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# Factors associated with telemedicine use in a tertiary care pediatrics center - A cross-sectional study

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**Abstract:** *Introduction:* While quality health-care is considered a fundamental human right for all citizens; the challenge remains in making it accessible to all. Information systems have been identified as possible solution that can be used to alleviate disparity between rural and urban healthcare services and bridge the digital divide. Literature has suggested that one of the barriers for successful implementation of health information system is the user acceptance by health care personnel. *Objectives:* To assess the factors associated with telemedicine use in a tertiary care pediatric center. *Method:* This is a cross-sectional study, using mixed methods to obtain data from a sample of research participants from tertiary care pediatrics center during July to October 2017. *Results:* In general the health-care personnel were aware of the benefit of tele-medicine to improve effectiveness and efficiency of the health care system. The barriers to the effective implementation of tele-medicine include lack of knowledge and lack of awareness regarding use and usage of the tele-medicine system. *Conclusion:* Health care personnel do acknowledge that tele-medicine can help to increase the effectiveness of the healthcare system. In general the acceptance of tele-medicine among healthcare personnel is positive. However in order to integrate it into standard work practices, specific training and capacity building for tele services is essential among health care personnel.

**Keywords:** Telemedicine, UTAUT model, User Perception, Health care personnel.

## Introduction

Increased demand for health care services in developing countries and lack of resources to meet this demand has focused efforts on the use of modern technology [1-2]. Information and Communication Technology (ICT) has the potential to improve equity in underserved areas [3]. Telemedicine (TM) is upcoming field in health science arising out of effective fusion of Information and Communication Technology (ICT) with medical science having enormous potential in meeting challenges of healthcare delivery to rural and remote areas besides several other applications in education, training and managements in health care [4].

The World Health Organization (WHO) has identified Telemedicine as a possible application to strengthen health systems and improve the quality of health care delivery [5]. The readiness, acceptance and perspective of healthcare worker play an important role in success of such health information system [6]. The present study examined the computer literacy, perception and attitude of health care personnel using Unified theory of acceptance and use of technology (UTAUT) model [7].

*Objective:* To assess the factors associated with telemedicine use in a tertiary care pediatric center.

## Material and Methods

This study was conducted from July to October 2017, at tertiary care pediatrics center as a Cross- sectional study using mixed method approach. Requisite ethics clearances and administrative permissions and consent from participants were obtained. The major components of assessment included computer literacy and perception of medical fraternity on technology in general and telemedicine in specific. Quantitative data was collected using semi-structured questionnaire adopted from UTAUT model & qualitative data was collected through In-depth interview.

 

The study population comprised of the staff (Medical / Technical/ Administrative) consented to participate in the study. A pre-tested semi-structured questionnaire was used for obtaining information and In-Depth interviews with Key respondents were conducted. The first part of questionnaire pertained to demographic details; second part had nine questions regarding computer literacy; third part which was adapted from Unified theory of acceptance and use of technology "UTAUT" model had 32 questions under 8 domains. Data generated from the questionnaire were coded and analyzed using Statistical Package for Social Science (SPSS) version 20. Data were analyzed in terms of frequency/ percentages and measures of central tendency-mean, median and variance through standard deviation.

## Results

*Participants Profile:* The total number of participants were forty eight with 30 (62.5%) of them being females. The proportion of participants with a diploma, under-graduation, post- graduation and super-specialist were 23 (47.9 %), 8 (16.7%), 13 (27.1%) and 4 (8.3%) respectively. Among them 17 (35.4%) were doctors, 25 (52.1%) nurses, 5 (10.4%) were technicians and 1(2.4%) engineer.

*Computer Literacy:* Most of the participants had working knowledge of computer usage and considered as computer literates; although only 13 (27.7%) had a formal computer training. About 30 (63.8%) knew to type letters on computer, 23 (48.9%) could draw graph, 25(53.2%) used power point presentations, and about 31 (66%) used e-mail, 25 (53.2%) used scanner and send scan copy without help of others and only10 (21.3%) of participant knew about statistical packages & 21 (44.7%) were aware of data base.

**Table-1: Base line Characteristics of Study Participants**

| Characteristics | Number (Percentage) (N=48) |
|---|---|
| **AGE years** | |
| <25 | 5(10.4%) |
| 26 -36 | 25(52.1%) |
| 37-46 | 9(18.8%) |
| 47-56 | 7(14.6%) |
| >57 | 2(4.2 %) |
| **Gender** | |
| Males | 18(37.5%) |
| Females | 30(62.5%) |
| **Experience in Present Hospital (years)** | |
| >1 | 13(27.1%) |
| 2 -6 | 11(22.9%) |
| 7-11 | 8(16.7 %) |
| 12-16 | 8(16.7%) |
| 17< | 8(16.7%) |
| **Total Experience (years)** | |
| >1 | 2(4.2%) |
| 2 -6 | 13(27.1%) |
| 7-11 | 9(18.8%) |
| 12-16 | 11(22.9%) |
| 17< | 13(27.1%) |
| **Highest completed education** | |
| Diploma | 23(47.9%) |
| Under-graduate | 8(16.7%) |
| Post-graduate | 13(27.1%) |
| Super specialization | 4 (8.3%) |
| **Designation** | |
| Associate Professor | 4(8.3%) |
| Professor | 2(4.2%) |
| Residents | 5(10.4%) |
| Medical-Officer | 6(12.5%) |
| Nurses | 25(52.1%) |
| Technicians | 5(10.4%) |
| Engineer | 1(2.1%) |

*Construct from UTAUT Model*

*Perceived Usefulness:* Among the participants (N=48) 89.4% answered that TM could help to improve the care that they provide to patient.91.3% and 87.2% replied that TM will help to Increase efficacy and make their job easier respectively.87.2% consider TM will help improve their job area. 85.1% say it will increase their productivity in job.

*Ease of use:* Among the participants (N=48) 93.6% consider computer training is must for use of TM, 95.7% consider TM can be learnt to operate, 91.5% consider it is easy to use & 80.9% have clear understanding about TM.

*Social Influence:* Among the participants (N=48) 71.7% and 83% consider people who influences them and are important consider

that TM should be used by these people respectively.77.8% and 86.7% answered that they get support from administrative officer or doctor respectively.

*Facilitating Condition*: Among the participants (N=48) 91.3% and 78.7% answered that they have physical ,mental abilities and sufficient knowledge about TM.87.2% were of opinion that they will get support if required during use of TM.

*Attitude:* Among the participant(N=48) 96.9% were not in favor of TM as it lacks face to face interaction and of its complexity .89.1% were in favor as it is beneficial to people and 85.1% for it is fully integrated in providing patient care.

*Anxiety:* Among the participant (N=48) 19.1% answered they are nervous in using TM services. 34.5% fear of losing information if they do mistake while using TM.15.2% consider TM is intimidating to them.

*Self Efficacy:* Among the participant (N=48) 63% can complete the task without the assistance of any other person.

*Behavior intention:* Among the participant (N=48) 85.1% answered they use TM because their hospital implemented TM services.89.4% will increase use of TM in near future, & 91.5% will recommend TM to their colleague.

There is lack of adequate training in handling various aspects of telemedicine services among staff. Connectivity between centers the major problem faced was internet breakdown. They were also concerned about legal issues with tele-consultation.

## Discussion

We employed the unified theory of acceptance and use of technology (UTAUT) as the theoretical foundation to understand the behavioral intention of healthcare personnel. In the study conducted by Bharat Holla et al "Utilization Pattern, current and future challenges" [8] it was concluded that the telemedicine services has been largely under utilized and has failed to deliver the promise in Karnataka state. One of the reasons for the failure noted was most (52%) of health care personnel reported they had never undergone training in telemedicine. In a similar study by Suhaiza zailani et al "Determinants of telemedicine acceptance in selected public hospital in Malaysia" [9]. Indicated that government policies, top management support, perception of usefulness and computer self efficiency have a positive and significant impact on telemedicine acceptance. Both the study findings are almost same as that of study that we conducted.

From a study done on telemedicine centers from Karnataka, Ugargol A P [10] had found that physician characteristics that influenced utilization included awareness, physician attitude, need for incentives, satisfaction with the consultation, highest education, training and rapport with other physicians. At the center level, staffing issues, inability to ensure proper scheduling of duties for physicians, lack of incentives, poor technical support and connectivity were issues that influenced utilization and hence need addressing even this study deals with most of same components. In the similar study "Awareness, attitude and readiness of clinical staff towards telemedicine "by Abbas Sheikh taheri et al [11]. It was found that Clinical staff had little knowledge about telemedicine services, however they had a positive perception the same is ours finding.

## Conclusion

The health care personnel in tertiary care pediatrics center found telemedicine to increase their productivity, quality and efficiency of work. The behavioral intent of the health care personnel was also found to be favorable for future use of system. Most of health care personnel found system easy to use. Social influence and facilitating conditions were also found to influence acceptance of health care personnel of telemedicine. However in order to integrate it into standard work practices, specific training and capacity building for tele services is essential among health care personnel.

### Limitations

A significant limitation of this study was its single center study, small sample size of healthcare personnel.

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