

Nursing Managers' Attitudes towards Using Artificial Intelligence Systems in Nursing Decisions

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Abstract: Artificial Intelligence (AI) is a branch of computer science that the same of human intelligent behaviors can have respond such as understanding complex situations, simulating thinking processes and human reasoning methods and responding to them, also, learning and the ability to acquire knowledge and reason for solving problems. The concept and development of AI, defined as computer systems able to perform tasks that usually require human intelligence can enhance and expedite a critical component of nursing care delivery, namely decision making. The aim of this study was to evaluating the attitude of nursing managers in using artificial intelligence systems in nursing decision making in hospitals affiliated to Zahedan University of Medical Sciences (ZAUMS).

The present study was a descriptive cross-sectional study in hospitals affiliated to Zahedan University of Medical Sciences on 2018. The research population consisted of all nursing managers of Zahedan University of Medical Sciences (130 people) and all the research population participated in the study. The research instrument consisted of a researcher made questionnaire (40 items), that its' validity and reliability tested and confirmed.

The findings of this study showed that the nurses' skill with the artificial intelligence system was very low, but the level of awareness and knowledge of nursing managers about AI applications was high. The overall attitude of nursing managers toward the application of the artificial intelligence system was positive, but it required adequate information about the benefits of artificial intelligence and a positive incentive for managers. Finally, Nurses and Nursing Managers will be able to deliver care better, faster, and safer if they appropriately harness the power of AI.

Keywords: Artificial Intelligence; Attitude; Decision Making; Nursing

Date of Submission: 21-02-2019

Date of acceptance: 08-03-2019

I. Introduction:

Decision support is a critical function for decision makers in many industries. Typically, decision support systems help decision makers to collect and interpret information and create a basis for decision making [1]. Since humans have limited ability to use information in decision making, and our short-term memory can only hold data between four and seven items, so, trying to use more volume of information simultaneously can have an adverse effect on decision making [2]. An early branch of Artificial Intelligence (AI) that many nurses will be familiar with are clinical decision support systems (CDSS). A CDSS is a health information technology system that is designed to provide nurses and other healthcare professionals with clinical decision support – assistance with clinical decision-making tasks. Clinical decision-making is a required component of professional nursing. Poor decision-making can lead to adverse events and have negative consequences for patients. It is estimated that up to 65% of adverse events could have been prevent had nurses made better decisions [3-5].

Teams of computer experts and subject-matter experts (e.g. nurses) work together building a variety of tools that enhance decision-making in the clinical workflow. These tools include computerized alerts and reminders; clinical guidelines; condition-specific order sets; focused patient data reports and summaries; documentation templates; diagnostic support, and contextually relevant reference information, among others [6]. Historically, decision making in clinical practice and operations is made based on little or no data. Data tends to be used retrospectively in its descriptive form, devoid of prescription. But, intelligent decision support systems allow physicians and nurses to rapidly collect and process patient information with an intelligent and knowledge-based method, and apply it in different ways to help identify and improve decision making [1].

Artificial Intelligence (AI) or Machine Intelligence should be considered as a crossroads of many of the old and new knowledge, science and technology [7]. In fact, AI is a branch of computer science [8], which is said to be systems that can respond to similar intelligent human behaviors Including understanding complex situations, simulating thinking processes and human reasoning approaches, and responding to them successfully,

also, learning and the ability to acquire knowledge and reason for solving problems [9]. Artificial Intelligence branches are include Expert Systems (ES), Robotic Machines (RM), and Processing Normal language [10].

The concept and development of AI, defined as computer systems able to perform tasks that usually require human intelligence can enhance and expedite a critical component of nursing care delivery, namely decision making. The some benefits of artificial intelligence that can be used for in nursing information systems are include monitoring patients' information, helping to remind information, reporting of forms, managing quality and reducing hospitalization time, increasing the efficiency of care and doing Timely interventions, cost and time saving, and assistance in patient document auditing [11]. As implementation of any technology is facing barriers, implementation of successful AI-based decision support systems for nursing, there are certain barriers and challenges such as technology constraints, high system cost, and continuous performance updates [12].

In this regard, Khademiet al., in a research conducted in 2011 stated that intelligent software was suitable for diagnosing and presenting the treatment plan for pulp and peri-apical of the tooth [13]. Also, Ghaderzadehet al., (2012) in their study designed a medical decision-making system to assist professionals in the diagnosis and categorization of prostate neoplasia diseases. His study showed that intelligent medical systems based on artificial intelligence, and especially neural networks, could help physicians to accurately diagnose prostate cancer and its benign magnitude and reduce unnecessary biopsies and diagnostic costs and time [14]. On the other hand, Ghayomiet al., (2014) found that thermal images based on artificial intelligence could have a special place in screening for breast cancer [15]. Artificial intelligence systems can also reduce therapeutic and diagnostic errors that are inevitable in human clinical practice [16-19].

In Junkes-Cunha et al. (2014) study, when asked about the usefulness of the "expert system tool for clinical use of physiotherapists," 67% of physiotherapists responded positively to using this tool. In this study, more interesting findings were that most physiotherapists (92%) found that these systems were suitable for educational purposes [20].

AI is a relatively new concept in healthcare, particularly in nursing practice. Computer systems also have been used to efficiently analyze large amounts of data and assist instruction. But can a large nursing knowledge database serve to support the clinical decisions of practicing staff nurses? So, the aim of present study was to investigate the attitude of nursing managers regarding the use of artificial intelligence systems in nursing decisions in hospitals affiliated to Zahedan University of Medical Sciences (ZAUMS). I hope that the results of this research will be helpful in the areas of reduction of workload, improvement of training process, improvement of reasoning, finding new facts and information for nursing managers and help physicians and nurses to better and fast diagnoses and ultimately improving the health care process.

II. Material and Methodology:

The present study was an applied and descriptive cross-sectional study. The present study was conducted on 2018 in five affiliated hospitals of Zahedan University of Medical Sciences include Ali-IbneAbitaleb, Khatam-al-Anbia, Al-Zahra, Baharan, and Boali. The statistical population of the research is all nursing managers of Zahedan University of Medical Sciences (130 people). In this study, sampling was not performed and all the research population participated in the study. The research instrument consisted of a researcher made questionnaire (40 items). Validity of the questionnaire was carried out by content validity method and with the opinion of five experts and approved. The test-retest method was used to estimate the reliability coefficient of the questionnaire used in this study. First, the questionnaire was completed by 20 nurses and then completed by the same 20 nurses after 10 days. Finally, the results of the two tests, using the Cronbach's alpha coefficient, were 0.86, which shows the reliability of questionnaire is fairly well. The questionnaire was based on the Likert scale. The data were analyzed using descriptive statistics. The means and percentage of responses to the questionnaires were calculated by SPSS software version 22 and, finally, the findings were presented in the form of tables and statistical charts.

III. Results

In order to improve the decision-making activity of nurses in hospitals, this study examined nursing managers' attitude toward using artificial intelligence system in nursing decision making.

- ✓ In the present study, 87.2% of ZAUMS nursing managers were female, most participants were more than 36 years old (59%), most of the participants had a bachelor's degree (84.6%), most of the participants were formal employee (92.3%), the majority of participants had their working experience between 11 to 15 years old (33.3%) and among the nursing managers of the surveyed hospitals, the majority of nursing managers were employees of Ali-IbneAbiTaleb hospital (51.3% of the participants).
- ✓ The majority of nursing managers agreed that computer systems have assisted nursing by way of management information, billing, staffing, and record keeping (92%).

- ✓ According to results, at present, the level of skill with artificial intelligence systems in the more than half of nursing managers was low (53%).
- ✓ On the other hand, the Awareness level of majority of nursing managers about Application of Artificial Intelligence in nursing was high (61%).
- ✓ The overall attitude of majority of nursing managers towards application of artificial intelligence systems in nursing was positively (77%).
- ✓ 41% of nursing managers believe that the level of necessary skills for using artificial intelligence systems in hospitals of ZAUMS is very low.
- ✓ Majority of nursing managers expressed that there are not an appropriate landscape (85%), and the necessary hardware for setting up artificial intelligence systems (80%) in hospitals of ZAUMS.
- ✓ But 69% of them opined that by using artificial intelligence systems, will have improve in the performance of decision-making activity.
- ✓ Also, ZAUMS nursing managers believed that the most important advantages of AI for nursing are in order of importance: reducing human error, fast & accurate diagnostics, and enhancing clinical decision support.

IV. Discussion and Conclusion:

AI decision support systems may one day help nurses by suggesting appropriate nursing diagnoses and treatment options based on information gathered at the bedside, such as specific patient symptoms or the results of diagnostic tests. This study showed that the level of skill and knowledge of nursing managers of ZAUMS about artificial intelligence systems was low. This finding contradicts with the research of Kahoeiet al., (2013) in an article entitled "Nurses' Experience of the Influence of Nursing Information System on The Nursing Services efficiency ", which the Nursing Information System had a significant impact on the effectiveness of some nursing care services [21].

Results of this study showed that the attitude of nursing managers of ZAUMS toward AI systems is positive. This results is in line with the research by Kahoeiet al., (2013) in an article entitled "Nursing managers' Attitudes toward the impact of nurses' electronic reports on patient care [22].

In this research, awareness level of nursing managers of ZAUMS about the application of artificial intelligence was high. In this regard, this results is in line with the research by Saeidiet al., (2013) in an article entitled "awareness, skill, access, and extent of using computers, the Internet and information data bases by nursing students. The results of this study emphasize the need to develop computer and online education courses for the nursing community, which could be of interest to health planners and policy makers [23].

As a result, we can say that there are many advantages using AI for nurses, includes:

- *Improving efficiency*
- *Personalizing treatment*
- *Fast & Accurate diagnostics*
- *Enhancing clinical decision support*
- *Gaining clinical knowledge*
- *Reducing human error*

To take full advantage of these future advances, Managers, Nurses, Clinicians and informatics specialists must be involved and engaged at the outset to ensure that the AI systems are well-engineered and trusted.

However, according to the results obtained in the research, the following strategies are suggested to managers:

1. Give appropriate information about the benefits of artificial intelligence and create positive motivations in nursing managers and nurses.
2. Participation and support of hospital managers from the beginning of the implementation of the artificial intelligence system.
3. Assessing the organization's readiness in terms of hardware and software and adequate budget.
4. Assessment of human resource readiness in terms of required knowledge, awareness, attitude and skills.
5. Gaining support and a willingness of managers to implement the artificial intelligence system.

By 2025, AI systems could be involved in everything from population health management, to digital avatars capable of answering specific patient queries [24]. Finally, Nurses and Nursing Managers will be able to deliver care better, faster, and safer if they appropriately harness the power of AI.

Acknowledgment

I would like to thank all the distinguished Nurses and Nursing Managers of Zahedan University of Medical Sciences who helped me in this research.

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Dr. Yousef Mehdipour. " Nursing Managers' Attitudes towards Using Artificial Intelligence Systems in Nursing Decisions" .IOSR Journal of Nursing and Health Science (IOSR-JNHS), vol. 8, no.02 , 2019, pp. 87-90.