



## Effectiveness of mHealth app on self –management of ascites in terms of knowledge and attitude of chronic liver disease patients

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### ABSTRACT

*Among all the chronic diseases, Liver Diseases was ranked as the fifth most common cause of death (National Statistics of UK, 2010). The presence of Ascites is a sign of poor prognosis in patients with Chronic Liver Diseases. So, the aim of the present study was to provide an emphasize on Self-Management of Ascites for patients who are living with Chronic Liver Diseases. For this purpose, Quantitative approach with Two groups, Pretest-Posttest designs were adopted and a study conducted in Hepatology OPD, ILBS. A total of 60 patients were enrolled based on sampling criteria and consent has been taken. Assessing Knowledge and Attitude with Structured Knowledge Questionnaire and Likert Attitude Scale collected the data, respectively. These scales were highly reliable and valid. On the same day of assessment of the Experiment group, the mHealth app was introduced and given to the subjects. MS Excel and SPSS 22.0 were used for analysis. The data obtained were analyzed using Descriptive (Mean, Percentage, and chi-square) and Inferential statistics (Paired t-test, Independent t-test, Karl Pearson's correlation, and Krushkal Wallis test). The study results showed that the majority of patients in both the Experiment and Comparison group were upper-middle-class, male, aged between 47-60 years, married, and residing in urban areas. Independent t-test was computed which showed a significant ( $p= 0.04$ ) difference between the post-test Knowledge score of Experiment and Comparison group. In the Experiment group, a statistically significant positive correlation ( $r=0.37$ ,  $p=0.04$ ) was found between Posttest Knowledge and Posttest Attitude score. Based on the findings of the study, it is concluded that mHealth app was effective in Self –Management of Ascites in terms of Knowledge of CLD Patients.*

**Keywords:** CLD, Self-Management, Knowledge, Attitude, mHealth app

### 1. INTRODUCTION

Liver diseases are a major public health problem and occur throughout world in all ages, gender and races. In US Chronic Liver Diseases (CLD) were the twelfth leading cause of death and causing more than 66,000 deaths annually. Among all the causes of CLD, Viral Hepatitis affected the individuals in all geographic regions from low or middle income countries. Worldwide, Viral Hepatitis accounted for 0.3 million deaths per year with an increase of 46 percent from 1990 to 2013 (Lozano et al., 2010). The estimated prevalence of Chronic Hepatitis C is 2.5 percent ranging from 1.8 percent in the US to 5.6 percent in Africa. Overtime, Cirrhosis lead to various life threatening complications included Ascites and Spontaneous Bacterial Peritonitis, Portal Hypertension, Variceal Bleeding, Hepato-Pulmonary Syndrome and Hepatorenal Syndrome. Ascites was seen as the most common complication of Liver Cirrhosis and 50 percent of patients with decompensated Cirrhosis developed Ascites over a period of 10 years of the illness. The presence of Ascites in CLD patients was a sign of poor prognosis. Such patients needed to be taught Self-Management measures to manage the chronic symptoms. Among CLD Patients, Self-Management for Ascites was to be directed toward restoring normal fluid volume, improving gas exchange, maintaining skin integrity and measuring vital signs, abdominal girth and body weight.

### 2. STATEMENT OF THE PROBLEM

A study to assess the effectiveness of mHealth app on Self –Management of Ascites in terms of Knowledge and Attitude of Chronic Liver Disease Patients attending Hepatology OPD, ILBS

### 3. OBJECTIVES OF THE STUDY

#### 3.1 Primary Objective

To evaluate the effectiveness of mHealth app on Self –Management of Ascites in terms of Knowledge and Attitude among CLD Patients.

#### 3.2 Secondary Objectives

- To determine the relationship between the Knowledge and Attitude of CLD patients in the Experiment group
- To find the association of the Change in Knowledge and Change in Attitude of CLD patients in the Experiment group with the selected Demographic Variables and Clinical Parameters

### 4. CONCEPTUAL FRAMEWORK

“Conceptual model or framework involved interrelated concepts or abstractions assembled in a rational and often explanatory scheme to illuminate relationships among them”. Conceptual framework facilitates communication and provides systematic approach to nursing research, educational status, administration and practice. The conceptual framework selected for this study was Wiedenbach’s Helping Art Model for Clinical Practices. This conceptual model is called as “Wiedenbach’s Prescriptive Theory proposed by Ernestine Wiedenbach in the year 1964.

### 5. METHODOLOGY

#### 5.1 Study design and Sample

Quantitative approach with Two group Pretest-Posttest design was adopted for the present study conducted in Hepatology OPD, ILBS. This design was administered to the Experiment and Comparison group to look at the effectiveness of mHealth app on Self-Management of Ascites. Experiment group received information through the mHealth app along with routine information on Self-Management of Ascites and Comparison group received the routine information. Sample of the present study comprised of Chronic Liver Disease patients with Ascites who attend the Hepatology OPD, ILBS for the first time. This criterion was chosen with a view that the out patients those who come for the first time, may not be having complete awareness about their disease condition and its management.

#### 5.2 Sampling Technique

The choice of sampling technique depends on the nature of problem, kind of variables and the number of sampling units. In the present study, the first thirty subjects are recruited in the Comparison group and next thirty were in the Experiment group. This is done to prevent the contamination of intervention between the groups.

#### 5.3 Inclusion Criteria

Chronic Liver Disease Patients

- Newly diagnosed with CLD and Ascites
- Including Liver Cirrhosis, Chronic Hepatitis, Non-Alcoholic and Alcoholic Fatty Liver Diseases with Ascites
- Who visit the OPD of ILBS for the first time
- Who are present during the data collection period
- Who can read/write Hindi or English
- In the age group of  $\geq 18$  years and  $\leq 60$  years

#### 5.4 Exclusion Criteria

- Patients having Ascites due to other causes like Heart Failure, Pancreatitis, Myxedema, Nephrotic Syndrome, Postoperative Lymphatic Leak and Liver Transplantation.
- In-patients of Chronic Liver Diseases
- Patients who physically and mentally are unable to use Mobile Health App.
- Patients who have no access to Android Mobile Phones.

#### 5.5 Data Collection Tools

This study utilized a Demographic profile, Clinical parameters, Knowledge Questionnaire and Likert Attitude Scale. The scales used in this study were organized as

Part 1: Socio-Demographic Profile

Part 2: Clinical Profile

Part 3: Structured Knowledge Questionnaire

Part 4: Likert Attitude Scale

#### 5.6 Data Collection Procedure

Formal Permission was obtained from the administrative authority and Ethic Committee. The participants who met the selection criteria were recruited in Comparison and Experiment group. Total 60 patients were recruited, 30 in each group. Recruitment into the Comparison group and their data collection was completed first followed by recruitment into the Experiment group and their data collection. This was to ensure that during data collection there was no contamination in terms of use of mHealth app by the Comparison study subjects. Participant information Sheet was given to each subject to read followed by clear explanation of their rights and assuring their queries. Informed consent form was then signed and taken from every participant.

The data collection tools were given to the patients and they were allowed to read and tick the appropriate answers. Data related to Demographic Profile, Clinical profile, Knowledge and Attitude was collected first from the Comparison group by using the selected scales. During the second OPD visit (after 7-14 days) of the Comparison group, the investigator collected the data using the same scales. After the completion of the entire data collection of the Comparison group, the Investigator provided the mHealth app to the group. The same scales were used for collecting data from the Experiment group. On the same day, the Investigator teaches the Experiment group regarding Self-Management of Ascites through mHealth app. The app is made available to the group by sending an email link (app-debug.apk). During second OPD visit (after 7-14 days) of the Experiment group, the investigator collected the data using same scales again. Out of 60 patients' one patient of Comparison group was lost to follow up because of the early second OPD visit (on fourth day). The data entry was simultaneously done in Microsoft excel 2010.

### **5.7 Intervention: mHealth app**

In the present study, mHealth app was prepared to fulfill the objectives of the study and to make patients understand and manage their disease condition. The app was developed in three stages:

- a) Planning of mHealth app
- b) Validation of content for Self-Management of Ascites for upload in the mHealth app
- c) Development and Evaluation of the mHealth app

## **6. STATISTICAL METHODS EMPLOYED**

The following Statistical methods were employed using SPSS version 22.

- Descriptive statistics was used to describe the sample characteristics. The data was presented as frequency and percentage.
- Distribution of Knowledge and Attitude of patients was computed and presented as Range, Median, Mean and Standard Deviation. Paired t-test (with in the groups) and Independent t-test (between Experiment and Comparison group) were used to assess the effectiveness of mHealth app in terms of Knowledge and Attitude of patients.
- Karl Pearson Coefficient of Correlation was computed to determine the relationship between Knowledge and Attitude score of Patients.
- The Mann-whitney or Kruskal-wallis test was applied to determine the association of Change in Knowledge and Change in Attitude with the selected Demographic Variables and Clinical Parameters of patients.

## **7. RESULTS**

The t test computed, the value was found to be not significant as evident by the value of  $p=0.26$ . Groups were homogenous and comparable in terms of their baseline Knowledge and Attitude.

### **7.1 Effectiveness of mHealth app in terms of Knowledge of patients**

In the Experiment group, the mean pre-test Knowledge score was  $9.37 \pm 2.12$  and post-test Knowledge score was  $12.37 \pm 2.71$ . The Mean difference (3.0) between pre-test and post-test Knowledge score of patients was found highly statistically significant ( $t=7.08$ ,  $p=0.001$ ). In Pretest, 6.6 percent had good knowledge and in Posttest 43.3 percent had good knowledge. None of patients in the Experiment group had poor knowledge in the Posttest In the Comparison group the mean pre-test Knowledge score of patients was  $10.57 \pm 2.72$  and the mean post-test Knowledge score was  $10.90 \pm 2.69$ . The mean difference of 0.20 between pre-test and post-test Knowledge score of patients was not statistically significant ( $p=0.18$ ). The difference of mean post-test Knowledge score of Experiment and Comparison group was 1.47. The calculated 't' value (2.09) was found to be statistically significant as  $p=0.04$ . There was a significant difference between post-test Knowledge score of Experiment and Comparison group.

### **7.2 Effectiveness of mHealth app in terms of Attitude of patients**

In the Experiment group the mean pre-test Attitude score was 66.07 and mean post-test was 66.47 with mean difference 0.40 which was statistically significant, as evident from the 't' value of 2.11 at 'p' value of 0.04 and majority of patients (96.6%) in Pre and Posttest had neutral Attitude towards the use of mHealth app. In the Comparison group, the mean pre-test Attitude score was 63.86 which increased in post-test up to 64.34 and to assess the significance of this mean difference (0.48) between the pre-test and post-test Attitude score of patients paired t-test was computed. The Mean difference of 0.48 between pre-test and post-test Attitude score of patients was not statistically significant as p value is more than 0.05. The mean value of Posttest Attitude in Experiment group (66.47) was higher than in the Comparison group (64.34). The calculated 't' value (0.98) was not statistically significant as evident by the value of  $p=0.32$ .

### **7.3 Correlation between Knowledge and Attitude of patients**

A positive correlation ( $r=0.37$ ) was seen between Posttest Knowledge score and Posttest Attitude score. The correlation was found to be statistically significant as depicted by a 'p' value of 0.04.

### **7.4 Association of Change in Knowledge with selected Demographic Variables and Clinical Parameters**

Mann-Whitney/Kruskal-Wallis test was computed and p value was found not significant ( $p \geq 0.05$ ) for the selected Demographic Variables and Clinical Parameters except salt intake per day ( $p=0.03$ ). The data showed that with change in knowledge there was significant change in per day salt intake.

### **7.5 Association of Change in Attitude with selected Demographic Variables and Clinical Parameters**

Mann-Whitney/Kruskal-Wallis test was computed and 'p' value was found not significant ( $p \geq 0.05$ ) for the selected Demographic variables and Clinical Parameters except salt intake per day ( $p=0.001$ ). There was significant association of Change in Attitude with 'salt intake per day'.

## 8. DISCUSSION

On the basis of objectives and stated hypothesis of the study, the findings have been discussed with reference to other studies.

### 8.1 Effectiveness of mHealth app in terms of Knowledge of patients

In the Experiment group, the Mean difference (3.0) between pre-test and post-test Knowledge score of patients was found to be highly statistically significant, as evident from the 't' value 7.08 at 'p' value of 0.001. In Comparison group, no statistically significant ( $p=0.18$ ) improvement was seen.

The study results found similar with Goldsworthy, Fateen, Thygesen, Aldersley, Rowe and Jones (2017) study findings which showed that the mean knowledge score improved from 25 percent (in pretest) to 66.7 percent (in posttest); an increase of 41.7 percent seen which was significant ( $p<0.001$ ). It was concluded that participants had poor baseline knowledge of Liver Cirrhosis and delivering information led to a significant improvement. In the present study, the difference of mean post-test Knowledge score of Experiment and Comparison group was 1.47 which found to be statistically significant as  $p=0.04$ . There was a significant difference between post-test Knowledge score of Experiment. In other study conducted by Volk, Fisher and Fontana (2013) showed that only 53 percent were answered correctly at the baseline. After the educational intervention to the study subjects, the median knowledge score significantly ( $p<0.001$ ) improved from 53 percent to 67percent.

### 8.2 Effectiveness of mHealth app in terms of Attitude of patients

In the Experiment group, the majority of patients (96.6%) in Pre and Posttest had neutral Attitude towards the use of mHealth app. Another study conducted by Husseina, Oonb and Fikry (2016) oppose the present study findings. They found Attitude highly significant with the intention to use mHealth ( $p$  value = 0.000) and there was positive relationship with each other ( $r=0.81$ ,  $p=0.000$ ). The majority of respondents' Attitude towards mHealth was favourable.

### 8.3 Association of Change in Knowledge and Change in Attitude with selected Demographic Variables and Clinical Parameters of patients

Mann-Whitney/Kruskal-Wallis test was computed and  $p$  value was found not significant ( $p\geq 0.05$ ) for the selected Demographic Variables and Clinical Parameters except salt intake per day ( $p=0.03$ ). The data showed that with change in knowledge there was significant change in per day salt intake.

There was a positive significant association found between age and knowledge about cirrhosis of liver in the study conducted by Johani, Aljehani and Alzahrani (2018). This could be due to the fact that the younger have good access to new technology from which they could gain a lot of information. Another study showed that the level of patient knowledge was not associated with age, gender, etiology or severity of liver disease, or length of time followed in the clinic (Volk, Fisher & Fontana 2013).

## 9. CONCLUSION

Based on the findings it concluded that the mHealth app was effective in terms of Knowledge regarding Self-Management of Ascites but not effective in changing the Attitude of the patients towards the use of mHealth app for Self-management of Ascites. There was a significant positive relationship found between Posttest Knowledge and Posttest Attitude. So, it was concluded that Knowledge brought the positive change in the Attitude of patients towards the use of mHealth app for Self-Management of Ascites.

### 9.1 Strengths of the study

The strengths of the present study were

- Limited studies available in India on Self-Management of Ascites
- This study was based on through review of related literature.
- Reliable and validated tools were used in the study.

### 9.2 Limitations of the study

The limitations of the current study were

- Limited data collection period
- The study was confined to a small number of the subjects which limits the generalization of the findings.
- The study was limited to only the OPD patients with Chronic Liver Diseases, IPD new cases who directly admitted from Emergency were not included
- The study was limited to only one hospital.
- Standardized scales were not available to elicit data related to Knowledge and Attitude of the patients
- The simple informative mHealth app was used to deliver the information. Interactive mHealth app could be used.
- The investigator faced difficulty in collecting the reviews related to effectiveness of mHealth app on Self-management as the studies conducted in India were limited.

### 9.3 Implications of the study for Nurses

The findings of the presented study had several implications in the field of nursing profession i.e. in nursing practice, nursing administration, nursing education and nursing research.

### 9.4 Nursing Practice

Knowledge about the Chronic Liver Diseases will improve and develop nursing practice. This is expected to positively influence the patients' health outcomes. The knowledge of nurses can be improved by the use of mHealth app which was AASLD guidelines based.

The mHealth apps are less time consuming and can be easily implemented by the nurses to the patients. So, patients can use the app for Self- Management aspects. It automatically reduces the workload of nurses by promoting self-care among patients. The Nurses should be encouraged to use mHealth app for the management of Ascites among Chronic Liver Diseases.

### 9.5 Nursing Administration

The Nurse administrators should take an active part in formulation of evidence-based mHealth apps and make these apps available online for nurse, health care providers and patients' education, to ensure that the Nurses working in related area are updated about the current guidelines of Management of Ascites, improving the standards of Nursing practice and patient outcomes.

Continuing Nursing Education should be arranged for the Nurses at regular interval in which these mHealth apps can be used to update their Knowledge, followed by supervision and evaluation of the updated practices of Nurses.

The Nurse administrator should ensure proper implementation of mHealth apps which should be followed by regular audits. The incidence of Chronic Liver Diseases should be reported and documented. Regular supervision should be there to prevent erroneous documentation.

The Nurse administrator should organize Educational Program on Management of Ascites to update the Knowledge of the Nurses. So that nurses can further teach the patients about Self-Management. The use of evidenced based mHealth app should be promoted and the problems in practical implementation should be noted.

### 9.6 Nursing Education

There are various techniques available for imparting health education by the nurses. But the mHealth apps can be used effectively and independently for the Self-Management of the Chronic Diseases. Nurses must undergo special training regarding the use and operation of mHealth apps. Also, the nursing curriculum should be updated with evidenced based nursing research on mHealth apps. The evidences based mHealth app can be one of the ways to bridge the existing knowledge and updated knowledge gap. Nurses working in the hepatology units need to be updated on current knowledge regarding the Chronic Liver Disease and Management of Complications. The mhealth app used in the present study can be utilized in the induction training of the Nurses working in the Hepatology units.

### 9.7 Nursing Research

Emphasis should be laid on publications of findings of research in journals to disseminate the research based evidences for clinical nursing. It can be presented at various nursing forums so that more number of nurses become aware about current emerging medical technology, mHealth app, its importance and need to include in the routine care of the patients. The study helps to provide information regarding Chronic Liver Diseases and Ascites based on the research evidences. Nurses can positively influence patient care by incorporating the evidence-based practices based on mHealth app. The findings of this study will help in strengthening the body of knowledge in the discipline of nursing. Nurses to increase the scope of the study can do further researches.

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