



## Predictors of Knowledge Regarding Artificial Intelligence Among Medical Sector Students

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### **Abstract**

**Background:** The adoption of artificial intelligence (AI) in healthcare is expanding rapidly, impacting clinical decision-making, diagnostics, and patient care. For medical sector students, possessing a strong understanding of AI is crucial to ensure they can effectively engage with these technologies in their future professional roles. Exploring the determinants of AI knowledge among students provides valuable insight for designing educational interventions that enhance readiness and competence in AI-driven healthcare environments. **Aim:** To investigate predictors of knowledge regarding artificial intelligence among medical sector students. **Design:** A descriptive cross-sectional study design was utilized. **Setting:** The study was conducted in the faculties of (Medicine, Nursing, and Pharmacy) at Zagazig University, Egypt. **Subjects:** A simple random sample of 643 undergraduate students enrolled in the final academic year. **Tools of data collection:** Data were collected using a structured self-administered questionnaire consisting of part A: demographic characteristics; part B: knowledge questionnaire regarding artificial intelligence. **Results:** The findings revealed that 68.6% of the studied students had a satisfactory level of knowledge regarding artificial intelligence, while 31.4% had an unsatisfactory level. The most common predictor was presence of statistically significant relationship between total knowledge scores and nationality ( $P=0.025$ ), parental marital status ( $P=0.026$ ), living with parents ( $P<0.001$ ), student birth order ( $P=0.043$ ), family income ( $P=0.021$ ), and number of rooms at home ( $P=0.028$ ). Moreover, highly significant associations were identified between knowledge level and the availability of smart devices at home ( $P<0.001$ ) as well as internet connection source ( $P<0.001$ ) additionally statistically significant relation was found between students' knowledge about AI and name of college and academic achievement level. **Conclusions:** more than two-thirds of medical sector students had a satisfactory level of knowledge regarding artificial intelligence, Knowledge is significantly influenced by demographic, academic and technological factors. Access to digital resources and supportive family environments play a crucial role in enhancing students' knowledge levels. **Recommendations:** continuous awareness campaigns, including webinars and conferences led by experts, to keep students updated on the rapidly evolving field of artificial intelligence and to address common misconceptions.

**Keywords:** predictors, knowledge, Artificial intelligence, medical sector students



## Introduction

Artificial intelligence (AI) is rapidly transforming healthcare, influencing diagnostic processes, treatment planning, patient management, and hospital administration. As AI technologies become increasingly integrated into clinical practice, it is essential for future healthcare professionals to possess a solid understanding of AI concepts, applications, and limitations. Assessing medical sector students' knowledge of AI provides critical insight into their readiness to engage with these emerging technologies and ensures they can make informed decisions in AI-driven healthcare environments. Recent studies indicate that while students recognize the potential of AI in healthcare, gaps remain in their conceptual understanding and practical familiarity (**Alsultan et al., 2025; Hanifa et al., 2025**).

Knowledge of AI among healthcare students is influenced by various predictors spanning demographic, academic, and technological factors. Factors such as nationality, family income, living arrangements, academic year, prior exposure to technology, and access to smart devices can significantly shape students' AI knowledge (**Ebada, 2023; Taher et al., 2025**). Identifying these predictors is crucial for designing targeted educational interventions and policies that ensure equitable exposure to AI concepts, enabling students to fully leverage AI's potential in clinical and administrative healthcare settings. Understanding these factors helps educators anticipate knowledge gaps and implement strategies to foster comprehensive AI literacy among future healthcare professionals.

Several previous studies have explored healthcare students' knowledge and attitudes toward artificial intelligence (AI). For example, (**Bohan et al. 2025**) found that medical students' AI knowledge was significantly associated with access to smart devices and internet resources at home. Similarly, (**Alsultan et al. 2025**) reported that socioeconomic and familial factors, such as parental education and living arrangements, influenced students' understanding of AI applications in healthcare. Moreover, (**Yeşilyurt & Vezne 2023**) highlighted that digital literacy, technological literacy, and internet literacy were strong predictors of students' readiness to apply AI in educational and clinical settings. These studies suggest that knowledge of AI among medical sector students is shaped by a combination of technological exposure, educational background, and personal and environmental factors, highlighting the need to identify predictors to guide curriculum development.

Artificial intelligence (AI) is increasingly integrated into healthcare systems, influencing clinical practice and healthcare delivery. Nurses, as the largest group of healthcare professionals, play a critical role in patient care and in the use of healthcare technologies within clinical settings. The growing implementation of AI applications such as decision-support systems and patient monitoring tools requires nurses and other medical sector students to develop adequate knowledge and understanding of these technologies. Therefore, assessing and identifying the predictors of knowledge regarding artificial intelligence among medical sector students is essential to support their preparedness for future technology-driven healthcare environments (**Buchanan et al., 2021**).

### Significance of the Study:

Despite the rapid expansion of artificial intelligence applications in healthcare, the level of knowledge among medical sector students remains variable and not fully understood. Evaluating students' knowledge of AI is essential because these students represent the future healthcare workforce who will increasingly interact with AI-driven technologies in clinical practice. Therefore, assessing their level of understanding provides insight into their preparedness for the evolving digital healthcare environment (**Paranjape et al., 2019**).

In addition, identifying the predictors associated with students' knowledge such as demographic characteristics, academic exposure, and technological accessibility can help explain variations in AI awareness among healthcare students. Understanding these factors is important for guiding educational institutions in developing targeted interventions that strengthen AI literacy and better prepare students for technology integrated healthcare systems (**Pinto dos Santos et al., 2019; Oh et al., 2019**).

### Aim of the study:

To investigate predictors of knowledge regarding artificial intelligence among medical sector students.



This aim will be fulfilled through the following objectives:

1. To assess knowledge regarding artificial intelligence among medical sector students.
2. To determine the predictors of knowledge regarding artificial intelligence among medical sector students.

#### Research questions:

1. What is the level of knowledge regarding AI among medical sector students?
2. What are the predictors of knowledge regarding AI among medical sector students?

#### Methods:

##### Research design:

A cross-sectional descriptive design was used to conduct the study.

##### Study setting:

The study was conducted in the faculties of (Medicine, Nursing, and Pharmacy) at Zagazig University, Egypt.

##### Study participants:

Based on data from literature (*Allam et al., 2023*), to calculate the sample size with precision/absolute error of 5% and type 1 error of 5%, Sample size is calculated according to the following formula,

$$n = \frac{(Z_{1-\alpha/2})^2 \cdot P(1-P)}{d^2}$$

where,  $Z_{1-\alpha/2}$  at 5% type 1 error ( $p < 0.05$ ) is 1.96, P is the expected proportion in population based on previous studies and d is the absolute error or precision. Therefore, sample size

$$n = \frac{(1.96)^2 \cdot (0.87)(1-0.87)}{(0.026)^2} = 642.8. \text{ excluding pilot study.}$$

The total sample size required for the study is **643**.

##### Distribution of sample size

| Faculty  | Number | Sample |
|----------|--------|--------|
| Medicine | 1616   | 268    |
| Pharmacy | 809    | 135    |
| Nursing  | 1446   | 240    |
| Total    | 3871   | 643    |

##### Tools for Data Collection:

An interview questionnaire was developed by the researcher based on the relevant recent literature. It consisted of the following parts:

##### Part A: Demographic characteristics of medical sector students.

This part included personal data such as age, gender, and place of residence, as well as family-related information including parents' marital status, student's birth order, and family income.

##### Part B: Questions related to the level of knowledge.

This part was designed to assess students' level of knowledge regarding Artificial Intelligence (AI). It included questions to determine whether students had previously heard about AI, understood its basic concepts, or had learned about AI during their university studies. It also assessed students' knowledge of AI applications in documentation, such as designing short- and long-term goals.

##### Knowledge Scoring:

For the knowledge items, each correct answer was given a score of (1), while an incorrect answer was given (0). The scores of the items in each knowledge area were summed and divided by the total number of items to obtain a mean score for that part. The results were then converted into percentage scores, and the mean and standard deviation were calculated. The total scores ranged from 0 to 13. Scores from 0 to 7 (0% – <60%) were considered unsatisfactory, while scores from 8 to 13 ( $\geq 60\%$ ) were considered satisfactory.

##### 1-Content Validity:



Content validity was assessed by a panel of three experts: one professor of Community Health Nursing from the Faculty of Nursing, Zagazig University; one assistant professor of Community Health Nursing from the Faculty of Nursing, Zagazig University; and one professor of Community Health Medicine from the Faculty of Medicine, Zagazig University. They reviewed the study tools in terms of clarity, relevance, comprehensiveness, and understandability. Based on their comments and recommendations, the necessary modifications were made to the tools.

## 2-Reliability:

| Tools                                   | Cronbach's alpha value | Internal consistency |
|-----------------------------------------|------------------------|----------------------|
| Knowledge about Artificial Intelligence | 0.901                  | Excellent            |

## 3. Pilot study:

A pilot study was conducted on a sample of 64 medical sector students, representing 10% of the total study sample. The pilot study aimed to assess the feasibility, clarity, and applicability of the study tools, as well as to estimate the time required to complete the data collection instruments. All participants were provided with a clear explanation of the study purpose. The participants included in the pilot study were excluded from the main study sample.

## 4. Ethical consideration:

Ethical approval was first obtained from the Research Ethics Committee (REC) at the Faculty of Nursing, Zagazig University. Oral consent was then obtained from the students after providing a full explanation of the aim of the study. Participants were informed that their participation was voluntary and that they had the right to refuse or withdraw from the study at any time during data collection. They were also assured that all collected information would remain confidential and would be used for research purposes only. The researcher ensured the anonymity and confidentiality of all participants' data.

## 5. Fieldwork:

After obtaining the necessary permissions to conduct the study, the researcher met with the deans of the selected faculties to obtain their approval for carrying out the research. The aim of the study, its procedures, and the data collection tools were explained to the deans. In coordination with the dean of each faculty, a schedule for data collection was arranged.

Data were collected from students in the three faculties sequentially, where data collection was completed in one faculty before moving to the next. The researcher spent some time with the students before starting the actual data collection to establish familiarity with them.

The researcher met the students individually, explained the purpose of the study, and invited them to participate. After obtaining their agreement, the interview questionnaire was distributed to them. Each student took approximately 20–25 minutes to complete the questionnaire.

Data collection was conducted three days per week (Saturday, Monday, and Wednesday) from 10:00 AM to 1:00 PM. The data were collected during the second semester over a period of three months, starting from the beginning of March until the end of May of the academic year 2024–2025.

## 6. Administrative Design:

After obtaining permission to conduct the study, the researcher met with the deans of the selected faculties to request approval for carrying out the research. The study's objectives, procedures, and data collection tools were explained to the deans. Following this, a schedule for data collection was established in collaboration with each faculty dean. Prior to the actual data collection, the researcher



spent time with the students to become acquainted with them. Individual meetings were held with students to explain the purpose of the study and invite their participation. Oral consent was obtained from the students who agreed to participate.

### Statistical Analysis

All statistical analyses were conducted using the Statistical Package for Social Sciences (SPSS) for Windows, version 20.0 (SPSS, Chicago, IL). Continuous variables that were normally distributed were presented as mean  $\pm$  standard deviation (SD). Categorical variables were expressed as frequencies and percentages.

The Chi-square test (or Fisher's exact test when appropriate) was used to compare categorical variables. The correlation coefficient test was applied to examine the relationship between two continuous variables. Linear regression analysis was performed to predict knowledge, attitude, and practices regarding Artificial Intelligence (AI) based on different factors.

In addition, the reliability (internal consistency) of the study questionnaires was assessed. A p-value at  $<0.05$  was considered statistically significant.

### Results:

**Figure1**, demonstrates the distribution of the overall knowledge level about artificial intelligence among medical sector students. It indicates that 68.6% of the students had a satisfactory level of knowledge, whereas 31.4% had an unsatisfactory level.

**Table1**, This table shows that 97.5% of medical sector students were at age 20-24 years with mean age  $22.2 \pm 1.0$  years, 64.7% of them were females and residing in rural areas 60.8% , also 76.7% were Egyptian, 92.2% of them had a married parents ,in addition 89.4% of them lived with their parents, as well as 60.8% were the middle birth order, 72.0% of students reported the family income was enough for daily needs ,crowding index Mean  $\pm$ SD  $1.4 \pm 0.7$  and there were healthy environment at their homes consisted of presence of electricity, water, sewage and natural gas (97.5%,91.4%,83.0% and 51.5% respectively).

**Table2**, shows that there were statistically significant relationships between the total students' knowledge and several socio-demographic variables, including nationality ( $P = 0.025$ ), parents' marital status ( $P = 0.026$ ), living with parents ( $P < 0.001$ ), student birth order ( $P = 0.043$ ), family income ( $P = 0.021$ ), and number of rooms at home ( $P = 0.028$ ).

Moreover, statistically significant associations were also found between students' total knowledge and the availability of smart devices in the house ( $P < 0.001$ ) as well as the source of internet connection ( $P < 0.001$ ).

**Table3**, this table indicates that statistically significant relation was found between students' knowledge about AI and name of college and academic achievement level ( $P=0.014$ ,  $0.002$ ) respectively.

**Table4**, this table demonstrates the best-fitting linear regression model for the total knowledge score about artificial intelligence (AI). The findings show that nationality, living with parents, number of rooms in the home, and academic achievement level were significant independent positive predictors of students' knowledge score. On the other hand, parents' marital status and the number of family members were identified as significant independent negative predictors of the knowledge score. The regression model accounted for 13.3% of the variance in students' knowledge score, as indicated by the  $R^2$  value.

### Discussion:

**Regarding the first research question related to students' knowledge about artificial intelligence**, the findings of the present study revealed that more than two thirds (68.6%) of the studied students had good knowledge about AI. This could be attributed to several factors such as self-directed learning, the extensive use of digital media and social networking platforms, as well as greater exposure to AI concepts through daily technology use and repeated interaction with AI-based applications in healthcare within the Egyptian context.



This result agrees with the findings of **Abd El-Monem et al. (2023)** in Egypt, who reported that nearly two thirds (66.1%) of the studied sample demonstrated a high level of knowledge regarding AI technology. Likewise, a study conducted in Pakistan by **Ahmed et al. (2022)** found that more than two thirds (68.8%) of students possessed good knowledge about AI. Furthermore, a study carried out in Syria by **Swed et al. (2022)** indicated that more than two thirds (70%) of students had good knowledge about AI.

On the opposite side, this finding differed from **Yüzbaşıoğlu et al., (2021)** in Turkey showed that less than half of studied participants had moderate knowledge about artificial intelligence, also a study in Egypt administered by **Shehata et al., (2025)** revealed that only more than quarter (28,7%) of students had a good knowledge about AI, this may be explained by several factors. First, limited integration of artificial intelligence into medical curricula in Egypt and Turkey reduced students' exposure to the topic. Second, the lack of practical training and hands-on experience with AI tools contributed to lower knowledge levels. Third, restricted access to modern technological resources, such as AI software and high-speed internet, limited students' opportunities to explore AI applications.

**Concerning the second research question related to predictors of students' knowledge about artificial intelligence**, the findings of the current study revealed highly statistically significant associations between students' knowledge levels and several factors, including nationality, parents' marital status, living with parents, birth order, family income, and the number of rooms in the household. In addition, a statistically significant relationship was identified between the overall knowledge score and the availability of smart devices at home as well as access to an internet connection.

These findings may be explained by the impact of socioeconomic and family-related factors on students' learning opportunities. Characteristics such as nationality, parental marital status, living arrangements, birth order, income level, and housing conditions may indicate variations in family stability, parental involvement, and the presence of a supportive learning environment. Moreover, the availability of smart devices and stable internet access can enhance students' digital skills and provide greater opportunities to obtain knowledge and explore artificial intelligence-related information.

**Regarding the relationship between students' AI knowledge and their nationality**, these findings align with **Mansoor (2024)**, who conducted a comparative study among university students in Egypt, Saudi Arabia, Malaysia, and India, reporting a highly significant association between students' knowledge levels and their nationality. Similarly, a study by **Al Omari et al. (2024)** across 10 Arab countries found notable differences in mean knowledge scores among the countries.

**Concerning the association between AI knowledge and living with parents**, the results are consistent with **Garg & Sengupta (2020)**, who examined students in Hawaii, USA, and suggested that residing with parents may affect students' engagement with AI-related technologies through parental guidance and support for in-home learning.

**Regarding the relationship between AI knowledge and income**, the current findings are consistent with **Goyal & Aneja (2020)** in India, who reported a significant association between students' AI knowledge and their income. However, this result contrasts with **Dang et al. (2025)**, who conducted a study in Vietnam and found no significant relationship between income and AI knowledge. This discrepancy may be due to differences in study populations, institutional contexts, sample sizes, academic levels, fields of study, and data collection methods, all of which can influence outcomes.

**Concerning the relationship between AI knowledge and the source of internet connection**, a study conducted in Indonesia by **Awaludin & Risyda (2024)** reported a significant association. From the researcher's perspective, having reliable and adequate internet access enhances exposure to AI-related information, online learning platforms, and digital tools, thereby improving individuals' AI knowledge.

**In terms of the relationship between AI knowledge and the availability of smart devices**, the findings align with **Awaludin & Risyda (2024)**, who demonstrated a significant link between students' AI knowledge and their effective use of smart devices.

**Related to relation between knowledge and academic achievement level**, In this concern, a study



facilitated by **Hasan et al., (2024)** in six countries in the Middle East and North Africa region and declared that there was a significant relation between knowledge and academic achievement level. In the opposite line, a study conducted by **Bećirović et al., (2025)** in Austria reported that there was no relationship between knowledge of AI and academic achievement level, might be attributed to the fact that knowledge of artificial intelligence may depend more on personal interest, self-learning, and extracurricular exposure rather than academic achievement level. Students with different academic performance levels may have similar access to AI-related information, resulting in no significant relationship between AI knowledge and academic achievement.

### **Conclusions:**

Based on the findings of the present study, more than two-thirds of medical sector students demonstrated a satisfactory level of knowledge regarding artificial intelligence. Students' knowledge was significantly associated with several demographic, academic, and technological predictors. Access to digital resources and supportive family environments appears to play an important role in improving students' knowledge of AI.

### **Recommendations:**

**On the basis of the current study findings the following recommendations are suggested:**

- 1-Continuous awareness campaigns: Organize webinars and conferences featuring experts to keep students updated on the rapidly evolving AI landscape and correct misconceptions.
- 2-Addressing key predictors of AI knowledge such as: nationality, parental marital status, living with parents, student birth order, family income, and number of rooms at home, the availability of smart devices at home, internet connection source, name of college and academic achievement level.

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### **AUTHOUR'S CONTRIBUTIONS:**

**S.A.H.M.** contributed to the study conceptualization, data collection, analysis and data interpretation, writing the original draft preparation (subjects and methods, discussion, conclusion, and recommendations).

**S.A.A.H. and A.A.E.A.** contributed extensively and participated in the study conceptualization (study idea, aim, and research questions), study design contribution, preparation of the original draft of the manuscript before the publication, review and editing, and overall supervision. All authors have read and approved the final manuscript.

### **DECLARATION OF CONFLICTING INTERESTS:**

no conflict of interest.

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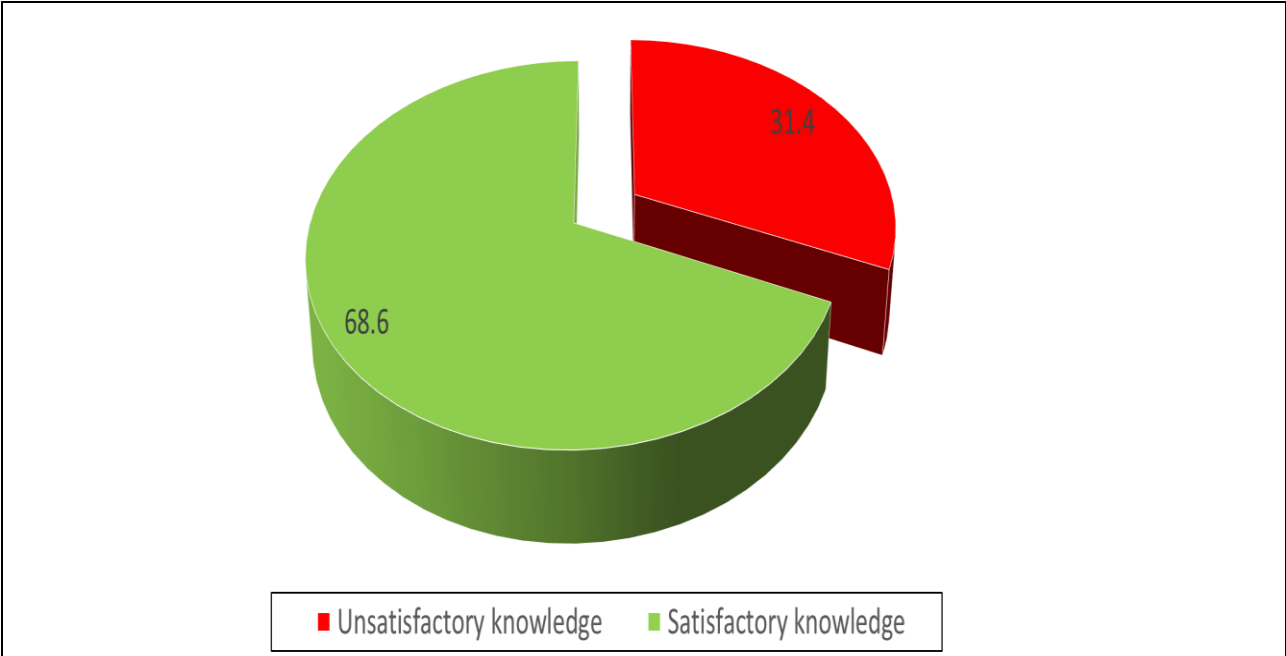


Figure 1. Distribution of total knowledge level about artificial intelligence

| General characteristics of the study sample. (Table 1) |                 |      |
|--------------------------------------------------------|-----------------|------|
|                                                        | N               | %    |
| Age (Years)                                            |                 |      |
| 20 – 24                                                | 627             | 97.5 |
| 25 or more                                             | 16              | 2.5  |
| Mean ±SD                                               | 22.2 ±1.0 years |      |
| Gender                                                 |                 |      |
| Male                                                   | 227             | 35.3 |
| Female                                                 | 416             | 64.7 |
| Place of residence                                     |                 |      |
| Urban                                                  | 252             | 39.2 |
| Rural                                                  | 391             | 60.8 |
| Nationality                                            |                 |      |
| Egyptian                                               | 493             | 76.7 |
| Non – Egyptian                                         | 150             | 23.3 |
| Marital status of parents                              |                 |      |
| Married                                                | 593             | 92.2 |
| Divorced                                               | 10              | 1.6  |
| Widowed                                                | 40              | 6.2  |
| Living with parental                                   |                 |      |
| No                                                     | 68              | 10.6 |
| Yes                                                    | 575             | 89.4 |
| Student birth order                                    |                 |      |
| First                                                  | 246             | 38.3 |
| Middle                                                 | 391             | 60.8 |
| Last                                                   | 6               | 0.9  |
| Income                                                 |                 |      |
| Not enough                                             | 120             | 18.7 |
| Enough                                                 | 463             | 72.0 |
| Enough and saved                                       | 60              | 9.3  |
| Crowding index (Mean ±SD)                              | 1.4 ±0.7        |      |
| Healthy environment at home                            |                 |      |
| Electricity                                            | 627             | 97.5 |
| Water                                                  | 588             | 91.4 |
| Sewage                                                 | 534             | 83.0 |
| Natural gas                                            | 331             | 51.5 |



| Table 2. Association between demographic characteristics for the students and knowledge about artificial intelligence |                          |      |                        |      |                                    |                    |
|-----------------------------------------------------------------------------------------------------------------------|--------------------------|------|------------------------|------|------------------------------------|--------------------|
|                                                                                                                       | Unsatisfactory knowledge |      | Satisfactory knowledge |      | Chi – square / Fisher's exact test |                    |
|                                                                                                                       | N                        | %    | N                      | %    | X <sup>2</sup>                     | P                  |
| <b>Age (Years)</b>                                                                                                    |                          |      |                        |      |                                    |                    |
| 20 – 24                                                                                                               | 194                      | 96.0 | 433                    | 98.2 |                                    |                    |
| 25 or more                                                                                                            | 8                        | 4.0  | 8                      | 1.8  | 2.630                              | 0.105              |
| <b>Gender</b>                                                                                                         |                          |      |                        |      |                                    |                    |
| Male                                                                                                                  | 64                       | 31.7 | 163                    | 37.0 |                                    |                    |
| Female                                                                                                                | 138                      | 68.3 | 278                    | 63.0 | 1.690                              | 0.194              |
| <b>Place of residence</b>                                                                                             |                          |      |                        |      |                                    |                    |
| Urban                                                                                                                 | 72                       | 35.6 | 180                    | 40.8 |                                    |                    |
| Rural                                                                                                                 | 130                      | 64.4 | 261                    | 59.2 | 1.555                              | 0.212              |
| <b>Nationality</b>                                                                                                    |                          |      |                        |      |                                    |                    |
| Egyptian                                                                                                              | 166                      | 82.2 | 327                    | 74.1 |                                    |                    |
| Non – Egyptian                                                                                                        | 36                       | 17.8 | 114                    | 25.9 | 4.993                              | <b>0.025*</b>      |
| <b>Marital status of parents</b>                                                                                      |                          |      |                        |      |                                    |                    |
| Married                                                                                                               | 178                      | 88.1 | 415                    | 94.1 |                                    |                    |
| Divorced                                                                                                              | 4                        | 2.0  | 6                      | 1.4  |                                    |                    |
| Widowed                                                                                                               | 20                       | 9.9  | 20                     | 4.5  | 7.292                              | <b>0.026*</b>      |
| <b>Living with parental</b>                                                                                           |                          |      |                        |      |                                    |                    |
| No                                                                                                                    | 36                       | 17.8 | 32                     | 7.3  |                                    |                    |
| Yes                                                                                                                   | 166                      | 82.2 | 409                    | 92.7 | 16.353                             | <b>&lt;0.001**</b> |
| <b>Student birth order</b>                                                                                            |                          |      |                        |      |                                    |                    |
| First                                                                                                                 | 86                       | 42.6 | 160                    | 36.3 |                                    |                    |
| Middle                                                                                                                | 112                      | 55.4 | 279                    | 63.3 |                                    |                    |
| Last                                                                                                                  | 4                        | 2.0  | 2                      | 0.5  | 6.288                              | <b>0.043*</b>      |
| <b>Income</b>                                                                                                         |                          |      |                        |      |                                    |                    |
| Not enough                                                                                                            | 50                       | 24.8 | 70                     | 15.9 |                                    |                    |
| Enough                                                                                                                | 132                      | 65.3 | 331                    | 75.1 |                                    |                    |
| Enough and saved                                                                                                      | 20                       | 9.9  | 40                     | 9.1  | 7.770                              | <b>0.021*</b>      |
| <b>Number of family members</b>                                                                                       |                          |      |                        |      |                                    |                    |
| 2 – 4                                                                                                                 | 42                       | 20.8 | 82                     | 18.6 |                                    |                    |
| 5 – 7                                                                                                                 | 144                      | 71.3 | 329                    | 74.6 |                                    |                    |
| 8 or more                                                                                                             | 16                       | 7.9  | 30                     | 6.8  | 0.796                              | 0.672              |
| <b>Number of rooms at home</b>                                                                                        |                          |      |                        |      |                                    |                    |
| < 4                                                                                                                   | 136                      | 67.3 | 257                    | 58.3 |                                    |                    |
| 4 – 5                                                                                                                 | 60                       | 29.7 | 152                    | 34.5 |                                    |                    |
| 6 or more                                                                                                             | 6                        | 3.0  | 32                     | 7.3  | 7.117                              | <b>0.028*</b>      |
| <b>There are Smart devices in the house</b>                                                                           |                          |      |                        |      |                                    |                    |
| No                                                                                                                    | 10                       | 5.0  | 4                      | 0.9  |                                    |                    |
| Yes                                                                                                                   | 192                      | 95.0 | 437                    | 99.1 | 10.635                             | <b>&lt;0.001**</b> |
| <b>There is an internet connection source</b>                                                                         |                          |      |                        |      |                                    |                    |
| No                                                                                                                    | 18                       | 8.9  | 12                     | 2.7  |                                    |                    |
| Yes                                                                                                                   | 184                      | 91.1 | 429                    | 97.3 | 11.934                             | <b>&lt;0.001**</b> |
| <b>Healthy environment at home</b>                                                                                    |                          |      |                        |      |                                    |                    |
| Electricity                                                                                                           | 196                      | 97.0 | 431                    | 97.7 | 0.282                              | 0.595              |
| Water                                                                                                                 | 180                      | 89.1 | 408                    | 92.5 | 2.057                              | 0.151              |
| Sewage                                                                                                                | 166                      | 82.2 | 368                    | 83.4 | 0.158                              | 0.691              |
| Natural gas                                                                                                           | 104                      | 51.5 | 227                    | 51.5 | 0.001                              | 0.998              |



Table 3: Association between academic features of the students and knowledge about artificial intelligence

|                                   | Unsatisfactory knowledge |      | Satisfactory knowledge |      | Chi – square / Fisher's exact test |               |
|-----------------------------------|--------------------------|------|------------------------|------|------------------------------------|---------------|
|                                   | N                        | %    | N                      | %    | X <sup>2</sup>                     | P             |
| <b>Name of college</b>            |                          |      |                        |      |                                    |               |
| Medicine                          | 74                       | 36.6 | 194                    | 44.0 |                                    |               |
| Pharmacy                          | 36                       | 17.8 | 99                     | 22.4 |                                    |               |
| Nursing                           | 92                       | 45.5 | 148                    | 33.6 | 8.543                              | <b>0.014*</b> |
| <b>Academic achievement level</b> |                          |      |                        |      |                                    |               |
| Acceptable                        | 18                       | 8.9  | 19                     | 4.3  |                                    |               |
| Good                              | 40                       | 19.8 | 50                     | 11.3 |                                    |               |
| Very good                         | 74                       | 36.6 | 188                    | 42.6 |                                    |               |
| Excellent                         | 70                       | 34.7 | 184                    | 41.7 | 15.167                             | <b>0.002*</b> |

Table4. Best fitting multiple linear regression model for total knowledge score about AI to predict student's knowledge about artificial intelligence based on the demographic characters and other factors

|                                               | Unstandardized Coefficients |            | Standardized Coefficients | T      | Sig.     |
|-----------------------------------------------|-----------------------------|------------|---------------------------|--------|----------|
|                                               | B                           | Std. Error | Beta                      |        |          |
| <b>(Constant)</b>                             | 4.305                       | 1.142      |                           | 3.770  | <0.001** |
| <b>Age (Years)</b>                            | 0.051                       | 0.465      | 0.004                     | 0.110  | 0.913    |
| <b>Gender</b>                                 | 0.117                       | 0.160      | 0.028                     | 0.727  | 0.467    |
| <b>Place of residence</b>                     | -0.182                      | 0.161      | -0.045                    | -1.132 | 0.258    |
| <b>Nationality</b>                            | 0.491                       | 0.205      | 0.105                     | 2.396  | 0.017*   |
| <b>Marital status of parents</b>              | -0.391                      | 0.151      | -0.098                    | -2.579 | 0.010*   |
| <b>Living with parental</b>                   | 1.008                       | 0.247      | 0.157                     | 4.088  | <0.001** |
| <b>Student birth order</b>                    | 0.251                       | 0.148      | 0.064                     | 1.688  | 0.092    |
| <b>Income</b>                                 | 0.192                       | 0.144      | 0.051                     | 1.332  | 0.183    |
| <b>Number of family members</b>               | -0.401                      | 0.156      | -0.102                    | -2.571 | 0.010*   |
| <b>Number of rooms at home</b>                | 0.371                       | 0.124      | 0.114                     | 2.993  | 0.003*   |
| <b>There are Smart devices in the house</b>   | 0.196                       | 0.545      | 0.014                     | 0.359  | 0.720    |
| <b>There is an internet connection source</b> | 0.344                       | 0.375      | 0.037                     | 0.917  | 0.360    |
| <b>Academic life</b>                          |                             |            |                           |        |          |
| Name of college                               | 0.148                       | 0.098      | 0.067                     | 1.508  | 0.132    |
| Academic achievement level                    | 0.256                       | 0.087      | 0.112                     | 2.948  | 0.003*   |

$R^2=0.133$ , Adjusted  $R^2=0.108$



## References

- Alsultan, M. M., Baraka, M. A., Alhajri, L. H., Althayf, L., Omar, N., Alhomoud, F., ... & Al-Awad, F. A. (2025). Knowledge and perception of artificial intelligence education among undergraduate healthcare students. *BMC Medical Education*, 25, 1066. <https://doi.org/10.1186/s12909-025-07577-x>
- Hanifa, H., Atia, M., Daboul, R., et al. (2025). Artificial intelligence in focus: assessing awareness and perceptions among medical students in three private Syrian universities. *BMC Medical Education*, 25, 801. <https://doi.org/10.1186/s12909-025-07396-0>
- Ebada, M. A. (2023). Knowledge, attitude, and perception of Arab medical students towards artificial intelligence in medicine and radiology: A multi-national cross-sectional study. *European Radiology*. <https://doi.org/10.1007/s00330-023-10509-2>
- Taher, E., Hassanin Hegazy, M., Hegazy, M. M., Abomousa, M. M., Osman, N. A., Mohamed, M. E., & Elfar, E. (2025). Students' perception towards applying artificial intelligence in the medical field: A cross-sectional study among medical students, Cairo University. *Egyptian Journal of Nutrition and Health*, 20(1), 17–36. [https://ejnh.journals.ekb.eg/article\\_418668](https://ejnh.journals.ekb.eg/article_418668).
- Buchanan, C., Howitt, M. L., Wilson, R., Booth, R. G., Risling, T., & Bamford, M. (2020). Predicted influences of artificial intelligence on the domains of nursing: Scoping review. *JMIR Nursing*, 3(1), e23939. <https://doi.org/10.2196/23939>
- Bohan, H. H., Jasim, B. A., Nsaif, N. G., et al. (2025). Artificial intelligence literacy among medical students: Knowledge, usage, and ethical awareness. *Al-Iraqia Medical College Journal*, 2(3), 65–76.
- Yeşilyurt, E., & Vezne, R. (2023). Digital literacy, technological literacy, and internet literacy as predictors of attitude toward applying computer-supported education. *Education and Information Technologies*, 28, 9885–9911. <https://doi.org/10.1007/s10639-022-11311-1>
- Paranjape, K., Schinkel, M., Panday, R. N., Car, J., & Nanayakkara, P. (2019). Introducing artificial intelligence training in medical education. *JMIR Medical Education*, 5(2), e16048.
- Pinto dos Santos, D., Giese, D., Brodehl, S., Chon, S., Staab, W., Kleinert, R., Maintz, D., & Baessler, B. (2019). Medical students' attitude towards artificial intelligence: A multicentre survey. *European Radiology*, 29(4), 1640–1646.
- Oh, S., Kim, J. H., Choi, S. W., Lee, H. J., Hong, J., & Kwon, S. H. (2019). Physician confidence in artificial intelligence: An online mobile survey. *Journal of Medical Internet Research*, 21(3), e12422.
- Allam AH, Elteuacy NK, Alabdallat YJ, et al. Knowledge, attitude, and perception of Arab medical students towards artificial intelligence in medicine and radiology: A multi-national cross-sectional study. *Eur Radiol* (2023).
- Abd El-Monem, A., Rashed, S., & Hasanin, A. (2023). Artificial intelligence technology and its relation to staff nurses' professional identity and problem solving abilities. *International Egyptian journal of nursing sciences and research*, 3(2), 144-164.
- Swed, S., Alibrahim, H., Elkalagi, H., Nasif, N., Rais, A., Nashwan, J., & Shoib, S. (2022). Knowledge, attitude, and practice of artificial intelligence among doctors and medical students in Syria: a cross-sectional online survey. *Frontiers in artificial intelligence*, 5, 1011524.
- Yüzbaşıoğlu, E. (2021). Attitudes and perceptions of dental students towards artificial intelligence. *Journal of dental education*, 85(1), 60-68.
- Shehata Ramadan Wafa, H., El-Ahmady Sarhan, A., & Kamal Shedeed, W. (2025). Perception of Nursing Students regarding Artificial Intelligence in Health Care. *Journal of Nursing Science Benha University*, 6(2), 464-478.
- Ahmed, Z., Bhinder, K. K., Tariq, A., Tahir, M. J., Mehmood, Q., Tabassum, M. S., ... & Yousaf, Z. (2022). Knowledge, attitude, and practice of artificial intelligence among doctors and medical students in Pakistan: A cross-sectional online survey. *Annals of medicine and surgery*, 76, 103493.
- Al Omari, O., Alshammari, M., Al Jabri, W., Al Yahyaei, A., Aljohani, K. A., Sanad, H. M., ... & Aljezawi, M. (2024). Demographic factors, knowledge, attitude and perception and their association with nursing students' intention to use artificial intelligence (AI): a multicentre survey across 10 Arab countries. *BMC Medical Education*, 24(1), 1456.
- Dang, N. B., Phan, Q. N., & Tran, N. H. (2025). Curious but Unprepared: Healthcare Students' Perspectives on AI and Robotics in Care and the Need for Curriculum Reform. *International Medical Education*, 4(3), 30.
- Awaludin, M., Yasin, V., & Risyda, F. (2024). The influence of artificial intelligence technology, infrastructure and human resource competence on Internet access networks. *Inform: Jurnal Ilmiah Bidang Teknologi Informasi Dan Komunikasi*, 9(2), 111-120.
- Goyal, A., & Aneja, R. (2020). Artificial intelligence and income inequality: Do technological changes and worker's position matter?. *Journal of Public Affairs*, 20(4), e2326.



- Garg, R., & Sengupta, S. (2020). Conversational technologies for in-home learning: Using co-design to understand children's and parents' perspectives. In Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems (CHI '20) (pp. 1–13). Association for Computing Machinery. <https://doi.org/10.1145/3313831.3376631>
- Mansoor, H. M. H., Bawazir, A., Alsabri, M. A., Alharbi, A., & Okela, A. H. (2024). Artificial intelligence literacy among university students—a comparative transnational survey. *Frontiers in Communication*, 9, 1478476. <https://doi.org/10.3389/fcomm.2024.1478476>
- Moosa, D., Bozkurt, V., Reesha, A., & Shina, A. (2025). THE EFFECTS OF ARTIFICIAL INTELLIGENCE (AI) LITERACY AND USE ON STUDENTS' PERCEPTIONS OF ACADEMIC PERFORMANCE IN THE MALDIVES. *Bilgi Ekonomisi ve Yönetimi Dergisi*, 19(2), 163-174.
- Shi, X., He, J., & Niu, G. (2024). The Association between Family Socioeconomic Status and Children's Digital Literacy: The Explanatory Role of Parental Mediation. *Adolescents* (2673-7051), 4(3).
- Siddiq, F., Fischer, F., & Friedrich, H. F. (2019). The relation between students' socioeconomic status and ICT literacy: Findings from a meta-analysis. *Computers & Education*, 138, 13–32. <https://doi.org/10.1016/j.compedu.2019.04.011>
- Lou, J., Wang, M., Xie, X., Wang, F., Zhou, X., Lu, J., & Zhu, H. (2024). The association between family socio-demographic factors, parental mediation and adolescents' digital literacy: a cross-sectional study. *BMC Public Health*, 24(1), 2932.
- Hasan, H. E., Jaber, D., Al Tabbah, S., Lawand, N., Habib, H. A., & Farahat, N. M. (2024). Knowledge, attitude and practice among pharmacy students and faculty members towards artificial intelligence in pharmacy practice: A multinational cross-sectional study. *Plos one*, 19(3), e0296884.
- Bećirović, S., Polz, E., & Tinkel, I. (2025). Exploring students' AI literacy and its effects on their AI output quality, self-efficacy, and academic performance. *Smart Learning Environments*, 12, Article 29. <https://doi.org/10.1186/s40561-025-00384-3>.