

An exploratory study: Monitor children's health condition involving different contributors

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ABSTRACT

*This paper is to seek a new method that provides a discussion and a possible framework that might be able to help guardians on record keeping of their children who are under 12 years old. After exploring the current methods that guardians are using to help them monitor and document their children's health condition, researcher discovered a possibility of using web service or system that can be adopted by **healthcare provider** (clinics/hospitals), **healthcare receiver** (parents/legal guardians) and **the third place** (schools/daycare center) to monitor and document a child's health condition.*

KEY WORDS

Health record keeping, parents, children, clinic, monitor health, documentation

1. INTRODUCTION

We all have experience of record keeping; taking photos, keeping a diary, memorizing every moment in life, those things that make us who we are. The behavior of record keeping all started with photos when we were in our mother's belly and the documentation that stated our health conditions [1]. From the time we were babies, our parents keep record for us, then when we are growing up, we keep those memory to ourselves; until we meet someone and have our children, we then will repeat the steps of our parents. These habitual behaviors give us information about ourselves from time to time. However, in United State, due to the lack of communication, guardians mostly rely on themselves to manage family health record, and also because of this disadvantage, it is hard to maintain the habit of record keeping. The motivation has been weakened in result of those technology that would improve the communication seems to favor in medical profession but not patients [2].

The researcher will first compares different media that commonly used by guardians in order to monitor and document their children's health condition. Second, this paper will address the obstacles of health record documentation for guardians nowadays. Then the researcher tries to provide a possible solution that would have fewer burdens for guardians, and furthermore, regarding to the paper of Grimes, Tan, and Morris [3], which proposed the consideration for supporting family

reflections on health data efficiently through technology, the researcher will then discuss the possibility of different parties of contribution that helps with health record keeping.

2. METHODOLOGY

Three methods were used to discover the issues within this topic: literature reviews, heuristic reviews, and in person interviews (& phone interviews.)

Literature reviews:

The literature review will focus on understanding what are the existing technology or related conceptual design that has been explored or done [4] to aid this target group documenting health record of their children and what methods had being discussed to improve the communication gap between the three major players in this system. Furthermore, discussed the possible benefit of leveraging to educate and provide a transition to healthy adult behaviors [5].

Heuristic reviews

Heuristic reviews were conducted on the current related services that exist nowadays; this was able to address the potential usability issues when the guardians using websites or application on their smart phone as a method to keep track of their children's health record or monitor their children's health condition.

Interviews

Interviews were conducted in person (one person) and through phone calls (two people), with the target population, who are parents with children under 12 years old. In order to understand how the interviewees keep track on their children's health condition and the interactions between healthcare providers (clinics/hospitals), healthcare receiver (parents/ legal guardians) and the third place (schools/daycare center), the interview questions aimed to discuss the current methods guardian (parents) to monitor their children's health condition.

Starting with the warm-up that asked the interviewees to talk about their children, their general health condition, and how often they consult with family doctor or visit hospital. Following by the warm-up, the researcher focused on the questions about how guardians maintain

the record keeping habit, and how they keep the record due to any environmental changes (e.g. moving). Then, the researcher asked questions about the relationship with their healthcare providers and places that the children currently spend most time in. Finally, questions about how they think what solutions might be able help them the most.

3. MEDIA COMMONLY USED

From the interviews that researcher conducted, there are mainly three ways of health record keeping to help guardians to monitor their children’s health condition.

Physical documentation

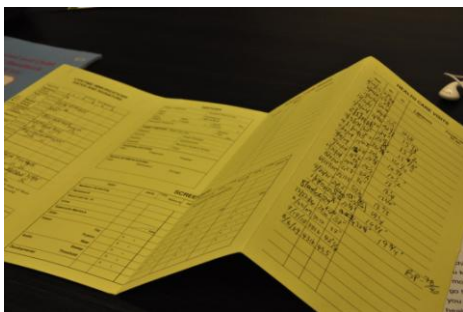


Figure 1: paper documentation

Figure 1 shows one of the common methods nowadays that used to keep track about a child’s immunization status and other health conditions. One sheet of hard paper or notebook usually is provided by the clinic/hospital alone the time a child grows up. It is easy to fold up and bring alone when it’s needed. This is the result of that computerization of healthcare record is not adopted by all the clinics around states, some clinics give out as a copy for guardians; or, guardians don’t have direct access to their children’s record through other media that connected to the clinic/ hospital/ insurance company, this is a convenient method that comes in handy.

However, paper documentation are easily being lost due to the move of family or careless obtained by family members.

Using online service or standalone software

Guardians have access to document children’s health conditions through online service such as Google health, BabySteps[2] or other programs that run on an in home computer such as NutriStat [6], Microsoft Excel, or even Microsoft Word.

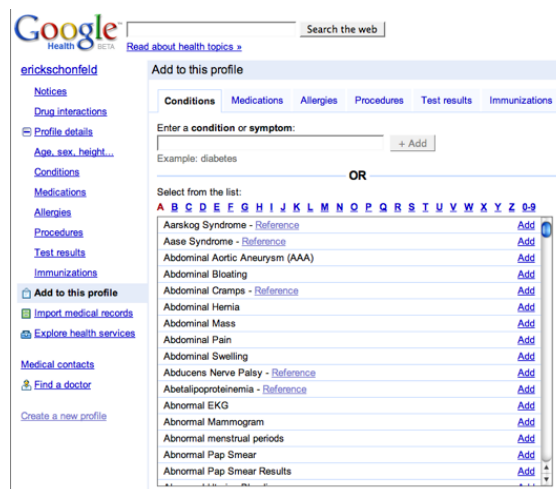


Figure 2: Google Health interface (sample page [7])

The interface is made to be easy to input and analyze the data that has been inputted for Google health (see in Figure 2) or other specifically targeting service users. By showing the graphs from analysis (Figure 3), guardians have better understand of the children’s overall health performance and have quick access gathering web information when they need to consult someone.



Figure 3: Google graph analysis (sample page [8])

Online service also provide more flexibility if guardians wish to share information with the family and easily storage. However, there are always concerns about e-healthcare record regarding to patient’s privacy. As for guardians who use other software such as Excel, it is a good way to maintain the routine or record keeping, these software is not designed for health data input and calculation.

Using portable device (e.g. smartphone)

As the market predicted, the constantly growing (see Figure 4) of smart phone provides guardian access to keep record via different applications (see Figure 5) that come with OS system operating on their phones.

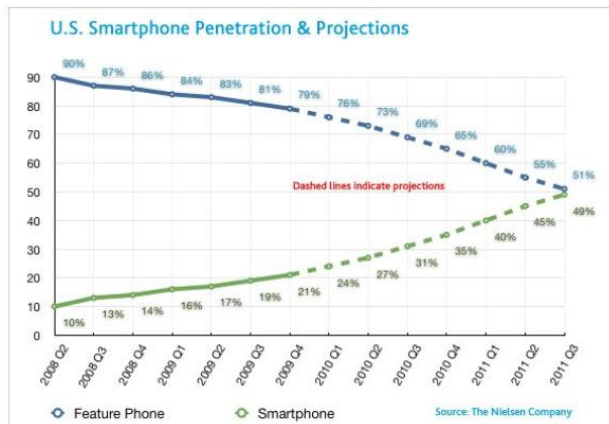


Figure 4: Niesen_U.S. smart phone usage [9]

Guardians are able to input information on-to-go; this is an easy way to carry with them while visiting the clinic so that they don't have to spend time digging out the record before going to the doctor. Some of these applications also provide simple graph analysis and nutrition information, or export function for guardians to transfer the record to their personal computer or other form of documentation. Even though this seems to be one of convenient way to monitor family member's health condition, there's still no indication that the health record would be able to sync up with clinic visiting log or indications that this could be a plausible communication with healthcare providers.



Figure 5: Current applications

4. OBSTACLES

The methodologies that used above, these are the major obstacles that guardians are facing these days.

- **Different clinic use different recording system to keep their patients' record**

Guardians found it is hard to keep a record when there is different form of information, one of the interviewee said that due to this inefficiency happened while they moved from New York, her child accidentally got an immunization

shot he already had again when they visit the clinic in Chicago.

- **No access to view the health record of their children**

Guardians have no access to view the record after they visit a clinic or hospital, even though mostly they just want to check up on the their children's health condition to keep their copy of record at home.

- **No Communication between the three parties, provider (clinics/hospitals), guardians (parents) and the third place (schools/daycare center)**

According to one of the interviewees, every semester she has to submit the updates of her children's health report that signed by a doctor; there is no other way other than visiting the clinic, wait several days to get the legit record issued by the doctor (paper form), then goes back to the schools to submit it.

- **No connections between web service/smart phone application and the medical providers**

From the heuristic reviews of Google health and several mobile application that used guardians to keep their health records for family members, usability issues occurred frequently (not carefully designed) and no indications that these applications are sync with doctor's notes nor clinic visit log. The privacy issue is also another concern regarding to this form of record keeping.

- **No united form of transforming data from a smart phone interface to home computer**

The documentation recorded on a portable device has their own format due to the size of screen and how the interface was designed. Not all the data record on the portable device are able to transcribe into a common form that used in computer OS. Several applications offer the users to send their record via email, users online account or the coordinate software they need to install in order to manage the data in another device (e.g. PC). There is no united form that serves the purpose for users to easily share their medical information with clinic or schools.

- **No educational value to help children understand their own health condition**

Nowadays, there are websites that help children with chronic disease to understand their own illness and help them to document their daily activities with children-friendly interface that intrigue children to spend time knowing the changes of their health condition. However, the resource for average children or family is surprisingly limited.

Currently, there is no method of documentation allowing children to contribute about their own health condition, which, might be an essential way to educate children about the nutrition that are good for them. Through the ability to contribute, children would be more interested in those changes of themselves and gain the knowledge of their wellbeing.

5. SUGGESTIONS

From the research and analysis above, the researcher is able to make several suggestions regarding to the development of using a framework that could widely adapt by three major parties. This framework is focusing on how to apply the concept of sharing information into possible system or software design in the future.

This system or software will be widely installed or being able access through web service, the date should be synced and be able to offer different levels of authorizations for the three parties that mentioned above. By using the same system, the medical will be in the same format and based on different levels of clearance, each party will be able to use these data to monitor a child's health.

Healthcare Receiver (parents/ legal guardians)

Limited access will be provided to the guardians, enabling them to review and download health record of family members. The entry of medical data should be contributed only by medical personals (e.g. doctors) during the medical visitation. However, applying the insight from the Kientz, Arriaga, and Abowd [1] the interface designed for guardians can be more intriguing that is able to help the record keeper more engaging and willing to use it on a regular basis. The functions of this interface may also include the ability to record data not only just for medical reason, but also a way of memory keeping; the feature might be diary keeping, photo gallery...etc. Another pathway is the communication channels with medical professions in regarding of health/nutrition consulting via emails or notes sharing with their designated health providers.

Also, the communication between guardians and schools can be leveraged by using the alert system (via cell phone application or email) and information updating for guardians being able to monitor the nutrition uptake and children's health condition at schools (e.g. children with chronic disease.)

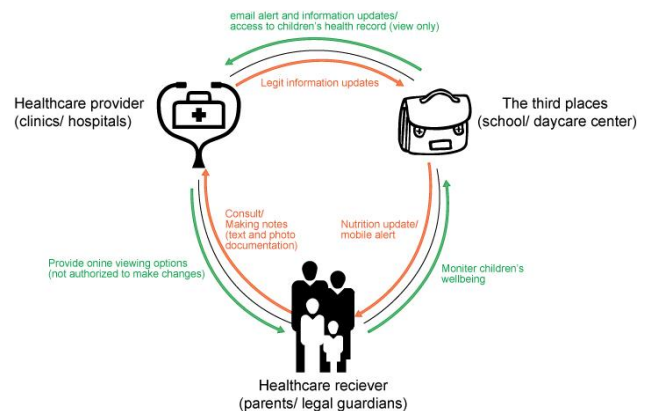
The third places (school/daycare center)

Schools will be provide with student's medical record directly from medical providers and be able to have direct connection through the system if there's any incident happen. Schools nurse will have limited accessibility toward the medical data (view only) but be able to contact either parent or doctors within the same system more efficiently.

Healthcare provider (clinics/ hospitals)

Medical personals will have access to use this system in order to document the condition of their young patients during the visitation. The data they enter should have the ability to analyze the overall performance of a child's health condition, this function would be able to help medical provider understand patients' will being and the follow-up medication they should take.

Within this system, a communication channel is also built for the purpose to connect with each family. Medical provider is able to give quick feedback or medical information that aid guardians to nurture their children's medical condition. Also, a connection established between schools and healthcare provider is important. The shared information can ease the barrier and inconvenience between these two parties.



6. CONCLUSION

The result of this paper is not concluded due to the small sample size of participants, however, this paper would be able to open the discussion and further research in more detailed and concise format about 1) the relationship and communication that include different parties (e.g. insurance companies); 2) health monitoring and record keeping by different personal (e.g. children themselves); 3) the interface and levels of security for different type of record contributors; 4) the extension of using different channels (e.g. software, games, product) to educate children for them to learn about their wellbeing alone the way they grow up.

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