http:// ijp.mums.ac.ir
Original Article (Pages: 5113-5123)

# Determining the Content of a Pediatric Asthma Website from Parents' Perspective: The Internet Use and Information Needs

Rezvan Ansari[1], *Leila Ahmadian[2], Nasrin Bazargan Harandi[3], Moghadameh Mirzai[4]

[1]Medical Informatics Research Center, Institute for Futures Studies in Health, Kerman University of Medical Sciences, Kerman, Iran.
[2]Medical Informatics Research Center, Institute for Futures Studies in Health, Kerman University of Medical Sciences, Kerman, Iran.
[3]Medical School, Kerman University of Medical Sciences, Kerman, Iran.
[4]Kerman University of Medical Sciences, Kerman, Iran.

***Abstract***

***Background***

The acquisition of knowledge by parents of children with asthma plays an important role in the treatment of children. Thus, it is important to understand their needs and provide this information through available methods such as a website. The aim of this study was to determine the content of a pediatric asthma website based on the evaluation of parents information needs.

***Materials and Methods***

This cross-sectional study was conducted by a descriptive-analytical approach in Kerman, Iran. Data were collected using a semi-structured questionnaire. The questionnaire was distributed among a sample of 300 parents visiting allergy and asthma specialists' offices. Three experts confirmed validity of the questionnaire. The reliability of the questionnaire was confirmed using the test- retest method on 40 participants (r = 0.82). Data were analyzed using descriptive and analytical statistics by SPSS version 20.0 software.

***Results***

Participants demanded information concerning asthma nutrition (79.0%), prevention (78.1%), treatment (77.1%), medications (72.4%) as well as general information (71.4%) and information about etiology of the disease (70.5%), respectively. The results showed that the fathers use the Internet significantly more than the mothers (p=0.0001). There was a statistically significant relationship between participants' educational level and the type of resources they use to obtain information (P<0.05).

***Conclusion***

This study highlighted the most important information needs of parents of children with asthma. The results indicated that most parents have access to the Internet and prefer to get their required asthma information from it. Therefore, providing required information to parents through a website can offer them the opportunity to increase their corresponding level of knowledge and skills.

***Key Words:*** Asthma, Child, Information Needs, Pediatric Asthma, Internet, Website.

*Please cite this article as: Ansari R, Ahmadian L, Bazargan Harandi N, Mirzai M. Determining the Content of a Pediatric Asthma Website from Parents' Perspective: The Internet Use and Information Needs. Int J Pediatr 2017;5(6):5113-23.DOI:**10.22038/ijp.2017.22367.1877**

***Corresponding Author:***

Leila Ahmadian, PhD, Associate Professor, Medical Informatics Research Center, Institute for Futures Studies in Health, Kerman University of Medical Sciences, Kerman, Iran. Fax: (+98 34) 3132 5221,

E-mail: ahmadianle@yahoo.com.

Received date: Feb.22, 2017; Accepted date: Mar.22, 2017

## 1- INTRODUCTION

Globally, asthma is one of the most common chronic diseases, and its prevalence is increasing day by day (1-3). The prevalence of asthma varies among countries from 1% to 28%, and the disease affects people of all races and ethnic groups from infants to the elderly (1). In the last decade, the number of children with asthma has increased, so that in 2001 the prevalence among children was 8.7% compared to 9.6 % in 2009 and this trend will continue. The Centers for Disease Control and Prevention (CDC) in the United States predicted that in 2025 more than 400 million people will be suffering from asthma (4). Studies have shown that the prevalence of asthma in Iran among children under 18 years is 13.14 % (5).

Morbidity associated with asthma is the leading cause of school absences, emergency department visits, and hospitalizations (6). The disease may increase anxiety, stress and even psychological problems that these problems can have a negative effect on individual learning. Asthma in children not only affects their health status, but also the other aspects of their life such as school attendance, physical activity, family dynamics, mental function, sleep and generally their quality of life (7, 8).

The impact of obtaining information about the disease on maximizing patient contribution in the process of care and adherence to treatment is well established (9). Also, obtaining information by families of patients has an important role in patients' recovery (10-12). Parents typically are the primary care providers of children with asthma and they need sufficient knowledge to effectively manage the illness. Studies have shown that lack of information about the disease by patients and their families is a barrier to effective communication between doctors and patients (13). Examples of ineffective communication include physician and patient contradictory information, misunderstanding of medical advice, mismatch between requested services and what is provided (14-16). Identifying information needs of parents of children with asthma is an essential step toward planning and implementing educational interventions. Archibald and Scott (17), showed that the majority of studies conducted about the information needs of parents of children with asthma have demonstrated that parents need information about asthma basics, treatment modalities, coping with the situation, and medical expectations.

In the past, patients obtained nearly all the required information about the disease from their physicians. This method has several limitations as the amount of time that physicians spend with a patient may be insufficient to properly answer questions raised by patients. Moreover, it is impossible to access physicians every time in any place to obtain the required information. Therefore, it is essential to provide information to patients using an accessible and effective method. People obtain a bulk of information through the Internet (18, 19), and it can be used as an important tool for obtaining information about their diseases and for promoting their health knowledge. This helps patients to have a more dynamic relationship with their physicians (20, 21).

Today patients are relying more heavily on the Internet to obtain knowledge (22, 23) about required medical procedures before seeking a physician's advice (23). Lack of health knowledge may lead to poor health outcomes, discomfort in communication with health care providers and hesitance to ask required information (24). Asthma in children is a chronic and long lasting disease that its treatment requires a good cooperation between patients or their families and health care providers. Hence, providing information to these children and their parents can improve the

treatment and encourage better interaction with health care providers (25). This can be met by first understanding their information needs about asthma. The aim of this study was to assess the information needs of parents of children with asthma, as a preliminary study to develop an educational website for asthma in children. In addition, in this study, the use of the Internet, access to the infrastructure necessary to use it and the need to create an interactive website for pediatric asthma were studied.

## 2- MATERIALS AND METHODS

### 2.1. Study design and population

This cross-sectional study was conducted by a descriptive-analytical approach in Kerman, the largest city in South East of Iran, in 2015 to 2016. In this geographical area, there are approximately 1,700, 1-18 year-old patients with pediatric asthma. The study population was all parents of children with a confirmed diagnosis of asthma who visited offices of pediatric allergy and asthma specialists for the treatment of their children.

### 2.2. Data collection method

The questionnaire was distributed by one of the authors (the first author) on a sample of 300 parents visiting specialists' offices. The author visited specialists' offices in different visiting hours and asked parents waiting for their appointments to participate in the study.

### 2.3. Measuring tool: validity and reliability

To assess the information needs of parents, a semi-structured questionnaire was developed based on Experts consensus and the study done by Anand et al. (26). One pediatric allergy and asthma specialist, and two medical informatics specialist, participated in the development of the questionnaire. The questionnaire consisted of four sections.

- Demographic information of participants (6 questions),
- Questions regarding the extent of information needs (very low / medium / much / very much) and resources used by parents (Internet/ printed materials/None) (3 questions),
- Questions related to parents' Internet use and their access to the Internet and its infrastructure (14 questions), and
- Questions about patents interest in an asthma website and their recommendation for the content of the website (6 questions).

For some of the questions, participants were allowed to select more than one option. The validity of the questionnaire was confirmed by 5 medical informatics specialist and a pediatric allergy and asthma specialist. The reliability of the questionnaire was determined using the test- retest method on 40 participants ($r = 0.82$). These participants were excluded from the current study.

### 2.4. Ethical consideration

The study was approved by the ethical research committee of Kerman University of Medical Sciences (ID number: Ir.kmu.rec.1394.334).

### 2.5. Inclusion criteria

Parents of children aged 1-18 years with a confirmed diagnosis of asthma, who visited offices of pediatric allergy and asthma specialists for the treatment of their children, were included in the study. Parents who had the ability to fill out the questionnaire were asked to participate.

### 2.6. Data Analysis

Data were analyzed using descriptive (frequency and percentage) and analytical statistics. Chi-square and marginal

independence test were applied to examine the relationship between demographic data of parents with their information needs, information source, time spent on the Internet, and the ability to use computer and smartphone. SPSS version 20.0 and R version 3.2.2 software were used to examine the relationship between demographic data with multiple choice questions (location of the Internet use, reasons to use of the Internet and information needs). The significance level of 0.05 was considered.

## 3- RESULTS

From the total number of 300 questionnaires 115 questionnaires were returned (38.33%). Demographic information of participants are shown in **Table.1**. Among the 115 participants, 63.5% (n=73) were mothers. The average age of parents of children with asthma was 35 $\pm$ 4.108 years and the mean age of children with asthma was 6$\pm$ 2.19 years. About half of the participants (n=57, 49.6%) were living in the capital and the rest (n = 58, 50.4%) in other cities or villages of Kerman province, Iran.

Most parents (73%, n=84) had an academic degree. Around 50% of participants (n=56) were employed. The age of 55.7% of parents (n=64) was 36 or less. The results showed that 14.8% (n = 17) of participants were unable to use computers and smart mobile phones. Ten out of these 17 parents had no desire to learn and to use computers and mobile phones. Thus, they were excluded from the study and did not answer the rest of the questions. The remaining parents either had the ability to use the Internet (85.2%, n=98) or desired to learn and use it (6.08%, n=7). In total, 105 (91.3%) parents answered the research questions.

The response rate was 35%. The highest number of hours using the Internet was 3-5 hours per day, which is reported by 10.5% (n=11) of the parents. The participants mostly (41.9%, n=44) use the Internet 30 to 60 minutes daily. All participants in the study (n=115) had mobile phones. Most participants (69.5%, n=73) had access to the Internet at home. The majority of participants used the Internet for web browsing (93.3%, n=98), and access to social networks (92.4%, n=97), respectively. Results of this study showed that most of the parents needed information concerning asthma nutrition (79.0%, n=83%), prevention (78.1%, n=82), treatment (77.1%, n=81), medications (72.4%, n=76) as well as general information (71.4%, n=75), and information on etiology of the disease (70.5%, n=74), respectively.

The results of this study showed that fathers need significantly more information compared to the mothers (P=0.001). Most of the mothers (52.1%, n=38), who visited the physician’s office with their children, reported that they need "much" information about asthma, but most of the fathers (61.9%, n= 26) reported they need "very much" information. The majority of the participants with a bachelor and higher educational degrees (52.7%, n=29) reported that they need "very much" information. There was a statistically significant relationship between educational level and the amount of information need (P=0.001) (**Table.2**).

The participants place of residence had a significant relationship with the amount of information need (P=0.017). So that about half of the parents living in capital (50.9%, n=29), reported that they need "very much" information about asthma, and most of the people living in other cities and villages (51.7%, n=30) reported that they need "much" information about asthma. The participants jobs also had a significant relationship with the amount of information (P=0.003). So that most of the parents working outside home (n=35), reported that they need "very much"

information about asthma. There was no significant relationship between the age and the amount of information needs (**Table.2**). The results of this study showed that the fathers use the Internet significantly more than the mothers (P=0.001). There was a statistically significant relationship between the educational level and the type of resources used to obtain information about asthma (P=0.001). Parents who had a high school diploma or a lower degree did not use the Internet and printed books as a source of information. Most parents with an associate degree (65.5%, n=19), and with a bachelor or higher degree (74.5%, n=41) used the Internet. Unlike most housewives that did not make use of the Internet and printed books as sources of information (60.9%, n=28), most of those who had a self-employed job (69.2%, n=9) and most of those who were employed somewhere else (78.6%, n=44) used the Internet (P=0.001) (**Table.2**).

Most mothers (35.6%, n= 26) and fathers (42.9%, n=18) spent 30 to 60 min on the Internet daily (p=0.012). There was a significant relationship between educational level of the participants and time spent on the Internet (P=0.001), so that parents with high educational degree, spent more time on the Internet. Also, participants' job had a significant relationship with the time they spent on the Internet (P=0.001). The employed parents spent more time than others using the Internet (**Table.2**).

All participants with an associate degree (100.0%, n=29) and most participants with a bachelor's or a higher degree (98.2%, n=54) had the ability to use computers and smart mobile phones. This was significantly different with the ability of participants having a high school diploma or a lower educational degree. About half of the later participants (51.6%, n=16) were not able to use mobile phones and computers (P = 0.001) (**Table.2**).

The results in **Table.3** show that most of the participants had access to the Internet at home. The relationship between educational level and location of the Internet use was statistically significant (P <0.001). Concerning the location of the internet use, by increasing the level of education, parents used the Internet more in places such as workplace and Café Net than at home. Most parents significantly used the Internet for web browsing and social networking sites compared to other reasons (P= 0.01). Participants' educational level had a significant relationship with the reasons for which they used the Internet (P < 0.001) (**Table.3**).

Parents with high educational degree used the Internet for educational objectives and social networking and web browsing. Mothers (79.4%, n=50) highly demanded information about the nutrition for children with asthma and fathers (83.3%, n=35) about treatment and medications. There was a statistically significant relationship between the type of parenthood (mother/father) and information needs (P=0.004). All parents with a high school diploma or a lower degree (100.0%, n=21) and most parents with an associate degree (82.8%, n=24) reported that they need information about prevention of asthma and asthma attacks.

The majority of parents with a bachelor or a higher degree (87.3%, n=48) reported that they need information about child nutrition. There was a significant relationship between educational level of the participants and information needs (P=0.002). Most self-employed parents (84.6%, n=11) significantly needed treatment information, most housewives (91.7%, n=33) prevention information and most employed parents (85.7%, n=48) asthma nutrition information as compared to other information needs. There was a significant relationship between job of the participants and information needs

(P=0.007). Parents in this study would like to have information about exercises, researches related to asthma, allergy and allergens, disabilities that are caused by asthma and asthma triggers in addition to the six major topics (nutrition, prevention, treatment, medications, general information and information on etiology of the disease) presented in **Table.3**.

**Table-1:** Characteristics of the parents

| Characteristics | Value: number (%) |
|---|---|
| Parent (n=115) | |
| Mother | 73(63.5) |
| Father | 42(36.5) |
| Residence | |
| Kerman city | 57(49.6) |
| Other cities and villages | 58(50.4) |
| Education level | |
| High-school diploma and lower | 31(27) |
| Associate degree | 29(25.2) |
| Bachelor and higher | 55(47.8) |
| Job status | |
| Employed | 56(48.7) |
| Housewife | 46(40) |
| Self-employed | 13(11.3) |
| Age | |
| ≤ 36 | 64(55.7) |
| > 36 | 51(44.3) |

**Table-2**: The relationship between parents' characteristics and information needs, sources, length of the Internet use and ability to use computers and mobile phones

| N=115 | Parent No (%) | | Age, year No (%) | | Education level No (%) | | | Residence No (%) | | Job No (%) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Extent of Information Needs | Mother | Father | ≤ 36 | >36 | High school diploma & lower | Associate degree | Bachelor & higher | Kerman | Other cities & villages | Self-employment | Housewife | Employee |
| Very low | 12 (16.4) | 1 (2.4) | 6 (9.4) | 7 (13.7) | 8 (25.8) | 4 (13.8) | 1 (1.8) | 7 (12.3) | 6 (10.3) | 1 (7.7) | 7 (15.2) | 5 (8.9) |
| Medium | 6 (8.2) | 6 (14.3) | 7 (10.9) | 5 (9.8) | 7 (22.6) | 0 (0.0) | 5 (9.1) | 4 (7.0) | 8 (13.8) | 3 (23.1) | 6 (13.0) | 3 (5.4) |
| Much | 38 (52.1) | 9 (21.4) | 30 (46.9) | 17 (33.3) | 13 (41.9) | 14 (48.3) | 20 (36.4) | 17 (29.8) | 30 (51.7) | 2 (15.4) | 25 (54.3) | 20 (35.7) |
| Very much | 17 (23.3) | 26 (61.9) | 21 (32.8) | 22 (43.1) | 3 (9.7) | 11 (37.9) | 29 (52.7) | 29 (50.9) | 14 (24.1) | 7 (53.8) | 8 (17.4) | 28 (50.0) |
| P-value | 0.000 | | 0.459 | | 0.000 | | | 0.017 | | 0.003 | | |
| Information sources | | | | | | | | | | | | |
| Internet | 37 (50.7) | 30 (71.4) | 38 (59.4) | 29 (56.9) | 7 (22.6) | 19 (65.5) | 41 (74.5) | 37 (64.9) | 30 (51.7) | 9 (69.2) | 14 (30.4) | 44 (78.6) |
| Internet &printed Book | 4 (5.5) | 9 (21.4) | 5 (7.8) | 8 (15.7) | 0 (0.0) | 4 (13.8) | 9 (16.4) | 6 (10.5) | 7 (12.1) | 3 (23.1) | 4 (8.7) | 6 (10.7) |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| None | 32 (43.8) | 3 (7.1) | 21 (32.8) | 14 (27.5) | 24 (77.4) | 6 (20.7) | 5 (9.1) | 14 (24.6) | 21 (36.2) | 1 (7.7) | 28 (60.9) | 6 (10.7) |
| P-value | 0.000 | | 0.395 | | 0.000 | | | 0.333 | | 0.000 | | |
| Time spent on the Internet | | | | | | | | | | | | |
| None | 10 (13.7) | 0 (0.0) | 5 (7.8) | 5 (9.8) | 10 (32.3) | 0 (0.0) | 0 (0.0) | 1 (1.8) | 9 (15.5) | 0 (0.0) | 10 (21.7) | 0 (0.0) |
| >30min | 17 (23.3) | 8 (19.0) | 13 (20.3) | 12 (23.5) | 9 (29.0) | 7 (24.1) | 9 (16.4) | 18 (31.6) | 7 (12.1) | 4 (30.8) | 12 (26.1) | 9 (16.1) |
| 30 min-1hour | 26 (35.6) | 18 (42.9) | 21 (32.8) | 23 (45.1) | 12 (38.7) | 16 (55.2) | 16 (29.1) | 21 (36.8) | 23 (39.7) | 8 (61.5) | 19 (41.3) | 17 (30.4) |
| 1-3hour | 17 (23.3) | 8 (19.0) | 16 (25.0) | 9 (17.6) | 0 (0.0) | 6 (20.7) | 19 (34.5) | 10 (17.5) | 15 (25.9) | 0 (0.0) | 5 (10.9) | 20 (35.7) |
| 3-5hour | 3 (4.1) | 8 (19.0) | 9 (14.1) | 2 (3.9) | 0 (0.0) | 0 (0.0) | 11 (20.0) | 7 (12.3) | 4 (6.9) | 1 (7.7) | 0 (0.0) | 10 (17.9) |
| P-value | 0.012 | | 0.273 | | 0.000 | | | 0.011 | | 0.000 | | |
| Ability to use computers and mobile phones | | | | | | | | | | | | |
| Yes | 59 (80.8%) | 39 (92.9%) | 57 (89.1) | 41 (80.4) | 15 (48.4) | 29 (100.0) | 54 (98.2) | 50 (87.7) | 48 (82.8) | 10 (76.9) | 34 (73.9) | 54 (96.4) |
| No | 14 (19.2) | 3 (7.1) | 7 (10.9) | 10 (19.6) | 16 (51.6) | 0 (0.0) | 1 (1.8) | 7 (12.3) | 10 (17.2) | 3 (23.1) | 12 (26.1) | 2 (3.6) |
| P-value | 0.080 | | 0.193 | | 0.000 | | | 0.454 | | 0.004 | | |

**Table-3:** The relationship between parents' characteristics and the Internet access location, reasons to use the Internet and information needs

| N=105 | Parent No (%) | | Age No (%) | | Education Level No (%) | | | Residence No (%) | | Job No (%) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Internet access location | Mother | Father | ≤ 36 | >36 | High school diploma & lower | Associate degree | Bachelor & higher | Kerman | Other cities &villages | Self-employment | Housewife | Employee |
| Home | 44 (69.8) | 29 (69.0) | 43 (72.9) | 30 (65.2) | 21 (100.0) | 16 (55.2) | 36 (65.5) | 35 (62.5) | 38 (77.6) | 10 (76.9) | 31 (86.1) | 32 (57.1) |
| Work place | 24 (38.1) | 23 (54.8) | 26 (44.1) | 21 (45.7) | 0 (0.0) | 13 (44.8) | 34 (61.8) | 24 (42.9) | 23 (46.9) | 7 (53.8) | 9 (25.0) | 31 (55.4) |
| café net | 20 (31.7) | 27 (64.3) | 21 (35.6) | 26 (56.5) | 0 (0.0) | 13 (44.8) | 34 (61.8) | 22 (39.3) | 25 (51.0) | 6 (46.2) | 9 (25.0) | 32 (57.1) |
| Home aacquaintances | 18 (28.6) | 17 (40.5) | 19 (32.2) | 16 (34.8) | 3 (14.3) | 8 (27.6) | 24 (43.6) | 21 (37.5) | 14 (28.6) | 3 (23.1) | 11 (30.6) | 21 (37.5) |
| university | 1 (1.6) | 3 (7.1) | 3 (5.1) | 1 (2.2) | 0 (0.0) | 0 (0.0) | 4 (7.3) | 3 (5.4) | 1 (2.0) | 0 (0.0) | 0 (0.0) | 4 (7.1) |
| P-value | 0.000 | | 0.364 | | 0.000 | | | 0.552 | | 0.000 | | |
| Reasons to use the Internet | | | | | | | | | | | | |
| Web browsing | 59 (93.7) | 39 (92.9) | 57 (96.6) | 41 (89.1) | 15 (71.4) | 29 (100.0) | 54 (98.2) | 50 (89.3) | 48 (98.0) | 10 (76.9) | 34 (94.4) | 54 (96.4) |
| Educational | 17 (27.0) | 13 (31.0) | 20 (33.9) | 10 (21.7) | 0 (0.0) | 6 (20.7) | 24 (43.6) | 13 (23.2) | 17 (34.7) | 3 (23.1) | 7 (19.4) | 20 (35.7) |
| Business | 15 (23.8) | 19 (45.2) | 20 (33.9) | 14 (30.4) | 0 (0.0) | 11 (37.9) | 23 (41.8) | 13 (23.2) | 21 (42.9) | 3 (23.1) | 3 (8.3) | 28 (50.0) |
| Shopping | 3 (4.8) | 8 (19.0) | 9 (15.3) | 2 (4.3) | 0 (0.0) | 0 (0.0) | 11 (20.0) | 7 (12.5) | 4 (8.2) | 1 (7.7) | 0 (0.0) | 10 (17.9) |
| Social networks | 58 (92.1) | 39 (92.9) | 56 (94.9) | 41 (89.1) | 15 (71.4) | 29 (100.0) | 53 (96.4) | 50 (89.3) | 47 (95.9) | 10 (76.9) | 34 (94.4) | 53 (94.6) |
| Other | 4 (6.3) | 3 (7.1) | 2 (3.4) | 5 (10.9) | 6 (28.6) | 0 (0.0) | 1 (1.8) | 6 (10.7) | 1 (2.0) | 3 (23.1) | 2 (5.6) | 2 (3.6) |
| P-value | 0.01 | | 0.1485 | | 0.001 | | | 0.187 | | 0.000 | | |
| Information needs | | | | | | | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| General info | 44 (69.8) | 31 (73.8) | 39 (66.1) | 36 (78.3) | 17 (81.0) | 21 (72.4) | 37 (67.3) | 40 (71.4) | 35 (71.4) | 10 (76.9) | 25 (69.4) | 40 (71.4) |
| Medications | 42 (66.7) | 35 (83.3) | 41 (69.5) | 36 (78.3) | 16 (76.2) | 19 (65.5) | 42 (76.4) | 39 (69.6) | 38 (77.6) | 9 (69.2) | 26 (72.2) | 42 (75.0) |
| Treatment | 46 (73.0) | 35 (83.3) | 42 (71.2) | 39 (84.8) | 17 (81.0) | 21 (72.4) | 43 (78.2) | 45 (80.4) | 36 (73.5) | 11 (84.6) | 27 (75.0) | 43 (76.8) |
| Prevention | 53 (84.1) | 29 (69.0) | 49 (83.1) | 33 (71.7) | 21 (100.0) | 24 (82.8) | 37 (67.3) | 44 (78.6) | 38 (77.6) | 10 (76.9) | 33 (91.7) | 39 (69.6) |
| Nutrition | 50 (79.4) | 34 (81.0) | 47 (79.7) | 37 (80.4) | 14 (66.7) | 22 (75.9) | 48 (87.3) | 42 (75.0) | 42 (85.7) | 10 (76.9) | 26 (72.2) | 48 (85.7) |
| Disease causes | 49 (77.8) | 25 (59.5) | 47 (79.7) | 27 (58.7) | 16 (76.2) | 20 (69.0) | 38 (69.1) | 37 (66.1) | 37 (75.5) | 7 (53.8) | 26 (72.2) | 41 (73.2) |
| P-value | 0.004 | | 0.122 | | 0.002 | | | 0.304 | | 0.007 | | |

*The participants could select multiple answers.

## 4- DISCUSSION

This study examined the information needs of parents of children with asthma and provided an insight into the content of a pediatric asthma website. Moreover, it highlighted the extent of the Internet use by parents. The results showed that multiple factors such as the type of parenthood (mother/father), educational level and job play a role in information needs of parents of children with asthma. They demanded information concerning: asthma nutrition, prevention, treatment, medications, general information and information on disease etiology to be considered for developing a tailored content for an informative asthma website. Deis et al. in their study (27), showed that parents of children with asthma need information about medications, triggers and prevention, self-perceived efficacy and action or treatment plan. Ghajar-Khosravi et al. (28), also showed that asthma patients need information about risk factors, triggers, allergies, prevention and treatment approaches.

The results of another study (26), showed that patients need to know general information, and information concerning medications, new therapies, disease progression, respiratory therapy and transplantation. In different studies, patients reported a need for information about two common topics; prevention and treatment. Knowing information about symptoms of asthma and general information are reported by parents of children with asthma in another study (29). All parents in this study reported that they need varied amounts of information. While the results of a study showed that from 1.022 patients with asthma, 25% did not seek information about asthma and its treatment, and they did not feel that they need to know it (30). The results of our study showed that about half of the mothers (50.7%) and most fathers (71.4%) used the Internet as an information source. This is consistent with the results of other studies (30, 31) showing that more than half of the patients with asthma obtain required information from the Internet and websites. Therefore, providing reliable and high-quality information to patients through the Internet can facilitate their access to the required information (32).

In contrast with our results showing no significant relationship between age and the ability to use computers and mobile phones (P=0.193), the results of another study by Chaudhuri et al (19), showed that with increasing age, people have less ability to use computers and the Internet (P <0.001). The difference in the results can be related to the differences in the age range of the participants between two studies. In the study of Chaudhuri et al. (19), mean age was 77.65 years, while the average age in the study was 35 years.

### 4-1. Strengths and Limitations of the study

We used the results of this study to develop a specialized website (www.asthmanet.ir) for providing information about asthma in children. Collecting the viewpoints of actual users of the website for its development shed lights on required content for designing an effective website. In order to increase the validity of the findings, possible topics concerning website content were reviewed and confirmed by different experts and especially by an allergy and asthma specialist before collecting parents' insights and priorities. However, this study did not collect the viewpoints of some older children with asthma who may use the information independently.

Other, limitation of the study is that we used a questionnaire to collect data and patients' insights, future studies can benefit from a more qualitative approach such as interview with patients and parents to capture more comprehensive data. It has been shown that providing individualized information based on parental characteristics is more valuable and associated with better health outcomes (33, 34). Taking this into account in the future updates of the website will make it more tailored to patients and their parents' information needs. This can be attained by developing a dynamic website personalization and providing the ability to dynamically change the content of the website based on a set of criteria selected by the user. Moreover, since a considerable number of participants in this study tend to use the Internet for social networking, in the future development of the website it is planned to add a social networking module for sharing the information among users.

## 5- CONCLUSION

In general, the results of this study showed that parents of children with asthma desire to obtain information to satisfy their need. Information needs of the parents should be the central concern of information providers. Providing the requested information in a manner that is understandable and accessible to people, is essential. Since, the results of this study indicated that most parents have access to the Internet and would prefer to get their information from the Internet, development of a specialized website can provide a good platform. Development of an interactive and scientific website can increase the level of knowledge and skills of parents and patients. This can also encourage more and better communication with healthcare providers.

## 6- PRACTICE IMPLICATIONS

Considering the viewpoints of the actual users of a website helps developers to develop a tailored content for an informative website. Subsequently, this web site may improve the delivery of healthcare services by facilitating parents' informed decisions and minimizing the potential miscommunication between specialists and parents of children with asthma.

## 7 - CONFLICT OF INTEREST

The authors declare no conflicts of interest.

## 8- ACKNOWLEDGMENTS

The authors would like to thank Medical Informatics Research Center of Kerman University of Medical Sciences for its support in developing the website. The funding sources had no influence on the writing of the manuscript or the decision to submit it for publication. We also thank the parents of children with asthma who contributed to this study.

## 9- REFERENCES

1. Global Initiative for Asthma (GINA). Global strategy for asthma management and

prevention. GINA Updated Report 2015. Available at: http://www.ginasthma.org/local/uploads/files/GINA_Report_2015.pdf. Published April 2015. Accessed April 24, 2015.

2. Chipps BE, Zeiger RS, Borish L, Wenzel SE, Yegin A, Hayden ML, et al. Key findings and clinical implications from the epidemiology and natural history of asthma: Outcomes and treatment regimens (TENOR) study. J Allergy Clin Immunol 2012; 130(2): 32-42.

3. Forno E, Celedon JC. Predicting asthma exacerbations in children. Curr Opin Pulm Med. 2012; 18(1):63-9.

4. Centers for Disease Control and Prevention (CDC). Vital signs: asthma prevalence, disease characteristics, and self-management education: United States, 2001-2009. MMWR Morb Mortal Wkly Rep 2011; 60(17):547–52.Available at: http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6017a4.htm. Accessed in 2016.

5. Heidarnia MA, Entezari A, Moein M, Mehrabi Y, Pourpak Z. *Prevalence* of asthma symptom in Iran*:* a meta-analysis. Research in Medicine 2007; 31 (3):217-25. (Persian)

6. Pedersen SE, Hurd SS, Lemanske RF, Becker A, Zar HJ, Sly PD, et al. Global strategy for the diagnosis and management of asthma in children 5 years and younger. Pediatric Pulmonology 2011; 46: 1–17. Available at: http://dx.doi.org/10.1002/ppul.21321.

7. Zaraket R, Al-Tannir MA, Bin Abdulhak AA, Shatila A, Lababidi H. Parental perceptions and beliefs about childhood asthma: A cross-sectional study. J Croatian Medical 2011; 52(5): 637–43.

8. Yangzong Y, Shi Z, Nafstad P, Håheim LL, Luobu O, Bjertness E. The prevalence of childhood asthma in China: A systematic review. BMC Public Health 2012; 12(10):860-9.

9. Coulter A. Patient engagement--what works? J Ambul Care Manage 2012; 35: 85–9.

10. Johnson B, Abraham M, Conway J, Schlucter J, Ford D, Sodomka P, Simmons L. Partnering with patients and families to design a patient and family centered health care system. Recommendations and promising practices. 7900 Wisconsin Avenue, Suite 405, Bethesda, MD 20814: Institute for Family-Centered Care; 2008, Available at: http://www.familycenteredcare. org.

11. Carman KL, Dardess P, Maurer M, Sofaer S, Adams K, Bechtel C, et al. Patient and family engagement: a framework for understanding the elements and developing interventions and policies. Health Aff (Millwood) 2013; 32(2):223-31. doi: 10.1377/hlthaff.2012.1133.

12. Khajavikia H, Valizadeh L, Zarei S, Bilan N, Taleschian-TabriziN. The Effect of Education-Modified of Asthma Stimulants on Attitude of the Adolescents with Asthma in Respiratory Specialty Clinics of Tabriz, North West of Iran. Int J Pediatr 2017; 5(2):4385-93.DOI:10.22038/ijp.2016.7657.

13. Greenberg CC, Regenbogen SE, Studdert DM, Lipsitz SR, Rogers SO, Zinner MJ, et al. Patterns of communication breakdowns resulting in injury to surgical patients. J Am Coll Surg 2007; 204(4):533-40.

14. Sleney J, Christie N, Lyons RA, Lyons RA, Kendrick D, Towner E. Improving recovery-learning from patients' experiences after injury: a qualitative study. Injury 2014; 45(1):312-9. doi: 10.1016/j.injury.2012.12.025. Epub 2013 Jan 22.

15. Kelly KM, Ajmera M, Bhattacharjee S, Vohra R, Hobbs G, Chaudhary L, et al. Perception of cancer recurrence risk: more information is better. Patient Educ Couns 2013; 90: 361–6.

16. Olde Hartman TC, van Rijswijk E, van Dulmen S, van Weel-Baumgarten E, Lucassen PL, van Weel C. How patients and family physicians communicate about persistent medically unexplained symptoms. A qualitative study of video-recorded consultations. Patient Educ Couns 2013 Mar; 90(3): 354-60. doi: 10.1016/j.pec.2011.02.014. Epub 2011 Apr 8.

17. Archibald MM, Scott SD. The information needs of North American parents of children with asthma: a state-of-the-science review of the literature. J of Pediatric Health Care 2014; 28(1): 5-13.e2.

18. Dalton DM, Kelly EG, Molony DC. Availability of accessible and high-quality information on the Internet for patients regarding the diagnosis and management of rotator cuff tears. J Shoulder Elbow Surg 2015; 24(5): 135-40 e.

19. Chaudhuri S, Le T, White C, Thompson H, Demiris G. Examining health information-seeking behaviors of older adults. Comput InformNurs 2013; 31(11): 547-53. Doi: 10.1097/01.NCN.0000432131.92020.42.

20. Haymes AT. The Quality of Rhinoplasty Health Information on the Internet. Ann Plast Surg 2016; 76(2):143-9.

21. Fahami F, Mohamadirizi S, Bahadoran P. Effect of electronic education on the awareness of women about postpartum breast feeding. Int J Pediatr 2017; 8(2): 57-63.

22. Slomian J, Bruyère O, Reginster JY, Emonts P. The internet as a source of information used by women after childbirth to meet their need for information: A web-based survey. Midwifery 2017; 48: 46-52.

23. Zaidi R, Pfeil M, MacGregor AJ, Goldberg A. How do patients with end-stage ankle arthritis decide between two surgical treatments? A qualitative study. Brit Med Open 2013; 3(7): e002782.

24. Perez L, Morales KH, Klusaritz H, Han X, Huang J, Rogers IM, et al. A health care navigation tool assesses asthma self-management and health literacy. J of Allergy and Clinical Immunology 2016; 138 (6): 1593-1599.e3**.**

25. Harrington KF, Haven KM, Bailey WC, Gerald LB. Provider Perceptions of Parent Health Literacy and Effect on Asthma Treatment Recommendations and Instructions. Pediatr Allergy Immunol Pulmonol 2013; 26(2): 69–75. Doi: 10.1089/ped.2013.0237.

26. Anand A, Tullis E, Stephenson A, Abhyankar P. Development and evaluation of an educational website for adults with cystic fibrosis. J of Cystic Fibrosis 2014; 13: 306–10.

27. Deis JN, Spiro DM, Jenkins CA, Buckles TL, Arnold DH. Parental knowledge and use of preventive asthma care measures in two pediatric emergency departments. The Journal of Asthma 2010; 47(5):551-56.

28. Ghajar-Khosravi S, Tarlo SM, Liss GM, Chignell M, Ribeiro M, Levinson AJ, et al. Development of a web-based, work-related asthma educational tool for patients with asthma. J Can Respir 2013; 20(6): 417-23.

29. Jones CH, Neill S, Lakhanpaul M, Roland D, Singlehurst-Mooney H, Thompson M. Information needs of parents for acute childhood illness: determining 'what, how, where and when' of safety netting using a qualitative exploration with parents and clinicians. BMJ Open 2014; 4(1):e003874. doi: 10.1136/bmjopen-2013-003874.

30. Partridgea MR, Dal Negrob RW, Olivieric D. Understanding patients with asthma and COPD: insights from a European study. Prim Care Respir J 2011; 20(3): 315-23.

31. Wahl H, Banerjee J, Manikam L, Parylo C, Lakhanpaul M. Health information needs of families attending the paediatric emergency department. Arch Dis Child 2011 Apr; 96(4):335-9. doi: 10.1136/adc.2009.177527. Available at: http://adc.bmj.com/ on February 15, 2016**.** Published by group.bmj.com.

32. Samadbeik M, Ahmadi M, Mohammadi A, Mohseni saravi B. Health Information on Internet: Quality, Importance, and Popularity of Persian Health websites. Iran Red Crescent Med J 2014; 16(4): e12866.

33. Atack L, Luke R. The impact of validated, online health education resources on patient and community members' satisfaction and health behaviour. J Health Educ 2012; 71(2):211–8.

34. Wantland DJ, Protillo CJ, Holzemer WL, Slaughter R, McGhee EM. The effectiveness of web-based vs. non web-based interventions: a metaanalysis of behavioural change outcomes. J Med Internet Res 2004; 6(4): E40.