Applications of Mobile Phones for Communication by Health Personnel: A Study in the context of Bihar

*Istkar Ahmed **Dr. Rajesh G. Konnur

*Research Scholar, Himalayan University, Itanagar, Arunachal Pradesh, India.
**Associate Professor, KHFHCON, Patna, Bihar, India.

ABSTRACT:

A study to assess the applications of mobile phone in communication in health care sector Patna, Bihar was conducted. The study objectives were to assess the application of mobile phone in health care, find out association between applications of mobile phones with selected demographic variables. Descriptive research approach was used. Descriptive research design is applied to collect the data. The total sample was 100 health care professionals who were working in a selected hospital. The tool consisted of questionnaire on demographic characteristics and mobile assessment in health care. The data obtained was analyzed using descriptive and inferential statistics. The mean score on "communication "was (22.16+- 6.60) which is 67.15%. The mean score on "over all application" was $(49.28_{+-}12.62_{)}$ which is 69.22%. The above findings of the present study show that mobile use in health care setting is very significant. The health apps are used as a tool in prevention and management of health and illness.

Key words: Health care, mhealth, health apps and mobile phone.

INTRODUCTION:

The development of wireless communication systems started in the 1930s with the use of "Walkie-talkies" during the Second World War to enable foot soldiers to stay in contact with the headquarters. In 1946, A.T. and T. Bell introduced the first commercial radiotelephone service in the US, which allowed communication between mobile users in cars and public fixed network services. In the 1960s, Bell systems launched the Improved Mobile Telephone service (IMTS), which laid the basis for commercial sector mobile communications. Developments in microprocessor technologies in the late 1970s & early 1980s enabled the introduction of the reliable wireless communications system, the so called first generation.

Mobile technologies have transformed the way healthcare providers communicate and these mobile devices are poised to revolutionize the way hospital delivers care. Mobile technology offers ways to help these challenges. Through mobile health applications, sensors, medical devices and remoter patient monitoring products, there are avenues through which health care can be improved a lot.

Contemporary healthcare industry emphasizes safety, patient-oriented approach, timeliness and balance. U- Healthcare makes it possible to safely deliver appropriate services from any location at any time. To explain the emergence of healthcare, one must invoke, first of all, progress in IT and medical technology, and then the desire and willingness on the part of healthcare institutions to adopt the new service concept and increased healthcare demand. Digitalization of information, introduction of broadband communication and leaps made in healthcare technology in recent years have provided the technological capacity necessary for achievement of u- healthcare.

Mobile health (mHealth) is defined as the use of portable electronic devices with software applications, known as "apps", to provide health services and manage patient information. Tele monitoring is one of the greatest functions of mHealth. It "entails the use of an electronic device to generate remote, real-time monitoring of medical conditions, facilitate disease management. Many chronic diseases need frequent monitoring and care over a long period of time. The electronic devices, continuously and accurately report physical activity and other wide ranging biomarkers including temperature, blood pressure, heart rate, electrocardiograph, weight and glucose etc helps to record and report accurately.

Mobile health technologies have the potential to conveniently provide clinicians and researchers with persistent & unbiased patient data that can be used to monitor, recovery, identify patients most in need of intervention, & modify treatment course. For example, this technology could greatly assist disabled patients or patients recovering from surgery who live far away from hospitals by allowing clinicians to monitor them from afar. This may improve access to quality care, & prevent frequent and costly trips to an urban health facility.

NEED OF THE STUDY:

Electronic media like the internet, mobile phones, computer games etc. have become an integral part of our professional, social and private lives. Some of the functions and effects of electronic media are widely appreciated such as information delivery and entertainment. Among younger generation, electronic media enjoys wide publicity.

The youths are using mobile phones to stay in touch with friends and parents. They are using them to share stories and photos, entertaining themselves when bored. Some are using to coordinate their schedules and face-to- face gatherings, go online to browse, to participate in social networks and check their emails. Teens are also using their phones to chat on texts and to skirt rules at school and their parents. Some are using to send sexts, others are sleeping with buzzing phone, under their pillows and some are using to place calls and text while driving.

Koehler N, Vujovic O et al (2013) conducted a survey on use of mobile phone in clinical practice at Victoria, Australia. The main aim of the study was to enumerate the use of mobile phone within clinical practice and their attitudes related to it on 43 healthcare professionals for different disciplines and specialization. The results were 91% of healthcare professionals owned a mobile phone of which 87% used it during clinical practice. The samples had

positive attitude towards use of internet and were perceived negatively in regard to confidentiality. Furthermore, healthcare professionals also had the perception that patients may think that they are using their mobile for non-medical purposes.

Complex mobile health applications help in areas as training for health care workers, the management of chronic disease, monitoring of critical health indicators. They enable easy to use access to tools like calorie counters, prescription reminders, appointment notices, medical references & physician or hospital locators. These applications empower patients and health providers proactively to address medical conditions, through near real time monitoring and treatment, no matter the location of the patient or health provider.

RESEARCH PROBLEM:

This study has to be done to assess the applications of mobile phone in the healthcare sector in Patna, Bihar.

AIM OF THE STUDY:

The overall aim of the study is to assess the use of mobile phone by health personnel in different sectors of healthcare.

OBJECTIVES:

- To assess the application of mobile phone in communication in health care.

REVIEW OF LITERATURE:

Wallace S, Clark Marcia et al, (2014) conducted a study to evaluate how the learners and teachers of medical profession use mobile devices. Total samples were 18 participants (10 medical students, 7 residents & 1 faculty) conducted through interviewing using convenience method. The results showed that maximum number of participants (98%) was using android phones & iphones for their learning and entertainment.

Ventola, L.C. (2012) carried out a research on mobile devices and apps for health professionals at California. Total 200 samples were selected and random method questionnaire was used to collect data. The study findings reported that physicians spend the majority (64%) of their time on online looking for information to make or support clinical decisions, double the time spent reviewing print resources.

Mobile devices are invaluable tools for health care professionals to use to search or access medical literature, as well as other information sources. The survey of medical school health care professionals and students found that mobile devices were often used to access medical journal websites (60%) or medical news online (74%). Several medical journals, such as the New England Journal of Medicine, The Lancet and BMJ (British Medical Journal), provide

apps that allow articles to be viewed on mobile devices. However, journals rarely provide free access to articles without the purchase of a subscription.

Applications for health professionals such as PubMed/ MEDLINE also facilitate searches of medical literature databases to identify published medical information. Mobile medical literature search apps used by health care professionals include: Pub Search, PubMed on Tap, Medscape, MEDLINE Database on tap (MD on Tap or MDoT), Docphin, Docwise, read by QxMD, ask MEDLINE, PICO, and Disease Associations. Pub Search is available for free, while PubMed on tap is available on demand. Both apps work with the iOS platform to facilitate PubMed/ MEDLINE searches using the iphone, iTouch and iPad. The free app MD on Tap is provided by the National Library of Medicine to help health care professionals using PDAs access medical information at the point of care through the search engines: PubMed, Essie and Google.

Drug reference applications are generally used to access information including: drug names, indications, dosages, pharmacology, interactions, contraindications, cost, formulator status, identification guides and dose by weight calculators. The most frequently used mobile drug reference apps include: Epocrates, Skyscape, Rx Drugs/ Omnio, Micromedex, FDA drugs, which includes official FDA labeling for prescription and over the counter drugs, permits searching by active ingredients. The survey found that 90% physicians used Epocrates drug reference app to access drug information.

MedPage today is one of the most popular apps among HCPs for accessing breaking medical news, organizing news by interest and earning CME credits. The Med Page today app provides information about drugs, diseases, and medical procedures, as well as daily podcasts, videos, & news updates. It encompasses 30 medical specialties & provides annual coverage of more than 60 meetings and symposia.

Mobile devices have been proven to improve contact between HCPs and their colleagues. In a research study, mobile devices were shown to improve communication between doctors and nurses on inpatient wards. In a survey of medical school HCPs and students, more than 80% of respondents described using mobile devices to communicate with colleagues about patient care via e mail, telephone and text messages. They described texting as a more efficient means of communication than telephone conversations or in person meetings. Mobile devices also allow rapid response to e-mail, allowing users to keep up with communication. Texting or calling colleagues directly on their mobile devices, rather than paging them, has also been shown to save critical time in emergency situations. Mobile devices can also be used by HCPs to aid long distance patients by allowing them to text or send pictures regarding problems or questions.

METHODOLOGY:

- **Research Approach:**
  Descriptive research approach was used in the present study.

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- **Research Design:**

  The research design in the present study was non experimental research design.

- **Research Setting:**

  The present study was conducted in Kurji Holy Family Hospital, Patna. This hospital was founded by Dr. Angel Dengal. It is a missionary hospital with a philosophy to serve the poorest of poor to have a good medical care. KHFH has more than 300 bed strength and encompasses a huge area of 40 acres. The hospital is so famous that patients from the states of Bihar, Jharkhand, Orissa and other parts of India come here for medical aid. It has all types of OPDs and wards. It has a multidisciplinary team of doctors and nurses. Para medical professionals also serve the institution.

- **Target Population:**

  The target population is the total group of subjects to whom the investigator is interested and to whom the results could reasonably be generalized. The population for this study was 100 health care professionals.

- **Sample and Sampling Technique:**

  Health care professionals who met the inclusion criteria were selected as samples. The sample for the present study composed of 100 health care professionals (doctors, nurses and allied health care workers) practicing in Kurji Holy Family Hospital, Patna, Bihar.

- **Sampling criteria:**

  Health care professionals who are practicing in KHFH, Patna and willing to participate constituted the sample.

- **Exclusive Criteria:**
  a. Grass root level workers in hospital.
  b. Those are not willing to participate.

- **Development and Selection of Tools:**

  Tool I: Socio Demographic data

This section consisted of items related to personal data ie, age, gender, educational status, marital status, monthly income, type of mobile, number of mobile phone, type of health worker, main use of mobile phone, hours used and use of health apps.

Tool II: Structured Mobile Application Rating Scale

The schedule consisted of 30 items related to use/ application of mobile in health care setting. Four point scales were adopted to assess the level of use. It is measured with the help of Likert Scale. Each item has 4 alternatives, i.e not at all (0), always (1), sometimes (2), and rarely (3).

Theses 30 items were divided into 3 domains, such as -

   i.   Clinical application: (Items 1,3,4,8,9,12,13,14,15,16,19,20, 26, 28)

   ii.   communication (7,10,17,18,21,22,23,24,25,27,29,30)

   iii.   Educational application (2,5,6,11)

The total score was 90.

- **Content validity of the tools:**

   The content validity refers to what an instrument measures i.e. what it is supposed to measure. For all parts of the tool, for each items four response criteria was prepared for rating which as follows

   i.   Not at all (0)

   ii.   Always (1)

   iii.   Sometimes (2)

   iv.   Rarely (3)

   The prepared instrument in line with objectives of the study, operational definitions, blue print, scoring key and evaluation criteria checklist were used for validation by 5 experts who included two administrators, one doctor, one nurse educator and one statistician. Suggestions were taken and final tool was prepared accordingly.

- **Pilot study:**

   The pilot study was conducted in Kurji Holy Family Hospital, Patna. The pilot study was conducted from 1/2/2017 to 8/2/2017 after getting administrative approval for conducting it. The purpose of the pilot study was to pretest the data collection tool, to find out the feasibility of conducting final study and to determine the method of statistical analysis.

   The purpose of study was explained to the subjects and written consent was obtained from the subjects prior to the study to gain complete co-operation & "honest responses". The tool was administered to ten (10) health care professionals who fulfilled the sample selection criteria. The pilot study helped to find out the time

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required to administer questionnaire tool on health care professionals, which was approximately 20-25 minutes. After gaining the needed experience in various areas the investigator decided to proceed with the main study since the research tool was found to be feasible and the data analysis plan was decided upon and was judged to be appropriate for the study. The feasibility of the study was established in terms of method of administration of tools, cooperation from respondents and others concerned, time taken for the completion of the tools and clear understanding of the tools to the subjects.

- **Reliability of the Tools:**
  The reliability of the tool was assessed by split half method. In order to assess reliability, the tool was administered to ten (10) samples by the investigator. The reliability coefficient was calculated by using Spearman Brown Prophecy formula. The data represents that the correlation of mobile application tool was found to be 0.52 and reliability was 0.68. This suggests reliability is high.

- **Data Collection Procedure:**
  A formal administrative permission was obtained. Data was collected from 1/3/2017 to 30/3/2017. Samples were selected as per sampling criteria using purposive sampling method. Selected health care professionals were met individually and from each ward selected individuals are made to sit in a room. Prior instructions were given. The purpose of the study and uses of the study are explained by keeping confidentiality and anonymity. The questionnaire was distributed to all. The time for data collection from each ward was between 2pm to 3 pm. Confidentiality was assessed and consent was obtained from the participant in the study.

- **Ethical Consideration:**
  Verbal consent was obtained from the health care personnel who were willing to participate in the study. To gain their confidence, they were told that their responses will be kept confidential & the information will be used only for research purpose. The samples were also informed about their right to refuse from participating in the study.

- **Plan of Data Analysis:**
  The plan of data analysis is as follows.
  Computation of mean, standard deviation for assessment of use of mobile in health care was done. Chi -square test was used to find the association between the application of mobile in health care and selected socio-demographic variables. The level of significance was set as $P<0.05$ levels to test the significance. This level was often used as a standard for testing the difference. ANOVA was used to find the

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significant difference between the application of mobile phone in health care and the normal test after verifying the normality assumption by Q-Q plot technique.

ANALYSIS AND INTERPRETATION:

Table 1.1 Opinions about Communication

	Not at all	Rarely	Sometime	Always	Total
Using mobile phone for sending information	11	6	21	**62**	100
Using mobile phone for call schedule	**36**	9	22	33	100
Using mobile for consultation	**58**	14	17	11	100
Using mobile for patient discharges	**65**	17	15	3	100
Using mobile to connect others	11	5	30	**54**	100
Using mobile to collaborate with others in different places	17	12	21	**50**	100
Using mobile phone applications such as Imo/whatsapp/Hike/ Skype to connect others	4	7	24	**65**	100
Using e-mail to connect others	11	8	27	**54**	100
Using mobile to text and send others	10	8	31	**51**	100
Using Facebook to connect others	14	8	20	**58**	100
Use any other networking site	18	24	27	**31**	100
Using any other media to connect others	17	19	**36**	27	100

Table 1.1 describes the distribution of the opinion towards communication. It is analyzed by considering the factors "*using mobile phone for sending information, using mobile phone for call schedule, using mobile for consultation, using mobile for patient discharges, using mobile to connect others, using mobile to collaborate with others in different places, using mobile phone applications such as Imo/ whatsapp/ Hike/ Skype to connect others, using e-mail to connect others, using mobile to text and send others, using Facebook to connect others, using any other networking site, using any other media to connect others*". It is clear from the analysis that 11% of the respondents went with "Not at all", 6% of the respondents with "Rarely", 21% of the respondents with "Sometime", 62% of the respondents with "Always" regarding "Using mobile phone for sending information".

Regarding the factor "Using mobile phone for call schedule", 36% of the respondents went with "Not at all", 9% of the respondents with "Rarely", 22% of the respondents with "Sometime", 33% of the respondents with "Always".

Regarding the factor "Using mobile for consultation", 58% of the respondents stayed with "Not at all", 14% of the respondents with "Rarely", 17% stated with "sometime", 11% of the respondents with "Always".

Regarding the factor "Using mobile for patient discharges", 65% of the respondents selected "Not at all", 17 % of the respondents selected "Rarely",15% of the respondents selected "Sometime", 13% of the respondents selected "Always".

Regarding the factor "Using mobile to connect others", 11% of the respondents chose "Not at all", 5% of the respondents chose "Rarely", 30% of the respondents "Sometime", 54% of the respondents chose "Always".

Regarding the factor "Using mobile to collaborate with others in different places", 17% of the respondents preferred "Not at all", 12% of the respondents preferred "Rarely", 21% of the respondents preferred "Sometime" and 50% of the respondents preferred "Always".

Regarding the factor "Using mobile phone applications such as Imo/ Whatsapp/ Hike/ Skype to connect others", 4% of the respondents selected "Not at all", 7% of the respondents selected "Rarely", 24% of the respondents selected "Sometime", 65% of the respondents selected "Always".

Regarding the factor "Using e-mail to connect others", 11% of the respondents stayed with "Not at all", 8% of the respondents with "Rarely", 27% of the respondents with "Sometime", 54% of the respondents with "Always".

Regarding the factor "Using mobile to text and send others", 10% of the respondents had gone with "Not at all", 8% of the respondents with "Rarely", 31% of the respondents with "Sometime", 51% of the respondents with "Always".

Regarding the factor "Using Facebook to connect others", 14% of the respondents stayed with "Not at all", 8% of the respondents with "Rarely", 20 % of the respondents with "Sometime", 58% of the respondents with "Always".

Regarding the factor "Use any other networking site", 18% of the respondents selected "Not at all", 24% of the respondents selected "Rarely", and 27% of the respondents selected "Sometime", 31% of the respondents selected "Always".

Regarding the factor "Using any other media to connect others", 17% of the respondents chose "Not at all", 19% of the respondents chose "Rarely", 36% of the respondents chose "Sometime", 27% of the respondents chose "Always".

It is clear from the analysis made in the study that majority of the respondents chose "Not at all" with the factors of "Using mobile phone for call schedule, Using mobile for consultation, Using mobile for patient discharges", "Sometimes" with the factors of "Using any other media to connect others", "Always" with the factor of "Using mobile phone for sending information, Using mobile to connect others, Using mobile to collaborate with others in different places, Using mobile phone applications such as Imo/ Whatsapp/ Hike/ Skype to connect others, Using e-mail to connect others, Using mobile to text and send others, Using Facebook to connect others, Use any other networking site".

Table 1.2 Friedman Test- Communication

	Mean	SD	Mean Rank	Reliability
Using mobile phone for sending information	2.33	1.01	**7.98**	0.768
Using mobile phone for call schedule	1.51	1.28	5.57	

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Using mobile for consultation	0.82	1.08	3.69
Using mobile for patient discharges	0.57	0.86	3.07
Using mobile to connect others	2.26	0.99	**7.66**
Using mobile to collaborate with others in different places	2.03	1.15	7.05
Using mobile phone applications such as Imo/Whatsapp/ Hike/ Skype to connect others	2.49	0.80	**8.38**
Using e-mail to connect others	2.23	1.01	7.63
Using mobile to text and send others	2.22	0.97	7.55
Using Facebook to connect others	2.21	1.09	7.55
Use any other networking site	1.71	1.10	5.93
Using any other media to connect others	1.74	1.05	5.96

It can be noted from the above table that among the 12 factors "Using mobile phone applications such as Imo/ Whatsapp/ Hike/ Skype to connect others" was ranked first. It is followed by the "Using mobile phone for sending information". "Using mobile to connect others" was ranked third.

RECOMMENDATIONS:
The recommendations reached at are as follows:
1. The study can be repeated on large scale sample for better generalization of the findings.
2. A similar study can be conducted in assessing the application of mobile use in health care sector in different hospital settings.
3. A varied research approaches can be conducted on mobile use especially in hospital and community settings.
4. True experimental study can be conducted to assess the mobile application in health care setting.

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