship Nil.

References

1. Zhu G, Tan TK. Medical student mistreatment by patients in the clinical environment: prevalence and management. *Singapore Med J.* 2019;60(7):353-8. <https://doi.org/10.11622/smedj.2019075>.
2. Ahmad W, Waqas A, Amin H, et al. Attitudes of medical students in Lahore, Pakistan towards the doctor-patient relationship. *PeerJ.* 2015;3:e1050. <https://doi.org/10.7717/peerj.1050>.
3. Steiner-Hofbauer V, Schrank B, Holzinger A. What is a good doctor? *Wien Med Wochenschr.* 2017;168(15-16):398-405. <https://doi.org/10.1007/s10354-017-0557-9>.
4. Sayed-Hassan RM, Bashour HN, Koulsi AY. Patient attitudes towards medical students at Damascus University teaching hospitals. *BMC Med Educ.* 2012;12:13. <https://doi.org/10.1186/1472-6920-12-13>.
5. Ben Salah A, El Mhamdi S, Bouanene I, Sriha A, Soltani M. Patients' attitude towards bedside teaching in Tunisia. *Int J Med Educ.* 2015;6:201-7. <https://doi.org/10.5116/ijme.5641.7f35>.
6. Passaperuma K, Higgins J, Power S, Taylor T. Do patients' comfort levels and attitudes regarding medical student involvement vary across specialties? *Med Teach.* 2008;30(1):48-54. <https://doi.org/10.1080/01421590701753493>.
7. O'Flynn N, Rymer J. Women's attitudes to the sex of medical students in a gynaecology clinic: cross sectional survey. *BMJ.* 2002;325(7366):683-4. <https://doi.org/10.1136/bmj.325.7366.683>.
8. Marwan Y, Al-Saddique M, Hassan A, Karim J, Al-Saleh M. Are medical students accepted by patients in teaching hospitals? *Med Educ Online.* 2012;17:1-14. <https://doi.org/10.3402/meo.v17i0.17172>.
9. O'Flynn N, Spencer J, Jones R. Consent and confidentiality in teaching in general practice: survey of patients' views on presence of students. *BMJ.* 1997;315(7116):1142. <https://doi.org/10.1136/bmj.315.7116.1142>.
10. Lafta R, Cetorelli V, Burnham G. Health and health seeking in Mosul during ISIS control and liberation: results from a 40-cluster household survey. *Disaster Med Public Health Prep.* 2019;13(4):758-66. <https://doi.org/10.1017/dmp.2018.161>.
11. Marwan Y, Al-Saddique M, Hassan A, Karim J, Al-Saleh M. Are medical students accepted by patients in teaching hospitals? *Med Educ Online.* 2012;17:1-14. <https://doi.org/10.3402/meo.v17i0.17172>.
12. Goldie J, Dowie A, Goldie A, Cotton P, Morrison J. What makes a good clinical student and teacher? An exploratory study. *BMC Med Educ.* 2015;15:40. <https://doi.org/10.1186/s12909-015-0325-5>.

13. Conn JJ, Lake FR, McColl GJ, Bilszta JL, Woodward-Kron R. Clinical teaching and learning: from theory and research to application. *Med J Aust.* 2012;196(8):527. <https://doi.org/10.5694/mja11.11449>.
14. Sayed-Hassan RM, Bashour HN, Koudsi AY. Patient attitudes towards medical students at Damascus University teaching hospitals. *BMC Med Educ.* 2012;12:13. <https://doi.org/10.1186/1472-6920-12-13>.
15. Alawad AAM, Younis FH. Patients' attitude towards undergraduate medical students at university charity teaching hospital in Sudan. *Int J Med.* 2014;2:28-31.
16. Sweeney K, Magin P, Pond D. Patient attitudes: training students in general practice. *Aust Fam Physician.* 2010;39(9):676-82.
17. Temesgen WA. Patients' attitude towards medical students' involvement in their health care at Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia, 2010. *Ethiop J Health Sci.* 2013;23(2):158-64. <https://doi.org/10.4314/ejhs.v23i2.9>
18. Ramanayake RPJC, Sumathipala WLAH, Rajakaruna IMSM, Ariyapala DPN. Patients' attitudes towards medical students in a teaching family practice: a Sri Lankan experience. *J Family Med Prim Care.* 2012;1(2):122-6. <https://doi.org/10.4103/2249-4863.104984>
19. Onotai LO, Asuquo EO, Amadi E, Amadi-Oparelli A, Ali DU. Patients' perception and attitude towards medical students' involvement in patient care at a Nigerian university teaching hospital. *Educ Res.* 2012;3(9):732-43.
20. Cooke F, Galasko G, Ramrakha V, Richards D, Rose A, Watkins J. Medical students in general practice: how do patients feel? *Br J Gen Pract.* 1996;46(409):361-2.
21. Iqbal MZ, Bukhamsin EY, Alghareeb FY, Almarri NM, Aldajani LM, Busaleh HA. Participation of medical students in patient care: how do patients perceive it? *J Family Med Prim Care.* 2020;9(7):3644-51. https://doi.org/10.4103/jfmprc.jfmprc_265_20.
22. Saeed F, Kassi M, Ayub S, Rehman R, Kasi PM, Rizvi JH. Factors influencing medical student participation in an obstetrics and gynaecology clinic. *J Pak Med Assoc.* 2007;57(10):495-8.