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AI and Big Data: Current and Future Nursing Practitioners' Views on Future of Healthcare Education Provision

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Abstract. Artificial Intelligence (AI) is defined as "the capacity of a computer, robot, programmed device, or software application to perform operations and tasks analogous to learning and decision making in humans, such as speech recognition or question answering. Chat Generative Pre-Trained Transformer (ChatGPT) represent an example of this promising technology as it is designed to communicate and interact with people similarly to a human being". The introduction of any form of AI based technologies could be beneficial in nursing education and healthcare provision. A questionnaire co-created with ChatGPT was administered to nursing students, nurses and educators aiming at exploring how those technologies would impact on the world of healthcare and education. 176 participants were recruited. Data analysis showed that the perceived potential benefits of introducing AI include: improved quality of nursing care, of the diagnostic process and of job satisfaction. Conversely, some of the risks would be: limited opportunities to critical thinking and reduction of interaction and collaboration.

Keywords. Artificial Intelligence, ChatGPT, Nursing care, Big data, Education

1. Introduction

Artificial Intelligence (AI) is defined as "the capacity of a computer, robot, programmed device, or software application to perform operations and tasks analogous to learning and decision making in humans, such as speech recognition or question answering" [1]. So,

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AI would, to a certain extent, simulate human intelligence equipping machines with the ability to "think" and "act" like humans [2,3].

An AI chatbot is a type of chatbot that uses AI to converse with people and to respond to user queries in a human-like way [2,3]. Chat Generative Pre-Trained Transformer (ChatGPT) is a special chatbot released by its parent company OpenAI [4]. It is a system designed to communicate and interact with people in a similar way to a human. It is constantly learning and improving its abilities and it is capable of answering a variety of questions and/or provide several information [2,3].

The use of ChatGPT and other open AI based technologies could be beneficial in nursing education for instance in session planning, simulated scenario development, in providing additional opportunities to explore available resources for seminars delivery and or exam preparation [5–8]. Moreover, chatbots such as ChatGPT are currently implemented to boost student engagement, support group activities, produce interactive learning tools, and deliver swift feedback and assessment in Higher Education [7]. AI could be used to improve nursing school curriculum by analysing curricula available on the internet and by taking into due consideration students' and staff' feedback on their past teaching and learning experiences. According to a path analysis approach it may predict nursing students' intent to use AI-based healthcare technologies [9].

However, the implementation of ChatGPT in education might pose several challenges and risks that need to be considered by both lecturers and students [7]. The misuse of this technology may prevent students' from developing crucial skills, including writing [10]. Furthermore, students could potentially exploit ChatGPT to cheat on exams or could incur in plagiarism or generate inaccurate and incomplete data when writing reports [2,3,11,12]. Despite these concerns, students could be educated to use ChatGPT in a constructive and ethical manner [7].

AI could also be useful for healthcare provision since applicable for instance to the diagnostic and therapeutic process in various perspectives such as global and public health, patient monitoring, patient engagement and compliance, as well as administrative activities [13–19]. Similarly, to the Higher Education field, there could be some disadvantages following the introduction of AI in healthcare. Some disadvantages could be limited accuracy, bias and limitations of data, lack of context, limited engagement and no direct interaction with health professionals [14,20].

A recent study has shown that nurses have moderate perceptions and positive attitudes towards the use of AI. Notably, significant differences have been observed between nurses' perceptions of AI based on gender and social status, as well as significant difference between nurses' attitude toward AI, and age, qualifications, social status and years of experience [21].

This study aims at exploring nurses', educators' and students' views on how ChatGPT could potentially impact the world of healthcare and education in the near future and the repercussion that this could have on the nurse-patient relationship.

2. Methods

An observational study was conducted on a convenient sample of nursing students, nurses and educators voluntarily recruited in a Northern Italy University. An online questionnaire based among others on multiple choice and Likert-type questions was administered.

ChatGPT [4] was asked to create a questionnaire designed to explore the views of the participants on the use of AI. The authors then revised the proposed questionnaire and paraphrased some questions for clarity.

The study was approved by the Research Ethics Board of a Northern Italian University. Data were stored in an electronic spreadsheet and analysed with the statistical software Jamovi 2.3.18. Descriptive statistical calculations were performed such as: mean, standard deviation, frequencies and percentages. Analyses with ANOVA were performed to identify significant differences with a 95% CI. The internal consistency was calculated by using Cronbach's Alpha while the sample size was measured with the KMO.

3. Results

A total of 176 subjects responded, of whom 70.5% (n = 124) were female and 29.5% (n = 52) male. The most involved age class was comprised between 18 and 25 years old [369% (n = 65)] followed by 26 to 30 years old one [17.6% (n = 31)]. With regard to the role held, students from the Nursing degree program 37.5% (n = 66) were the most representative followed by nurses 32.4% (n = 57), Master's students 20.5% (n = 36), and nursing educators 6.3% (n = 11). 37% (n = 65) of the participating nurses held a non-university diploma, 33.1% (n = 57) a Bachelor's degree, 19.2% (n = 33) possessed a 1st level Master's degree 5.8% (n = 10) and the remainder of the sample held a Ph.D. and 2nd level Master's degree.

25.7% (n = 38) of the participants worked in the medical area, 14.9% (n = 22) were based in ICU, 12.8% (n = 19) were employed in A&E, 8.1% (n = 12) were in charge of the surgical area. 38.5% (n = 57) of the sample did not specify any clinical setting.

The instrument showed good internal consistency ($\alpha = 0.852$) and an equally good sample size (KMO = 0.880) and the Bartlett's test of sphericity showed a p-value < 0.0001 (Chi square= 1316.140 and df=210) [22]. No changes in internal consistency reliability were found by excluding each item one by one.

50% to 60% of all respondents agreed on: the ethical implications that the use of AI might have on nursing, the positive impact of AI on nursing practice and their inclination on explaining the magnitude of AI implementation to nursing students.

Moreover, 60% to 70% of the respondents believe AI implementation would help in reducing healthcare expenditure, provide for equal gender opportunities in nursing, improve student-mentor relationship and finally make nursing education more inclusive. More than 70% of the sample size agreed on the positive role that AI may play in fulfilling individual training needs (73.0%), in improving the quality of care (80.0%) and the quality of nursing education (85.1%). Nursing practitioners agreed on the fact that nurses (86.8%) and educators (87.9%) should be educated on the use of such technologies (86.8%) and that they would be inclined to use them as well (89.7%).

The sample also expressed scepticism with very low levels of agreement when asked whether AI could lead to decreasing or increasing in the number of nursing staff (36.4%) or the replacement of staff in charge of nursing education (18.5%).

Nursing practitioners reported that AI could improve nursing care outcomes in 26.9% (n = 100) of cases, provide faster and more efficient care in 25.5% (n = 95), ensure improved accuracy in diagnosis in 22.6% (n = 84) and promote greater job satisfaction in 21.0% (n = 78). The sample listed the most suitable tasks that would benefit from the introduction of AI. In the first place, among those tasks, they indicated administrative

activities in 39.4% (n = 145), followed by patient monitoring in 28.8% (n = 106), patient education in 18.2% (n = 67) and support to the decision-making process in 12.2% (n = 45). Practitioners pointed out that there might be potential risks related to AI adoption in care which are: the decreased interaction between practitioners and patients in 30.4% (n = 115), misinterpretation of data and subsequent clinical errors in 25.9% (n = 98) and the limited capacity of the algorithm in 24.3% (n = 92). Nursing professionals also identified some of the obstacles that the current healthcare system may pose to the introduction of this technology. First of all, 31.8% (n = 55) of the respondents foresee resistance opposed by professionals as one of the major obstacles followed by a lack of financial resources in 30.1% (n = 52) of the sample and by technological limitations in the organisation in 20.8% (n = 36) of the participants. With regard to the use of AI in nursing education, the respondents considered the tool useful in simulations 40.1% (n = 144), in the presentation of teaching activities 28.4% (n = 102) and in the development of personalised learning 16.2% (n = 58). Once implemented, the potential risks or disadvantages of this technology in education were limited opportunities to use critical thinking in 31.3% (n = 101) for the respondents, the reduction of interaction and collaboration in 29.7% (n = 96) of the sample, the inaccuracies of algorithms in 22.9% (n = 74) and the reduction of educators 15.5% (n = 50). The obstacles perceived by the sample on the use of AI in education substantially overlap with those already described on the use of this technology in care.

4. Conclusions

AI and Big Data are relatively new technology with potential revolutionary applications in nursing care and education. This study shows that these technologies are perceived as attractive and potentially beneficial by student nurses, nurses and nursing practitioners. The almost ubiquitous presence of those technologies in daily life has been impacting participants' life in many ways and promoting a positive perception of them. According to the participants, AI and in particular ChatGPT might bring, if implemented, several positive implications in nursing education and care. Participants foresee the opportunity to improve the effectiveness and efficacy of the diagnostic and therapeutic processes while ensuring a more personalized teaching and learning experience by equipping students and educators with state-of-the-art technologies, up-to-date teaching materials and ways of delivery. Nevertheless, respondents identified some negative aspects that might pose risks in building and maintaining a profitable nurse-patient relationship. In fact, AI might play a potentially disruptive role by reducing the amount of direct human interaction between nurses and patients. This could diminish the personal touch and empathy in care, which are fundamental components of a strong nurse-patient relationship.

This eventuality might also jeopardise students' ability to build such relationship. While the introduction of AI in Higher Education might represent an invaluable opportunity for taking the whole teaching and learning experience on a higher level the related implementation strategy must be carefully considered. In fact, students, if not adequately educated and supervised, might unethically use those systems and produce inaccurate reports and/or project works without paying the required attention and efforts. Thus, further studies would be recommended to delineate appropriate strategies and to promote the ethical use of those promising technologies in clinical settings and Higher Education.

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