

SMS Reminder Program to Improve Drug Adherence of Multi-drug Resistant Tuberculosis (MDR-TB) Patients in Medan

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Abstract: SMS is a way to communicate through cellphone to send or receive short messages by all phone users. This media can be alternative in health promotion to improve MDR – TB patients' compliance in case of therapy. This research aims to design reminder SMS to improve patients' treatment compliance. This qualitatively-designed research to create SMS content and design program with System Development Life Cycle (SDLC). The informants are MDR – TB patients who are undergoing treatment and recovered patients. Collected data to design reminder SMS, so the patients are complied to undergo treatment, analyzed by content analysis. Results show the long format-designed SMS reminder, containing 27 messages delivered everyday. Contents : the patients are complied to take medicine and injection until completion as prescribed recommendation says, prevent transmission to family and surrounding environment and accept themselves as MDR – TB patients. After implementation to the patients then qualitatively and generally the patients are relieved, capable to encourage them to take medicines without psychological obstacle, nevertheless a small part considers it normal but they still want to be reminded through the next messages. It is recommended that SMS are delivered regularly, messages' acceptance level is monitored and compliance level for therapy is analyzed qualitatively.

1 INTRODUCTION

The average number of drug adherence of patients with chronic disease with long-term therapy in developed countries is only 50%, meanwhile in developing countries the number is even lower (WHO, 2003). Patient's compliance is needed to achieve a successful therapy, including MDR – TB patients that needed long-term treatment. Patient's compliance requires a health promotion strategy. Thus far, the emphasis of health promotion is done through health education via newspaper, radio, television, leaflet, newsletter, magazine, poster, brochure, etc (Emilia, 2008). However, these media are still limited and are not reachable for the MDR – TB patient. Nowadays, the increase of MDR – TB cases and the inadequate number of health worker who can provide *Komunikasi Informasi Edukasi* (KIE) to the patient needs an alternative strategy as a

promotion media through the utilization mobile phone.

The opportunity of mobile phone utilization as health promotion strategy is expected to improve the degree of public health. This technology is able to facilitate the delivery of information more closely, and reach out to sick as well as healthy people who have irregular contact with health services. According to the data gathered by *Asosiasi Telekomunikasi Seluler Indonesia* (ATSI), up until the end of 2011 the number of penetration of mobile phone utilization in Indonesia is around 250 million or 110% from the total population of Indonesia (Nugraha F, 2012). The optimalization of the program becomes essential if being referred to the data from *Balitbang SDM Kemkominfo* which is, the proportion of population who own cell phones is increasing from 14.79% in 2004 to 82.41% in 2009. High flexibility and accessibility act as supporting factor in the importance of mobile phone utilization

in increasing public health. SMS is a way of communicating via a cell phone to send or receive short messages by all mobile users (Saputra, 2013).

Indonesia ranked eighth with the most cases of TB-RO in the world (*Kemenkes RI*, 2011). This case is basically a man-made phenomenon, as a result of inadequate TB treatment, which impacted on the long-term treatment, the side effect of drugs is more severe and with quite expensive cost. Medan is an area with the highest number of TB-RO patients in Sumatera Utara, until March 2018 there are 255 people are confirmed TB-RO, from that number only 197 (77%) have been receiving the treatment, the remaining have not yet received treatment, and this number has been growing (Syarifah, Mutiara and Novita, 2018). Out of those who have been receiving treatment, there are only 99 patients (50.2%) stay in treatment, the remaining are no longer in treatment, such as 31 patients default (15.72%), 11 patients failed (5.58%), and 25 patients cured (12.69%) (e-TB Manager, 2018). The number of default is higher than the tolerable number (5%). Therefore, it is necessary to design the SMS for the MDR – TB patient in Medan, the content of the SMS is being mustered from the cured MDR – TB patients and in-treatment MDR – TB patients, these SMS are being delivered to improve patient's compliance in undergoing a therapy program.

2 RESEARCH METHOD

The research design is using qualitative approach to design the content of the SMS and design program with the Systems Development Life Cycle (SDLC) method. This design is divided into three main activities, which are: analysis, design, and implementation (Ladjamudin, 2005).

The informants for the qualitative research are MDR – TB patients who are undergoing a treatment along with MDR – TB patients who have been cured. The reason to interview the cured patients is because they have generally experienced difficult phases in the treatment process due to limited health facility, health worker, drug, as well as various matters regarding personal experience and the surrounding environment which has little knowledge on the disease so that often cause discrimination in the society. The qualitative data is gathered to design the drug adherence model of MDR – TB patient through SMS Reminder, to remind the patient to take the medicine regularly. An interview guideline is developed, which included questions such as: for

the patient to take the medicine regularly and getting the injection according to the recommendation, for the patient to prevent transmission to the family and the surrounding environment as well as accepting themselves as MDR – TB patients. The qualitative data gathering is transformed into a transcript which covers overall data without making a conclusion, and then content analysis is performed.

3 RESULT AND DISCUSSION

3.1 Qualitative Research Result

3.1.1 The Content of SMS for Patient to Take Medicine Regularly

The qualitative research result includes the content of SMS for drug adherence for 18-24 months and getting injection for 6-8 months five days per week. Cured informants showed the most important thing to emphasize to the patient are the belief in medical drug, such as the following informant's statement:

“If the medicine is taken regularly then TB can be cured. Disbelief in the medicine can lead to failure” (Informant 1 PP).

This message needs to be emphasized because there are a lot of patients who don't take their medicine regularly due to disbelief in the medicine, especially if the amount of the medicine is quite a lot and the treatment takes a long period of time. Therefore to convince the patient, it is should be emphasized that TB can be cured with the medicine from the hospital. Next, as disclosed by the informant, if the symptoms of coughing last more than 2 weeks, then it is recommendable to seek health care. The statement of the informant is as follows:

“Do not hesitate if you have been infected with TB, immediately seek a treatment” (Informant 1 PP).

Many people are trying to seek a traditional medicine, initially it creates a good feeling for the body, but the condition of lungs will worsen. Herbal and traditional medicine have a temporary curative effect, there are times when the patient's body is gaining weight thus they feel healthier, however the TB germs within the body cannot be vanished with traditional medicine, the germs are still within the body in accordance to informant 2.

“TB germs are only dormant within the body, if the condition of the body decreases then the germs will act up hence the disease will only get worse”

In accordance to the informant, the delay of the treatment will worsen the disease, if the patients only seek for treatment when their health condition is severe, they would not be cured thoroughly. Therefore even though the disease has been cured the lungs had been damaged, hence the body will be vulnerable and prompt to fatigue.

The content of the message is as follows:

1. Take medicine regularly, TB can be cured.
2. Disbelief in the medicine can cause failure.
3. Be courageous to take the medicine to be cured, a belief to be cured should be established, and believe that TB can be cured.
4. To convince the patient that TB can be cured by the medicine from the hospital.
5. Do not postpone seeking treatment from the hospital if the symptoms of MDR-TB have been detected.

**The research result with the informants who are undergoing treatment shows that the factor that influence drug adherence is internal factor of family. Currently the father of the informant was suffering from light stroke and the informant is the only daughter in the family. She is young and if she gets sick, her mother will be in despair. Hence to be cured she kept taking her medicine despite the side effects. Other than that, self-motivation to be healed is what causes her to not feel the side effects. Although with external factor such as SMS will also help to increase the drug adherence, thus she revealed the context of SMS for the patient to take medicine regularly as follows:

“The future is still long, not to mention you are young. Take your medicine regularly, if you do not take the medicine just for a day it will deteriorate your condition”

The result shows that word revealed by the informant such as “telaten” (persevering) is not the local language of Medan, even though the informant is from North Sumatera she has lived in Yogyakarta and has finished her study there. She has suffered from coughing, and encouraged by her parents to come home. After several tests, it was found that she is infected with TB-RO whereas she never suffered from TB before. The informant was very disappointed with her condition but has to be strong and move forward by adhering to her treatment.

Related to 2 years period of treatment, there are a lot of important things to be instilled in the patient in

order to avoid default, and considering the side effects of the medicine is varying. It starts from nausea, dizziness, vomiting, up to medium and heavy side effects such as heavy feels in the ears, numbness in the legs, and memory disorder as well as hallucination. According to the informant the thing that needed to be instilled in the mind is TB can be cured by taking medication. So for the patients who are still undergoing treatment they usually are accompanied by Non-Governmental Organization (Lembaga Swadaya Masyarakat) Pejuang Sehat Bermanfaat (Pesat), it is a Non-Governmental Organization of MDR – TB companion originating from the cured MDR – TB patients. This Non-Governmental Organization receive many funds from Global Fun to accompany, persuade, and supervise the patient to take their medication regularly, regular visit depends on the monthly condition and said that:

“The patient is increasing every day, and most of them come from Medan.”

The data revealed that each member (Pesat) has a considerable amount of companions meanwhile the member of Pesat is insufficient, therefore an alternative method is needed to enforce the drug adherence to the patient. One of the strategies is sending SMS Reminder which content is gathered from the previous patient so the words will be more patient-oriented. Previous research result indicated sending SMS through cellphone is increasing the level of Anti Retroviral Therapy (ART) on limited sources (Lester, 2010). (Rodrigues, 2012) postulated the sending of reminder text message via cellphone will increase the drug adherence of HIV, the effect will even last for six months after the intervention has stopped. Sending a reminder text message via cellphone is increasing the attendance in the health center with lower cost than phone call (Car, 2012). Moreover, sending a text message via cellphone is proved to increase the drug adherence of Anti Retroviral (ARV) on group with low income (Free., 2013). This is certainly related to the problem of MDR – TB patient, which generally come from low-income family. SMS is proved to be useful to convey health information and build the awareness of the mother to do regular pregnancy check (antenatal care) (Herlina, 2015).

To overcome the boredom then a strategy is needed. As for the strategy performed by the informant is as stated below:

“We used to share our story with other TB-RO patients. Especially when it was time to take the

medicine, we made a phone call to remind each other (Informant 3, cured patient).”

Another activity than sharing is:

“We had a gathering so we do not feel alone. Every week we usually went to some place together so we do not feel lonely (Informant 3, cured patient).”

3.1.2 The Content of SMS in Coping with the Side Effect

The side effect of MDR – TB drug differs for every individual starting from light, medium, to heavy side effect. Therefore, it is required to nurture the patient’s mind not to feel burdened by the amount of the medication and the long period of treatment which is 2 years or more. Consequently, this new paradigm must be imprinted in the mindset of all the patients as well as a behavior to prevent transmission.

For that reason the words that needed to be conveyed through SMS are:

1. If experience any severe side effects you should immediately refer to the hospital.
2. All drugs have side effects.
3. If any side effects occur please consult to the health center (Informant, Cured patient 1, 2)

Another informant revealed if any side effects occur, then it is suggested to divert attention through activities such as:

“Listening to music or watching TV, or calling a friend before taking the medicine. Because the patient needs to adapt to the medicine and accepts their condition (Informant 3).”

3.1.3 The Content of SMS for the Patient to Getting Injection Regularly

Injection for 6-8 months is an activity that needs to be passed by a MDR – TB patient and it happens 5 days per week. This is a painful activity for the patient, especially on early stage of the treatment. If it can be imagined how painful when both thighs are getting 5 injections in a week for 6-8 months until there is no place available for the injection. From the statement of cured informant it is found the words that made them getting the injection regularly:

“Please follow the rules from the hospital. The injection only hurts in the beginning, gradually it feels better than taking medicine. Like the motto in taking medicine, Be courageous to take the medicine to be cured, a belief to be cured should be

established, and believe that TB can be cured (Informant 1,4).”

Similarly a cured informant also stated:

“Do not think about the pain, think about being cured. The pain is only temporary and all disease can be cured. Follow the rules of treatment from the hospital, because it is one package of oral medication and injection. Since the sickness is not permanent and this is can be cured, so why not just abide the process.”

To overcome the pain, do some activities, such as:

“Sharing some personal experience to motivate TB patient, pain is only temporary, all disease can be cured, just go with the flow.”

From the statement of an informant who is still undergoing treatment, it is revealed the way to get over the pain causes by the injection:

“It is scary at first, gradually we will get used to it.”

So the core in overcoming the injection pain is the will, if the patient has a strong will then it will be less painful. Other than that, the informant is overcoming the pain by:

“After getting an injection, I compress it with warm water or balsam (usually I use Baljitot balsam). If I do not compress, it the spot will harden and cannot be injected next time.”

3.1.4 The Content of SMS in Preventing Transmission

Prevention is important in controlling MDR – TB, this is due to TB-RO patient can transmit MDR – TB to other people, especially to the closest person or the people they live with as well as their surrounding environment, if a precaution is not taken. The prevention of transmission can be executed by using a mask, the ethics of coughing and nutrition consumption. The content of SMS for using the mask is as follows:

“Wear a mask actively, to prevent the transmission and not getting exposed to the germs in the surrounding environment. The mask is to prevent yourself from other germs (Informant 2, Cured).”

“Wear a mask to protect yourself and other people, all this time people believe wearing a mask is to prevent transmission to other people, even though mask is also to take care of yourself. Especially if we are already infected with TB then

our body is vulnerable. So we have to wear a mask (Informant 1, 4, Cured).

An essential preventive measure to be performed by the patient is related with the ethics of coughing by giving education through SMS as disclosed by the informant:

“Cover your mouth with your sleeve, tissue, or a handkerchief. If the sleeve is being exposed to the sunlight the germs will die immediately. If you are using a tissue throw it out afterwards (Informant 3, Cured).”

Next another informant revealed thing regarding the place to dispose sputum:

“Sputum is to be disposed in a container of water Lysol/Biclyne, the germs will then die, then dispose it to a drain or a ditch (Informant 2, 3, Cured).”

3.1.5 The Content of SMS in to Mantain Physical Fitness

For the patient to stay fit there are several things to such as maintaining a good diet, taking plenty of rest, and practicing clean and healthy behavior pattern. As for the message to be conveyed is:

“Eat nutritious food, refrain from eating spicy and greasy food, do not eat instant noodles, and drink milk. There is no food prohibition for MDR – TB patient, except for patient with diabetes mellitus (DM). The point is live healthy, take plenty of rest, sunbathe for 30 minutes every morning, exercise lightly such as walking, no smoking and drinking alcohol, and do not overwork as well as having a positive mind, and patient in dealing with the health worker (Informant 1, 2, 3, Cured).

From the results of the research above, the SMS format that was developed was long messages, containing as many as 27 messages every day delivered the same message to all patients. The message is delivered in the morning around 9:00 a.m. The SMS format used in several countries that have used SMS reminder is different, in Kenya the format used is long SMS and short SMS (Pop-Eleches, 2011).

The contents of the message sent via text are 1) Are you Mr / Mrs / Friends all taking medicine today Remember the future is still long, take medication regularly so that we can gather with the family to see children and grandchildren married? 2) Immediately seek treatment if MDR – TB is known, do not be postponed before it's too late !! Love your lungs before the lungs get damaged !! Lung damage

can cause coughing up blood. 3) Must Be Sure, never get tired of taking medication as recommended, Regular medication for a disease can be cured. 4) The duration of taking MDR – TB medication 2 years, and 8 months of injection. if you are not diligently treated, the disease gets worse, it can become TB XDR. 5) Just one day not taking medication will make things worse. Bring medicine wherever you go. 6) How not to get bored and bored taking medication ??? Sharing experiences and complaints with friends Calling each other at meal time Remind each other for mutual healing. 7) Injections are very painful but rest assured we can recover. Come to health services to get a 5-day injection in 1 week. Follow the recommendation of a Doctor / Health Officer because of one package injection and medication. 8) Don't think about the pain, but think about getting well, getting sick only temporarily and everything has a cure, just live it. 9) How to reduce side effects Nausea and vomiting Do not eat large portions. Eat small portions but more often Eat and drink slowly. Avoid foods that are too sweet, greasy or fatty. Take a break after eating don't lie down. 10) How can we get well?

Medication packages from doctors are the only drugs that can cure MDR – TB. Beyond the doctor's medicine, makes the body feel good for a moment, but the disease in the body cannot heal. 11) Non-medical treatment is just tired and a waste of time. Finally the disease gets worse. 12) Don't feel alone, there are still many people who care about us Don't be lazy to take medicine, so that you can get healthier, so you can play again ... Pain is a sin, the sign is that God still loves us. 13) Remember !! check his health in the laboratory as recommended by the doctor Remember !! do not forget to check MDR – TB to the laboratory at the designated hospital, routinely according to the doctor's recommendation until it is declared cured. 14) Communication with health workers If you experience complaints or side effects, immediately contact and discuss with a health worker / doctor. Adhere to the advice of health workers on medication and other examination schedules. 15) Wear a mask to protect your health and that of others. If you have TB TB, your body is susceptible to illness, so you must use a mask. 16) Cover the mouth with a tissue when coughing. Bring tissue when traveling. Cover your mouth when coughing with tissue and throw it in the trash that is exposed to sunlight and then burnt. 17) Dispose of phlegm in a place filled with Lysol / byclean Do not throw sputum carelessly. Dispose of phlegm in a container containing Lysol or byclean, then dispose of water

drainage. 18) Eat nutritious foods Eat lots of fish, drink juice every day, eat fruit, and drink milk. If you do not eat, try to keep eating a little but repeatedly. 19) Avoid drinks and foods that contain milk, fat, soda or supplements (additional drinks) with drugs.

So the drinks above should be less than 2 hours before or after taking medication. 20) Accept yourself as a MDR – TB patient (not ashamed, do not be alone) Do not be shy if you have MDR – TB disease and seek treatment immediately at the health services provided (H Adam Malik Hospital, Haji Hospital, Pirngadi Hospital) Do not assume that MDR – TB disease is not can be healed, the spirit to continue treatment until healed. 21) Keep in touch with friends and family. Don't be alone, join your family. Establishing good relationships with people nearby can help speed up your health recovery. 22) Rest. Get enough rest so that the body is always in shape. Sleep at the same hour every night, and try to wake up at the same time every day. 23) Don't take sleeping pills except those prescribed by a doctor. During sleep, avoid sounds that can disturb your sleep comfort. 24) Try to sunbathe every morning from 09.00 around 15 minutes. If you need a nap, keep it not too long for 30-45 minutes. 25) Perform light physical activities and avoid activities that can aggravate the situation. Do exercise regularly, do not exercise before bed time. Exercise at least three hours before going to bed. 26) Don't smoke and drink alcoholic beverages. 27) Pray regularly, the sickness is a sin, it is a sign that God loves us, because until now we are still given the opportunity to do activities. So take medication regularly so that you can continue to carry out daily activities.

3.1.6 SMS Program

The messages that have been compiled are sent via SMS design using the SDLC program starting from the input, process and output stages of Debi (2015). The design of input on the SMS reminder service in compliance with taking medicine for MDR – TB patients in Medan city includes the identity of the patient, the identity of the admin / admin, the patient's medication schedule.

It is recommended that this sms be delivered to the patient accurately and regularly every day, then monitored how the patient receives the reminder SMS messages and analyzes the SMS recipient compliance in medical treatment after health promotion is done through the SMS reminder that has been designed.

4 CONCLUSIONS

Results show the long format-designed SMS reminder, containing 27 messages delivered everyday. Contents : the patients are complied to take medicine and injection until completion as prescribed recommendation says, prevent transmission to family and surrounding environment and accept themselves as MDR – TB patients. After implementation to the patients then qualitatively and generally the patients are relieved, capable to encourage them to take medicines without psychological obstacle, nevertheless a small part considers it normal but they still want to be reminded through the next messages.

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