The Availability and Uses of Digital Technology in Community Service with Reference to Health Sector in Oromia Regional State, Ethiopia

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ABSTRACT

Health and malnutrition are the major challenges for any developing country. One of the major problems is to reach the masses and educate them about better health practices. Reaching to the masses becomes even more challenging for the developing countries where the level of education and availability of fund is low. In this case, digital technology definitely can play a crucial role in health education to the masses, if properly used. Because even in countries like the USA, digital health still is not fully adopted, with nearly half of consumers having used only one digital health, technology or have not adopted any at all (Malay Gandhi & Teresa Wang, 2015).

The objective of the study was to identify the gap between availability and uses of digital technology in helping the citizens to follow good health practices to avoid diseases. The major finding of the study indicates the uses of technology in the health sector in Ethiopia are in the infant stage and awareness level is low amongst the citizens. The study also indicated the gap between the availability of technology and uses in the health sector. It describes a huge opportunity to reach the masses for the promotion of health awareness and prevention from diseases.

1. Introduction

Health and malnutrition are the major challenges for any developing country. One of the major problems is to reach the masses and educate them about better health practices. Reaching to the masses becomes even more challenging for the developing countries where the level of education and availability of fund is low. Whereas in developed and developing countries with the advent of internet modern media practices have evolved significantly from their traditional forms, with the help of internet participation and interactivity with the masses are possible. Society exists in a digital age, where everything in our lives is spread out across as much media as possible and these media are shaped by everyone. Now the Internet is reaching to everybody and everyday life. It is now possible to do the same on the Internet as in real life, probably in a more efficient, faster and cheaper way. As such, communication using the Internet as a channel is becoming increasingly popular and marketers are using social networking sites, such as Facebook, Twitter, and MySpace for their marketing communication.

With the exponential growth of social media users like Facebook which has more than 1.1 billion active users open scope to reach users for public health communication. Eventhough social media platform has vast potential to reach the deprived class, the use of social media for health related conversations are low. The study of Neiger et al, 2009 observed the same. Chou et al, 2009 have emphasized the need for Public health practitioners to use social media to reach the masses.

Mobile phone technology is the predominant mode of communication worldwide. The average number of cell phones used per 100 people in Asia, Africa, and Latin America and the Caribbean (LAC) increased between 100% and 400% in the first five years of the 21st Century.
As per Lester et al (2009), cell phone interventions were successfully used in HIV adherence project. It was used for .538 HIV Patients in Kenya and the result was 62% adherent in intervention out of 50% in controls at 5 months and .58% in the intervention group had reduced viral load vs. 48% controls.

A review of 14 pilot studies shows positive short term behavioral outcomes in smoking cessation, increased physical activity, diabetes, and asthma self-management. A review of 25 studies shows voice & text messaging programs linked with declines in HbA1c and cholesterol.

In this scenario, digital technology definitely can play a crucial role in health education to the masses, if properly used. Because even in countries like the USA, digital health still is not fully adopted, with nearly half of consumers having used only one digital health technology or having not adopted any at all (Malay Gandhi & Teresa Wang, 2015). With the help of digital technology, communication can reach to the masses at a lower cost than through physical communication. After reaching a feedback system can be devised to understand the problems of the targeted population, a customized message at the right time and the right media can be used for better engagement of communities in health-related issues. The impact may be lower at the initial stage, but it will reach to more people, hence overall impact has to be greater on the masses. The other advantage of using digital technology is that the message can be standardized and easy to adapt or change. After getting the feedback on the campaign, a successful campaign can be replicated.

On this rationale, the study is an attempt to explore the availability of digital technology in engaging the community in health service in Ethiopia.

2. OBJECTIVES OF THE STUDY

- To find underlying factors in uses of technology in helping the citizens to follow good health practices to avoid diseases
- To evaluate gender consequences in the perception of using digital technology in the health sector

3. Literature Review

The literature shows that authors discussed at length the vast potential of digital technology on social media platform for improving the health and economical condition of marginalized population in developing countries.

Hofmann, 2002 in his study suggested that digital media can be helpful in improved dissemination of health information i.e. Doctor consultation and treatment and monitoring the health issues.

The uses of digital technology in Peru, Egypt and Uganda have prevented avoidable maternal deaths. The mobile was used in South Africa for reminding TB patients for timely medication. In developing countries like Cambodia, Rwanda, South Africa, and Nicaragua, multimedia communications are successfully used for awareness of disease like HIV and AIDS.

Advances in information and computer technology in the last quarter of the 20th century have led to the ability to more accurately profile individual health risk (Watson, 2003), to understand better basic physiologic and pathologic processes (Laufman, 2002) and to revolutionize diagnosis through new imaging and scanning technologies. However, with the fast pace of technological development also has increased the responsibility of practitioners, managers, and policy-makers for evaluating the suitability of new technologies (Hofmann, 2002).

- The methods people use to communicate with each other have also changed significantly. With the availability of Mobile, e-mail, social sites, free calling and video conferencing offer new options for sharing information. Digital technologies are making visual images and the voices of people more accessible through radio, TV, video, portable disk players and the Internet, that change the opportunities for people to share opinions, experience, and knowledge.
- The Mantra for success in public health practices is reliable information and effective communication. Norrish, P. (2005) in his study has stated that the use of appropriate technologies can improve the communication level. It can help social organisationsto achieve the quality health of masses through health related processes.

3.1 Greater access to communication tools and opportunities

A Significant area where ICT and different digital technologies are being used is for improving communication around health centers on community access. Developing a range of new ways for people to access health information and also to communicate themselves about health due to having access to communication mediums is a vital area of ICT strategy (Ahmed, M. 2004).
Community access points

- Research in Zambia, Botswana, and Mozambique found that access to information about HIV and AIDS was a major concern (Geers and Page, 2005). Recognizing that it was not possible to provide individual access to such information, the study recommended developing community access points (CAPs) which could act as HIV and AIDS ‘knowledge centers’, telecentres and local service providers. Encouraging uptake of the services could be facilitated by either basing or placing such centers close to primary client organizations – those who were likely to make extensive use of the service – such as the media, schools and health clinics.

Community telephones

- Another form of community access comes from the example in Bangladesh of how the introduction of village level mobile phones as a way to increase household income has led to improvements in food security and investment in health and education. While not directly targeted at the health sector, it demonstrates the way an integrated approach to using ICTs can contribute to the achievement of several millennium development goal reductions of poverty and hunger, access to basic education, improvement in child health at the same time. Similarly, reducing illness can have a very direct impact on livelihoods. Every day that is not spent being ill or taking care of a sick child with a recurring disease such as malaria can be used productively (Greenberg, 2005).

4. Research Methods

- The study included students of Undergraduates and Postgraduates levels of different departments and also included the staff of different departments of Wollega University, Nekemt, Ethiopia. At the first stage, a focus group study was conducted to assess the availability and uses of technology in the health sector in Ethiopia. The survey looked for specific health categories, like prevention for HIV, family planning, alcoholism, smoking, and hygienic environment.

Based on the information questionnaire was designed and it was tested. The convenience sampling method was used to complete the survey. The data were collected on five-point Likert type scales ranging from 1 (strongly disagree) to 5 (strongly agree). We distributed 250 questionnaires among students and staff of the Wollega University in Ethiopia and we received 226 responses from them.

The data were analyzed using MS excel 2007 and SPSS 20.0. Item to total correlation was used to check the internal consistency of the questionnaire. Face validity test was applied to check the validity of the questionnaires. Cronbach Alpha was used to check the reliability of the questionnaire. Z-Test was applied to evaluate the difference of perception on uses of technology between male and female.

5. Results And Discussion

5.1 Item to Total Correlation

First of all consistency of the questionnaire was checked through the item to total correlation. Under this condition, every item with total was measured and the computed value was compared with the standard value (i.e. \( R = 0.1298 \)). If the computed value was found to be less than the standard value, then that whole factor statement was dropped and termed as inconsistent. No question was dropped in the questionnaire.

The standard formula is:

\[ R = \frac{\sqrt{\sum_{i=1}^{n} x_i^2 + \sum_{i=1}^{n} y_i^2}}{n} \]

Where \( n \) = no. of respondents.

\[ R = \frac{\sqrt{38416}}{226} = 0.1298 \]

Table 1: Showing Item to Total Correlation of Uses of Digital Technology

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Statement</th>
<th>Correlation Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>I get information through digital media that smoking is not good for health</td>
<td>0.656074</td>
</tr>
<tr>
<td>2.</td>
<td>I get information through digital media that using a condom can prevent HIV</td>
<td>0.477724</td>
</tr>
<tr>
<td>3.</td>
<td>I get information through digital media that using sharing blade for shaving can lead to HIV</td>
<td>0.549939</td>
</tr>
<tr>
<td>4.</td>
<td>I get information through digital media that blood should not be shared without an HIV test</td>
<td>0.480441</td>
</tr>
</tbody>
</table>
5. I get information through digital media that Chat (local stimulant drug) 0.470003
6. I get information through digital media that female delivering the child below 20 years is not good for her health. 0.534484
7. I get information through digital media that numbers of devices are available to prevent pregnancy. 0.432886
8. I get information through digital media that during pregnancy healthy food should be consumed 0.357666
9. I get information through digital media that alcohol is not good for health. 0.567336
10. I get information through digital media that washing hands with soap before and after eating can prevent diseases. 0.482072
11. I get information through digital media that after toilet hands should be washed with soap. 0.565344
12. I get information through digital media that taking bath daily can prevent diseases. 0.358464
13. I get information through digital media that cleanliness is next to Godliness. 0.347567
14. I get information through digital media that still water is heaven for disease germs. 0.33012

a. Reliability Test
Cronbach’s Alpha Reliability Test was applied using SPSS software and the reliability test measure is given below:

<table>
<thead>
<tr>
<th>Table02: Showing Reliability Statistics using Cronbach's Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cronbach's Alpha</td>
</tr>
<tr>
<td>.730</td>
</tr>
</tbody>
</table>

It is considered that reliability value more than 0.7 is good and it can be seen that the reliability value of Cronbach’s Alpha was found to be higher.

b. Z-Test
The study has two demographic groups (i.e. Male and Female). The test was applied to the variables. The value of Z was calculated for the variables.

The formula for calculating the value of Z was as follows:

\[
Z = \frac{\bar{X}_1 - \bar{X}_2}{Standard \ Error}
\]

Where,
\[
\bar{X}_1 = \text{Mean of variable 1.}
\]
\[
\bar{X}_2 = \text{Mean of variable 2.}
\]

\[
Standard \ Error = \sqrt{\frac{S.D^2_1}{M_1} + \frac{S.D^2_2}{M_2}}
\]

Where,
\[
S.D^2_1 = \text{Square of Standard Deviation of variable 1.}
\]
\[
S.D^2_2 = \text{Square of Standard Deviation of variable 2.}
\]
\[
M_1 = \text{no. of respondents of variable 1.}
\]
\[
M_2 = \text{no. of respondents of variable 2.}
\]

Null Hypothesis: There is no significant difference in the perception of the uses of digital technology between male and female.
Alternate Hypothesis: There is a significant difference in the perception of the uses of digital technology between male and female.
Z-test Result and Hypothesis:

Standard Deviation and Mean were computed using excel sheet functions. Here, variable 1= Male & variable 2= Female

\[ \text{Standard Error} = \sqrt{\frac{\text{SD}_1^2}{M_1} + \frac{\text{SD}_2^2}{M_2}}, \]

\[ = \sqrt{\frac{52.34836^2}{202} + \frac{91.8846^2}{24}} \]

\[ = 2.021 \]

\[ Z = \frac{\bar{x}_1 - \bar{x}_2}{\text{Standard Error}} \]

\[ = \frac{52.09-45.66}{2.021} \]

\[ = 1.20 \]

The calculated value of Z (1.20) was found to be lower than the standard value (i.e. = 1.96) at 5% significance level, hence Null Hypothesis is accepted and there is no significant difference between the two demographic groups (i.e. Male & Female).

c. Descriptive Analysis

Descriptive Analysis was done using SPSS for uses of Computer and Mobile and results are shown in Table 3, 4, 5 and 6.

Table 03: Showing Applications of Computer by the Respondents

<table>
<thead>
<tr>
<th>Valid</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Material</td>
<td>120</td>
<td>53.09</td>
</tr>
<tr>
<td>Health-Related Information</td>
<td>58</td>
<td>25.66</td>
</tr>
<tr>
<td>News</td>
<td>138</td>
<td>61.06</td>
</tr>
<tr>
<td>Total</td>
<td>226</td>
<td></td>
</tr>
</tbody>
</table>

Table 04: Showing Uses of Mobile by the Respondents

<table>
<thead>
<tr>
<th>Valid</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>214</td>
<td>94.7</td>
<td>94.7</td>
<td>94.7</td>
</tr>
<tr>
<td>No</td>
<td>12</td>
<td>5.3</td>
<td>5.3</td>
<td>94.7</td>
</tr>
<tr>
<td>Total</td>
<td>226</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Table 05: Showing Uses of Smart Mobile by the Respondents

<table>
<thead>
<tr>
<th>Valid</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>57.5</td>
<td>57.5</td>
<td>57.5</td>
<td>57.5</td>
</tr>
<tr>
<td>No</td>
<td>42.5</td>
<td>42.5</td>
<td>42.5</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 06: Showing Applications of Smart Mobile by the Respondents

<table>
<thead>
<tr>
<th>Valid</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>WhatsApp</td>
<td>66</td>
<td>29</td>
</tr>
<tr>
<td>Facebook</td>
<td>178</td>
<td>78</td>
</tr>
<tr>
<td>Any other Social sites</td>
<td>46</td>
<td>20</td>
</tr>
<tr>
<td>Total</td>
<td>226</td>
<td></td>
</tr>
</tbody>
</table>
d. Factor Analysis

Principle component factor analysis with Varimax Rotation and Kaiser Normalization was applied. The factor analysis resulted in 5 factors for the availability of uses digital technology in the health sector. The details about the factors, convergence and their Eigenvalues are given in table 7:

**Table 07: Showing Result of Factor Analysis**

<table>
<thead>
<tr>
<th>Factor</th>
<th>Eigen Value</th>
<th>% of variance</th>
<th>Variable Convergence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>3.500</td>
<td>24.999</td>
<td>I get information through digital media that smoking is not good for health</td>
</tr>
<tr>
<td></td>
<td>1.904</td>
<td>13.601</td>
<td>I get information through digital media that numbers of devices are available to prevent pregnancy.</td>
</tr>
<tr>
<td></td>
<td>1.388</td>
<td>9.912</td>
<td>I get information through digital media that Chat (local stimulant drug) is dangerous for health</td>
</tr>
<tr>
<td></td>
<td>1.313</td>
<td>9.378</td>
<td>I get information through digital media that blood should not be shared without an HIV test</td>
</tr>
<tr>
<td></td>
<td>1.198</td>
<td>8.555</td>
<td>I get information through digital media that cleanliness is next to Godliness.</td>
</tr>
</tbody>
</table>

6. Discussion

The study indicated that uses of smart mobile have not reached to the masses, hence the using social media for personalizing communication for health-related information is difficult. The mode of communication is available to the marketer is the mobile handset. The Computer is used, but searching for health-related information
is minimal; hence a lot of scopes is there for increasing the awareness level. The study also indicated that there is no difference in the perception of the uses of digital technology between male and female. Hence, for using digital technology different awareness campaigning for male and female is not required. Factor analysis indicated that consumers are aware of a few measures to prevent HIV and smoking is not good for health, the major problem area of awareness seems to be cleanliness and water-borne diseases. The study also indicated that 78% of respondents use Facebook, so this media can be used to increase the awareness level amongst the citizens with respect to the health sector.

REFERENCES