Study of Chat Applications used as a mode of reminder for patients suffering from Diabetes

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ABSTRACT
The scope of this research paper is to analyze whether using chat applications as a mode of reminder is helpful to the diabetic patients or not. These patients are required to frequently visit the doctors to be up to date on their health front, which is not always possible. Thus, there is a need to provide a better mode of communication between the doctors and the patients. In this paper, an empirical study is conducted for the same by carrying out online surveys with doctors and diabetic patients. Results show that usage of chat applications help the patients to acquaint the doctors about their health in a faster and convenient way. Improvements in self & time management will be seen, but only if more patients use the specific applications developed for them. These results are discussed.

Keywords
Chat application, mode, reminder, patients, chronic disease, Diabetes

1. INTRODUCTION
Over 30 million have now been diagnosed with diabetes in India. This means that India actually has the highest number of diabetic of any one country in the entire world. The prevalence of IGT is thought to be around 8.7 per cent in urban areas and 7.9 per cent in rural areas. [1]

Diabetes care remains a substantial burden for the patient who have the disease and for the healthcare system. Diabetes is beginning to appear much earlier in life in India, meaning that chronic long-run complications are becoming more common. The implications for the Indian healthcare system are enormous. [2] There is a need of chat applications which can improve the delivery of care for patients with diabetes. [3]

Many problems are faced by the patients suffering from diabetes, like reachability of the doctors and so on. Self-management is critical to achieving diabetes treatment goals. [4] Due to the busy schedule in an individual's life the people suffering from diabetes usually forget to do regular check-ups

as told by the doctors. Patients sometimes skip the appointment schedule or forget to take the prescribed medicines, also miss diets and exercises. Diabetes often attracts many other complications and thus it becomes very important to keep track over this disease at regular intervals of time. As the people today are growing with technology and becoming habitual to it, they prefer the use of technology more over traditional methods. Chat application is one such method by which the problems above can be overcome easily.

1.1 Chronic Disease
A chronic disease is a long-lasting condition that may be controlled however not cured. [5] A disease lasting for a long time or for a life time is considered a chronic disease. A person with a chronic disease needs to manage it and treat it all the time. There are many types of chronic diseases such as heart disease, cancer, blood stroke etc. amongst them diabetes is one such major chronic disease which has majority of the population covered under it.

1.1.1 Diabetes
Diabetes is a disease that affects the body's ability to produce or use a hormone called insulin. The food consumed is broken down into glucose that helps regulate the metabolism and gives energy to the body. Diabetes affects various parts of the body and comes up with serious complications, such as heart disease, stroke, blindness, kidney failure, and lower-limb amputation, among several conditions. [6]

1.1.1.1 Types of Diabetes
1.1.1.1.1 Type 1 Diabetes
Type 1 diabetes also called as Juvenile diabetes is an autoimmune disease where the pancreas produces very little insulin or no insulin at all. [7] It is usually seen amongst people under the age of 20 years.

1.1.1.1.2 Type 2 Diabetes
Type 2 diabetes also called as adult onset diabetes is considered a life style disease because it is normally triggered by living a fairly sedentary life, being obese and not

participating in exercise, with age and heredity as a factor. If a parent or a sibling develops Type 2 diabetes later in their life, a person has a greater chance of getting Type 2 diabetes as well. [7]

1.1.1.1.3 Gestational Diabetes

This type of diabetes is a condition seen in women during their second trimester of pregnancy. In contrast to Type 1 and Type 2 diabetes, gestational diabetes will disappear after the baby is born. But she is more likely to have it again in the next pregnancy, putting her at a higher risk of producing Type 2 diabetes. [7]

1.2 Current Trends of Diabetic Patients

The day of every diabetic is full of activities he should bear in mind – counting on the sort of disease and the type of treatment. Self-control and familiarity with one's own body, which enables proper management of the disease, is of critical importance. [8] Medication is one of the basic modes of treatment to overcome diabetes. Along with that patients are required to follow a change in their life style and diet modifications.

Regular checkups are needed to be done to keep their BMI (Body Mass Index) in control.

Patients with high diabetes keep a check of their blood sugar levels and record the readings for the doctor's reference.

Hence, the patients have to take appointments every time they want to meet the doctor for updating about their health. Due to the busy activities in life, patients usually forget about their appointments and also about their routine health checkups, so there a need for some solid mechanism to remind them for the same.

1.3 Chat Applications

Chat is a kind of communication over the web that offers a real time transmission of text messages/images/files from sender to the receiver. [5] One of the common features of the chat application is that it allows the participants to respond quickly to their queries. With the help of this main feature the problem of communication between the doctor and the patients can be overcome.

1.3.1 Types of Chat Applications

Chat applications are of many types viz. mobile chat applications, video chat applications, web chat applications.

1.3.1.1 Web Based Chat Applications

Web chat is a system that enables users to communicate in real time using simply accessible web interfaces. [5] It is a kind of web online chat distinguished by its simplicity and accessibility to users who do not wish to take the time to install and learn to use specialized chat software.

1.3.1.2 Mobile Chat Applications

Mobile based chat applications are similar to the web based chat applications with the only difference here is that the user needs to install that particular chat application into the mobile phones in order to use those services. [5]

1.3.1.3 Video Conferencing

It is a type of chat where in both audio and video transmission is done in two way communication process. [5]

1.3.2 Need of Chat Applications in Healthcare

Chat applications in healthcare delivery are a novel concept and are rapidly gaining ground in all fields of medicine. [9] They provide several edges for Health Care Professionals,

perhaps most considerably accumulated access to point-of-care tools, which has been shown to support higher clinical decision-making and improved patient outcomes. [10]

Chat applications are almost used in majority of the sectors. Doctors and patients use the social chat applications to connect on the personal as well as the professional front. One of the major drawbacks of those applications is that they do not provide full health care features which are needed for the patients and the doctors. To overcome this, health care specific applications must be used. These health care chat applications can help in recording each and every detail of the patients and the doctors can easily check through the details of the patients. As in for doctors since they need to connect with the patients as well their colleague they can connect with them easily and in a secure manner. As the privacy of the data is equally important the chat application provides facility to keep all the personal data secure for the patients.

1.3.3 How can Chat Applications be helpful?

As the world is getting adaptive to using technology, chat application is one such form of technology which is keeping everyone glued to it. In medical field too doctors mainly prefer using some of the widely used mobile based applications such as "WhatsApp", "Blackberry Messenger" as a channel to interact with the patients and solve their doubts. Although these applications are very much in use, still they do not provide complete solution of the doubts asked by the patients.

Few mHealth apps for diabetes have been diligently tested. Outcome studies of the use of mHealth for diabetes from the literature have shown the potential for edges, but higher-quality studies are needed. [11] Three additional hurdles should be controlled to facilitate widespread adoption of this technology, including demonstration of privacy to satisfy regulators, clinical benefit to satisfy clinicians, and economic benefit to satisfy payers. mHealth for diabetes is creating fast strides and is expected to be a remodeling technology which will be the next big thing. [11]

The use of healthcare specific application can help the patients in getting appointments with the doctors, asking queries to the doctors and also uploading their reports, so that they don't need to visit the doctor again and again. Also the application can serve as a mode of reminder to patients in case they miss their appointments, their updated diet plan and medication.

The chat application can also serve as an information guide to the patients so as to get an idea about the disease they are suffering with and what precautionary measures need to be taken in order to avoid such illness again. Since most of the patients are not aware of the disease they are having, they end up taking wrong treatment for the same. Hence with proper information this problem can be solved.

1.3.4 Example of Currently available Chat Applications

1.3.4.1 Diabetes Buddy (Krodzone Technologies)

It takes only a few keystrokes to enter information like glucose readings, time spent exercising, carbohydrate intake, and water consumption. Users can also add customized recipes to calculate the carbohydrate content per serving. It's not difficult to send the information recorded through e-mail, but the computer or device should have external spreadsheet software in order to display the information. [12]

1.3.4.2 Diabetes Pilot (Digital Altitudes)

The insulin calculator tells the range of insulin units in order to reach the targeted glucose level supported on what is consumed. However, the calculator doesn't consider how much a person exercises, his previous dose, and other factors that could affect how much insulin is actually needed. And there's an extra cost for the software required to synchronize recorded data and food information to a computer. [12]

1.3.4.3 Diabetes (iHealth Ventures)

This is a decent choice if recording blood sugar values is that the only operation required. It doesn't have a specific section for recording every diabetes-related medication. There is an option to manually log the meds, but the list provided includes only injectables, no oral medications. [12]

2. METHODOLOGY

2.1 Procedure and Design

An online survey was conducted for which a link of the form created on Google drive and Facebook was sent. Open ended questions were designed. Few questions were extended by text field for input from respondent's side. After submitting the form the data was saved in a spreadsheet template in Google drive. Basic objective was to find out the problems faced by the patients while interacting with the doctor for their treatment. Also, how well aware were they about the use of chat application as a mode of reminder for their disease.

A survey amongst respondents having diabetic history in the family was conducted to induce the respondent's view as to how chat applications can be beneficial for their treatment purpose.

2.2 Measures

Both, objective and subjective measures were used. One objective measure was, to find out what problem was mainly being faced while interacting with the doctors.

The subjective measure was the feedback taken by the user so as to get a view as to how the chat application can be beneficial to them and what features they need so as their queries can be resolved quickly.
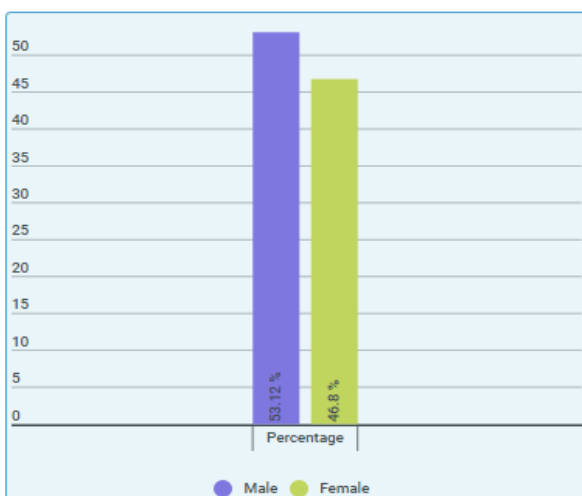
3. DISCUSSIONS/RESULTS

Fig 1: Participation of the people in survey

Table 1. Participation of the people in survey

Gender	No. of Respondents	Percentage
Male	33	53.12 %
Female	29	46.8 %

Fig 2: Graph for various problem faced by the patients

Table 2. Reasons for problem faced by the patients

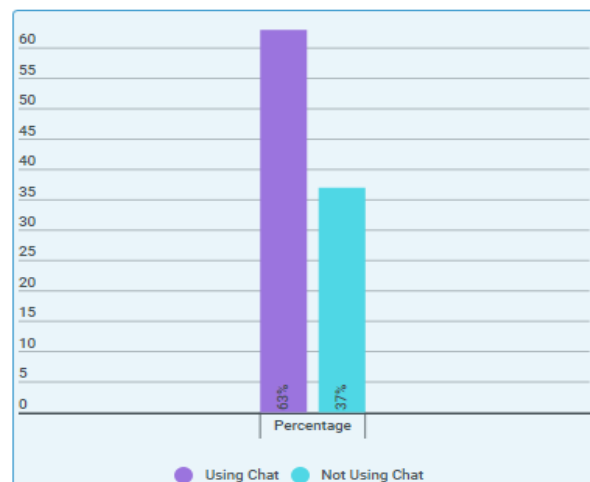| Reason	No. of Response	Percentage
Doctor's availability	37	47%
Travelling	34	43%
Other	15	10%

Fig 3: Percentage of people using chat applications

Table 3. Percentage of people using chat applications

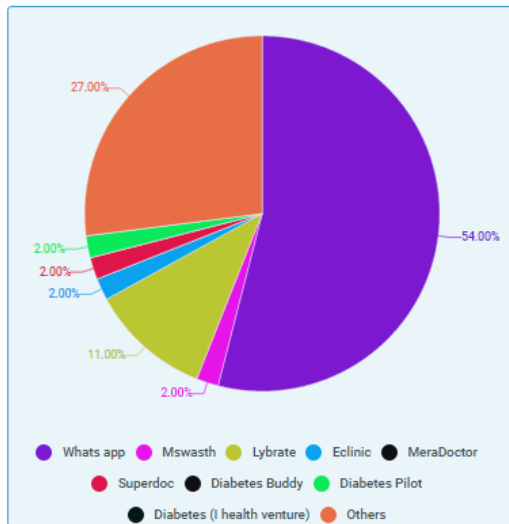| Reason	No. of Response	Percentage
Using Chat Application	60	63%
Not Using Chat Application	35	37%

Fig 4: Chat Applications used to interact with doctor

Table 4. Chat applications used to interact wih doctor

Application name	No of Response	Percentage
WhatsApp	20	54%
Mswasth	1	2%
Lybrate	3	11%
Eclinic	1	2%
MeraDoctor	0	0%
Superdoc	1	2%
Diabetes Buddy	0	0
Diabetes Pilot	1	2%
Diabetes (I health venture)	0	0
Others	10	27%
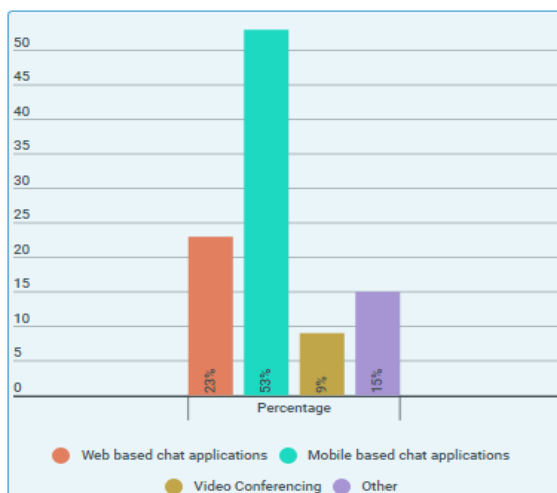
Fig 5: Type of chat applications used

Table 5. Type of chat applications used

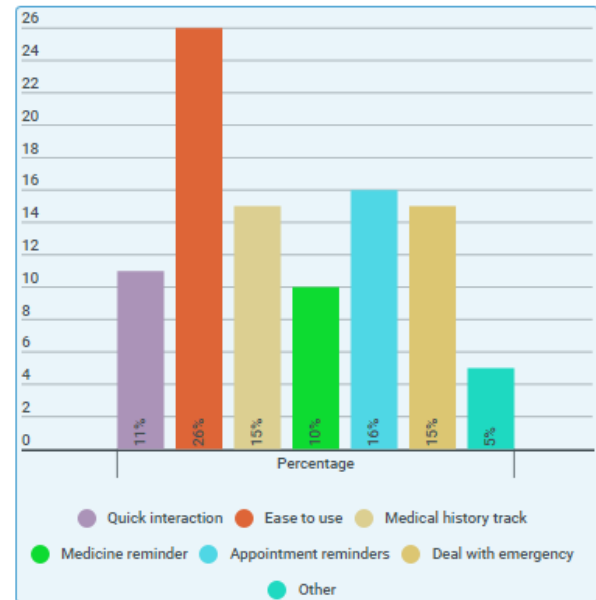| Type	No of Response	Percentage
Web based chat applications	8	23%
Mobile based chat applications	18	53%
Video Conferencing	3	9%
Other	5	15%

Fig 6: Why users prefer to use chat applications

Table 6. Why users prefer to use chat applications

Reason	No. of Response	Percentage
Quick interaction	7	11%
Ease to use	16	26%
Medical history track	9	15%
Medicine reminder	6	10%
Appointment reminders	10	16%
Deal with emergency	9	15%
Other	3	5%

3.1 Doctor's View on Chat Applications

Conducting surveys for doctors is very much different from conducting surveys for the general population. The doctor's work schedule is demanding as they represent an elite population. Their views give a detailed insight on how technology can be used as a medium to bridge the gap between the doctors and the patients. As the number of patients are significantly growing the doctors are now heading towards the use of chat applications as a medium to connect with their patients.

Most of the doctors mainly use web applications such as email, video conferencing, mobile applications such as WhatsApp, Blackberry messenger etc. These applications are

of great use in order to solve the queries asked by the patients and also used in emergency cases.

Despite the benefits they offer, better standards and validation practices regarding medical chat apps need to be established to ensure the proper use and integration of these increasingly sophisticated tools into medical practice. [10]

With the discussion it was found that the chat application is indeed the need of the hour. The doctors still feel the absence of a fully developed chat applications for patients as many services such as automatic health tracking reader, emergency services, uploading of reports are not available in the above applications. The doctors witnessed that many patients without appointment were made to wait longer to get his attention. With the help of chat application this problem of the patients could be solved. The doctors also suggested about some features which could be included in the application such as information about various diseases so that the patients could also get an idea of what medication they are taking in order to avoid any mistakes.

To provide higher health outcomes, a complete picture is required which combines informal health and fitness information collected by the user alongside official health records collected by health professionals. [13] Mobile chat apps are well positioned to play a vital role within the aggregation since they'll faucet into the official and informal health and data silos. By limiting the negative effects of health data silos, mobile chat apps can provide an improved holistic view of health and fitness information. Data will then be analyzed to supply higher and a lot of customized recommendation and care. [13]

4. CONCLUSION

Chat applications have been used successfully for symptom monitoring and for relatively short and simple communications between patient and care team, such as clinical status reporting. [3] One of the downsides of chat applications for diabetes management is that after a while, using them can become tiresome. [12] Based on the survey carried out, it was found out that majority of the respondents were not using any specific chat application for Diabetes.

It was also observed that some of the respondents were using WhatsApp as a medium to interact with the doctor in case of emergency. Most patients access only a limited number of features of the available chat applications. [3]

The doctors too suggested that chat applications could help them treating more number of patients during the course of the day. Diabetes being a chronic condition requiring ongoing support and intervention, which can be a significant strength of chat applications if addressed and incorporated well. [3] The available chat applications like WhatsApp, BBM messenger can be used for sharing reports and sending messages however doesn't provide careful analysis of the sickness and medicine.

The underlying assumption is that chat applications can be more productive, sustainable, and cost- and time-efficient than

traditional approaches and that they have the potential to amount to high risk patient populations that usually do not come to their doctor's workplace for constant care. [3] Thus, there is a need to build robust applications that can not only serve basic requirements of the patients but also advanced features which could help solve any problem related to the disease and which could also provide all kinds of information regarding the same.

5. ACKNOWLEDGMENTS

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