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### A Study on the Usage of Mobile Application for Oral Health- a Perspective of the Individuals towards Digital Media

\*Nidhi Poothulil

Research Student, Dental College and Hospital, Bharati Vidyapeeth Deemed University, Navi Mumbai, India <u>nidhimaria517@gmail.com</u>

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\*\*Harjit Kalsi

Associate professor,

Dental College and Hospital, Bharati Vidyapeeth Deemed University,

Navi Mumbai, India

h\_kalsi@rediffmail.com

#### Abstract

Individuals in modern society use mobile phones for communication. The mobile applications enable easy access to services and programs in the digital space. This study examines the Individual's usage of mobile application as a mass media platform. The study relies on a theory of communication 'Uses and Gratification Theory' of Elihu Katz and Blumler (1974). It propounds that, far from being passive, mass media users are active users of media; they expect to see what they want to see, while discarding whatever is of no use to them. There are several studies on the usage of mobile application for health care. However there are very few mobile applications for oral health care and the perspective of individuals towards digital media. Hence this research study was initiated to establish and demonstrate the usage of mobile

application for oral health care, in terms of satisfaction and motivation of the user in making appropriate oral health care decisions. The effect of contextual factors on mobile application as a digital media for dental health care was evaluated, after adjustment for individual characteristics in terms of satisfaction, motivation and decisions made by the user in dental hospital settings. Survey method was used and research tool was developed for the purpose of the study, which consisted of a mobile application and survey questionnaire. The same was administered after pilot study and standardization, with the help of communication and oral health care professionals. The data was gathered using questionnaire developed for the study, from patients, (n=40) above the age of 18 years. The analysis of the data demonstrated higher individual preference (50%) of choice of the type of dental hygiene information, with reference to brushing the teeth and maximum (45%) preference for digital video format among the users. In fact bleeding gums remained highest (30%) among the users for the preference of information on dental hygiene. The analysis however did not depict significant difference in individual user's gender and literacy as the main cause for decisions for usage of smart phone mobile applications for assistance for oral health care.

**Key words:** Oral Health, Mobile Application, Motivation, Satisfaction, Oral Health Decisions

\*Presenting and corresponding author.

#### Introduction

Individuals in our modern society use smart phones for communication. The penetration of smart phones within enterprises is rapidly increasing, so as the usage of it (M.M.F. Naja & , M.I.I. Mohamed, 2017). The mobile applications in smart phones enable easy access to services and programs in the digital space. This study examines the Individual's usage of mobile application in a smart phone for oral health, as a mass media platform, based on a theory of communication. 'Uses and Gratification Theory' of of Elihu Katz and Blumler (1974), which states, far from being passive, mass media users are active users of media; they expect to see what they want to see, while discarding whatever is of no use to them. There are several studies on the usage of mobile application for health care. For the most part, the term dental will be used in the paper to refer to conditions of the teeth and mouth. This is based on the conventional usage of this term when reporting findings associated with the oralfacial region. In their analyzes of the potential of using measures of social function as health indicators in dental research and the social impact of dental disease on society Reisine S.T (1984) reports work loss due to dental problems. Worldwide, incidence of Infective endocarditis (IE) in children with congenital heart disease (CHD) is at an alarming 60-90%. According to Tokyo Declaration on Dental Care and Oral Health for Healthy Longevity (2015) 'dental care should respond to the problem of increased non-communicable diseases as living environments change and should expand its support for people who need nursing care and preventing premature death. Dental associations and other health professionals around the world are encouraged to facilitate and enhance coordination of activities to increase global awareness of and contribute to the implementation of World Health Organization's (WHO) Global Action Plan for the Prevention and Control of Non-communicable diseases 2013-2030. Given the increasing social and economic burden of chronic disease and the need for efficient approaches to prevent and treat oral health problems, emphasis on the use of information and communication technology (ICT)-based health care has emerged. The lack of oral hygiene results in plaque accumulation and colonization of 'viridians streptococci' over tooth surface. In this condition, even mild manipulation of oral tissues via brushing or chewing can result in bruising of tissues and introduction of bacteria into the bloodstream followed by their subsequent colonization over damaged heart valves resulting in IE. Hence inputs from an interactive smart phone application on such vital information plays a significant role in preventing heart ailments. This study examines the individual usage of mobile application on smartphone, the pattern, preferences and perspectives.

#### Significance of Oral Health

The World Health Organization (WHO) defines oral health as a state of being free from mouth and facial pain, oral and throat cancer, oral infection and sores, periodontal (gum) disease, tooth decay, tooth loss and other diseases and disorders. In their report (Michael Glick and David Williams, 2014) of World Dental Federation (FDI,) depicts that worldwide, the most common oral diseases are dental caries (cavities, decay), periodontal (gum) disease, oral cancer, oral infectious diseases, trauma from injuries and hereditary lesions. Drawing from the study on socio economic conditions of persons who need dental care (Listl S, 2015) overall

improvements in oral health may imply substantial economic benefits, not only in terms of reduced treatment costs, but also because of decreased productivity losses in the labour market. The dental caries (which includes all stages of tooth decay) is the most common, yet preventable, chronic disease on the planet and constitutes a major global public health challenge. Oral health is an important tool for achieving good general health (Peterson 2004). Oral diseases and disorders often result in physical discomfort, pain, infection and sometimes tooth loss (Rockville, MD. 2000). The challenge is to develop the role of dental care and oral health in creating societies with healthy longevity. This study examines how individuals use oral health mobile application as a mediated device to reduce discomfort, pain, infection etc.

### **Mobile Application and Oral Health**

Mobile applications can be used on smart phones. The unique combination of features makes smart phone extremely usable and useful for different purposes (ATM Emdadul Haque et al., 2017). Mobile application is a part of smart phone that helps to improve oral health including IE prevention. The self-perception of dental status and oral function is an important aspect of oral health according to Chalub et al (2017). There are very few mobile applications for oral health care. Some persons use mobile application for objectively evaluating their perception about oral health. Patient satisfaction should be one of the main goals when planning oral health care (Damyanov ND, 2013). A health impact about oneself can be positive or negative. A positive health impact is an effect which contributes to good oral health or to improving oral health. For example, having a sense of control over one's life and having choices is known to have a beneficial effect on mental health and well being, making people feel "healthier" (Wilkinson, 1996). This study aims to demonstrate the usage of mobile applications and effects on oral health among persons above the age of 18years.





Chart No.1. depicts the screenshot of the mobile application named 'clean tooth2'. The digital visuals depict the utilities for oral hygiene to the individual user. The use of mobile and wireless technologies to support the achievement of health objectives (mHealth) has the potential to transform the face of health service delivery across the globe. A powerful combination of factors is driving this change. These include rapid advances in mobile technologies and applications, a rise in new opportunities for the integration of mobile health into existing 'eHealth' services, and the continued growth

in coverage of mobile cellular networks Patricia Mechael, Nadi Kaonga, and Hima Batavia 'mHealth' New horizons for health through mobile technologies Based on the findings of the second global survey on 'eHealth' Global Observatory for 'eHealth' series - Volume 3 2011

#### **Theoretical Frame Work**

The theoretical frame work of this study is based on the Uses and Gratification Theory (UGT) which suggests that people actively seek out specific media to satisfy audience-centered specific needs. UGT is an approach to understanding communication and supports this research on the usage of mobile applications based the satisfaction and specific needs of the users in terms of oral health information. Drawing from Rosengren (1974), attempting to theoretically refine U&G, suggested that certain basic needs interact with personal characteristics and the social environment of the individual to produce perceived problems and perceived solutions. Mobile applications provide some specific solutions to the individual user

#### Mobile Applications and Individual's Perspective towards Digital Media

Individuals have different perspectives in usage of technology and its applications. In their study on the usage of mobile application for electricity consumption, (Manhal Isam Sabri and Azham Hussain, 2017) states that 'The needs for an easy-access and use services in helping people manage events in their daily have led to considering the use of mobile applications'. Individual's perspective towards digital media may be also based on culture, identity and language. In fact in his book on digital media David Buckingham 2008 states that, 'Identity is not merely a matter of playful experimentation or "personal growth": it is also about the life-or-death struggles for self-determination that are currently being waged in so many parts of the world'. In this study individual's identity is essentially based on the communication theory of 'Uses and Gratification' of Elihu Katz and Blumler (1974). Hence it is imperative that individual's perspective towards digital media in this study is based on the use of mobile application on a smart phone device. Smart phone utilization has rapidly expanded due to its feasibility in executing different applications that can be used in solving everyday problems. It is interactive, provides choice of time and gratification to the user. The number and popularity of mobile apps is rising dramatically due to the accelerating rate of adoption of smartphones. The smartphone is a mobile phone with an integrated computer functions, typically having a touchscreen interface, Internet access, and an operating system capable of running downloaded applications (M.M.F. Naja & , M.I.I. Mohamed, 2017). In the following chart no.1, I have tried to depict the individual perspective of the mobile application as a digital media platform.

#### Chart No.1. Depicting the Factors that Determine the Digital Media and its

#### **Relationship to Individuals**



In the above chart no.1. it may be seen that the 'Individual Usage of Dental Hygiene Applications' is micro aspect of the digital space. However the digital space as a mass communication modality offers information, education and entertainment on the one hand and takes time, provide choice, uses and gratification to the individual users. These factors determine the usage of digital media and its relationships to individual user.

Preventive oral hygiene methods for specific needs using mobile application:

There are very few dental care mobile application as opposed to medical mobile application. Some mobile application explain the various oral diseases, where as some others depict its users how to maintain oral hygiene. Such applications can provide useful and preventive information to the general public in a cost effective manner. It saves time and cost required for actual seminars, workshop, lectures etc being held. Applications can also be created for follow ups of patients cases. Oral health related doubts can also be asked by people through interactive applications. Applications can also serve as reminders for oral hygiene procedures such as an application with a timer to brush teeth like 'DentalCluj Brush Assistant' by Chris Lenard. Mobile saves time and effort of both patients and dental practitioners. Hence people should be made aware of the existence of mobile application which can help in prevention of oral health diseases. When we consider a person's approach to visit a dentist one would never go for a checkup one will go only if there is pain, difficulty in eating a meal, or esthetic reason. Hence dental application will not only help to take care of oral health but also will help to encourage people in visiting the dentist for regular dental checkup.

The internet and mobile phone technology have changed the way we live life in the 21<sup>st</sup> century (Qureshi R, et al. 2014). While the use of the internet in bringing in new ideas is well recognized, it must be remembered that the internet can also serve as a mean to improve the life of individuals within an existing social structure. This paper examines this relationship of individual to the usage of mobile application in the digital space. India is a technologically advancing society with recent literature documenting an active use of the internet, mobile phones, and social media. One of the objectives of this study enabling the usage of mobile phone-based application was to explore the possibility of using this digital technology to overcome physical and logistical barriers toward providing preventive dental care. The fact that the application was able to bring about an increase in the knowledge of oral hygiene was a positive factor.

Since recent times mobile phones are not only being used for communication but for many other purposes. People use mobile applications for making their lives easier. Mobile applications are not only easily available but are easily accessible with minimum effort. Patient follow up can also be made simple and they can be taught the proper method of oral hygiene maintenance. Since there is evidence that prevention in oral health care has success, mobile application can be used for prevention of oral diseases and improving once oral health. Hence applications like 'Clean tooth 2', 'DentalCluj Brush Assistant', and 'Teeth Care' were introduced to the patients. They were told to use any one of the following application and was administered with the research tool to gather the data.

#### **Aim and Objective**

This study aims to examine and evaluate the Individual's perspective of usage of a mobile application on Oral Health, as a digital media platform, based on a theory of communication. 'Uses and Gratification Theory'. In the process the effect of contextual factors on mobile application as a digital media for dental health care was evaluated after adjustment for individual characteristics in terms of satisfaction, motivation and decisions made by the user in dental hospital/clinical settings.

#### **Research Questions**

- 1. What is the significance of the usage of a mobile application on oral health as a digital media platform on an individual?
- 2. What are the effect of contextual factors on mobile application as a digital media for individual dental health care in terms of satisfaction, motivation and decisions?
- 3. What is the relationship between Individual and digital mobile application on oral health?

#### Hypothesis

- 1. There is great significance in the usage of a mobile application on oral health as a digital media platform on an individual
- 2. There is no specific effect of contextual factors on mobile application as a digital media for individual dental health care in terms of satisfaction, motivation and decisions.
- 3. There is no relationship between Individual and digital mobile application on oral health

#### Materials and Methods:

The study used purposive and convenient sampling method. The research was done in dental hospital/clinical settings, convenient to the researcher, with an informed consent of the user of the mobile application. The study was carried out between 1<sup>st</sup> June 2017 and 31<sup>st</sup> August 2017. This study was initiated, and ethical approval was obtained from the Department of oral and maxillofacial surgery of Dental College and Hospital, Bharati Vidyapeeth Deemed University, Navi Mumbai, India. Informed consent was obtained on paper from all users of the mobile application provided to the user who participated in the study. A research tool was developed for the purpose of study consisting of an oral health mobile application and a survey questionnaire. The research tool was validated and standardized with the help of inputs of practicing professionals in the field of dental surgery, ICT and communication. A pilot study was done for field testing and further modifications .The data was gathered after administering the research tool was analyzed using statistical package for social sciences (SPSS) version- 19.

#### Limitations

- 1. The sample comprised of responses received from 40 persons aged 18 to 61 Years of age reporting to a dental hospital and a dental clinic in Mumbai.
- 2. Only one oral health mobile application 'clean tooth2' was used to assess the usage of dental patients.
- 3. The research tool was in English language and only those persons familiar with the usage of mobile applications on their smart phones were part of the study
- 4. No efforts were made to understand the cognitive ability of the participants.
- 5. The data was collected over a period of 4 months from 1<sup>st</sup> June to 30<sup>th</sup> September 2017.
- 6. All the participants in the study were provided the oral health mobile application on their smart phone for usage for a period of 3 days.

### **Results and Discussions**

In order to test the hypothesis and to find the answer to the research questions, the data gathered was analyzed using descriptive and correlation methods with the help of SPSS. The results of the descriptive analysis of the demographic data of the mobile application users is as follows

Chart No.2. Classification of the Users of Oral Health Mobile Application in terms of Gender and Age



Table No.1. Classification of the Users of Oral Health Mobile Application in<br/>terms of Gender and Age

Gender	Age						
	18-20 years	21-25 years	26-30 years	31-35 Years	36-40 years	41 and above years	Total
Male	6	4	1	1	8	2	22
Female	2	4	0	1	10	1	18
Total	8	8	1	2	18	3	40

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'p'-Value = .671
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In the Chart No.2 and Table No.1 it may be noted that there is no significant difference in the users of oral health mobile application selected for the study in terms of gender and age as 'p'- value = .671. However it may be noted that the maximum (45%) persons who use mobile application belonged to the age group of 36-40 years of age.

### Usage of a mobile application on oral health as a digital media platform and its Relationship to an individual

In order to find the answer to the research question about the usage of a mobile application on oral health as a digital media platform and the relationship to an individual, the data gathered and inferential analysis in terms of relationship of an individual and mobile application as the digital media platform was done using SPSS. The result of the analysis is as follows.

## Chart No.3. Classification of the Users of Oral Health Mobile Application in terms of Dental Problems



Table No.2. Classification of the Users of Oral Health Mobile Application in<br/>terms of Dental Problems

Type of dental problem of the users					
Decayed tooth	Bleeding gums	Tooth pain	Cavity	Any other	Total
6	7	1	8	0	22
4	5	4	3	2	18
10	12	5	11	2	40
-	Decayed tooth 6 4 10	Type of denDecayed toothBleeding gums67451012	Decayed toothBleeding gumsTooth pain67145410125	Decayed toothBleeding gumsTooth painCavity671845431012511	Type of dental problem of the usersDecayed toothBleeding gumsTooth painCavityAny other671804543210125112

In the Chart No.3 and Table No.2 it may be noted that there is no significant difference in the users of oral health mobile application selected for the study in terms of gender and the type of individual needs with reference to dental problems of the users as 'p'- value = .167. However it may be noted that the maximum (30%) persons who use mobile application faced bleeding gums as the dental problem. This may be due to the nutritional habit of the users of mobile application.

### Chart No.4. Classification of the Users of Oral Health Mobile Application in terms of Type of Individual Feature Preference



 Table No.3. Classification of the Users of Oral Health Mobile Application in terms of of Individual Feature Preference

	Whic						
Gender	Videos	Information	Any other	Total			
Male	5	8	1	14			
Female	13	7	1	21			
Total	18	15	2	35			
<b>'p'-Value = .314</b>							

In the Chart No.4 and Table No.3 it may be noted that there is no significant difference in the users of oral health mobile application selected for the study in terms of the type of gender and the features of the mobile application liked by the individual users as 'p'- value = .314. However it may be noted that the maximum (45%) persons who use mobile application liked the video in the mobile application as compared to information about the dental problems. This may be because of the animation of the video.

Chart No.5. Classification of the Users of Oral Health Mobile Application in terms of Dental Hygiene Methods



Gender	Infe					
	Brushing the teeth	Flossing	Brushing and Flossing the Teeth	Any other	Total	
Male	9	3	1	1	14	
Female	11	7	3	0	21	
Total	20	10	4	1	35	
'p'-Value = .475						

## Table No.4. Classification of the Users of Oral Health Mobile Application in<br/>terms of Dental Hygiene Methods

In the Chart No.4 and Table No.3 it may be noted that there is no significant difference in the users of oral health mobile application selected for the study in terms of gender and the type of individual preference for dental hygiene information for the users as 'p'- value = .475. However it may be noted that the maximum (50%) persons who use mobile application were interested in the information about brushing the teeth as compared to other dental hygiene information.

### Conclusion

In the inferential analysis of the data, it was found that there is no significant different between the gender and the different types of individual preferences for dental hygiene information among the users of mobile application. However the findings did demonstrate the preference of choice of the type of dental hygiene information, with reference to brushing the teeth (50%) and digital video format (45%) among the users. In fact bleeding gums remained highest (30%) among the users for the preference of information on dental hygiene. This may be because of the dental problems faced by the sample selected for the study. The study therefore demonstrated correlation between the individual's preference for digital media format of information and the type of information and thus depicted their perspectives.

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