Health communicationin Non-fatal illness care using ICT:A five-layer model

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Abstract

Objectives: This paper aims to construct a comprehensive Information and Communication Technology (ICT) model for communication dissemination in non-fatal illness care.
Methods/Analysis: This research is an adaptation of the Ten-layer ICT model for health communication in fatal disease management. A qualitative analysis of the model based on relevance, cost-effectiveness, and sufficiency of ICT tools relevant to disseminate communication for non-fatal illness care is studied.
Findings: A new Five-layer ICT model that is sufficient for health communication in non-fatal illness care is evolved. The model using USSD, OTT, Social networking Sites, Emails and Blogs is found to be sufficient for health communication in non-fatal illness care that will provide healthcare providers with easiest and quickest information and communication technologies for patients with non-fatal illness treated under a minus emergency condition.
Application/Improvements: This model is unique for its appropriateness in health communication for taking early disease-prevention measures, educating people about their symptoms. The novel application of the model will greatly benefit patients to prepare a healthy lifestyle to prevent non-fatal illness becoming complicate. By combining with the Ten-layer model for health communication in fatal disease management, healthcare providers will have the benefit of a using sufficient tools resulting in an improved health outcome in every forms of disease for individual and community at large.

***Key Words*:** Health communication model, Non-Fatal Diseases, USSD, OTT, Social Networking Sites, Emails, Blogs

1. Introduction

High impact health communication prompts and enhances people to live a healthy lifestyle by taking necessary measures to prevent disease and to protect, maintain and improve their own health, such as good nutrition, regular exercise, adhering prescribed drugs etc. [1]. Information and Communication Technologies (ICTs) like the web and cellular technology play a key role in this regard, having become ubiquitous components that can affect health and wellbeing [2].ICT tools simplifies and monitors the flow of communication and dissemination on growing number of diseases between healthcare providers and patients [3-5].

Effective dissemination of health information allows patients engaging with the healthcare system to follow recommended advice, adhere to treatment and cope up with the psychological consequences of their illness. Hence, a comprehensive ICT model is required for effective communication and dissemination that influences positive behavioural changes in patients.

1.1. Health communication in non-fatal illness care

Patients who are showing warning signs of potential health risks like occupational musculoskeletal, depression, asthma, myocardial infarction, ischemic stroke, type-2 diabetes repeated trauma, dermatitis, noise induced hearing loss, poisoning due to toxic exposures, back or neck problem, arthritis/rheumatism, lung/breathing problem, walking problem, eye/vision problem, hypertension are some of the non-fatal health complications [6,7].

According to World Health Organisation report projections for 2004 -2030 on the global average burden of disease across all regions in 2004 was 237 (disability-adjusted life years) DALYs per 1000 population, of which about 40% to non-fatal health outcomes of which unipolar depressive disorders, adult onset hearing loss, refractive errors and alcohol use disorders are the four primarily non-fatal conditions among the 20 leading causes of burden of diseases [8].

Health Communication applies to all people, not only to those with evident chronic health issues. A decade ago Centers for Disease Control and Prevention summed up that "most of the non-fatal diseases stem out of occupational illness which takes a long latency between exposure and development of diseases though the association of disease with occupation is not readily apparent". Therefore, disseminating health information by healthcare providers during the 'latency period' will prevent the disease becoming complicate and restores patient health [9].

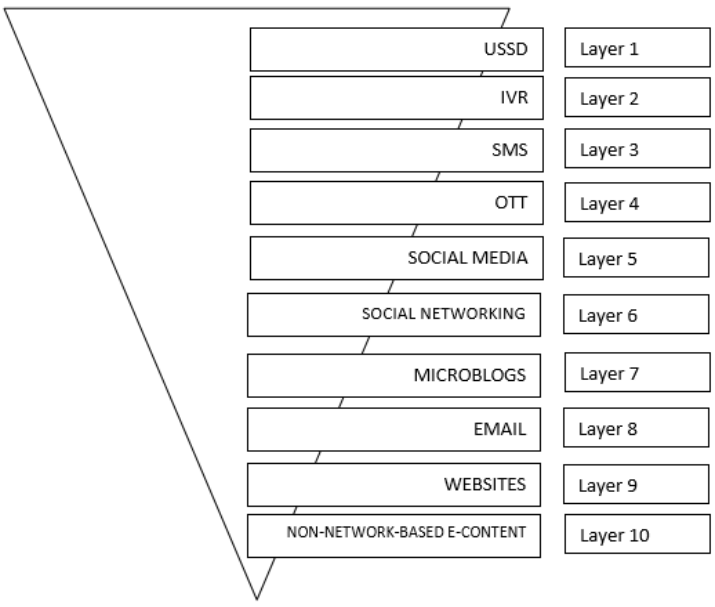
Many research states the importance of communication needs for people suffering from non-fatal diseases have been seriously underestimated by traditional media approaches that take into account only death and not disability. While death and disability are not hard to define, non-fatal outcomes of diseases are different from each other in their impact on the individual at the occurrence of any illness, people have more disability that of pain and discomfort, anxiety and depression, and cognitive impairment. For example, a day with a common cold is a day with disability, impairing normal activities [10].

Hence, there is a need to disseminate clear messages to patients who are under treatment of acute or chronic pain due to any non-fatal diseases/health complications for reversing ill health. Lack of communication intervention during the course of non-fatal illness may even lead to negative behavioural outcomes. For instance, it is found that patients with non-fatal diseases who could become terminal while reaching final stages seek assisted suicide for not wanting to live with prolonged illness [11].

1.2. Overview of the Ten-layer ICT model for health communication in fatal disease management

The exhaustive ten layer ICT model comprising effective, faster and affordable channels of communication disseminates health communication by all means to the patients undergoing high risk fatal disease complications (refer fig.1). Each ICT tool from USSD to Non-Network-Based E-content was layered depending on the degree of direct communication, easiness of technology for disseminating health communication from the sender (health practitioners) to the receiver (patients and patient attenders). The fitness of the model was tested using William McGuire's Communication-Persuasion Matrix. The strength of the ten-layer model is that it is reliable and provides direct communication. The model proved that healthcare providers and patients can benefit using the ten-layer ICT tools which disseminates communication that will be timely, aptly reachable and highly reliable for obtaining positive patient outcomes. The model (presented in fig. 1) supports patients' with information who may not be provisioned with opportunities of having access to use all ICT tools at a given period [12].

Figure. 1.Ten-Layer ICT model for health communication for treatment of fatal diseases



1.3. Examination of the ten-layer ICT model for health communication in non-fatal illness/health care

Presence of limited published literature in this area leads to examination of the exhaustive efficient ten layer ICT model for health communication in fatal disease management for application in ICT based healthcare communication in nonfatal disease management.

The ten-layer ICT model for disseminating health communication for fatal disease management offers easiest and quickest communication tools so that the patient or their attender shall be at no loss of information at the most crucial phase of illness, and priority was to keep the patients less anxious, confidence to manage pain and providing comfort to cope-up the fatality was highly regarded. For non-fatal illness care, there lies a common understanding that patients might not be in an emergency to receive communication through all the ten layers. Therefore, the ten layer model become adaptable to non-fatal illness care and management. Adapting the model will provide healthcare providers with ICTs that are relevant, cost-effective, and relatively sufficient to disseminate communication without having to meddle with all the tools resulting an improved health outcome in every forms of disease for individual and community at large.

1.4. Analysis of the ten-layer fatal disease health communication model for adaptation

The ten-layer model is categorically split into mobile services (USSD, IVR, SMS, OTT) and online social forums (Social Media, Social Networking Sites, Microblogs) and online services (Emails, websites) for analysis to derive the most sufficient communication tool in terms of its relevance, cost and functional application applicable to non-fatal illness care.

1.5. Unstructured supplementary service data (USSD), Interactive voice response (IVR) Short messaging system (SMS), and over the top messaging (OTT)

USSD is comparatively cheaper and faster than SMS to send bulk messages and maintains a database session permanently stored in the source server at the same time facilitating a 2-way exchange of data [13-15]. IVR is a voice based communication is more fast that reading a SMS [16] but requires a specialised team to leverage information to address patient needs, streamline development and control operational costs. IVR is a promising tool for reminding patients to take medications and more commonly used when patients cannot risk skipping it [17].

OTT like WhatsApp Messenger allows faster exchange of messages without having to pay for SMS. WhatsApp users can create groups, send each other unlimited images, video and audio media messages files [18]. WhatsApp, Viber allows creation of a group database with patient mobile numbers with similar non-fatal complications. A newly diagnosed diabetic patient could for example be offered to join a WhatsApp group with other diabetics that would be administered by their doctor, possibly to discuss drug prices, side effects, dietary practices and general support [19].

USSD and SMS offers the similar function, yet USSD can create real-time connection which is absent in SMS. IVR is appropriate for cases of high risk fatal diseases whose population is less compared to people undergoing non-fatal health complications. Much faster than SMS, and cheaper than IVR, healthcare providers can choose USSD over SMS by creating disease/complications wise databases to send separate messages instantly. Similarly, OTT can used in non-fatal health communication for a faster dissemination and exchange of communication with unlimited video and audio files to share.

1.6. Social media, Social networking sites, and microblogs

Social Media like YouTube share texts, photos, videos and other multimedia interface but effective participation or in engagement with other people in the channel is not possible [20,21]. Social Networking sites like Facebook and LinkedIn allows articulation with a list of other users with whom they share a connection [22,23]. Generally, LinkedIn profiles get ranked high on a google result page than having a Facebook account [24]. Simultaneously, aprofessional Facebook page can provide a wealth of information to patients, including links to reputable health websites and the doctor's take on health stories that are in the news [25].

Microblogs does similar task of Social Networking sites but may not be more suitable for health communication. Some communication needs an elaborate volume of information for patients that cannot be fixed into the 140 character limit. "It's very challenging for physicians, primarily because the messages that we have are not conducive to 14 characters" [26].

When communication about specific diseases in patient-centric social networking groups enhance better patient outcomes, healthcare providers can use such active forums for disseminating communication that is more reachable to the target patients. Though social media can disseminate health communication to fatal illness care, there is a partial reachability than into active engagement of the patients like social networking sites and blogs. Linking YouTube urls to social networking sites and blogs make them greatly networked. Microblogs cannot support detailed medical content for advice on any illness which social networking sites can take advantage for. Hence, social networking sites work without such limitations as evident in social media and microblogs.

1.7. Emails, Official websites, and Non-network based E-content

Email is the most ubiquitous communication tool, fast and secure for health communication. Of all technological advancements, Email is still the most preferred communication and the most popular online activity of 2012 [27]. Patient can go back to the message at any point of time which cannot be achieved in other ICT tools. Email helps build a trusting, caring doctor/patient relationship, which studies have shown is key to increasing the likelihood a patient will follow a doctor's advice, resulting in better outcomes [28,29]. Emails can be used in non-fatal diseases since it provides a written record of communications exchanged and allows a more thorough exchange of information than the traditional office visits and phone calls [30]. Most research studies point that websites for health communication are usually hard-to-reach audiences, difficult for interactivity, has navigational difficulties and are cost consuming tasks. Websites have limitations of establishing quality standard where there is a high risk of information written by anonymous sources [31-34].

Emails can create much more of a bond between users and a company than a website can. Other non-network removable media like CDs, DVDs, pen drives can be used for disease specific health communication but updation of the content is not possible.

1.8. Blogs

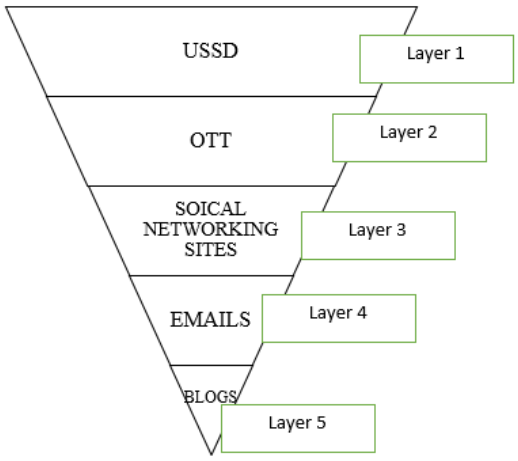
Blogs authored by health advocates is an effective tool to disseminate health communication. Blogs, or weblogs, are regularly updated online journals that almost anyone with an internet connection can use [35]. A blog works cheaper than websites that makes use for chronological listing of blogs posts unlike in websites' home page for browsing other pages. A blog can be easily started with services like WordPress, Blogger, etc. that includes design templates. Blogs often wants to share content in a way that allows readers to leave comments and engage in discussion. A blog can be used to discuss a topic that may be too complex for other channels and to give your topic or program a more personal and engaging presence than a website allows [36]. Health blogs reinforce and fosters health benefits like improving the psychological well-being of health bloggers [37]. Blog sites create a space where individuals can access tailored resources to deal with health issues [38,39]. Therefore, blogs as an ICT tool is suggested for communication in non-fatal illness care.

Analysing the relative benefits of the ten-layer model for adaptation to non-fatal illness, ICT tools – USSD, OTT, Social Networking Sites, Emails and a new layer Blogs forms the adapted five-layer ICT model for health communication in non-fatal illness care.

1.9. A Five-layer ICT model for health communication in non-fatal illness care

The components of the proposed the five-layer ICT model is shown in Figure.2

Figure 2. Five-Layer ICT model for health communication for non-fatal illness care



An evolved model has hence been developed using USSD (layer 1), OTT (layer 2), Social networking Sites (layer 3), Emails (layer 4) and Blogs (layer 5) found to be sufficient for health communication in non-fatal illness care.In the first layer USSD service can be used innovatively to educate people and spread awareness about any health complications. For many people affected by various non-fatal illness, there is an unmet need to circulate information regarding these diseases. For a substantiate discussion, the authors present how health communication can be disseminated via the five-layer model to patients having type-2 diabetes.

1.10. Layer 1 - Unstructured supplementary service data (USSD)

In type-2 diabetes illness, it's normal for a patient to ignore the problem in early stages when they feel fine. The disability arising at the onset of the illness like extreme fatigue and depression is managed by the adoption of a healthy lifestyle which includes healthy eating and regular physical activity, oral medication and weight loss [40]. This is the phase when doctors should care to communicate to patients to avoid long term complications arising out of not controlling blood sugar levels which affects many major organs, including heart, blood vessels, nerves, eyes and kidneys thus eventually be disabling or even life-threatening. The menu implementation of USSD can be set in a single transaction can orient toward the importance of the choice of food, the frequency of intake, amount of physical activity that help patients control and maintain blood sugar levels for a healthy life like

**535252* Eat Plenty vegetables, limit saturated fats in butter, cakes, choose foods low in salt. Get your sugar levels checked at once#*

1.11. Layer 2 – Over the top messaging (OTT)

For a more detailed content, the second layer Over The Top Messaging (OTT) services like WhatsApp, Viber can be used to model communication that can include audio, video and multi-media files targeted to specific patient forums. A simple preventable message to those who have pre-diabetes can influence monitoring blood sugar levels as a positive outcome like

Diagroup: Get your sugar levels checked. People have pre-diabetes with fasting sugar: 100-125 mg/dl ignore about it. A blood sugar test will help you to understand whether you're still pre-diabetic and your chances of developing diabetes. If you get diagnosed with pre-diabetes, then you can take the right steps and prevent it from transforming into irreversible diabetes.

1.12. Layer 3 – Social networking sites

Determining non-fatal disease burden within patients' social networking sites allow physicians to better communicate with patients' understanding their perspectives on their disease and ultimately help them achieve meaningful behavioural change. The third layer social networking platforms are aimed more at managing data and communicating with patients are fostering online peer support to cope with diseases. Trusted and verified Facebook pages like American Diabetes Association disseminated specific information to all its members' everyday (for example, as on October 1, 2014, approximately there are three posts a day in the American Diabetes Association Facebook Page at https://www.facebook.com/AmericanDiabetesAssociation) on health living for people with diabetics. Similarly, linking short videos (refer the above url) on Type 2 diabetes like 'The Glucose-Diabetes Connection', 'Type 2 Myths and Misconception', 'A 3-D Tour of Type 2' etc. in social networking sites generates a whole range of understanding crucial for maintaining one's health for better living. Together with text and video messages, there is a stimulus of an active engagement of members discussing issues related to treatment options, managing stress turns to better managing their health.

1.13. Layer 4 - Emails

Emails, the fourth layer in communication for non-fatal illness care can be used to disseminate large volumes of health communication to many recipients. In diabetes care management, it requires more details of patients' medical history for designing communication strategies for treatment and follow-up. It might be an online form or a data sheet sent to bulk recipients for intended responses. Such documents can be sent via Emails very quickly and in secure environment. E-newsletters is an effective strategy used by health care providers for communicating advanced treatments option in diabetes care.

1.4. Layer 5 - Blogs

Blogs, the last in the five-layer model for non-fatal illness communication, serves to offer a personal perspective relating to the illness. Blogs are the space for an informal communication used by the healthcare providers to introduce advanced treatment options for patients. For a diabetic patient it is often necessary to check the glucose level at varied intervals. Using blogs physicians can communicate on how to use a handy glucometer and read figures. Sharing the blog page via USSD, OTT, Social networking sites and Emails fastens the dissemination process.

2. Conclusion

A Five-layer ICT model integrating mobile and Internet communications like USSD, OTT, Social Networking Sites, EMails and Blogs is modelled and proposed for dissemination of health communication in non-fatal illness care. The proposed model fosters strong links between health professionals and patients by enhancing health professional-patient communication thus limiting the challenges in communicating a broad range of health messages to a wide variety of audiences through efficient ICT infrastructure.

This Five-layer model will increase the likelihood of patients under treatment to make healthy choices and successfully help to manage their own health with enhanced support from healthcare providers and physicians during the occurrence of non-fatal illness. This model is more suited for health communication for taking early disease-prevention measures, educating people about their symptoms. The application of the model will greatly benefit patients with a good psychological security, able to manage disability, and prepare a healthy lifestyle to prevent non-fatal illness becoming complicate.

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