Attitude of Indian Nurses towards Adopting Robotic Nursing in their Daily Practice

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Abstract:- Robotic nursing is the future of nursing practice all over the globe. Objective: This study was aimed to assess the attitude of nurses working in various hospitals and nursing colleges of India regarding adoption of robotic nursing in their daily practice. Methodology: It was a descriptive cross-sectional study with 86 samples selected by Purposive sampling technique. After obtaining ethical clearance, data was collected by General Attitudes Towards Robots Scale (GAToRS) supplemented by an open-ended question. Results: The study concluded that the nurses have Neutral attitude (Mean= 4.46, 3.52) at Personal level, fairly positive attitude (Mean= 4.9) for societal level positive attitude but also agrees for societal level negative attitude (Mean= 5.70). Majority of nurses (78.3%) suggested, robots can be used in shifting and lifting heavy patients in their clinical area. Conclusion: Nurses working in India do not much rely on robots for their personal use and they believe robots are good for taking up strenuous & hazardous activities that are difficult for the nurses to perform regularly. Results has also shown, nurses have a negative attitude toward the role of robot in society.

Keywords:- Robotic nursing, GAToRS, Attitide, Nurses.

I. INTRODUCTION

Pandemic created many wanted and unwanted technological advancements worldwide. These were the most innovative but challenging times for all. In health care, COVID-19 took many lives and also challenged health professionals in many ways. Nurses & doctors working in COVID unit quarantined from their family and many of them died because of the COVID-19 infection. The pandemic provided opportunity to test Robotic Nursing in health sector. Robotic Nursing is using machine for daily nursing practice for giving care to the patient, carry-out various nursing procedures, etc.

Robots in nursing are developed to reduce the workload of nurses. They are physically and socially assistive and also can be used at the times of pandemic for all age groups. Precisely, robots are used in disinfection, cleaning, logistics and service, telemedicine, detection and control. Robots are useful in treating and caring for patients with air-borne diseases, as they are non-biological creatures and resistant to disease and its transmission.

Robots have various advantages but also comes with many drawbacks. It is important to review the ethics and values in guiding the applications of robots in health-care sector. Ethical and moral decision making should be installed in robots to provide holistic care in hospitals, clinic and home-settings. Robots are expensive, to install full time health-bots, funds are necessary for training the staffs for the usage. Other challenges are- limited roles of robots in hospitals and security of data. (2) As robots would be used by all the workers in the hospitals, the data is accessible to all. Hence, the privacy of the patient data should be protected. These challenges should be considered during design and in the stages of implementation of robots in health-sector.

The adoption of robots in nursing is not only based on what type of work the robot will do but also on the usefulness of the robots and the ease of use them. According to Technology acceptance model by Fred Davis (1989), the users of the proposed technology should find the innovation more useful and easier to use in their daily work-life. (3) Thus, the adoption and acceptance arise from the perception of its users (nurses), their beliefs and attitudes.

II. SIGNIFICANCE OF THE STUDY

Adopting new technologies in nursing changes the lifestyle of nurses by reducing the risk of developing many diseases like Hypertension, back aches, stress, anxiety, etc. using robots in their daily practice involves many pros and cons which has to be overcome by the nurses using them. The study of attitude among nurses is needed to assess the acceptability of robotics in nursing practice and their expectations.

III. AIM OF THE STUDY

This study tries to find out the attitude of nurses working in various hospitals and nursing colleges of India regarding adoption of robotic nursing in their daily practice

IV. MATERIALS AND METHODS

It is a descriptive crosssectional study. Nurses' working in hospitals and colleges of Nursing were selected as samples by Purposive Sampling. Electronic informed consents were collected by the samples before data collection.

V. SAMPLES

86 Nurses were selected as samples who are working in various Government and Private Hospitals and College in India were selected as samples in this study. The samples do not have any previous experience of working with robots in clinical setting. Hospitals- AIIMS (Delhi, Bhopal, Bhatinda, Bibinagar, Raibareli, etc), Apollo Hospital, Bangalore, Sakra Hospital, Bangalore, JIPMER, Puducherry, L.N.J.P Hospital, Delhi, and T. John College

of Nursing were the major Hospitals and Colleges from where the samples were selected.

VI. TOOL

General Attitudes Towards Robots Scale (GAToRS) was used to collect the data which was supplemented by an open-ended question. The tool is 7 point likert scale, consisting 20 statements grouped as Personal level positive attitude, personal level negative attitude, societal level positive attitude and societial level negative attitude.

VII. RESULTS

A. Demographic Variables

VARIABLE	DESCRIPTION	FREQUENCY	%
Age	< 30 years	72	83.7
	>30 years	14	16.2
Sex	Male	27	31.3
	Female	59	68.6
Profession	Nursing Officer	69	80.2
	Tutor/ Asst. Prof/ Professor	17	19.7
Years of experience	≤ 5 years	72	83.7
	>5 years	14	16.2

B. Attitude of nurses' regarding Robotic Nursing in Daily Practice

	INDICATOR	Strongly Agree	Agree	Fairly Agree	Neutral	Fairly Disagree	Disagree	Strongly Disagree	Mean
Personal Level Positive Attitude	I can trust persons and organizations related to development of robots	12.7	38.3	6.9	24.4	8.13	5.8	2.32	**4.9**
	Persons and organizations related to development of robots will consider the needs, thoughts and feelings of their users	15.1	45.3	8.1	12.7	4.6	10.4	3.4	**5**
	I can trust a robot	6.9	17.4	8.1	29	11.6	22	4.6	**3.9**
	I would feel relaxed talking with a robot	5.8	13.9	8.1	36	18.6	9.3	8.1	**3.9**
	If robots had emotions, I would be able to befriend them	9.3	31.3	13.9	25.5	4.6	11.6	3.4	**4.6**
Personal Level Negative Attitude	I would feel uneasy if I was given a job where I had to use robots	3.4	19.7	6.9	32.5	11.6	18.6	6.9	**3.8**
	I fear that a robot would not understand my commands	4.6	17.4	16.2	29	8.1	20.9	3.4	**4.04**
	Robots scare me	2.3	15.1	6.9	20.9	17.4	20.9	16.2	**3.3**
	I would feel very nervous just being around a robot	8.13	4.6	15.1	18.6	8.1	36.0	16.2	**2.9**
	I don't want a robot to touch me	4.6	15.1	13.9	25.5	6.9	17.4	16.2	**3.6**
Societal Level Positive	Robots are necessary because they can do jobs that are too hard or too dangerous for people	17.4	30.2	16.2	24.4	3.4	4.6	3.4	**5.058**
	Robots can make life easier	19.7	30.2	16.2	26.7	3.4	2.3	1.16	**5.2**
	Assigning routine tasks to	20.9	30.2	20.9	22.09	2.32	2.32	1.16	**5.3**

	robots lets people do more meaningful tasks							
	Dangerous tasks should primarily be given to robots	17.4	16.2	16.2	23.2	13.9	6.97	5.8	**4.5**
	Robots are a good thing for society, because they help people	11.6	30.2	17.4	27.9	5.8	4.6	2.3	**4.9**
Societal Level Negative Attitude	Robots may make us even lazier	33.7	17.4	25.5	15.1	3.4	2.3	2.3	**5.4**
	Widespread use of robots is going to take away jobs from people	39.5	27.9	13.9	12.7	2.3	2.3	1.16	**5.7**
	I am afraid that robots will encourage less interaction between humans	37.2	27.9	15.1	11.6	4.6	2.3	1.16	**5.6**
	Robotics is one of the areas of technology that needs to be closely monitored	45.3	25.5	19.7	8.13	1.16	0	0	**6.05**
	Unregulated use of robotics can lead to societal upheavals	37.2	26.7	17.4	13.9	4.6	0	0	**5.7**

The attitude of the nurses is categorized in 4 groups according to the tool (GAToRs) which are as follows:

S. No.	Attitude	Mean	Findings
1.	Personal Level Positive Attitude	**4.46**	**Neutral**
2.	Personal Level Negative Attitude	**3.52**	**Neutral**
3.	Societal Level Positive Attitude	**4.90**	**Fairly Agree**
4.	Societal Level Negative Attitude	**5.70**	**Agree**

C. In the subjective question, samples were asked regarding the type of work they want robots to take up in their working area. Below are the answers:

S. No.	Tasks suggested for Robots	%
1.	Shifting and lifting heavy patients	78.3%
2.	Cleaning and disinfection of wards and patient's room, Waste management	14.4%
3.	Vitals monitoring and its documentation	4%
4.	Others: Preparation of chemotherapy drugs, Loading & administration of medications, Drug Calculations, Bed making, Emergency care & CPR, Minor Surgeries, Routine paper-work and sharing feelings and emotions.	3.3%

VIII. CONCLUSION

- The attitude of nurses working in Hospitals and Colleges of Nursing found to be Neutral at Personal level (both positive and negative), Fairly agree for societal level positive attitude (which included statements like Robots are necessary because they can do jobs that are too hard, Robots can make life easier, Assigning routine and dangerous tasks to robots and robots are good thing for society) and Agree for societal level negative attitude (which included robots makes us lazier, taking away people's job, less human interactions, etc.)

- In the open-ended question asked, nurses majorly suggested tasks like lifting and shifting the patients, other tasks like cleaning and disinfection, vitals monitoring and documentation, etc. are also been suggested.

- Overall, we can say that nurses working in India do not much rely on robots for their personal use and they believe robots are good for taking up strenuous & hazardous activities that are difficult for the nurses to

perform regularly. Results has also shown, nurses have a negative attitude toward the role of robot in society.

IX. RECOMMENDATIONS

- The same study can be done for the nurses who are already working with health-bots

- Perception of nurses can be assessed regarding adoption of robotic nursing in their daily practice.

- Comparative study can be done between vein detector and conventional method.

- A study can be done to assess the reduction in the work-load of nurses after implementing robots at their clinical area.

- More articles can be meta-analyzed for ethical use of robotic nursing.

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