

# **A Comparative analysis of the Educational Effectiveness of Leaflet and Website for Low-literate Patients**

## **– A Case Study of Immigrant Mothers in Taipei**

### **Abstract**

Low health literacy has been associated with poor outcomes in health care. Recent research suggests that good health educational material can help to reduce the literacy barrier and enhance health outcome. Immigrant populations are vulnerable to serious health disparities, and language barriers may further exacerbate their limited health literacy in accessing health care information. Yet, ways to help low-literacy parents to look after their children by applying health educational material are still at an early stage of development. The purpose of this study is to compare the educational effectiveness of leaflet and website to deliver knowledge related to children allergy healthcare for immigrant mothers with low literacy, thus establishing design guidelines of health educational materials for low-literate patients. The study was implemented in five stages, including a focus group interview, the development of testing media, a reliability and validity test, a pre-post knowledge test, and a usability survey. The findings revealed the problems low-literate patients usually encountered at the clinic, the pediatric information they most needed, the way they were able to acquire knowledge of children's healthcare, and the media they usually used to access information. Moreover, the results demonstrated that the leaflet intervention, as well as the website intervention, had a positive outcome. However, there was no significant difference between the influence of design intervention made by the leaflet and by the website. The findings also showed that the criteria used by low-literate patients to

evaluate health educational material could be analyzed in terms of the quality of information, presentation, and appeal. This research is an experiment that integrates design, communication and public health. Its findings are expected to be valuable, not only for providers and consumers, but also designers of health educational media

**Keywords:** Health Communication, Immigrant Mothers, Health Educational Media, Low literacy Health Education

## **1. Introduction**

### **1.1 Research Background**

Low health literacy has been associated with poor outcomes in health care, which include higher health care costs, a worse assessment of one's own degree of health, and less success in managing chronic diseases (National Institute of Health, 2002). Recent research suggests that good health educational media can help to reduce the literacy barrier and enhance health outcome, they can help modify attitudes, shape positive behaviours, and improve patients' self-prevention (Andersen et al., 2008; Atkinson, 2009; Choi & Bakken, 2010). However, the majority of health educational media are constructed for well-educated users rather than those with low literacy skills. This begs the question of whether or not various health educational media have the same effect on low-literate users.

Immigrant populations are vulnerable to serious health disparities, and language barriers may further exacerbate their limited health literacy in accessing health care information. According to the Ministry of the Interior,

there were 470,000 immigrants in Taiwan in 2012 and their number of their children reached 200,000 in 2012. This research considers a specific group within immigrant mothers who come from Southeast Asia in Taiwan, most of who have low levels of education and have married into poor families. Therefore, their children might not get good care because of parents' low socio-economic status. Recent surveys indicate that more than 20 per cent of children in Taiwan suffer from allergies (Zhou & Wu, 2012). Children with chronic diseases are highly dependent on their parents in the management of their health care. Yet, ways to help low-literate parents to look after their children by applying health educational media are still at an early stage of development.

## **1.2 Past Research**

The past decade has seen a great proliferation of research into low literacy health communication, such as health information technologies ( Mishra et al.,2007; Vargas et al., 2010; Allison & Ricardo, 2011; McInnes & Haglund, 2011; McCleary-Jones et al., 2013 ), the impact of health literacy (Nair & Cienkowski, 2010; Gill et al., 2012; Noblin et al., 2012; Rowlands et al., 2013), the problem of parental health literacy (Macy et al., 2011; Knapp et al.,2011; Dunn-Navarra, 2012;Yin et al.,2013), the racial and ethnic disparities in health education (Sentell & Braun, 2012; Shaw et al., 2012; Renfrew et al., 2013; Sperber et al., 2013 ), health education for low-literate patients (Andersen et al., 2008; Mackert et al.,2009; Ndwe et al., 2010; Choi & Bakken, 2010; Negarandeh et al.,2013), developing health educational material for low-literate users (Kirigia et al.,2005; Mackert et al.,2009; Dowse et al., 2011; King et al.,2012; Choi & Dinitto, 2013 ). Issues of physician-patient

communication, the problem of health literacy, and the development and evaluation of health educational materials have all been extensively discussed in the past decade. However, to the best of our knowledge, a plenty of studies focus on investigating the effectiveness of health promotional platforms from the perspective of information providers and consumers, while comparative analyses of the educational effectiveness of various media for low-literate users from the perspective of designers are comparatively rare.

### **1.3 Purpose of this Study**

While there is a high volume of complex knowledge on health care promotion, ways to help vulnerable members of the population to access appropriate health information on time is still under investigation. The purpose of this study is to compare the educational effectiveness of leaflets and websites to deliver knowledge related to children allergy healthcare for immigrant mothers with low literacy, thus establishing design guidelines of health educational media for low-literate patients. Even though leaflet is relatively inexpensive to create and provides valuable information for populations, the benefit of its one-size-fits-all approach varies from person to person. With the recent advances in computer technology, website, which combine texts, pictures, audio, and video, seem to be welcome, but whether or not their versatile presentations affect low-literate patients' health knowledge is not yet known. Considering the issues of concern above, the primary research objectives of this study are described below:

- To survey current strategies, methodologies, and tools to design health information for low-literate users
- To compare the educational effectiveness of leaflet and website to deliver children's health care knowledge to users with low literacy
- To set up guidelines for the design of health educational media for low-literate users

## **2 Literature Review**

### **2.1 Health Communication**

What is health communication? "Health communication is the study and use of communication strategies to inform and influence individual and community decisions that affect health. It links the fields of communication and health and is increasingly recognized as a necessary element of efforts to improve personal and public health" (Health.gov, 2013). The field of health communication starts with the creation of the Health Communication Division of the International Communication Association in 1975, and this subsequently becomes a division under the same name at the National Communication Association in 1985. Then, computer-tailored health education and behavioral change programs are developed and tested by researchers at several universities, health care organizations, and government agencies throughout the 1990s. There is no doubt that Health communication has grown dramatically in the past twenty-five years (Thompson, 2003, pp1-8; Kreuter et al. 2010, pp 152).

What are the themes of health communication? Garrett (2011) declares the

themes of healthcare applied to Human Factors and Ergonomics need to be concerned as follows: the improvement of healthcare delivery and process, the issues of healthcare information technology, the design of healthcare facilities and infrastructure, and the attention to clinical environment and patient safety. What are the purposes of health communication? Green & Tones (2010, p362) identified the role of health communication as followed: “ to increase the intended audience’s knowledge and awareness of a health issues, problem, or solution; to influence perceptions, beliefs, and attitudes that may change social norms; to prompt action; to demonstrate or illustrate healthy skills; to reinforce knowledge, attitudes, or behavior; to show the benefit of behavior change; to advocate a position on a health issue or policy; to increase demand or support for health services; to refute myths and misconceptions; and to strengthen organizational relationships.”

There is a great proliferation of research into health communication in the past decade, such as the physician-patient communication (Shaw 2009; Raiwan & Kim 2010), health information technology (Ashar et al. 2010; Gentles et al. 2010; Gagnon 2011), intervention of health promotional media (Johnson & Ambrose 2006; Lustria 2007; Hara & Khe 2007 ;Yang et al. 2007; Chowdhury et al. 2010; Yang & Gerla 2011) , health literacy risk communication (Kripalani et al. 2007; Andersen et al. 2008; Rubinelli et al. 2009), and health education for low literacy patients( Andersen et al.2008; Mackert et al.2009; Choi & Bakken, 2010) Although the ideological impact of various research areas brings different perspectives of thinking and more meaningful data to form a new model of health communication. However, the majority of them focus on addressing the influence of health intervention, seldom of them compared the

influence of various form of media on low-literate users.

## **2.2 Health Disparities of Immigrant Population**

Low literacy is more than just the inability to read and write. Individuals' health literacy skills and capacities are mediated by their gender, age, education, income, residence, race, ethnicity, culture, religion, etc. (Andersen 2008). It is important for health educators to adopt culturally sensitive communication practices to reach and influence vulnerable populations. Cooper et al. (2002) indicated that rapidly shifting immigration trends pose a real challenge, since significant numbers of people are forced to seek health information in a non-native language and navigate significant culture barriers. Besides, Jahanzeb et al. (2008) indicated that low literacy is the result of less schooling, and the experience of schooling imparts various skills beyond the mechanics of parsing written text, such as learning how to learn, learning the process of abstract thinking, learning to trust forms of knowledge other than experience-based knowledge, learning how to answer tests and exams, and even learning to make sense of other languages, dialects and accents. Indeed, lacking the skills to obtain, process, and understand basic information needed for their healthcare decision results in worse health outcomes for vulnerable populations.

Language barriers may supersede limited health literacy in impeding interactive communication. For example, Neuhauser & Kreps (2008) examined English-language online literature and selected books and policy documents related to literacy, cultural, and linguistic factors in health and cancer communication. The result showed that online cancer communication has not

met the literacy, cultural, and linguistic needs of non-English-speaking populations. Practitioners should guide vulnerable patients to better websites, and supplement that information with oral and tailored communication. Meanwhile, there are some websites which deliver medical and health information on a wide range of subjects with links especially aimed at low literacy audiences, such as “Medline Plus” which contains some materials for low literacy audiences, such as Easy to read, Interactive Tutorials, and Low Vision, but there is no online indication of the reading level. On the other hand, several websites are attempting to adapt current computer-based programmes tailored for low literacy ethnic minority populations. For example, “Ethnomed” provides health information in a variety of languages aimed at specific ethnic groups, such as Spanish, Chinese, Russian, Japanese, and Cambodian, but text occupies almost the whole layout, which may increase users’ cognition load and mislead patients’ treatment decisions.

Immigrant populations are vulnerable to serious health disparities. However, it is complicated to communicate effectively with these vulnerable populations. Kreps & Sparks (2008) claimed that immigrants demand effective health communication to help them manage serious diseases such as heart attacks, cancer, diabetes, strokes, HIV/AIDS, Yet, immigrants often had significant language and health literacy difficulties, which were further exacerbated by cultural barriers and economic challenges to accessing relevant health information. Therefore, adopting culturally sensitive communication practices for communication interventions were needed by immigrant populations. Furthermore, Campos (2006) explored how to improve health outcomes for patients with diabetes mellitus (DM), specifically for people in the

Hispanic/Latino community, currently the largest minority group in the United States. They used the search terms of prevalence, diabetes, Hispanic/Latino, and cultural barriers to identify English-language articles through an online search of MEDLINE/PubMed and Google (1990–2006). The findings showed that many Hispanic/Latino individuals lacked access to adequate health care because of their different cultural divide. They recommended that providing interpreters, hiring bilingual staff members, and becoming more familiar with the cultural factors could reduce racial and ethnic disparities. It goes without saying that effective communication between care providers and patients can often lead to improvements in health care management. Understanding the cultural competence and language barriers of ethnic minority populations is also important for the success of public health.

### **2.3 Leaflets VS. Websites**

There has been a huge proliferation of research into health-based design interventions in the past decade, most of which focused on the educational effectiveness of paper-based and web-based media. For example, Jan et al. (2007) attempted to determine whether or not a web-based multimedia asthma educational and monitoring programme would improve the knowledge and health status of children and caregivers. 164 paediatric patients with persistent asthma were enrolled for a 12-week controlled trial. The results showed that the adherence rates of therapeutic and diagnostic monitoring, the global assessment of asthma control, the knowledge of asthma self-management, and the quality of life of caregivers were all significantly higher in the intervention group. Moreover, Yardley et al. (2010) conducted two in-depth

qualitative studies to compare the effectiveness of paper-media and web-based media for providing medical care for flu. 47 participants were randomly placed into two groups to explore the influence of the tested media that delivered health care information about cold or flu symptoms. The results showed that users often felt overwhelmed by the quantity of information provided in paper-based media, and they wanted to have greater control of how information is accessed in web-based media. The majority of audiences are deterred by the limitation of the content layout and the static presentation.

Since paper-based media are typically created for the general population, they do not really consider the specific characteristics of prospective consumers. On the contrary, web-based media is based upon the principle of “market segmentation” which aims to find a specific group of consumers for a particular product or service. Indeed, targeted information is well suited to meet the needs of targeted populations. Compared to the function of one-size-fits-all paper-based media, web-based media can tailor information which applies to people with similar characteristics, allowing interventions to effectively target high-risk groups. Furthermore, since displaying photographs and video clips in a web browser does not require the use of additional expensive hardware, it can be generated inexpensively. Conversely, printed educational booklets are costly to produce and update. (Richards et al. 1998; Ahern et al. 2010; Kreuter et al. 2010)

While the advancement of IT technology, can computer-based media completely replace paper-based media on the work processes in daily clinical

care? Even though simple medium-portability can be achieved through contemporary handheld computer devices such as mobile phones, PDAs, tablets, etc., Paper-based media still play an essential role in clinical work. Because the functionalities offered by paper-based media, such as take notes, erase thing, and personal handwriting on mediation chart are lost in the computerized processing. Especially, paper based patient records help form cognitive tools that reduce clinicians' reliance on memory, and support joint attention and collaboration (Ban & Timpka, 2003; Bardram & Bossen, 2005; Dahl et al., 2008). Indeed, paper-based media might reduce extraneous processing and promote germane processing compared with dynamic animations, whereas web-based media might split the attention, increase the cognitive load, and reduce the transfer of learning compared with static illustration. However, most health care educators hold the same view, which is to simplify the descriptive text of educational materials and increase the visual effect to please the modern audience. The advantages and disadvantages of using a leaflet or website to promote healthcare are discussed below.

**Table 1 Leaflet VS. Website**

	<b>Leaflet</b>	<b>Website</b>
<b>1</b>	Static Media	Dynamic media
<b>2</b>	Portable	Portable but expensive (smart phone)
<b>3</b>	Initially inexpensive	Initially expensive
<b>4</b>	One-way communication	Interactive communication
<b>5</b>	One-size-fits-all	Tailor target users
<b>6</b>	General population	Market segmentation
<b>7</b>	No IT skills needed	Basic skills needed
<b>8</b>	No feedback	Allow feedback

## 2.4 Low-literacy Health Education

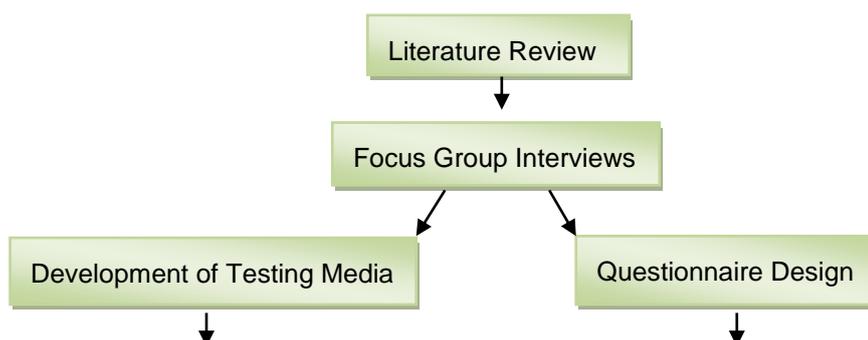
Health literacy is the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions and follow instructions for treatment (American Medical Association Foundation, 2008). It is important to examine health literacy because low health literacy has been associated with poor health-related outcomes, which include hospitalization rates, poor adherence to prescribed treatment and self-care regimens, increase medication or treatment errors, failure to seek preventive care, lack of skills needed to navigate the health care system, disproportionately high rates of diseases and mortality, and the increased use of emergency rooms for primary care (Heather L. Bankson, 2009; Choi & Bakken, 2010).

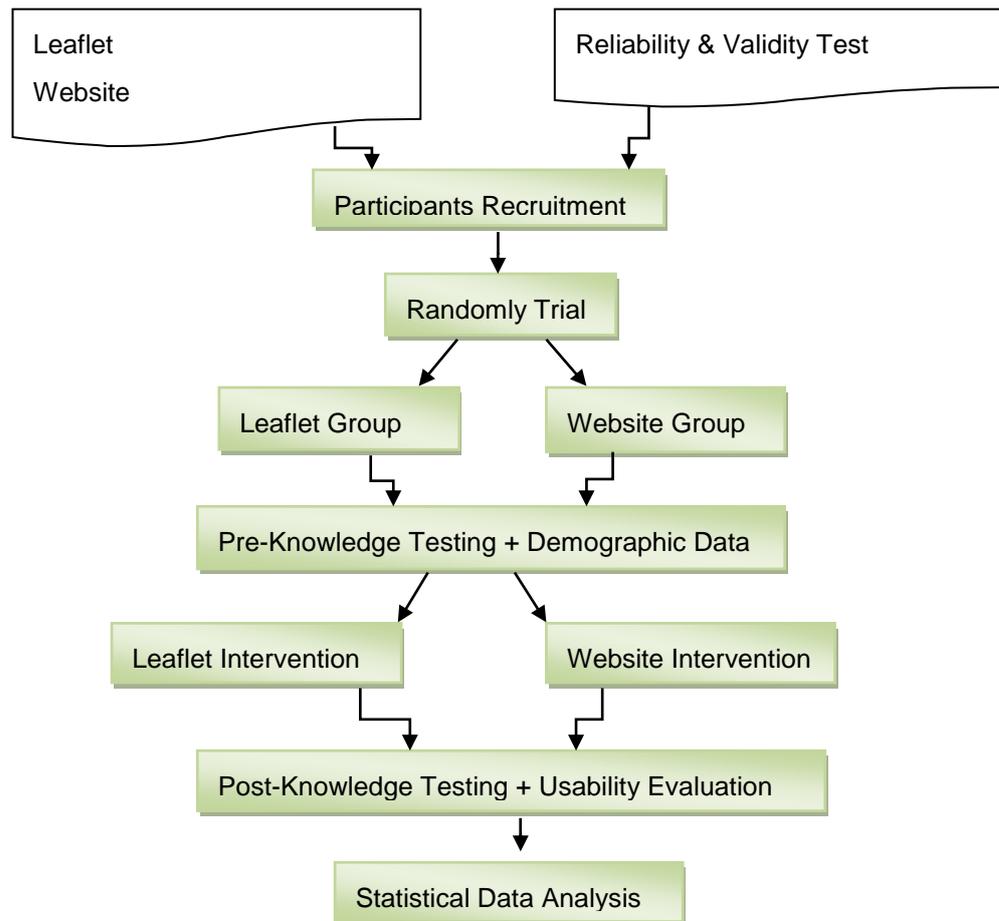
A growing number of studies are now available to shed some light on the development and evaluation of practicable health care applications for low-literate users. For example, Ishibashi & Nakajima (2004) developed a courseware to provide illiterate people with knowledge of preventing infectious diseases. They suggest that, rather than providing highly valuable satellite-assisted telemedicine systems to support high income doctors, a low valuable multimedia-assisted public health courseware will be far more cost-effective to engage in a project targeting poverty-stricken levels of society which are more susceptible to disease. It is undeniable that improving the knowledge of preventative measures of the low-literate population could reduce social risk and cost. Furthermore, Andersen et al. (2008) created an

adaptive web-based kiosk system to deliver appropriate information about smoking cessation to low-literate Hispanics (Mexican- Americans). The study was implemented in three stages, including a focus group interview, the development of a website, and a field testing and usability survey. The results showed that Hispanics were just as likely to use technology as Non-Hispanics, and that a kiosk was an appropriate way to collect data about the population of a clinic. In addition, Medhi et al. (2011) developed and tested three prototypes of mobile phone with a text-free interface, such as a spoken dialogue system, a graphical interface, and a live operator. They conducted an ethnographical study of the barriers to usability encountered by 90 low-literate subjects in India, Kenya, the Philippines, and South Africa. The results showed that first-time low-literate users found textual interfaces to be unusable and the greatest number of tasks were completed using a graphical interface. They also found that a live operator was up to ten times more accurate than a text-based interface, and a spoken dialogue system could be used by those who felt more comfortable and familiar with speech. The broad range of the available testing methods makes it difficult to choose the best usability assessment plan, which is what the study and methodology described in this paper intends to investigate.

### 3 Methodologies

#### 3.1 The Framework of this Study





**Figure1. The Framework of this Study**

### 3.2 Focus Group Interviews

A focus group interview was conducted with 10 Vietnamese volunteer interpreters to explore the problems experienced by immigrant mothers in terms of health communication and their use of media. These volunteers have lived in Taiwan for years and provide a translation service for clinics. Since they have similar local cultural values and local sociological issues as those experienced by immigrant mothers on a regular basis, their feedback related to general healthcare problems within the immigrant population can be regarded as being objective. Therefore, a wide range of issues related to the challenges

involved in face-to-face consultations with paediatricians, the special need for children's healthcare information, and the ways in which immigrant mothers acquire healthcare knowledge were discussed in the brain-storming meeting. The duration of this focus group interview at the Taipei Immigrant Hall was two hours and it was recorded on audiotape. All the participants were encouraged to express themselves openly without being concerned about others' opinion, and their feedback served as a reference for the further development of usability testing media and the implementation of pre-and-post knowledge testing.

### **3.3 Development of Testing Media**

A leaflet and a website were developed as the testing media, both including the same healthcare information relating to the causation, symptoms, treatment and prevention of children's allergies, and all of the developing strategies were informed by literature review and references collected from former focus group interviews. All the information and questionnaires for this research were created at secondary school level or lower to meet the standard of immigrant mothers' readability. All of the text, layout design and operating function in the testing media were integrated and converted using the computer software, Photoshop, Illustration, Flash and Dreamweaver, a combination of Adobe multimedia-development application systems. The theme content and design strategy for the testing media are described below.

### **3.4 Questionnaire Design & Reliability and Validity Test**

Questionnaire designed for this study is divided into two parts, pre-test and post-test. The pre-test (baseline) included demographic information (nationality, age, education, occupation, number of children, average monthly household income, number of children and whether suffer from allergies), the problems involved in health communication, and a questionnaire to test their knowledge related to the cause, symptoms, treatment and prevention of children's allergies healthcare. The post-test included the same questions for knowledge testing as those contained in the pre-test, as well as a usability survey to assess the participants' user satisfaction. All the questions in the questionnaire for this research were created at secondary readability level or lower, and they were made available in the Chinese and Vietnamese languages. The questions were asked in a yes/no or a multiple-choice format, and a qualitative and quantitative analysis had been performed concurrently with the data collection at a later stage.

In order to make sure that all of the questions in the questionnaire are good indicators to measure the important variables in this study, a reliability and validity test was conducted. A reliability and validity test was conducted by a paediatric allergy specialist, a paediatric clinical nurse, a Vietnamese translator, a new immigrant mother, and a professional researcher to ensure that all the questions in the questionnaire were good indicators to measure the important variables in this study. A 5-point Likert-type scale of response options ranging from strongly disagree to strongly agree was used to elicit endorsement of a particular statement. The rating scale for measuring the appropriateness of the questionnaire was scored from 1= strongly disagree, 2=disagree, 3=no opinion, 4=agree, 5= strongly agree. Then, the questions with higher scores, which

indicated greater appropriateness, were retained, while the questions with lower scores, which indicated lower appropriateness, were discarded. The results showed that the experts agreed or strongly agreed with most of the questions in the questionnaire because they marked them with 4.8 out of 5. However, they still disagreed with 10 questions, marking them below 4 out of 5, which were amended before commencing the pre-and-post knowledge Testing.

### **3.5 Pre-and-Post Knowledge Testing**

Randomised controlled trial (RCT) in healthcare is recognised as being a useful method to assess patient satisfaction after using various kinds of health intervention. The strength of RCT is its random allocation of participants and its feature of being blind or double-blinded reduces the chance of bias and eliminates the potential impact of factors other than the intervention (Taylor, 2005) 70 immigrant mothers from Vietnam and China were randomly placed into two groups to explore the educational effectiveness of leaflets and websites respectively; that is, when one participant was organized into the leaflet group, and the next one was organized into the website group. 35 were for a leaflet group to be presented with the leaflet, and 35 were for a website group to be presented with website. All of the groups were asked to fill out the knowledge testing questionnaire before and after the trial. Thus, this research could measure their memory recall of the presented media. Before the test, the assistant simply demonstrated how to operate the testing media, and then allowed all the participants to operate it themselves. According to the experts' opinion in the reliability and validity test, this best duration of test for immigrant

mothers is no more than an hour. Then every participant had 20 minutes to fill in a pre-test questionnaire, 20-30 minutes to view the media, and 20 minutes to fill in a post-test questionnaire. Participants could raise their hands to ask questions at any time when they were filling in the questionnaires and viewing the media.

### **3.6 Usability Evaluation**

Usability evaluation can be defined as being a measure of the learnable effectiveness as to whether or not a technological product fits the specified goals of users (Lewis 2002; Miller, 2005). To establish guidelines for the design of health educational materials for users with low literacy, a usability evaluation test was conducted to identify the factors of health promotional media that affect users' satisfaction and help them to learn best. Each participant was asked to complete a questionnaire to evaluate the usability of the presented media after the pre-test and post-test. This consisted of 21-24 items of evaluation criteria, including the quality of information, presentation, and the appeal of the media in question. These evaluation criteria were informed by recent studies from evaluation literature and references collected from former focus group interviews. A five-point Likert Scale was used for every question, with higher scores indicating the higher appropriateness. The rating scale for measuring the appropriateness of the questionnaire was scored from 1= very unimportant, 2=unimportant, 3=no opinion, 4=important, 5=very important. Then, the questions with higher scores, which indicated greater appropriateness, were retained, while the questions with lower scores, which indicated lower appropriateness, were discarded.

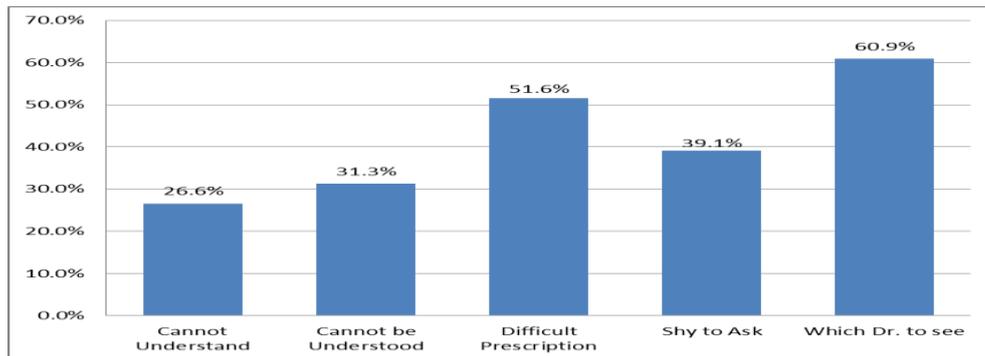
## 4 Results

### 4.1 Data Analysis of Questionnaire Survey

1. In order to examine that the problems immigrant mothers usually encountered in the clinic, Descriptive Statistics / Frequencies test was used.

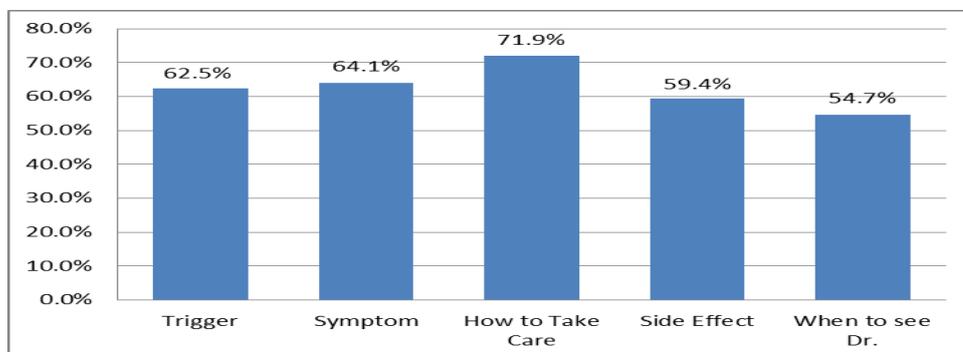
Chart 4.1.1 shows the results:

**Chart 4.1.1 The problems immigrant mothers usually encountered in the clinic**



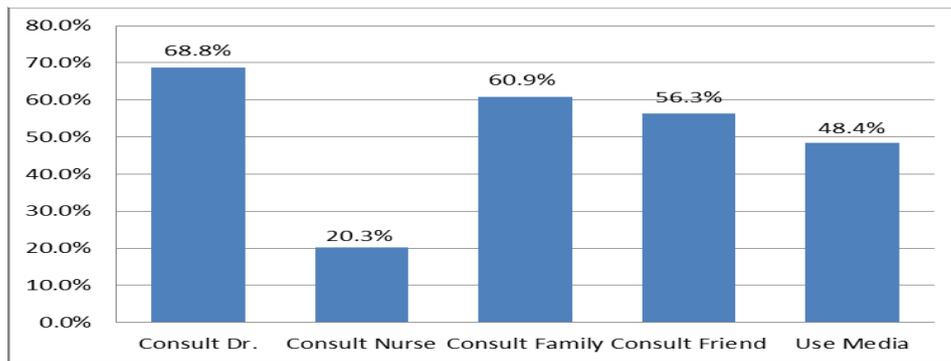
2. In order to examine the paediatric information immigrant mothers most need when their children are sick, a descriptive statistics / frequencies test was used. Chart 4.1.2 shows the results:

**Chart 4.1.2 The paediatric information immigrant mothers most need when their children are sick**



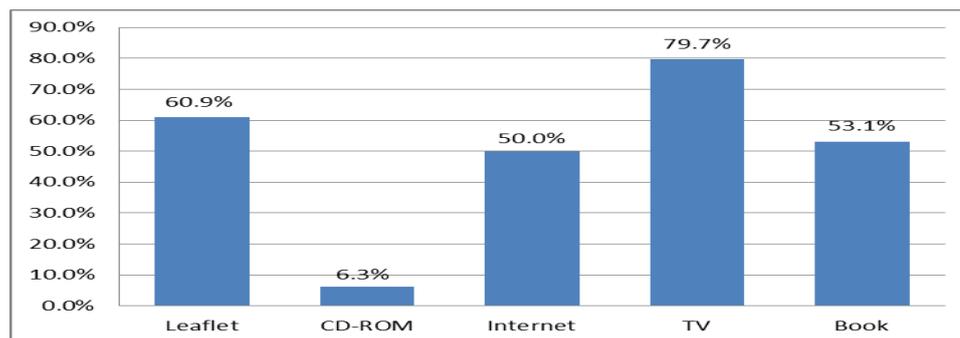
3. In order to examine the ways used by immigrant mothers to acquire knowledge of their children’s healthcare, a descriptive statistics / frequencies test was used. Chart 4.1.3 shows the results:

**Chart 4.1.3 The ways used by immigrant mothers to acquire knowledge of their children’s healthcare**



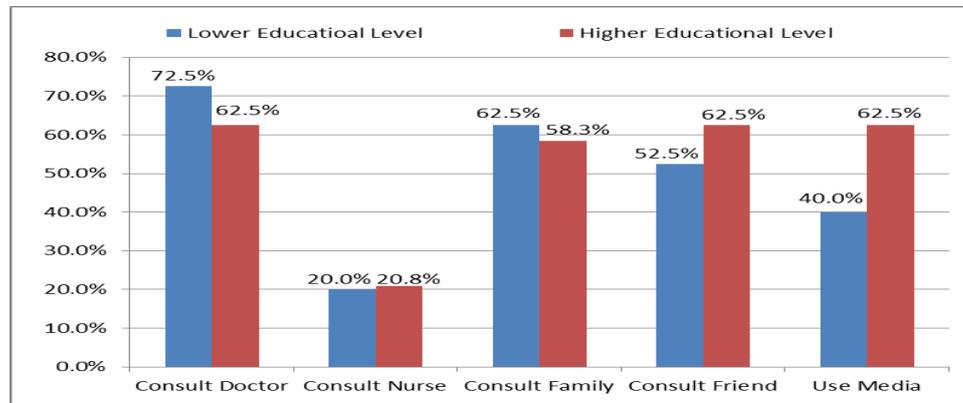
4. In order to examine the media immigrant mothers usually access to acquire information about their children’s healthcare, a descriptive statistics / Frequencies test was used. Chart 4.1.4 shows the results:

**Chart 4.1.4. The kinds of media immigrant mothers usually access to acquire information about their children’s healthcare**



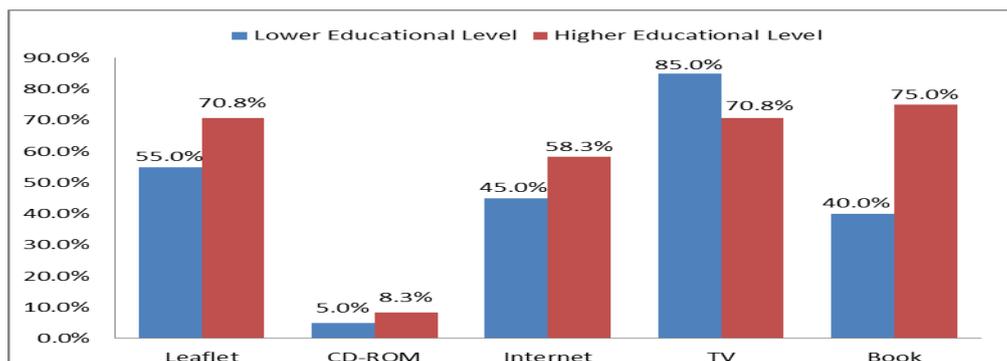
5. In order to examine the relationship between “the ways used by immigrant mothers to acquire knowledge of their children’s healthcare” and their “educational level”, Multiple Response / Crosstabs test was used. Chart 4.1.5 showed the results:

**Chart 4.1.5 “The relationship between “the ways used by immigrant mothers to acquire knowledge of their children’s healthcare” and their “educational level”**



6. In order to examine the relationship between “the kinds of media immigrant mothers usually access to acquire information about their children’s healthcare” and their “educational level”, Multiple Response / Crosstabs test was used. Chart 4.1.6 showed the results:

**Chart 4.1.6 The relationship between “the kinds of media immigrant mothers usually access to acquire information” and their “educational level”**



## 4.2 Data Analysis of Pre-and-Post Knowledge Test

### 4.2.1 Leaflet Group VS. Website Group

1. In order to examine whether there were significant differences between the results shown in the pre-test and the post-test of using the leaflet as a media, a Pair T-test was applied. Table 4.2.1.1 shows the results: there

were significant differences between the pre-test and the post-test of using the leaflet as a media. ( $t=-11.259$ ,  $*** p < .001$ )

**Table 4.2.1.1 Pair T-test (Leaflet)**

		Mean	Mean Difference	t-value
Leaflet Group	Pre-test	13.50	2.97	-11.259***
	Post-test	16.47		

2. In order to examine whether there were significant differences between the results shown in the pre-test and the post-test of using the website as a media, a Pair T-test was applied. Table shows the results: there were significant differences between the pre-test and the post-test of using the website as a media. ( $t=-9.063$ ,  $*** p < .001$ )

**Table 4.2.1.2. Pair T-test (Website)**

		Mean	Mean Difference	t-value
Website	Pre-test	14.44	3.03	-9.063***
	Post-test	17.47		

3. In order to examine whether there were significant differences between the effectiveness of health intervention made by the leaflet and by the website, an independent sample t-test was applied. Table 4.2.1.3 shows the results: there was no significant difference between the effectiveness of health intervention made by the leaflet and by the website ( $t=-0.147$ ,  $p>.05$ ).

**Table 4.2.1.3 Independent Sample t-test (Leaflet VS. Website)**

	Media	N	Mean	Std. Deviation	Sig.	t-value
Educational Effect	Leaflet	32	2.97	1.49	.884	-.147
	Website	32	3.03	1.89		

#### 4.2.2 Demographic Analysis

1. In order to examine if there were significant differences between the educational effect and the user's "nationality", an independent sample t-test was applied. Table 4.2.2.1 showed the results: there was no significant difference between the educational effect and the user's "nationality" ( $t=.154$ ,  $p>.05$ ).

**Table 4.2.2.1 Educational Effect VS. Nationality**

	Nationality	N	Mean	Std. Deviation	Sig.	t-value
Educational Effect	Vietnamese	42	3.02	1.77	.445	.154
Leaflet & website	Chinese	22	2.95	1.56		

2. In order to examine if there were significant differences between the educational effect and the user's "age", One-Way ANOVA test was used. Table 4.2.2.2 showed the results: there was no significant difference between the educational effect and the user's "age", ( $F=.016$ ,  $p>.05$ ).

**Table 4.2.2.2. Educational Effect VS. Age**

	1	2	3	F	Sig.	Scheffe Post Hoc Comparison
Mean	2.94	3.04	3.00	.016	.984	Not Sig.

Note:1:20-30, 2:30-40, 3: 40 or above.

3. In order to examine whether there were significant differences between the educational effect and the user's "educational level", One-Way ANOVA test

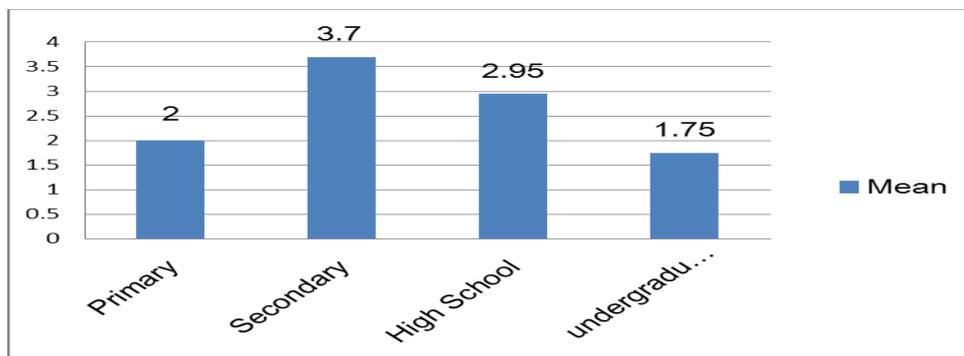
was used. Table 4.2.2.3 showed the results: there were significant differences between the educational effect and the user's "educational level", ( $F=4.435$ ,  $P<.01$ ). (Sig .002\*).

**Table 4.2.2.3. Educational Effect VS Education Level**

	1	2	3	4	F	Sig.	Scheffee Post Hoc Comparison
Mean	2.00	3.70	2.95	1.75	4.435	.007*	(1,2)*

Note: 1: Primary(grade 1-6), 2: Junior High(grade 7-9), 3: High school(grade 10-12),  
4:Undergraduate

**Chart 4.2.2.3 The differences between the educational effect and the user's "educational level"**



4. In order to examine if there were significant differences between the educational effect and the user's "job", One-Way ANOVA test was used. Table 4.2.2.4 showed the results: there was no significant difference between the educational effect and the user's "job", ( $F=1.72$ ,  $P>.05$ ).

**Table 4.2.2.4 Educational Effect VS. Job**

	1	2	3	F	Sig.	Scheffe Post Hoc
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						Comparison
Mean	2.30	2.81	3.28	1.72	.187	Not Sig.

Note: 1: Full Time, 2: Part Time, 3: Housekeeping.

5. In order to examine if there were significant differences between the educational effect and the user's "monthly income", One-Way ANOVA test was used. Table 4.2.2.5 showed the results: there was no significant difference between the educational effect and the user's "monthly income" ( $F=1.374$ ,  $P>.05$ ).

**Table 4.2.2.5 Educational Effect VS Income**

	1	2	3	4	F	Sig.	Scheffe Post Hoc Comparison
Mean	2.79	3.00	2.57	4.00	1.374	.259	Not Sig.

Note: 1: Less than 20,000 NTD, 2: 20,000-30,000 NTD, 3 :30,000-40,000NTD, 4: More than 40,000 NTD.

6. In order to examine if there were significant differences between the educational effect and the user's "number of children", One-Way ANOVA test was used. Table 4.2.2.6 showed the results: there was no significant difference between the educational effect and the user's "number of children", ( $F=.014$ ,  $P>.05$ ).

**Table 4.2.2.6 Educational Effect VS Numbers of Children**

	1	2	3	F	Sig.	Scheffe Post Hoc Comparison

Mean	3.03	2.94	3.00	.014	.986	Not Sig.
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Note: 1: 1 child, 2: 2 children, 3: 3 children.

7. In order to examine if there were significant differences between the educational effect and the user's "allergic child at home", One-Way ANOVA test was used. Table 4.2.2.7 showed the results: there was no significant difference between the educational effect and the user's "allergic child at home" ( $F=.957, P>.05$ ).

**Table 4.2.2.7 Educational Effect VS Allergic Children at Home**

	1	2	3	F	Sig.	Scheffe Post Hoc Comparison
Mean	3.2	3.3	2.63	.957	.390	Not Sig.

Note: 1: Yes, I have allergic child at home 2: No, I don't have allergic child at home, 3: No idea:

I don't know if my child has allergy.

8. In order to examine if there were significant differences between the educational effect and the user's "web-surfing frequency", One-Way ANOVA test was used. Table 4.2.2.8 showed the results: there was marginal significant difference between the educational effect and the use.r's web-surfing frequency ( $F=2.57, 1.0>P>.05$ ).

**Table4.2.2.8 Educational Effect VS Web-surfing Frequency**

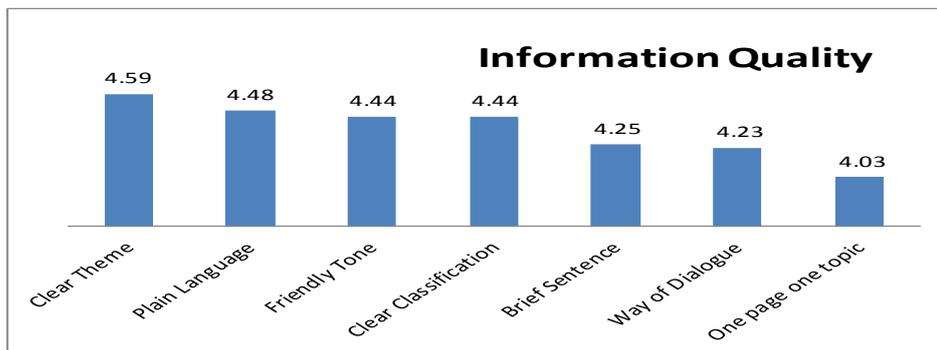
	1	2	3	4	F	Sig.	Scheffe Post Hoc Comparison
Mean	2.11	4.60	5.00	2.94	2.57	.074	Not Sig.

Note: 1: Surfing the web once a day, 2: Surfing the web once a week, 3: Surfing the web once a month, 4: Do not know how to use internet.

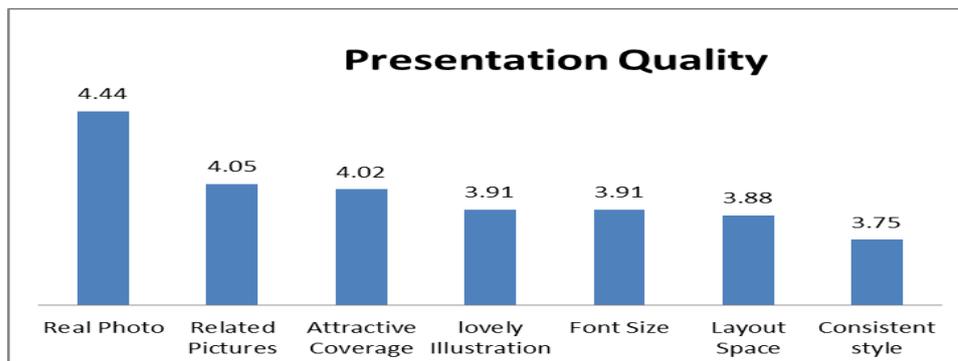
### 4.2.3 Data Analysis of Usability Evaluation

1. In order to examine the criteria used by immigrant mothers to evaluate health educational material, Descriptive Statistics / Frequencies test was used. Chart 4.2.3.1 to Chart 4.2.3.4 showed the results: In brief, the average score for all the evaluation criteria reached 4.22, which indicated that all the immigrant mothers agreed that it was appropriate. However, the average score for presentation quality was only 3.96, which was significantly lower the average score for information quality (4.35) and the average score for appeal quality (4.30).

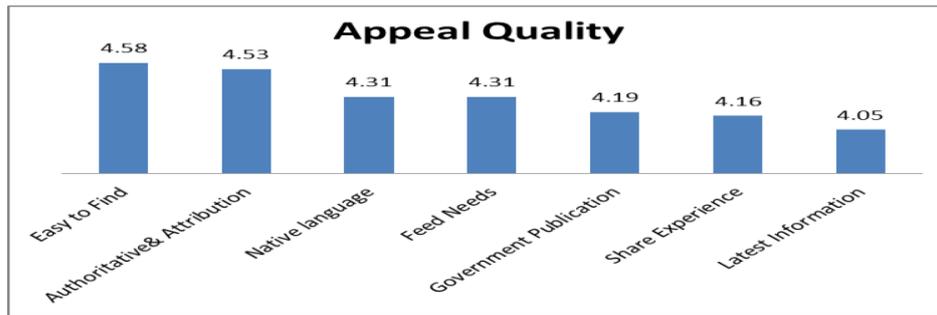
**Chart1 4.2.3.1 Information Quality**



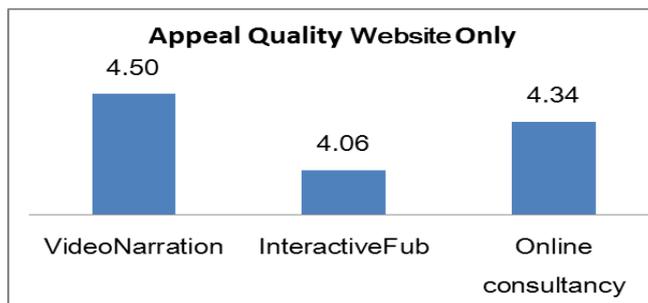
**Chart 4.2.3.2 Presentation Quality**



**Chart 4.2.3.3 Appeal Quality**

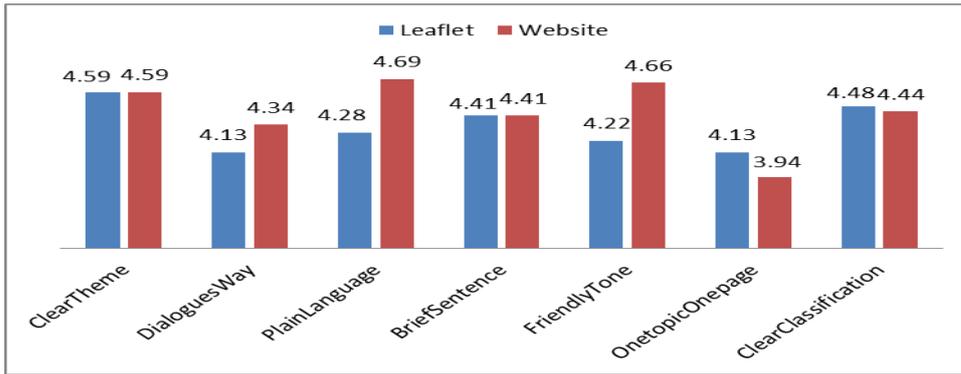


**Chart 4.2.3.4 Appeal Quality Website Only**

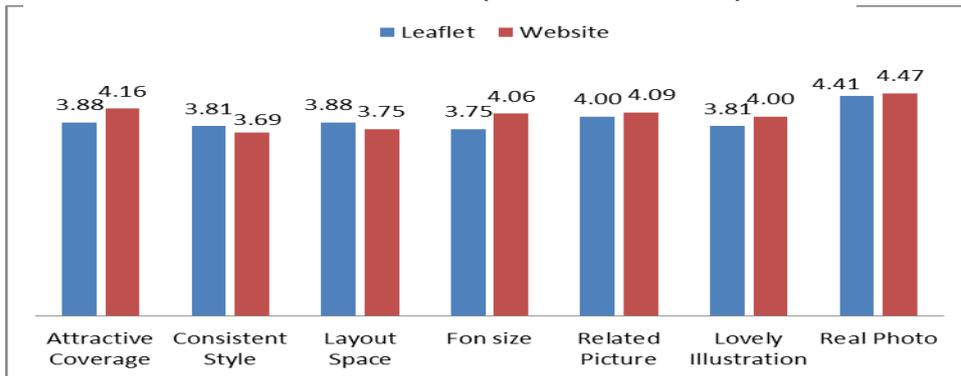


2. In order to examine whether there were different evaluation criteria used by the leaflet group and the website group, Multiple Response / Crosstabs test was used. Chart 4.2.3.5 to Chart 4.2.3.7 showed the results: In brief, the average score of the leaflet group was 3.95 and the average score of the website group was 4.04, which indicated that the website group agreed marginally more with the appropriateness of the evaluation criteria than the leaflet group. However, these two groups used different evaluation criteria. For example, in terms of the quality of information, “plain language” and “friendly tone” obtained a significantly different score from the two groups, as did “attractive coverage” and “font size” in respect of the presentation of information and “authoritative & attribution” and “easy to find” in terms of the quality of appeal.

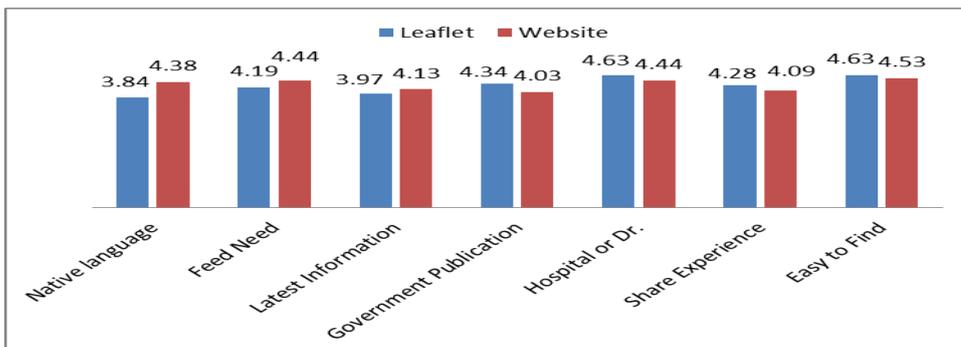
**Chart 4.2.3.5 Information Qualities (Leaflet VS. Website)**



**Chart 4.2.3.6 Presentation Qualities (Leaflet VS. Website)**



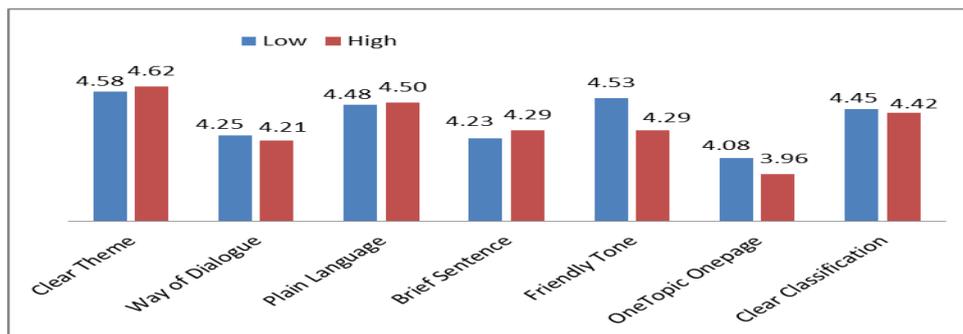
**Chart 4.2.3.7 Appeal Qualities (Leaflet VS. Website)**



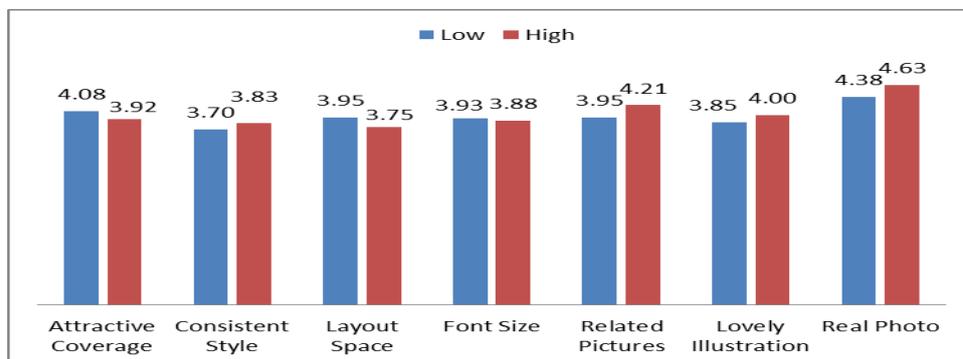
3. In order to examine whether the immigrant mothers with lower education level have different evaluation criteria from those with higher education level when evaluating the media of health promotion, Multiple Response / Crosstabs test was used. Chart 4.2.3.8 to Chart 4.2.3.10 shows the results: Briefly, the average score of those with a lower level of education was 4.21

and the average score of those with a higher educational level was 4.24, which indicated that all the evaluation criteria were agreed by both groups. However, the immigrant mothers with a lower level of education used different evaluation criteria than those with a higher educational level when evaluating the media of health promotion. For example, in terms of the quality of information, the criterion of “friendly tone” obtained a significantly different score from the two groups, as did the criterion of “relative pictures” in respect of the presentation of information and the criterion of “government publication” related to the quality of appeal.

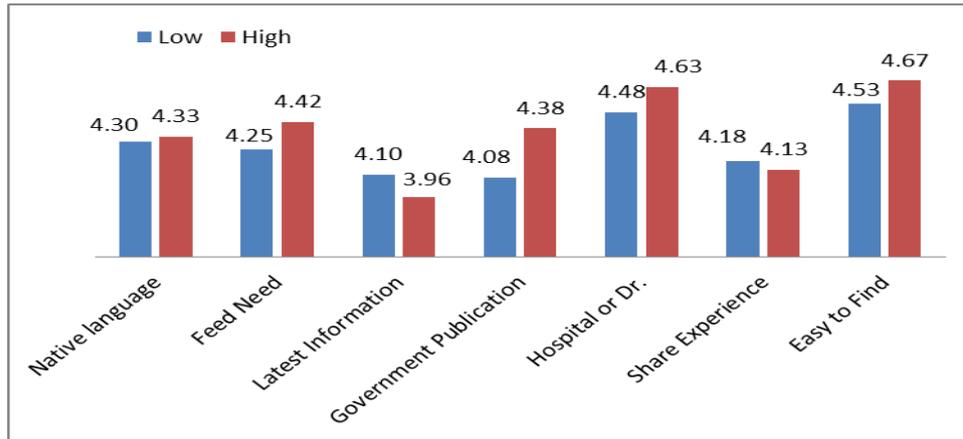
**Chart 4.2.3.8 Information Qualities (Lower Education VS. Higher Education)**



**Chart 4.2.3.9 Presentation Qualities (Lower Education VS. Higher Education)**



**Chart 4.2.3.10 Appeal Qualities (Lower Education VS. Higher Education)**



## 5 Discussions and Conclusion

### 5.1 Key Findings and Significance of the Study

The findings showed that the problems that immigrant mothers usually encountered in the clinic could be ranked as “I do not know which doctor to see”, “I cannot understand the prescription”, “I am too shy to ask questions”, “cannot understand what the doctor says”, and “the doctor cannot understand what I am saying”. Considering the issues mentioned above, it is evident that health literacy was the biggest obstacle for low-literate users in acquiring healthcare information, and language barriers even supersede the limited health literacy of immigrant population in impeding their interactive communication with physicians. This illustrates a fundamental concern to resolve the problems involved in doctor-patient communication among members of low-literate populations. Face-to-face methods have a number of advantages over other health promotional media if they really make specific advices to meet the needs of patients.

The findings also showed that the paediatric information immigrant mothers most need when their children are sick can be ranked as “how to give care”, “common symptoms”, “trigger factors”, “side effects of drug”, and “when to see a doctor”. To date, a big volume of information related to chronic diseases had been transmitted on various kinds of educational media. However, the more information provided, the low proportion of information are remembered by audiences. Targeted information is more suited to meet the needs of targeted populations. Low-literate patients expect simple topics with clear instructions rather than complex issues with professional suggestions.

Most of the immigrant mothers would ask their doctors, families and friends about the information of children’s healthcare, and only 48% of them indicated that they would make use of health educational materials. The above findings show that immigrant mothers prefer to have consultations with real people, to ask questions and receive answers, rather than using the non-interactive method of obtaining information from health educational media. No wonder racks of health educational materials are ignored in hospitals, clinics and community health centres. Although healthcare media are emerging as promising vehicles to provide health intervention, the way to increase their exposure rate within low-literate population is still challenging the information providers and content designers.

The media immigrant mothers usually access to acquire information about their children’s healthcare are ranked as television, leaflets, books, internet, and CD-ROM respectively. This is probably because it is easy to approach

healthcare information on television and in leaflets, whereas special digital knowledge is required in order to access healthcare information on a computer or video. Exploring what problems are caused by the digital-divide that prevents low-literate users from accessing health educational media and removing the technical obstacle for them to acquire health information will result in better communication.

There was no big difference between the way that low-literate immigrant mothers and high-literate immigrant mothers acquired knowledge of children's healthcare. However, the percentage of high-literate users was significantly higher than that of low-literate users in terms of accessing media to obtain health information, whereas the percentage of low-literate users was significantly higher than that of high-literate users in respect of consulting a doctor for health information. The majority of the immigrant mothers declared that they believed that most of the health educational media was constructed for well-educated users. Apparently, there is an enormous gap between the reading comprehension level of patients and the readability of patient educational materials.

The favourable media for the immigrant mothers with lower educational levels could be ranked as television, leaflets, websites, and books, whereas the favourable media for the immigrant mothers with higher educational levels could be ranked as books, brochures, websites, and television. We were not surprised to find that immigrant mothers with higher educational level preferred to access the media with complex content, while those with lower educational

level preferred to access media with simple information. However, we were encouraged to discover that the interventions made by television helped immigrants with different level of literacy learn new knowledge well. The critical combination of audio and visual elements of TV significantly really grabbed the attention of the majority of low-literate users.

## **5.2 Compare the Educational Effectiveness of Leaflet and Website for Low-literate Users**

The findings illustrated that there were significant differences between the pre-test and post-test of using leaflets or using the website as media. The result showed that leaflet intervention had a positive outcome, as well as the website intervention. However, there was no significant difference between the influence of design intervention made by the leaflet and by the website. Even the average mean of website group was marginally higher than the average mean of leaflet group.

Some of the participants in the Leaflet Group apparently lacked patience to read the text content but depended on the illustrations and photos to understand the healthcare information. It seems the realistic photos helped the participants to understand the information while situational photos deepened their impression. The lovely illustrations also shorten the distance among one another, cut down mental self-defences, and make the content easier and more readable for the participants. However, the participants who had allergic children at home in the Leaflet Group appeared more concentrated on the text content rather than illustrated content. They indicated that the advantages of

static leaflets are easy to navigate needed information, select specific topic, and read content repeatedly. More than half of the participants in the Leaflet Group found the leaflet very useful, and asked if they can bring it home as a backup reference for taking their allergic children.

Some of the participants in the Website Group indicated that the video-clip speed was so slow that disturbed their reading process, and that's why they liked to read the text content directly. On the contrary, some of them stated that some text of content on the website is hard to understand, so they directly watched the video-clip and listened to the voice-over. It was surprising to find that users in the Website Group who were not familiar with web-surfing performed better than those who were good at it. The users who surfed the net more often indicated that even though interactive functions on website can somewhat reduce the anxiety levels and enhance users' interest, they may also split their attention and increase their cognitive load so that they lose the key message.

Moreover, most of the demographic factors did not have an impact on the educational effectiveness, apart from the user's "web-surfing frequency" and user's "educational level". For example, the findings showed that there was no significant difference between the educational effect and the user's "nationality". Although Chinese participants had been predicted to perform better than their Vietnamese counterparts, surprisingly, there was not much difference between the performances of both groups. This is probably because the content of test media and the questions in questionnaires were made available in the Chinese and Vietnamese languages. There was also no

significant difference between the educational effect and the user's "age". The younger immigrant mothers were predicted to perform better than the older immigrant mothers, surprisingly; there was not much difference between the performances of both groups. This was probably because the older immigrant mothers who has longer residential period in Taiwan, they had the advantage of fluent language when they asked questions, while the younger immigrant mothers had the disadvantage of language barriers because of their shorter stays and they were shy to raise their hands to ask questions.

Then, there was no significant difference between the educational effect and the user's "job". The full-time users were predicted to perform better than housekeeping users since they had a comparative advantage in using social networks. On the contrary, it was surprising to find that the housekeeping users performed better than those who had a part-time job and even those in full-time employment, which shown that the testing media was well-designed for different groups of participants. There was also no significant difference between the educational effect and the user's "monthly income". However, users who had the highest monthly income performed marginally better than those who had the lowest monthly income. This was probably because the users with a higher monthly income also had a higher level of education, as well as more opportunity to access health educational media.

Then, there was no significant difference between the educational effect and the user's "number of children". The users that had numerous children were predicted to perform better those who only had one child. However, we were surprised to find that users who had more care experience with more children

didn't perform better than those who had less care experience. There was also no significant difference between the educational effect and the user's "allergic child at home". Users with an allergic child at home were predicted to perform better than those without an allergic child. However, it was surprising to find that users who may have had knowledge of children allergies did not perform better than those who may not have had similar knowledge. This is probably the users with an allergic child at home might have answered more correctly during Pre-test. However, the users who didn't know if their children have allergies performed the worst.

On the other hand, there was marginal significant difference between the educational effect and the user's "web-surfing frequency". Users in the website group who surfed the net more often were predicted to perform better than those who seldom surfed the net. However, it was surprising to find that users in the website group who were not familiar with web-surfing performed better than those who were good at it. This is probably because less confident users focused more on the test. There were also significant differences between the educational effect and the user's "educational level", those who achieved primary education and those who achieved secondary education show the significant differences. It was surprising to find that low-literate users performed significantly better than highly literate ones, which proved that these two testing media had been well-designed for low-literate users and well-accepted by them. It is also probably because the users with high literacy are not as compliant as the users with low literacy to receive any suggestion from health educational materials.

### **5.3 Strengths and Limitations of the Study**

This is an interdisciplinary research that integrates Design, Communication and Public Health, it conveys comprehensive new knowledge of visual design, information technology, and healthcare education. Successful health communication depends on the health information properly coded by the providers and correctly decoded by the consumers. The findings of this study are expected to be valuable, not only for the providers and consumers of health information, but also for the designers of health educational media.

To the best of authors' knowledge, this is the first research that compares the educational effectiveness of leaflets and websites for low-literate users. The majority of past researches were focus on developing and evaluating the effectiveness of health educational media for well-educated users, while comparative analyses of the influence of various forms of media on low-literate users are comparatively rare. Nevertheless, specific strategies, methodologies, and tools were determined to design, implement, and evaluate specific health educational media to meet the needs of low-literate users.

Secondly, this is the first experiment that uses quantitative and qualitative methods to compare the influence of health interventions made by various forms of media. Thousands of health interventions fail to go beyond the trial stage, because the broad range of the available usability testing methods makes it difficult to choose the best plan to assess the efficiency of the intervention. However, this study provides a holistic framework for improving

health intervention using various methodologies, including development, experiment, observation, comparison, and analysis.

Thirdly, this is the first exploration that focuses on tailoring the target audience and establishing and developing strategies of health educational media to meet the special needs of ethnic minority populations. Few past studies examined the impact of health intervention on immigrant populations, evaluated the relationship between caregivers' literacy and health outcomes, or even focused on interventions to improve child health outcomes for parents with low literacy. However, this study identifies these underlying factors and incorporates solutions to provide readable and reliable health educational media for immigrant populations.

Fourthly, this is the first prototype that focuses on the transfer of healthcare information related to paediatric allergies to low-literate users. Many past studies were interested in the influence of health intervention on improving the self-management skills of asthma and diabetic patients; yet, there is no comprehensive research focusing on improving healthcare knowledge related to paediatric allergies for low-literate parents. However, this study cooperated with paediatric allergy specialists to develop and evaluate a practical health educational platform, which provides healthcare knowledge related to atopic dermatitis, allergic rhinitis, and bronchial asthma to help low-literate parents to take care of their children.

This research has two major limitations, one of which is the use of probability sampling, while the other is the reliability of the questionnaire survey. It was very difficult to recruit low-literate participants because of the consent form for ethical reasons, while some feedback from the questionnaire may have been distorted because of embarrassing and upsetting issues. The results may have been a little different if we could have recruited more participants or if the immigrant mothers had been more confident. For example, there may have been a significant difference between the effectiveness of health intervention expressed in a leaflet and that illustrated on a website if the probability sampling was increased. Besides, the quality of the presentation of health educational media may have received higher evaluation scores if the immigrant mothers had not been embarrassed to say that they preferred an attractive design rather than serious content. Using a randomised multicentre trial design with a larger patient sample became the most important issue in determining the intervention's long-term effects. However, it was not easy to recruit low-literate participants for a two-hour experiment, while guiding immigrant mothers to give their true opinions by completing a number of pages in a questionnaire was also a difficult challenge.

#### **5.4 Future Directions for Research**

Enhancing the cultural competency of clinicians and healthcare systems may be the solution to reduce ethnic disparities in healthcare. Future studies have to identify the key components to be included in future medical education, clinical practice, healthcare systems, and health policy interventions to eliminate racial and ethnic health disparities.

Health literacy has been described as being a critical point to create successful health intervention. The reading strategies, information-seeking behaviour, and follow-up healthcare of higher and lower literate users are significantly different. However, studies related to comparing the impact of various forms of media on users with different levels of literacy have been comparatively rare during the past decade. Future studies are needed to determine if there is a correlation between the level of literacy and socio-economic and cultural factors. Identifying these factors and incorporating solutions into a health intervention may effectively optimise information systems.

Recent advances in computer technology have continually increased the impact of technology on the provision of health information. With the rise in the volume of newly-emerging media, the way to compare their impact on health intervention becomes more complex. Additional studies are needed to develop more appropriate and available usability testing methods to assess their efficiency over time.

The design of health educational media would be more practical and useful if the ideas of scholars, providers, caregivers, and users could be practically adopted and implemented. The development of healthcare learning systems has started a revolution for delivering instructional content, learning activities, and social communication. The next step for future research is to conduct longitudinal studies with the close operation of official educational systems, industrial systems, and academic systems.

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## Appendix

### I. Personal information:

Single-choice Questions. Please check the box ahead of the option based on your personal information.

1. Your nationality is : <input type="checkbox"/> Vietnam <input type="checkbox"/> Mainland China
2. Your age is: <input type="checkbox"/> 20 – 30 <input type="checkbox"/> 30– 40 <input type="checkbox"/> 40 or above
3. Your education level is: <input type="checkbox"/> Primary <input type="checkbox"/> Secondary <input type="checkbox"/> Post-secondary <input type="checkbox"/> Undergraduate or above
4. Your work condition is: <input type="checkbox"/> Full-time <input type="checkbox"/> Part-time <input type="checkbox"/> Housekeeping
5. How long have you lived in Taiwan: <input type="checkbox"/> Less than 1 year <input type="checkbox"/> 1 –3 years <input type="checkbox"/> 3–5 years <input type="checkbox"/> More than 5 years
6. Your monthly family income is: <input type="checkbox"/> Less than 20, 000 NTD <input type="checkbox"/> 20, 000 –30, 000 NTD <input type="checkbox"/> 30, 000–40, 000NTD <input type="checkbox"/> More than 40, 000 NTD
7. How many children do you have? <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 or above

8. Does your child have any allergic disease? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> No idea
9. The frequency of using a computer is: <input type="checkbox"/> Once a day <input type="checkbox"/> Once a week <input type="checkbox"/> Once a month <input type="checkbox"/> Do not know how

## II. About children's health care:

Multiple-choice Questions. Please check the box ahead of the options according to your opinions.

What kinds of problems do you usually encounter when seeing a doctor?	<input type="checkbox"/> 1. I don't understand what the medical staffs are talking about. <input type="checkbox"/> 2. The medical staffs don't understand what I am talking about. <input type="checkbox"/> 3. I can't understand the prescription. <input type="checkbox"/> 4. I am too shy to ask the medical staffs any question in person <input type="checkbox"/> 5. I don't know which doctor to see. <u>Other</u>
How do you usually acquire your knowledge of health care?	<input type="checkbox"/> 1. I will consult the doctor. <input type="checkbox"/> 2. I will consult the nurse. <input type="checkbox"/> 3. I will consult my family members. <input type="checkbox"/> 4. I will consult my friends. <input type="checkbox"/> 5. I will learn through mass media ( brochures, television, and the internet) <u>Other</u>
What kind of information of children's health care do you want to know when your child gets sick?	<input type="checkbox"/> 1. What are the factors that trigger this disease? <input type="checkbox"/> 2. What are the common symptoms of this disease? <input type="checkbox"/> 3. How to take care of the children with such disease? <input type="checkbox"/> 4. Will there be any side effect

	<p>when taking the medicine over a long period?</p> <p><input type="checkbox"/> 5. When should I take my child to see a doctor?</p> <p><u>Other</u></p>
<p>What types of mass media do you usually use to get information of children's health care?</p>	<p><input type="checkbox"/> 1. Promotion brochures</p> <p><input type="checkbox"/> 2. Video Films</p> <p><input type="checkbox"/> 3. Internet information</p> <p><input type="checkbox"/> 4. TV programs</p> <p><input type="checkbox"/> 5. Books on health issues</p> <p><u>Other</u></p>

### III Knowledge about children allergies”

Please carefully read the following descriptions about children allergies.

Make your selection by marking “o” or “x” if it is false in the ( ).

#### About bronchial asthma

( ) 1. If a child has bronchial asthma, his siblings will definitely have the same disease.
( ) 2. If stridor always occurs with a flu, or severe coughs appear after doing exercises, we should consider these symptoms belonging to bronchial asthma.
( ) 3. Although bronchial asthma cannot be completely cured of, the patient can use drugs to control the disease and take daily care of the windpipe to reduce possible outbreaks of bronchial asthma.
( ) 4. Taking medicines for bronchial asthma over a long period of time will do harm to both the liver and the kidneys.
( ) 5. Children with bronchial asthma should be sent to the hospital as soon as possible when their breath condition didn't get any improvements after taking medicines.
( ) 6. You should avoid keeping pets, using carpets and curtains at home so as to reduce allergens that may cause bronchial asthma.
( ) 7. Children with bronchial asthma cannot stay in a room with an air conditioner in order to avoid the aggravation of bronchial asthma.
( ) 8. Children with bronchial asthma cannot do violent sports, especially swimming.

#### About atopic dermatitis

( ) 1. Patients with atopic dermatitis usually have red rashes on the joints of
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the neck, the wrists, and the knees.
( ) 2. When children have yellow excretions on the skin and skin inflammation, their skin may well be infected, and need to be treated with antibiotics.
( ) 3. There is no need to see a doctor even when eating allergic food seriously aggravated the red rashes on children's skin. You can simply apply some medication to them.
( ) 4. Atopic dermatitis in children cannot be completely cured, so most of the children with this disease cannot fully recover from it.
( ) 5. Preventing children from being in contact with allergens can help reduce the outbreak of atopic dermatitis.
( ) 6. Children with atopic dermatitis need to use herbal soaps or bactericide when taking a bath.
( ) 7. Lanolin cream is the best moisturizer, so it can be applied to children with atopic dermatitis.
( ) 8. Children with atopic dermatitis should always avoid eating seafood.

### **About allergic rhinitis**

( ) 1. If children whose parents have allergic rhinitis often sneeze and scrub their eyes, they might suffer from allergic rhinitis as well.
( ) 2. Allergic rhinitis has a common complication of allergic conjunctivitis, atopic dermatitis, and bronchial asthma.
( ) 3. As long as a patient can comply with the doctor's prescription and medication instructions, it will help significantly improve most of the symptoms of allergic rhinitis.
( ) 4. Children can continually use nasal decongestants to improve nasal congestion for a long time.
( ) 5. When children continually use the new generation medication for allergic rhinitis over a long period, they will suffer from the side effect of sleepiness.
( ) 6. When children have severe nasal congestion, the parents should force them to wash the nasal cavity with normal saline.
( ) 7. If children with allergic rhinitis suffer from severe symptoms which influence their normal sleeps, they should see a doctor.
( ) 8. Children with allergic rhinitis can use air conditioners and fans as long as they stay away from the wind gap.

### III. What are the criteria you use to evaluate the media for health promotions?

Single-choice Questions. Please check the box ahead of the option according to the level of importance to you.

Criteria	Evaluation
1. It conveys clear themes.	<input type="checkbox"/> Strongly important <input type="checkbox"/> Important <input type="checkbox"/> No comments <input type="checkbox"/> Unimportant <input type="checkbox"/> Strongly unimportant
2. It represents information in a way of dialogues.	<input type="checkbox"/> Strongly important <input type="checkbox"/> Important <input type="checkbox"/> No comments <input type="checkbox"/> Unimportant <input type="checkbox"/> Strongly unimportant
3. It used plain language.	<input type="checkbox"/> Strongly important <input type="checkbox"/> Important <input type="checkbox"/> No comments <input type="checkbox"/> Unimportant <input type="checkbox"/> Strongly unimportant
4. It has brief descriptive sentences.	<input type="checkbox"/> Strongly important <input type="checkbox"/> Important <input type="checkbox"/> No comments <input type="checkbox"/> Unimportant <input type="checkbox"/> Strongly unimportant
5. It is written in a friendly Tone.	<input type="checkbox"/> Strongly important <input type="checkbox"/> Important <input type="checkbox"/> No comments <input type="checkbox"/> Unimportant <input type="checkbox"/> Strongly unimportant
6. One topic showed on one page	<input type="checkbox"/> Strongly important <input type="checkbox"/> Important <input type="checkbox"/> No comments <input type="checkbox"/> Unimportant <input type="checkbox"/> Strongly unimportant
7. Information classification is very clear	<input type="checkbox"/> Strongly important <input type="checkbox"/> Important <input type="checkbox"/> No comments <input type="checkbox"/> Unimportant <input type="checkbox"/> Strongly unimportant
8. It has an attractive homepage	<input type="checkbox"/> Strongly important <input type="checkbox"/> Important <input type="checkbox"/> No comments <input type="checkbox"/> Unimportant <input type="checkbox"/> Strongly unimportant
9. The color and background are designed consistently.	<input type="checkbox"/> Strongly important <input type="checkbox"/> Important <input type="checkbox"/> No comments <input type="checkbox"/> Unimportant <input type="checkbox"/> Strongly unimportant
10. The layout space of content is well situated.	<input type="checkbox"/> Strongly important <input type="checkbox"/> Important <input type="checkbox"/> No comments <input type="checkbox"/> Unimportant <input type="checkbox"/> Strongly unimportant
11. The font size is suitable for	<input type="checkbox"/> Strongly important <input type="checkbox"/> Important <input type="checkbox"/> No

reading.	comments <input type="checkbox"/> Unimportant <input type="checkbox"/> Strongly unimportant
12. Related pictures are placed right next to the descriptions.	<input type="checkbox"/> Strongly important <input type="checkbox"/> Important <input type="checkbox"/> No comments <input type="checkbox"/> Unimportant <input type="checkbox"/> Strongly unimportant
13. Lovely illustration is very attractive	<input type="checkbox"/> Strongly important <input type="checkbox"/> Important <input type="checkbox"/> No comments <input type="checkbox"/> Unimportant <input type="checkbox"/> Strongly unimportant
14. Real photos help for understanding information.	<input type="checkbox"/> Strongly important <input type="checkbox"/> Important <input type="checkbox"/> No comments <input type="checkbox"/> Unimportant <input type="checkbox"/> Strongly unimportant
15. Video-clip narrative clearly	
16. If the website is written in my native language (Vietnamese language or Chinese)	<input type="checkbox"/> Strongly important <input type="checkbox"/> Important <input type="checkbox"/> No comments <input type="checkbox"/> Unimportant <input type="checkbox"/> Strongly unimportant
17.If the website offers the information I need	<input type="checkbox"/> Strongly important <input type="checkbox"/> Important <input type="checkbox"/> No comments <input type="checkbox"/> Unimportant <input type="checkbox"/> Strongly unimportant
18.If the information on the website is frequently updated	<input type="checkbox"/> Strongly important <input type="checkbox"/> Important <input type="checkbox"/> No comments <input type="checkbox"/> Unimportant <input type="checkbox"/> Strongly unimportant
19.If the website is operated by a governmental unit	<input type="checkbox"/> Strongly important <input type="checkbox"/> Important <input type="checkbox"/> No comments <input type="checkbox"/> Unimportant <input type="checkbox"/> Strongly unimportant
20. If there is information of hospitals or doctors on the website	<input type="checkbox"/> Strongly important <input type="checkbox"/> Important <input type="checkbox"/> No comments <input type="checkbox"/> Unimportant <input type="checkbox"/> Strongly unimportant
21. If there are someone else's caring experiences offers in the brochure	<input type="checkbox"/> Strongly important <input type="checkbox"/> Important <input type="checkbox"/> No comments <input type="checkbox"/> Unimportant <input type="checkbox"/> Strongly unimportant
22. If it is easy for you find the information you want	<input type="checkbox"/> Strongly important <input type="checkbox"/> Important <input type="checkbox"/> No comments <input type="checkbox"/> Unimportant <input type="checkbox"/> Strongly unimportant
23. If it offer vivid interactive fun	<input type="checkbox"/> Strongly important <input type="checkbox"/> Important <input type="checkbox"/> No comments <input type="checkbox"/> Unimportant <input type="checkbox"/> Strongly unimportant

24.If the website offers online consultancy	<input type="checkbox"/> Strongly important <input type="checkbox"/> Important <input type="checkbox"/> No comments <input type="checkbox"/> Unimportant <input type="checkbox"/> Strongly unimportant
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