

Knowledge and Attitude of Paediatric Nursing Students Toward Artificial Intelligence in Nursing

Adraa Hussein Shawq¹, Ali Bashar Salem²

¹Assistant Professor, University of Baghdad, College of Nursing, Baghdad, Iraq.

²University of Baghdad, College of Nursing, Baghdad, Iraq.

ABSTRACT

Background

Artificial intelligence (AI) is increasingly impacting healthcare, including nursing, by enhancing clinical decision-making and patient care. However, many nursing students may have limited knowledge and varying attitudes towards AI applications in their field. As nursing education adapts to incorporate AI, it is essential to assess students' awareness and readiness to engage with these technologies. This study aims to evaluate the knowledge and attitudes of paediatric nursing students toward AI in nursing. The findings will help inform future educational strategies to better integrate AI into nursing curricula.

Objectives

Assess paediatric nursing students' knowledge about artificial intelligence in nursing. Assess paediatric nursing students' attitude toward artificial intelligence in nursing

Results

The result of the study show, more than half of the nursing student's knowledge and attitudes towards AI in nursing are moderate. Most of students are with mean age (21 ± 1.017), half of them with moderate socioeconomic status, most of them have own a smart device, half of them did not previously used artificial intelligence application, and most of them did not engage in any previous training of AI usage. The study concluded that, nursing students' knowledge and attitudes toward AI are moderate.

Keywords: Artificial Intelligence (AI); Covid-19; Knowledge; Nursing; SPSS

INTRODUCTION

Artificial intelligence AI is a topic that has become increasingly relevant in recent years. AI is imitating human actions and attitudes using technology by teaching machines how humans think, behave, and react in different situations [1]. AI has been adopted by many sectors such as economics, manufacturing, education, and health [2].

In the medical field, AI is rapidly evolving with the potential to revolutionize various aspects of healthcare, including diagnostics, treatment planning, and personalized medicine

How to cite this article:

Shawq AH, Salem AB, Knowledge and Attitude of Paediatric Nursing Students Toward Artificial Intelligence in Nursing, *Studies in Nursing & Healthcare* 2024; 1(1): 40-47.

Copyright:

Ali Bashar Salem @ 2024 This is an open-access article distributed under the terms of the Creative Commons Attribution License.

Email Id:

alibasharsalem@gmail.com

Reviewed: September 7, 2024

Accepted: October 15, 2024

Published: October 24, 2024

[3]. The use of AI is increasing and becoming popular in many medical fields; including ophthalmology, dermatology, pathology, nursing, and others [4].

Artificial intelligence in nursing encompasses various technologies that assist nurses in delivering safe and efficient care. These technologies include machine learning algorithms, natural language processing systems, robotics, and virtual reality simulations. In paediatrics specifically, AI can support diagnosis and treatment planning by analysing large datasets from electronic health records, identifying patterns or trends related to specific conditions or treatments [5]. These advancements have the potential to revolutionize patient care delivery and outcomes, particularly in managing chronic illnesses, which represent a significant portion of healthcare expenditures [6]. During COVID-19 pandemic the acceleration of AI is adopted in healthcare, particularly in the remote monitoring of patients, offering novel opportunities for patient care and disease control [7]. In the nursing field, AI applications span a wide spectrum, ranging from health promotion and disease prevention to treatment planning and fostering seamless collaboration among healthcare professionals. While the potential of AI in healthcare is widely recognized, the attitudes of nursing students towards AI remain a relatively under-explored territory. Understanding these perspectives is of paramount importance for the successful integration and adoption of AI in the field of nursing [8]. The role of nursing students in fostering the essential skills in AI is critical to the development of competent and compassionate nurses [9]. By striking a balance between AI-powered tools and human interaction, nursing schools can provide a more holistic and effective learning experience for students [10]. Collaborative efforts between AI researchers and nurse educators can lead to a comprehensive and nuanced approach to nursing education that leverages the benefits of technology while preserving the value of human interaction [11].

The integration of AI into nursing education and care presents a wide range of opportunities, including enhanced learning outcomes and improved efficiency; however, it also poses several challenges related to privacy and security, ethical considerations, and resistance to adoption [12]. A primary challenge associated with AI integration is the protection of student privacy. Given that AI requires access to personal information, it is essential to maintain student confidentiality and safeguard against any potential data breaches that could compromise student privacy [13]. For that, the current study aims to assess nursing students' knowledge and attitudes on AI, to highlight on the gap and try to fix it.

METHODOLOGY

The study designed as a descriptive study, to describe the knowledge and the attitudes of paediatric nursing students concerning AI in nursing application. This type of designed that aims to obtain information to describe a phenomenon, situation, or population. More specifically, it helps answer the what, when, where, and how questions regarding the research problem rather than the why. The study was started from 15th of November 2023 to 15th of April 2024.

The project of the study has approved by the committee of research projects at the College of Nursing Council\University of Baghdad. The agreement obtained from the deanship of College of Nursing and the Headperson of paediatric nursing department, to collect the data from the participants.

The study has been carried at College of Nursing\University of Baghdad which established 1962 as a first college in nursing specialty in Iraq. The college contain 7 department (fundamental, adult, paediatric, Chapter Three 28 maternal and newborn, community health, mental health nursing, and basic science). Paediatric nursing department as one of these nursing department deal with paediatric in different age groups and their families. The study was conducted at Google Classroom that affiliated to the administrative arrangement of the paediatric nursing department for the first and the second semester of academic year 2023-2024. The reason for chosen this department was due to the importance of nursing care that provided for children and their families, and the need of nurses how to use such AI application to develop their knowledge and use it in future for both theoretical and practical field.

The non-probability sample (convenient) of (137) students out of total (140) students in paediatric nursing department were participated in the study. They were from both genders, and within age (19-40) years. All of the participants were undergraduate at the third stage of nursing. Those students were asked to take part in the study voluntary. The formal Google classroom that assigned for students by the paediatric nursing department were used to collect the data, after get the permission from the headperson of the paediatric nursing department and the deanship of the college of nursing.

The instrument of the study has generated from the Buabbas et al. (2022), in their study about Students Perceptions Towards Artificial Intelligence in Medical Education, at college of Medicine, Kuwait University. The permission has obtained from the researcher by an email method. The scale was translated to Arabic language by using back translation to get appropriate translation, and submit to the experts also to be adapted.

The questionnaire format included three parts:

The first contain students' socio-demographic data (age, sex, has previous knowledge about AI, has personal digital device. The second part concern student knowledge about AI, that contain 10 items concern with student information about the main application and usage. Third related to attitude of student about AI, and include (15) items focused on students' attitudes for AI in future in both practice and theoretical base. The scale of the attitude was scored within 5 points of Likert scale (1=strongly disagree, 2= disagree, 3= neutral, 4= agree, 5= strongly agree).

A construct validity has been used to determine the validity of the instrument through a panel of (10) experts related to the field of the study, They were from: College of Nursing\ University of Baghdad (3) from paediatric nursing, (1) from maternal and newborn nursing, (1) from community health nursing. (2) from Adult nursing, (2) from Mental and psychiatric health nursing, (1) from college of computer science. 30 These experts were asked to review and evaluate the instruments of the study for its content, clarity, and adequacy. Based on their comments and suggestions, some modifications and changes were made for better clarity and validity. The pilot study has been conducted on (10) students to determine the content validity and internal consistency reliability of the questionnaire. The pilot study sample was excluded from the main study sample. The participants receive the link of questionnaire format after they agree to participated in the study. The pilot study carried through the period of 7th to 31st of December 2023. The test-retest method used to determine tool's reliability. The pilot study aims to confirm instrument clarity and adequacy, estimate the required time to answer questions, and find out any barriers through study process. 3.8. Reliability: The internal consistency reliability was employed to evaluate study instrument. The Test-retest method was used with computation of Cronbach alpha correlation coefficient by SPSS program version 23. Data was collected from (10) student at college of nursing and excluded later from the total sample. The retest was achieved after 3 weeks of the test on the students with the same instrument.

The result of this study indicate that Cronbach alpha correlation coefficient is ($r = 0.88$) which signify that the internal consistency is accepted. The data has been gathered by using study instrument through the self-administrative method, the study data was collected from the period 31 January 15th to February 15th 2024. The participations in the study were voluntary and the consent form was designed at the begin-

ning of the questionnaire. The time of questionnaire answer were between (10-15) minutes. The data were analysed by Statistical Package of Social Sciences (SPSS) version 23.

Result: This table shows that (86.9%) of the sample from age group 20-30 years with mean (21 ± 1.017), the female participants were account (61.3%), (54%) of them with moderate socioeconomic status, (78.1%) of them have Chapter

Table 1. Nursing Students Demographic Data

Students' age, mean (21 ± 1.017)		
Less than 20 years	4	10.20%
20-30 years	119	86.90%
More than 30 years	14	2.90%
Sex		
Male	84	61.30%
Female	53	38.70%
Socioeconomic status		
Good	54	39.50%
Moderate	75	54.70%
Poor	8	5.80%
Do you have own smart device		
Yes	107	78.10%
No	30	21.90%
Do you previously used AI application		
Yes	67	48.90%
No	70	51.10%
How often you used AI in study		
Daily	26	19%
Weekly	12	8.80%
Monthly	9	6.60%
Weekly	40	29.20%
Never Once	50	36.50%
Do you engage in previous training course for AI		
Yes	7	5.10%
No	100	73%
Self-learning	30	21.90%

Table 2. Nursing Students' Knowledge About Artificial Intelligence items In Nursing

Items	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree	Mean (SD)	Description
1. AI will play important role in healthcare	39 (28.5%)	70 (51.1%)	22 (16.1%)	4 (2.9%)	2 (1.5%)	4.5 (.72)	Strongly agree
2. AI will replace some specialties in healthcare during my lifetime.	19 (13.9%)	42 (30.7%)	41 (29.9%)	28 (20.4%)	7 (5.1%)	3.5 (.54)	agree
3. I understand basic AI principles	8 (5.8%)	29 (21.2%)	56 (40.9%)	36 (26.3%)	8 (5.8%)	3.2 (.43)	neutral
4. I am comfortable with AI terminologies	12 (8.8%)	30 (21.9%)	56 (40.9%)	30 (21.9%)	9 (6.6%)	3.7 (.76)	agree
5. I understand AI limitations	11 (8%)	33 (24.1%)	57 (41.6%)	27 (19.7%)	9 (6.6%)	3.1 (.34)	neutral
6. AI teaching will benefit my career	33 (24.1%)	76 (55.5%)	21 (15.3%)	3 (2.2%)	4 (2.9%)	4.3 (.54)	Strongly agree
7. All nursing students should receive AI teaching	35 (25.5%)	76 (55.5%)	18 (13.1%)	5 (3.6%)	3 (2.2%)	4.4 (.74)	Strongly agree
8. I will be confident using AI tools at the end of my nursing degree	21 (15.3%)	72 (52.6%)	33 (24.1%)	6 (4.4%)	5 (3.6%)	3.8 (.41)	agree
9. I will be confident using AI tools at the end of my nursing degree will have better understanding of the methods used to assess healthcare AI performance at the end of my nursing degree	27 (19.7%)	79 (57.7%)	23 (16.8%)	3 (2.2%)	5 (3.6%)	4.1 (.23)	agree
10. I will possess the knowledge needed to work with AI in routine clinical practice at the end of my medical degree	20 (14.6%)	85 (62%)	23 (16.8%)	5 (3.6%)	4 (2.9%)	4.3 (.52)	Strongly agree
Mean weight						3.9 (.53)	Agree

(1 - 1.79=strongly disagree, 1.80 - 2.59= disagree, 2.60 - 3.39= neutral, 3.40 – 4.29= agree, 4.30 - 5= strongly agree)

four 34 own a smart device, (51.1%) of them did not previously used artificial intelligence application, (36.5%) of them never once used AI, and (73%) of them did not engage in any previous training of AI usage.

Table 3. Assessment of Nursing students' knowledge about Artificial Intelligence in nursing

Knowledge scale	F	%	M.	SD.	Ass.
Negative	14	10	51.1	1.21	M
Fair	88	64			
Positive	35	26			
Total	137	100			

This **table 2** showed that all the items of students' knowledge toward AI were scored between agree and strongly agree description, and the mean weight was scored agree.

Negative= 15 – 34.9, Fair= 35– 54.9, Positive= 55 – 75

Table 4. Nursing Students' Attitudes About Artificial Intelligence

Items	Strongly agree	Agree	Neutral	Dis-agree	Strongly dis-agree	Mean (SD)	Description
1. Artificial intelligence tools are easy to use.	24 (17.5%)	64 (46.7%)	36 (26.3%)	7 (5.1%)	6 (4.4%)	4.4 (.43)	Strongly agree
2. I believe that artificial intelligence will have a positive impact on my education.	15 (10.9%)	32 (23.4%)	73 (53.3%)	13 (9.5%)	4 (2.9%)	3.6 (.75)	Agree
3. One of the benefits of artificial intelligence is helping students to ask questions and engage with their study materials.	28 (20.4%)	82 (59.9%)	21 (15.3%)	4 (2.9%)	2 (1.5%)	4.3 (.32)	Strongly agree
4. One of the benefits of artificial intelligence tools is that they save time.	29 (21.2%)	88 (64.2%)	14 (10.2%)	4 (2.9%)	2 (1.5%)	4.6 (.75)	Strongly agree
5. I believe that artificial intelligence tools should be included in the curriculum	34 (24.8%)	79 (57.7%)	17 (12.4%)	4 (2.9%)	3 (2.2%)	4.7 (.53)	Strongly agree
6. I edit the answers generated by artificial intelligence tools before using them in my work.	27 (19.7%)	65 (47.4%)	27 (19.7%)	13 (9.5%)	5 (3.6%)	4.1 (.85)	Agree
7. I believe that artificial intelligence tools will be a burden on education.	24 (17.5%)	64 (46.7%)	36 (26.3%)	7 (5.1%)	6 (4.4%)	4.4 (.43)	Strongly agree
8. Do you support the need for cautious use of artificial intelligence applications in the field of nursing?	10 (7.3%)	25 (18.2%)	42 (30.7%)	53 (38.7%)	7 (5.1%)	2.7 (.99)	Neutral
9. Artificial intelligence has the ability to improve patient care outcomes.	29 (21.2%)	70 (51.1%)	26 (19%)	7 (5.1%)	5 (3.6%)	4.2 (.54)	agree
10. Artificial intelligence can enhance the efficiency and accuracy of nursing tasks in patient care.	18 (13.1%)	76 (55.5%)	33 (24.1%)	8 (5.8%)	2 (1.55)	4.1 (.54)	agree
11. I am comfortable with the idea of integrating artificial intelligence into my future practice in nursing.	33 (24.1%)	76 (55.5%)	21 (15.3%)	3 (2.2%)	4 (2.9%)	4.2 (.56)	Agree
12. Among the disadvantages of using artificial intelligence tools are ethical issues such as plagiarism in writing (copying and pasting).	35 (25.5%)	76 (55.5%)	18 (13.1%)	5 (3.6%)	3 (2.2%)	4.7 (.67)	Strongly agree
13. Among the disadvantages of using artificial intelligence tools is the requirement for prolonged internet connectivity	21 (15.3%)	72 (52.6%)	33 (24.1%)	6 (4.4%)	5 (3.6%)	3.9 (.86)	Agree
14. Among the drawbacks of artificial intelligence tools is the lack of a definitive source for answers.	27 (19.7%)	79 (57.7%)	23 (16.8%)	3 (2.2%)	5 (3.6%)	3.7 (.98)	Agree
15. Among the drawbacks of artificial intelligence tools is the presence of security concerns.	20 (14.6%)	85 (62%)	23 (16.8%)	5 (3.6%)	4 (2.9%)	4.2 (.43)	Agree
Mean Weight						4.1 (.34)	Agree

(1 - 1.79=strongly disagree, 1.80 - 2.59= disagree, 2.60 - 3.39= neutral, 3.40 – 4.29= agree, 4.30 - 5= strongly agree).

This table showed that all the items of students' knowledge toward AI were scored between agree and strongly agree description, and the mean weight was scored agree.

Table 5 .Assessment of Nursing students' attitude about Artificial Intelligence in nursing

Knowledge scale	F	%	M.	SD.	Ass.
Negative	14	10	51.1	1.21	M
Fair	88	64			
Positive	35	26			
Total	137	100			

This **Table 3**, showed that 60% of student recorded as moderate knowledge about AI, and the mean showed it scored within moderate level of knowledge. Table (4) Nursing Students' Attitude About Artificial Intelligence In Nursing(1 - Negative= 15 – 34.9, Fair= 35– 54.9, Positive= 55 - 75

This table showed that all the items of students' knowledge toward AI were scored between agree and strongly agree description, and the mean weight was scored agree. This table 5 showed that 64% of students have a fair attitude about AI, and the mean showed it scored within fair level of attitude.

DISCUSSION

SECTION: 1 Students socio-demographic data:

The current result in table (1) showed, most of the study sample (86.9%) were from the age group 20-30 years with mean (21 ±1.017). the female participants were higher than male with account (61.3%). Half of the participants within moderate socioeconomic status (54%). Regarding own personal smart device, most of them (78.1%) have one. Half of the participants were did not previously used artificial intelligence application (51.1%), and more than one third of them (36.5%) never once used AI. Finally, most of students did not engage in any previous training of AI usage (73%).

This result was supported by a previous study by Abdullah & Fakieh (2020), to assess the perceptions of medical student's about using of AI Applications, their result showed most of the sample were female, and most of them were between 20-40 years old [14]. Ahmad and his colleague (2023) in their study about student perspectives on AI in Qatar showed, more students were female (79.3%) responded to male students who were 20.7% [15]. Abuzaid et al. (2022) in their study about integration of AI into nursing practice, were agreed with the current study that, most of the respondents were

female (89%) and the minority were male (11%), moreover, (30%) of them within age 20–29 years [15].

SECTION 2 Nursing students' knowledge about Artificial Intelligence in nursing

Table (2) revealed that, high percentage of student recorded as moderate knowledge about AI (60%), while (32%) of them recorded with poor knowledge. This result may be explained that, AI is new trend for Iraqi students, especially its application. Moreover, the internet services were not adequate which may effect on time spending and cost of using this services. This result was supported by a previous study of Al-Medfa and his colleague (2023), they studied health care providers' knowledge toward AI, their result showed about 71% of respondents declared average and above average levels of AI knowledge, while only 29% reported poor and below average levels [16]. Khater et al. (2023), also agreed with the current study to assess medical students' knowledge and attitude of artificial intelligence and its application in Egypt that, most of the students demonstrated moderate (41.2%) to good (57.7%) knowledge regarding AI and its application in medical education, and similarly moderate (67.5%) to good (28.9%) knowledge and attitude regarding AI and its application in medical practice [17]. In a systematic review study which aimed to assess of healthcare students' attitudes, knowledge, and skills towards artificial intelligence, 18 studies were evaluated the level of student knowledge as low (50%), only six of these studies evaluate students' knowledge highly, and two of these studies reported average student knowledge [18].

SECTION 3 Nursing students' Attitude about Artificial Intelligence in nursing

The findings of the study revealed that, most of students exhibited a fair attitude towards artificial intelligence (64%),

with the mean score indicating a fair level of attitude. This result suggests a balanced of attitude among the participants regarding AI. Some students were worried from integration of AI in their job in future and take their place. On other hand some student looks for AI as assistant tool which facilitate their job and aid in monitoring patient health easily.

The fair attitude observed among the majority of students underscores the importance of fostering an informed and balanced understanding of AI within educational contexts. There is a need for ongoing dialogue and education regarding the potential benefits and challenges associated with AI integration in various domains, including healthcare, education, and beyond [19]. These results align with the similar previous study for AI perception among students, which showed majority of students demonstrate a fair attitude, based on their perceptions, experiences, and exposure to AI technologies [20]. The results presented in a previous study regarding attitudes towards artificial intelligence (AI) among students in the medical field by Al Ali and others, their result were agreed with the current finding that reported, there was a significant awareness among students regarding AI, despite limited understanding of its underlying technology. Importantly, students need to recognize AI revolutionize and it enhance practice, rather than replace human place. The importance of integrating of AI in education especially in medical curricula, and reinforcing the issue of educating students about AI applications and implications in healthcare contexts [21].

Another study by Stewart and his colleagues about assess Australian medical students' attitudes towards artificial intelligence in healthcare. Their result supported the current finding and reported that, most of students (74.4%) were agreed with the statement that AI will improve medicine in general, and (56.6%) of them were not concerned about the impact of AI on their job [22]. Al Saad et al. (2022) in their study about evaluate of medical students knowledge and attitudes towards AI reported that, 89% of students acknowledged the importance of AI in medicine, while 71.4% emphasized the benefits of incorporating AI education into medical careers. Additionally, nearly half of the students (47%) displayed comprehension of fundamental AI principles, and a considerable proportion (68.4%) perceived AI education as essential for developing nursing profession [23].

However, Sheela (2024) in his research about attitude of nursing students towards artificial intelligence disagreed with the current finding and documented that, most of students' attitude 63% documented a satisfied attitude towards AI, while 37% of them were expressed satisfied attitude [24]. Understanding nursing students' perspectives towards AI is

essential for developing targeted educational interventions and fostering acceptance of AI technologies within the nursing profession [25].

CONCLUSION

More than half of the nursing students showed moderate score of knowledge toward AI. More than half of the nursing students showed moderate score of attitudes toward AI. Most of students were from age group 20-30 years with mean (21 ± 1.017), more than half of them were female, half of them with moderate socioeconomic status, most of them have own a smart device, half of them did not previously used artificial intelligence application, one third of them never once used AI, and most of them did not engage in any previous training of AI usage. Most nursing students have a positive attitude and an accepted knowledge for AI. In spite of more than half of them did not used its application previously. They need to expand their knowledge about the future of AI in nursing profession, and the nursing curriculum need to focus on the trends of technology in nursing.

REFERENCES

1. Nisheva-Pavlova, M. M. (2021). AI Courses for Secondary and High School – Comparative Analysis and Conclusions. *Education and Research in the Information Society*, 22(1), 45-58. Retrieved from [https://ceur-ws.org/Vol-3061/ERIS_2021-art01\(sh\).pdf](https://ceur-ws.org/Vol-3061/ERIS_2021-art01(sh).pdf)
2. Ouyang, F., Zheng, L., & Jiao, P. (2022). Artificial intelligence in online higher education: A systematic review of empirical research from 2011 to 2020. *Education and Information Technologies*, 27*(1). <https://doi.org/10.1007/s10639-022-10925-9>.
3. Cavaliere, L. P. L., Rajan, R., & Setiawan, R. (2021). The impact of E-recruitment and artificial intelligence (AI) tools on HR effectiveness: The case of high schools. *Productivity Management*, 26(1), 322-343. Retrieved from https://repository.petra.ac.id/19044/1/Publikasi1_04045_7022.pdf
4. Božić, V. (2023, Juny). Artificial Intennigence in Nurse Education. DOI: <http://dx.doi.org/10.13140/RG.2.2.29170.27846>
5. Seo, Y., & Ahn, Jung-Won. (2022). The validity and reliability of the Korean version of the General Attitudes towards Artificial Intelligence Scale for nursing students. *The Journal of Korean Academic Society of Nursing Education*. <https://doi.org/10.5977/jkasne.2022.28.4.357>
6. Altuwaijri, M. M., Bahanshal, A., & Almehaid, M. (2011,). Implementation of computerized physician order entry in National Guard Hospitals: Assessment of

- critical success factors. *Journal Name, 18*(3), 143-151. <https://doi.org/10.4103/2230-8229.90014> References 49
7. Haleem, A., Javaid, M., & Vaishya, (2020): Effects of COVID 19 pandemic in daily life. *Curr Med Res Pract.* 2020 <http://doi.org/10.1016/j.cmrp2020.03.011>
 8. Lukić, A., Kudenić, N., Antičević, V., Lazić-Mosner, E., Gnučić, V., Hren, D., & Lukić, I. K. (2023, August 1). First-year nursing students' attitudes towards artificial intelligence: Cross-sectional multi-center study. *Nurse Education in Practice, 71*, 103735. <https://doi.org/10.1016/j.nepr.2023.103735>
 9. Cherry, K. (2020): what is perception available at <https://www.verywellmind.com/perception-and-the-perceptual-process2795839>
 10. Carroll, W. (2019). Artificial intelligence, critical thinking and the nursing process. *Online Journal of Nursing Informatics*. Retrieved from https://www.researchgate.net/publication/338111542_Artificial_Intelligence_Critical_Thinking_and_the_Nursing_Process
 11. Alamanova M. (2018): The Perception of Artificial Intelligence and Other Technological Innovations Among Human Resources Specialists. Tallinn, Estonia: TALLINN UNIVERSITY OF TECHNOLOGY <https://digikogu.taltech.ee/en/Download/10b501a5-a15f-469c-8ba4-986c0a78bc70>
 12. Commins J. (2019): United Healthcare, AMA push new ICS-10 codes for social determinates of health. *Health Leaders*. Available from: <https://www.healthleadersmedia.com/clinical-care/unitedhealthcare-amapush-new-icd-10-codes-socialdeterminants-health>
 13. Davenport, T., & Kalakota, R. (2019, June). The potential for artificial intelligence in healthcare. **Future Healthc J, 6*(2)*, 94-98. <http://dx.doi.org/10.7861/futurehosp.6-2-94> 50
 14. Cherry, K. (2020): what is perception available at <https://www.verywellmind.com/perception-and-the-perceptual-process2795839>
 15. IBM. How is artificial intelligence used in medicine? Retrieved April 19, 2023, from <https://www.ibm.com/topics/artificial-intelligence-medicine>,
 16. chan K., & Zary, N. (2019). Applications and Challenges of Implementing Artificial Intelligence in Medical Education: Integrative Review. *JMIR Med Educ, 5(1)*, e13930.
 17. Ahuja, A.S. The Impact of Artificial Intelligence in Medicine on the Future Role of the Physician. *PeerJ* 2019, 7, e7702. [CrossRef]
 18. Bodur, G., Dinçer, M., Tutak, Z., & Ertaş, G. (2022, March). Effects of artificial intelligence on the future of health: A qualitative study among university students. **GOBEKLITEPE Sağlık Bilimleri Dergisi, 5*(7)*, 106- 115. Retrieved from https://www.researchgate.net/publication/358901431_Effects_of_artificial_intelligence_on_the_future_of_health_a_qualitative_study_among_university_students
 19. Civaner, M. M., Uncu, Y., Bulut, F., et al. (2022). Artificial intelligence in medical education: A cross-sectional needs assessment. **BMC Medical Education, 22**, 772. <https://doi.org/10.1186/s12909-022-03852-3>
 20. United Kingdom Central Council for Nursing, Midwifery and Health Visiting (1999). *Fitness for practice: The UKCC Commission for Nursing and Midwifery Education*. London: UKCC 1999. <https://search.worldcat.org/title/1015423602>
 21. Abdunnah, R., & Fakieh, B. (2020). Health Care Employees' Perceptions of the Use of Artificial Intelligence Applications: Survey Study. **Journal of 51 Medical Internet Research, 22*(5)*, e17620. doi:10.2196/17620. Available from: <https://www.jmir.org/2020/5/e17620/>
 22. Abuzaid, M.M., Elshami, W., & Fadden, S.M.(2022). Integration of artificial intelligence into nursing practice. *Health Technol (Berl); 12(6):1109-1115*. <https://doi.org/10.1007/s12553-022-00697-0>
 23. Kumar, M., Nguyen, T.P.N., Kaur, J. et al. Opportunities and challenges in application of artificial intelligence in pharmacology. *Pharmacy. Rep 75, 3–18* (2023). <https://doi.org/10.1007/s43440-022-00445-1>
 23. Ahmed, Z., Bhinder, K. K., Tariq, A., Tahir, M. J., Mehmood, Q., Tabassum, M. S., et al. (2022). Knowledge, attitude, and practice of artificial intelligence among doctors and medical students in Pakistan: A crosssectional online survey. *Ann. Med. Surg. (Lond) 76, 103493*. doi: 10.1016/j.amsu.2022.103493 PubMed Abstract | CrossRef Full Text | Google Scholar
 24. Alagappan, M., Brown, J. R. G., Mori, Y., and Berzin, T. M. (2018). Artificial intelligence in gastrointestinal endoscopy: the future is almost here. *World J. Gastrointest. Endosc. 10, 239– 249*. <https://doi.org/10.4253/wjge.v10.i10.239>