

SMS Text Messaging: A Ubiquitous Tool for Cheaper Medicine in the Philippines

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Abstract— Access to essential drugs is a key element for sustaining good health but medicines have become inaccessible to many because of very high prices. Consumers have no access to information regarding cheaper drugs that are alternatives to more expensive proprietary drugs. This study aimed to promote access to such information through the use of Short Message Service (SMS) and improve price transparency by creating a small database containing keywords that will easily provide consumers with detailed information about cheaper and branded drugs. The methodology being used consists of three parts. The first part includes interviewing key informants to obtain the necessary information from technical people with backgrounds and opinions relevant to the study. The collected data was then consolidated to make the system realistic through correlation with both internet and library research. The second step is by using an integrated software and modem so that consumers can get access to the database, allowing consumers to know the relative drug prices of different versions of the same drug simply by sending the name of the medicine anytime, anywhere. Lastly, a survey questionnaire was distributed to obtain immediate feedback regarding the system, including its ease or difficulty of use, applicability to actual needs, and problems that may arise. Moreover, this drug related information can be obtained even without an internet connection. This message handling system can save a lot of time and money to both consumers and patients and empower them to make informed decision-making on drug purchases.

Keywords— Short message service, Ubiquitous, Cheaper, Medicine, Text messaging, Affordable

I. INTRODUCTION

Essential to an individual daily life is the ability to communicate clearly and quickly. Emerging technologies like mobile phones have become effective means in facilitating communication.

The Philippines, a Southeast Asian country with a population of approximately 91 million (2007) is considered “the text capital of Asia” due to the sheer volume of short message service (SMS) being exchanged daily. The SMS has also become a powerful tool for consumers to obtain information. This technology has likewise improved the lives of thousands of people, particularly in far-flung areas, where doctors and patients can communicate through telemedicine.

One of the major healthcare problems in the Philippines is the exorbitant prices of drugs, which are among the highest in

Asia. As such, only 30% Filipinos have access to essential medicines [1]. However, despite higher prices, most Filipinos continue to prefer proprietary or branded medicines due to the limited information on cheaper alternatives and generic medicines.

To bridge the gap, this study provides better choices for patients and consumers by short message service (SMS), which will be a ubiquitous tool to access the costs of branded and cheaper medicines anytime, anywhere through the use of established information sharing. The paper is divided into 5 sections. After the Introduction in Section I, Section II provides statistical data to fully support the main objective of the study while Section III describes message handling system. Section IV focuses on the system implementation and Section V states the study limitations. A final section provides conclusion and a possible future work.

II. NATIONAL DATA

To fully support the implementation of the system, some statistical data are needed. As of 2003, according to National Telecommunications Commission in the Philippines, there are 22 million mobile phone subscribers coming from different telephone operator [2]. Most telecommunications have seen a rapid increase in number of mobile phone subscribers, thereby pushing for improved features and benefits for consumers. In less than five years, the number of mobile subscribers doubled to as much as 57 million by 2007 [2], which is actually more than 50 percent of the total population.

On the other hand, the high prices of medicines are still a major problem for consumers. Medicine prices in the Philippines are expensive compared to neighbouring countries like Indonesia, Malaysia, India and Bangladesh. Table 1 shows an example of the comparative trade prices of selected originator brand products in the Philippines, India and Pakistan in 2005 in Philippine peso [3], while Table 2 shows the comparisons between cheaper medicine (generic medicine) and branded medicine in Philippine peso [4].

A republic act known as the Generic Act of 1988 encourages and requires the use of generic medicines to all public and private sectors to lessen the economic burden caused by expensive drugs. However, due to lack of promotion and advocacy, there is still a very big difference in public knowledge between cheaper (generic) and branded

medicines, which are more heavily promoted through advertising. Consumers are then constrained to adhere to what is expensive.

Recently, another republic act known as the Universally Accessible Cheaper and Quality Medicines Act of 2008 has required drug outlets including drugstores, hospital and non-hospital pharmacies and non-traditional outlets such as supermarkets and stores, to inform consumers especially patients, regarding “any and all other drug products having the same generic name, together with their corresponding prices so that the buyer may adequately exercise his option” [5]. But again, consumers are left to the mercy of drug stores to find out drug prices.

TABLE I. COMPARATIVE TRADE PRICES

Medicine	Philippines	India	Pakistan
Ponstan 500mg tab	22	3	1.4
Lopid 300mg cap	36	12	3
Buscopan 10mg tab	10	2	0.6
Bactrium 400/80mg tab	16	1	1
Adalat Retard 20mg tab	38	1	4
Lasix 40mg tab	9	0.5	1
Ventolin 50mg inh	315	123	62
Voltaren 50mg tab	18	1	4
Imodium 2mg cap	11	3	2
Fortum 1g inj	980	390	304

TABLE II. GENERIC AND BRANDED MEDICINE

	Generic	Branded
Anti-Microbial		
Amoxicillin 500mg cap	2.70	10.00
Cough		
Ambroxol 30mg tab	1.10	11.23
High Blood		
Captopril 25mg tab	4.20	19.56
Cholesterol		
Astrovastatin 10mg tab	18.00	58.62
Pain Reliever		
Paracetamol 500mg tab	0.60	2.65

In the Philippines, in terms of economic costs, the lack of information as regards choices and prices of medicine result in heavy burden, both for those who are acutely ill or those with chronic illnesses requiring long-term medication. Although medical treatment has improved and services have expanded most consumers typically pay the full cost of the medicines themselves because they do not have information about the prices or where to find the best prices.

For instance, based on the previous surveys made, affordability is calculated as the number of days the lowest paid unskilled government worker need to work to pay for one month's treatment [6]. As such, a low-paid government employee earning P254.1 per day (in Philippine peso, \$4.64 in US dollar), will spend 8.5 days' wages for buying originator

or proprietary drugs but 3.1 days' wage to get the cheaper generic counterpart for one month's treatment of ulcer.

The big difference in the costs of medicines enables most consumers to spend a lot of time going to public hospitals or government pharmacies just to get the cheapest drug equivalent of proprietary or branded drugs especially if these drugs would serve as their lifetime maintenance. Thus, better and more efficient access to necessary information on drug prices and choice is imperative.

III. MESSAGE HANDLING

The basic purpose of the study is to help consumers become aware of the costs of cheaper and branded medicine in order to make some comparison. Although, this information is available through the internet, it requires some effort and some basic knowledge to get a good comparison. On the other hand, the mobile phone is still the cheapest and easiest way of obtaining quick information even without internet connection, through the use of SMS.

Message handling can be done in two ways. One is by making a script or interface to communicate with the software that handles the received messages and the databases, which contains the information related to the received message. This is basically done by administrators or programmers. For actual implementation of the system, this approach is necessary. The second is by using keywords to generate an automatic response to the mobile users. Both ways can be done through Frontline SMS software. This study uses the second approach and has come up with the pilot testing of the system, which also allowed for quick results and feedback.

Frontline SMS is an application that can communicate with the USB modem (Fig. 1) [7]. It is free and open source software that can be used both under Linux and Windows environment. This software works even without internet connection and has the capability to store messages. Through the use of USB modem, Frontline SMS and mobile users can send and receive messages simultaneously.



Figure 1. USB modem with SIM card

Thus, taking the second approach means creating a keyword in Frontline SMS. The keyword serves as a reference whenever a message is received from mobile users. As such, if the keyword from the message has been recognized by Frontline SMS, an automatic response will be sent to the mobile user containing the specific information that

he/she needs. For instance, an example of generic name is “Amoxicillin” that has several equivalent branded or proprietary names like “Benedex”, “Pediamox” and “Amoxil” depending on the manufacturer. Both generic and branded medicines are usually written in the prescription made by the doctor (Fig. 2).

If the mobile user key in the name of generic medicine, which is referenced as the keyword in Frontline SMS, the keyword will be searched through the Frontline SMS database to retrieve the information and sends it back to the mobile user. The same will be for branded names. If the mobile user key in the branded name, like “Mucosolvan” which is also referenced as the keyword in Frontline SMS, it will automatically retrieve the information and send it back to the mobile user.

Name: _____ Age: _____ Date: _____ 1. Amoxicillin 250mg/ml (Pediamox) #2 Sig: Give 3ml 3x/day x 7 days 2. Ambroxol 30mg/ml (Mucosolvan) #1 Sig: Give 2.5ml 3x/day for cough No: _____ Sig: _____

Figure 2. Example of a prescription

IV. SYSTEM IMPLEMENTATION

The section will discuss how the system works through the use of short message service (SMS). It will also show the reaction of users after initial testing. A survey questionnaire was distributed after this testing.

A. Why Short Message Service (SMS)

Short message service (SMS) is the most powerful tool in terms of communication especially for mobile users. It does not limit anyone regardless of high- or low-end mobile phones for as long as they can receive and send messages anytime, anywhere. In the Philippines, using SMS is also not as expensive as making a voice call. In order to fully utilize the mobile phones, this study has come up with a fast way where users can get information quickly without spending more and without the use of internet connection.

As previously discussed, two approaches can be used. Choosing the second approach meant creating many keywords. While both approaches will certainly give the same output, the first approach is usually being used to communicate with large databases, creating an own script or integrating an existing application program interface (API). Building a database is time-consuming and will require doing script. The second approach enables faster pilot testing of the system and generation of results.

The first step is to create a batch of keywords in Frontline SMS.

In the first example given, “Amoxicillin” serves as the keyword inputted in Frontline SMS. Since “Amoxicillin” is a generic name, the information should contain at least five branded names having at least the same formulations but different prices. This also includes the generic name itself (Fig. 3). The figure shows that in the sending information, the keyword, Amoxicillin is included in the list with corresponding formulations and prices. The rest are the branded names and their corresponding formulations and prices (e.g. Benedex, Pediamox, Amoxil, Novamox and Trexil).

Keyword: Amoxicillin
Sending Information:
Amoxicillin drops P33.00, 125mg 60ml P37.00, 250mg 60ml P49.00, cap 500mg, P2.70; Benedex drops, P60.00, 125mg 60ml P70.00, 250mg 60ml P116.00; Pediamox drops 100mg/ml x10ml P66.12, susp 250mg/5ml x 30ml P70.61, 250mg/5ml x 60ml P116.07; Amoxil cap 250mg P6.11, 500mg P10.00, forte syrup 250mg/5ml x30ml P61.00, 250mg/5ml x60ml P97.00, drops 100mg/ml x 10ml P78.00, syrup 125mg/5ml x 30ml P41.00, 125mg/5ml x60ml P66.00; Novamox tab 500mg P11.50, suspension 125mg/5ml x 60ml P78.00, 105ml P89.50, 250mg/5ml x 60ml P132.50, 105ml P138.00, drops 100mg/ml x 10ml P65, Trexil cap 250mg P5.30, 500mg P8.50, suspension 125mg/5ml x 60ml P80.00, drops 100mg/ml x 15ml P59.00

Figure 3. Sample generic name as keyword

This entire information is very useful since the mobile user will have enough options to choose from and more importantly, can compare prices of both generic and branded names. This will eventually guide them in terms of maximizing their money or resources.

In the second scenario, “Mucosolvan”, which is a branded or proprietary name, is referenced as the keyword in Frontline SMS. As a brand or proprietary name, the information should contain only information about the branded name and its equivalent generic name. Based on studies made, there is usually only one generic name but multiple branded names of the same equivalent (Fig. 4).

The sending information consists of only 160 characters because most of the mobile users have low-end mobile phones consisting of 160 characters only.

After inputting sample keywords for generic and branded names, the next step is to text the keyword using any mobile phone. The mobile user has to text either the generic name or branded name and send it to the SIM card inserted in the modem. For example, the mobile user can write “Amoxicillin” in the mobile phone and send it to a number where the Frontline SMS can retrieve the message and that is the modem attached to it. The USB modem contains a SIM card where mobile users can actually send messages anytime.

The card can either be post paid or pre-paid credits. Once the message reaches Frontline SMS, it will automatically search the keyword and retrieve the information and send it back to the mobile user. This is beneficial to most consumers or mobile users as they can get the information fast.

Keyword: Mucosolvan
Sending Information:
Mucosolvan tablet 30mg P11.23, capsule 75mg P32.24, liquid 30mg/5ml x 60ml P125.00, 30mg/5ml x 120ml P192.00, pedia liquid 15mg/5ml x 60ml P87.00, 15mg/5ml x 120ml P132.00, drops 6mg/ml x 15ml P82.00, inhalation soln 15mg/2ml x 20ml P163.00; Ambroxol drops P27.00, syrup 15mg 60ml P28.00, 30mg 60ml P33.00, tablets 30mg P1.10

Figure 4. Sample branded name as keyword

Using the Nokia 6680 for sending the name of the drug, the system responded with only one text message to the mobile user containing all the information needed. However, when using the Nokia 8280, the received message from the system was concatenated and the message was divided into four parts because the mobile phone's display is limited only to less than 160 characters (Fig. 5).

The received information consists of the name of the drug the mobile user has sent for example, "Amoxicillin". All the information under Amoxicillin is separated by a comma in between formulations and there is a space before each price and another comma and space after the price. Then, a semi-colon comes first before the name of the branded medicine.

For example, "Amoxicillin" is an actual message sent by a mobile user. The returned message shows "Amoxicillin drops P33.00, 125mg 60ml P37.00, 250mg 60ml P49.00, cap 500mg, P2.70; Benedex drops, P60.00, 125mg 60ml P70.00, 250mg 60ml P116.00; Pediamox drops 100mg/ml x10ml P66.12, susp 250mg/5ml x 30ml P70.61, 250mg/5ml x 60ml P116.07; Amoxil cap 250mg P6.11, 500mg P10.00, forte syrup 250mg/5ml x30ml P61.00, 250mg/5ml x60ml P97.00, drops 100mg/ml x 10ml P78.00, syrup 125mg/5ml x 30ml P41.00, 125mg/5ml x60ml P66.00; Novamox tab 500mg P11.50, suspension 125mg/5ml x 60ml P78.00, 105ml P89.50, 250mg/5ml x 60ml P132.50, 105ml P138.00, drops 100mg/ml x 10ml P65, Trexil cap 250mg P5.30, 500mg P8.50, suspension 125mg/5ml x 60ml P80.00, drops 100mg/ml x 15ml P59.00." The flow of the system is shown in Fig. 6.

B. Results and Discussion

After the pilot testing, a survey sheet was given to determine if the system was beneficial and if the information received via the mobile phones was useful. The actual survey was done in a small town and a remote area, and included ten people (consumers). Each one actually tested the system and discussion was made afterwards.



Figure 5. Text message from the system

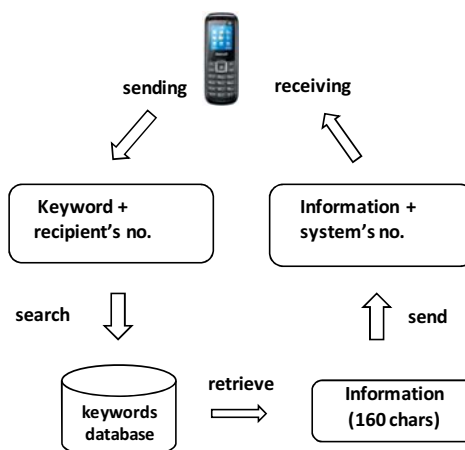


Figure 6. Flow of the system

1. **Texting the name of the medicine was easier:** Eight out of ten mobile users were able to successfully text the right spelling of the medicine as indicated in the prescription. They easily identify in the prescription the difference between the generic name and branded name. Most were quite familiar with the spelling of the drug. Moreover, it was easy for them to just text the name of the medicine instead of texting an entire message, which is more prone to errors. Likewise, the language barrier is one the most common reason why they prefer texting just the name of the medicine.
2. **Comparison of medicine prices:** According to the ten initial "consumers", the information was very useful to them. With one text message, they were able to see different names of medicines, formulations and prices, which made it easier for them to decide which ones to purchase. Furthermore, because the prices or estimated prices were indicated, it enabled them to know how much money they should bring and how much money they could save. Since most of the pharmacies offered generic and branded medicines, it would save them time travelling from one pharmacy to another just to canvass and compare drug prices. In the information given, if one medicine was not available in a particular pharmacy, they had other options to choose from,

based on prices they obtained from the information. Basically, almost all of the responders who received the information could readily understand its details and were happy to use the system. They said that the widespread use of the system will improve information sharing on the part of the consumers as well as the patients that will have long-term benefits. Nonetheless, two persons initially had difficulty understanding the information. These are the people living in more remote area. Although they understood the prescription, they were not able to immediately understand the information sent to them by the system. After careful explanation, they were able to appreciate its use.

In terms of practical utilization, all of the responders considered the system very useful. It saved them a lot of time, money, and effort. Because there are thousands of pharmacies or drugstores in the Philippines, it is still quite helpful for consumers to just text the name of the medicine instead of travelling from one drug store to another not knowing if the medicine is available there or consuming a lot of time just to find out the cheapest price of the medicine.

Most of the consumers who tested the system would rather spend P1.0 peso for texting the name of the medicine in the system and getting the information they need rather than spending P15.00 pesos for two-way fare to go to a drugstore in which does not even guarantee the availability of the said medicine.

V. LIMITATIONS OF THE STUDY

There are certain limitations of the system that has to be taken into consideration. First is the natural language query for consumers. Like in India, consumers need to send messages in a form of question to obtain drug-related information, which is entirely not applicable in the Philippine setting. Thus, the system takes into consideration not just the telecommunications system but also the healthcare system specific to a country. Secondly, the system is forced to limit the number of characters to 160, where it can only display formulations and prices of the medicines. The main purpose of the system is to make it useful and accessible for the majority. Lastly, the system does not have spelling corrector. Since most of the text messages are based on prescription, there is a small chance of texting an incorrectly spelled drug name. Nonetheless, the drug names are medical jargon. This may be integrated in future work.

VI. CONCLUSION AND FUTURE WORK

The study aims to help consumer become aware of cheaper medicines and their prices. Most consumers prefer branded medicines over generic medicine due to a lack of this kind of information.

As most people prefer using internet to obtain information, those in developing countries still ponder on the costs of getting such information, especially when the internet is not readily available.

This system brings to consumers the needed information through the use of SMS, to enable them to make more informed choices and lessen their economic burden. The system shown here is quite easy to use and much less expensive for the consumers. However, the system does not cover emergency information or any other drug-related information. This can be much improved in the future by better databases and cheaper but more capable mobile phones.

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