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Nursing Students' Perception and Attitudes toward Utilization of Artificial Intelligence in Health Care

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Abstract: The aim of the study was to evaluate nursing students' perception and attitudes toward utilization of Artificial Intelligence in Health care. Descriptive design was applied. The study was carried out at Vision Medical College, Jeddah. KSA. Two hundred and six students registered in the nursing program were included in the study by using convenience sampling. Three instruments were employed to gather data, Self-Administered questionnaire, covering student nurses' demographic characteristics, Questionnaire to assess the perception and attitudes regarding artificial intelligence. Results revealed that majority of participants (79.6%) were familiar with artificial intelligence, and their attitudes toward using it were significantly correlated with their demographic characteristics (living location, educational attainment, self-assessment of technological competence, and familiarity with artificial intelligence). Also, it showed that 64% of the participants had a positive attitude regarding using artificial intelligence. Both the attitude and perception scales had mean scores of 3.29±0.76 and 3.43±0.69. Likewise, a statistically significant positive correlation ($\beta = 0.855$, $p < 0.001$) showed between the students' perception and attitudes. Conclusion. The current study concluded that the students most likely held positive attitudes and had a favorable perception toward utilization of artificial intelligence in health care. Arranging frequent workshops and training sessions for healthcare personnel and student nurses to enhance their knowledge about artificial intelligence and its developments.

Keywords: *Artificial Intelligence, Attitude, Perception & nursing students.*

1. Introduction

Healthcare is changing quickly due to Artificial Intelligence (AI), which has enormous potential to revolutionize nursing. Applications of AI in nursing encompasses the clinical nursing services as well as professional nurse-patient relationship, is already apparent in empirical evidence [1]. Nursing education programs must increasingly equip students to influence and integrate AI technology into their nursing practice as a result of the technology's advancement. Keeping up with technological changes and making sure nurses are capable of using AI well are crucial for keeping a competitive edge. Based on existing data, student nurses exhibit increased curiosity about this new technology and greater assurance when utilizing AI-powered instruments [2].

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Realizing that artificial intelligence is a fundamental technology, many nations are vying for a global lead in AI innovation. In order to realize vision 2030, Saudi Arabia has started integrating technology and AI into various health sectors. In the field of medicine, AI is the process of assembling, processing, and analyzing expert data input through computers and cutting-edge technologies like machine learning algorithms. This results in critical thinking that is on par with human reasoning [3]. AI has an impact on the roles of nursing practice by increasing their creativity and strategic thinking [4]. It has many applications in healthcare, it can help with disease assessment, diagnosis, and solving a range of clinical problems. It can also reduce data loss, improve nursing communication skills, improve inpatient care management, lessen the workload of nurses, and improve patient safety [5]. AI and its potential uses in clinical settings, such as how it might improve medical education and in-patient care training to transform healthcare [6].

Artificial intelligence is a rapidly expanding field that pervades many facets of people's daily life. The likelihood of successful AI adoption and its benefits in healthcare services are increased by nursing students' propensity for AI in healthcare [7]. In order to keep up with technological advancement through AI applications in health systems, nurses must be involved as a core member. Therefore, given the developments in healthcare, future nurses should be involved with this technology to deliver comprehensive advanced care and have a thorough understanding of AI [8]. Several published studies about AI applications in health care were applied, but attitudes and perceptions about AI are still largely unclear. Consequently, the study was carried out.

1.1. Aim of the Study

The study aimed to evaluate nursing students' perception and attitudes toward utilization of artificial intelligence in health care.

1.2. Study Questions

Q1. What are the nursing students' attitudes and perceptions towards utilization of AI in health care?

Q2. What is the effect of students' perception on their attitude towards application of AI in health care?

2. Materials and Method

2.1. Research Design

The study started from March to May 2024, a descriptive correlational study was conducted at Vision Medical College in Jeddah (VMC) to evaluate nursing students' perceptions and attitudes toward AI. An anonymous electronic survey was created using Google Forms and used to achieve the study objective.

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2.2. Research Sample

To fulfill the study purpose, nursing program students at VMC were used as a convenient sample. It was also open to undergraduate nursing students, interns, and bridge students who hold 2 years of nursing education, have clinical experience, and enrolled in the program to obtain a bachelor's degree were also eligible. G*Power software was used to calculate the sample size as the following statistical parameters were reported in the literature, a small effect size of 0.05, a significance level of 0.05, and statistical power of 0.80 **[9].** Taking a non-response percentage of 10% into consideration, ultimately, 206 students were eligible to join in the research.

2.3. Research Instruments

An electronic survey was conducted. It involved three parts, the 1st part included demographic data such as gender, civil status, academic level, residence, academic performance and familiarity with AI. The 2nd part was adopted from **[10]** used to evaluate the perception regarding AI. It consisted of (14) items within three domains**,** presented on a five-point Likert scale from 1 to 5 (strongly disagree/ strongly agree). The 1st domain (4) items, perception regarding AI. 2nd domain (5) items, advantage of using AI. The 3rd domain (5) items, problems about AI application in healthcare. The 3rd part adopted from **[11]** aimed to evaluate attitudes regarding AI, it involved (20) items presented on a five-point Likert scale from 1 to 5 (strongly disagree/strongly agree). The scoring system of students' attitude was calculated based on cut off value 60%, ≤ 60 was identified as negative and ≥ 61 as positive attitude.

2.4. Content validity & Reliability of the Tools

The content validity was reviewed by 3 experts in nursing; Based on their comments, changes were considered. Internal consistency was measured by using Cronbach's alpha test and was 0.879 for 2nd part and 0.899 for 3rd part.

2.5. Procedure

Upon approval by the IRB in March 2024, the survey was distributed to Vision Medical College nursing students. Research information was included in the survey, and the survey was anonymous to ensure confidentiality. An informed consent has been obtained from the students prior to the beginning of the study. Also, they were notified of their right to withdraw at any time. In order to improve the participation, potential participants were reminded. Statistical Packages for the Social Sciences (SPSS) v.26.0 used to analyze the collected data. Demographic data was analyzed using descriptive statistics. To investigate relationships between variables, bivariate analysis such as linear regression analysis and Pearson's correlation coefficient were carried out. The accepted criterion for statistical significance, $p < .05$, was used to define the significance level.

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3. Results

The study sample involved 206 undergraduate nursing students. As shown in (Table 1) below, 58.3% were females and 41.7% were male. The participants were sampled from communities, representing urban areas 73.3% and rural areas 26.7%. Out of the participants, 26.7% were 1st year students, 13.1% were 2ndyear students, 36.9% were 3rd year students, 13.6% were fourth-year students, and 9.7% were interns. Regarding their academic performance which depends on their GPA, 42.7% (n = 88) have excellent academic performance, 21.4% (n = 44) have very good academic performance, 25.2% (n = 52) have good academic performance, and 10.7% (n = 22) have acceptable academic performance. In addressing the self-assessment of technological competence, 50.5% (n = 104) categorized as having excellent proficiency, while 44.7% (n = 92) was average, and 4.9% (n = 10) was poor. Furthermore, 79.6% (n = 164) of participants responded that they are familiar with AI.

The results assessed the influence of demographic variables on the students' attitude about AI utilization in health care. As shown in (Table 1), the results showed that the relationship between the living location, self-assessment of technological competence, participants' familiarity with AI and attitude toward AI utilization was negatively significant. Also, it showed that there was a significant positive correlation between educational level and attitude scores. These findings signify those students in higher educational levels had more positive attitude scores toward AI utilization. On the other hand, the results showed that gender and academic performance had no statistically significant correlations with attitude toward AI utilization in health care.

Table 1.
Demographics data of the study sample (N=206).

Variable	Frequency (%)	Correlations with attitudes toward AI utilization
Gender		-0.17
Female	120(58.3%)	
Male	86(41.7%)	
Living Location		-0.21*
Urban	151(73.3%)	
Rural	55(26.7%)	
Educational Level		+0.21*
First Year	55(26.7%)	
Second Year	27(13.1%)	
Third Year	76(36.9%)	
Fourth Year	28(13.6%)	
Internship	20(9.7%)	
Academic Performance		+0.02
Excellent	88(42.7%)	
Very Good	44(21.4%)	
Good	52(25.2%)	
Acceptable	22(10.7%)	
Self-Assessment of technological competence		-0.34*
Excellent	104(50.5%)	
Average	92(44.7%)	
Poor	10(4.9%)	
Familiarity with artificial intelligence		-0.33*
Yes	164(79.6%)	
No	42(20.4%)	

Note: *Significant at $\alpha = 0.05$.

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The graph below shows the levels of the students' attitude toward AI utilization. It's clear that 64% of the participants had a positive attitude toward using AI in health care, while nearly a third of participants (36%) had a negative attitude.

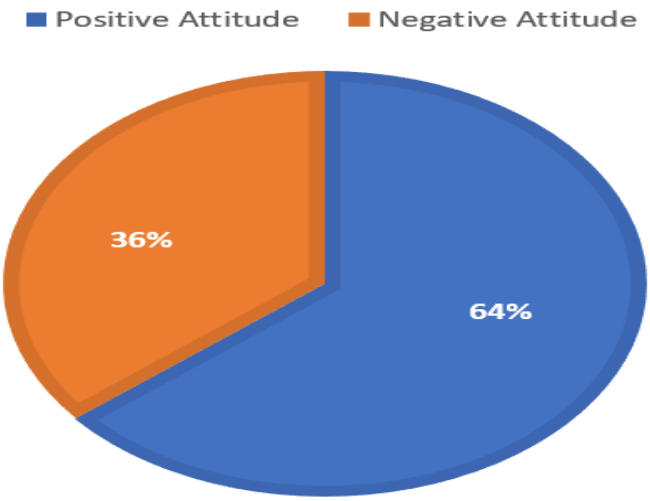

Figure 1. Levels of students' attitude toward AI utilization.

Table 2 showed that the student attitudes and perceived utilization of AI in health care receive high mean scores. The mean score on the attitude towards AI scale was (M= 3.29, SD = 0.76), while the mean scale score of the perceived utilization of AI scale was (M= 3.43, SD = 0.69). The high mean scores for both variables indicate that the students most likely held positive attitudes regarding AI utilization and had a favorable perception of AI.

Table 2.
Students' attitudes and perception toward utilization of AI in health care (N=206).

Variable	Mean (M)	Standard deviation (SD)
Attitude towards AI	3.29	0.76
Perceived Utilization of AI	3.43	0.69
Knowledge of AI	3.25	0.94
The advantages of using AI	3.74	0.93
The application of AI in health care	3.27	0.88

By using linear regression analysis, the results in (Table 3) revealed that there was a significant positive relationship between perceived utilization of AI and attitudes towards AI ($\beta = 0.855$, $p < 0.001$). This result indicates that students' perceptions of AI utilization in health care influence their attitudes regarding AI utilization.

Table 3.
Effect of perception toward AI on students' attitudes.

Variable	B	SE	*t*	*p*	95.0% confidence interval for B	
					Lower bound	Upper bound
Perceived utilization of AI	0.855	0.047	18.062	0.000	0.762	0.949

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4. Discussion

Artificial Intelligence (AI) has advanced to offer useful support in various health care aspects to improve the patient's outcome and enhance care efficiency. Despite the growing number of AI-driven healthcare applications and attempts to integrate these models into clinical practice, there has been a recent surge of scholarly curiosity on the perspectives of healthcare providers regarding these advancements. Hence, it was the main objective to assess student nurses' attitudes and perception regarding using AI.

Findings of the current study showed that there was a statistically significant correlation between students' demographic variables (living location, education, self-assessment of technological competence, and familiarity with AI) and their attitudes regarding AI utilization in health care. Additionally, the findings indicated no statistically significant correlation among the gender, academic level and attitudes. However, there appears to be notable differences in the attitudes of students among specific participant groups.

Urban residents and intern students have a highly positive attitude view toward utilization of AI in healthcare. It is associated with a certain possibility that the positive aspects of AI are perceived to be more attractive in an urban area with a powerful advanced technology and research focused environment than in an area that is less technologically advanced. Since the most significant environmental factors influencing students' thoughts and perceptions are their study specialization, education, and place of employment, there may be a rationale for this outcome. which in turn influences how someone perceives things. It's likely that students from rural areas or those who are newly enrolled students don't know enough about the use of AI due to a lack of knowledge. These underrepresented groups must be considered when developing healthcare programs that seek to offer the essential knowledge about new digital technology and its healthcare applications.

In response to the study about investigating attitudes towards using AI at work in European Nations, these findings confirmed that the educational level and specialty significantly affects attitudes towards robots and AI **[12].** Furthermore, as reported in the study that assessed the nurses' perceptions and attitudes regarding the use of AI, there was a significant positive relationship between the general characteristics as education, Job position, and employment place and how they perceive AI **[13].** Similarly, research at a German tertiary referral hospital found that while 90% of participants had heard of artificial intelligence previously, only 24% were knowledgeable about it. However, 4.77% of respondents gave artificial intelligence in medicine a bad rating, while 53.18% gave it a high positive rating **[14].**

The results showed that students had high mean scores for their attitudes and perceptions on the use of AI in healthcare. Given the high mean scores for these two factors, it is likely that the students had a good opinion of AI and positive attitudes about its use. This outcome was consistent with research by **[15,16],** which showed that student nurses had positive attitudes, high intentions for integrating AI into their future practice, and a favorable perception of its usage in nursing practice. According to their cross-sectional study, intent to use was predicted by facilitating conditions (β=0.117, p=.045) and nursing students' positive attitude regarding AI (β=0.485, p=.009).

The results of this study are in line with those of earlier research where healthcare professional students and student nurses showed high intention and positive attitudes to use AI **[17].** According to **[18],** who reported this agreement, the students seemed to have positive views and ideas regarding AI and its advantages in healthcare. According to a survey of medical students, half of them said they understood AI well and were aware of its potential to enhance human capabilities and boost the effectiveness and efficiency of healthcare delivery. AI will also enhance the experience of healthcare professionals by lowering the workload and enabling them to concentrate more on providing direct patient care. As the sample was comparatively small and attained from a single setting, the generalization of these findings may be limited.

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5. Conclusion

The study findings support the utilization of artificial intelligence throughout health care, as evidenced by positive attitude and favorable perception of the nursing students toward utilization of AI in healthcare. Furthermore, perception and positive attitudes among nursing students were found to be significantly positively correlated.

6. Recommendations

- Arranging frequent workshops and training sessions for healthcare personnel and student nurses to enhance their knowledge about AI and its developments.
- Incorporation of AI technology and its uses in nursing practices for improving the patient's outcomes.
- Carrying out comparable studies on a variety of samples at other educational sites in order to generalize the results.

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