

World Journal of *Clinical Pediatrics*

World J Clin Pediatr 2021 September 9; 10(5): 84-111



Contents

Bimonthly Volume 10 Number 5 September 9, 2021

MINIREVIEWS

- 84 Prospects for clinical applications of butyrate-producing bacteria

Zhu LB, Zhang YC, Huang HH, Lin J

ORIGINAL ARTICLE

Observational Study

- 93 Influence of education and residence on the parental search for pediatric surgical information on the internet

Aggelidou M, Deftereos SP, Cassimos DC, Skarentzos K, Oikonomou P, Angelidou A, Nikolaou C, Koufopoulos G, Kambouri K

CASE REPORT

- 106 Pediatric case with vaccine-related poliovirus infection: A case report

Taherkhani R, Farshadpour F

ABOUT COVER

Editorial Board Member of *World Journal of Clinical Pediatrics*, Li-Ye Yang, MD, PhD, Chief Doctor, Chief, Precision Medical Center, People's Hospital of Yangjiang, Yangjiang 529500, Guangdong Province, China.
yangleeyee@sina.com

AIMS AND SCOPE

The primary aim of the *World Journal of Clinical Pediatrics* (WJCP, *World J Clin Pediatr*) is to provide scholars and readers from various fields of pediatrics with a platform to publish high-quality clinical research articles and communicate their research findings online.

WJCP mainly publishes articles reporting research results and findings obtained in the field of pediatrics and covering a wide range of topics including anesthesiology, cardiology, endocrinology, gastroenterology, hematology, immunology, infections and infectious diseases, medical imaging, neonatology, nephrology, neurosurgery, nursing medicine, perinatology, pharmacology, respiratory medicine, and urology.

INDEXING/ABSTRACTING

The WJCP is now abstracted and indexed in PubMed, PubMed Central, Scopus, China National Knowledge Infrastructure (CNKI), China Science and Technology Journal Database (CSTJ), and Superstar Journals Database.

RESPONSIBLE EDITORS FOR THIS ISSUE

Production Editor: *Ying-Yi Yuan*, Production Department Director: *Yu-Jie Ma*, Editorial Office Director: *Yu-Jie Ma*.

NAME OF JOURNAL

World Journal of Clinical Pediatrics

ISSN

ISSN 2219-2808 (online)

LAUNCH DATE

June 8, 2012

FREQUENCY

Bimonthly

EDITORS-IN-CHIEF

Toru Watanabe, Consolato M Sergi

EDITORIAL BOARD MEMBERS

<https://www.wjgnet.com/2219-2808/editorialboard.htm>

PUBLICATION DATE

September 9, 2021

COPYRIGHT

© 2021 Baishideng Publishing Group Inc

INSTRUCTIONS TO AUTHORS

<https://www.wjgnet.com/bpg/gerinfo/204>

GUIDELINES FOR ETHICS DOCUMENTS

<https://www.wjgnet.com/bpg/gerinfo/287>

GUIDELINES FOR NON-NATIVE SPEAKERS OF ENGLISH

<https://www.wjgnet.com/bpg/gerinfo/240>

PUBLICATION ETHICS

<https://www.wjgnet.com/bpg/gerinfo/288>

PUBLICATION MISCONDUCT

<https://www.wjgnet.com/bpg/gerinfo/208>

ARTICLE PROCESSING CHARGE

<https://www.wjgnet.com/bpg/gerinfo/242>

STEPS FOR SUBMITTING MANUSCRIPTS

<https://www.wjgnet.com/bpg/gerinfo/239>

ONLINE SUBMISSION

<https://www.f6publishing.com>

Observational Study

Influence of education and residence on the parental search for pediatric surgical information on the internet

Maria Aggelidou, Savas P Deftereos, Dimitrios C Cassimos, Konstantinos Skarentzos, Panagoula Oikonomou, Artemis Angelidou, Christina Nikolaou, George Koufopoulos, Katerina Kambouri

ORCID number: Maria Aggelidou 0000-0002-3907-0407; Savas P Deftereos 0000-0002-5459-6845; Dimitrios C Cassimos 0000-0001-8738-0285; Konstantinos Skarentzos 0000-0003-0994-4959; Panagoula Oikonomou 0000-0001-5059-8010; Artemis Angelidou 0000-0002-8956-1287; Christina Nikolaou 0000-0002-5693-0181; George Koufopoulos 0000-0002-0423-1370; Katerina Kambouri 0000-0003-0817-6513.

Author contributions: Aggelidou M designed the article; Deftereos SP and Kambouri K wrote and revised the article; Cassimos DC revised and edited the article; Skarentzos K wrote the article and collected the data for review; Oikonomou P analyzed the data; Angelidou A, Nikolaou C and Koufopoulos G collected and analyzed the data; all authors have read and approved the final manuscript.

Institutional review board

statement: This study was reviewed and approved by the medical ethical committee of our hospital.

Conflict-of-interest statement: The authors declare no conflicts of interest.

Open-Access: This article is an open-access article that was

Maria Aggelidou, Department of Pediatric Surgery, Democritus University of Thrace, University Hospital of Alexandroupolis, Alexandroupolis 68100, Greece

Savas P Deftereos, Department of Radiology, University Hospital of Alexandroupolis, Democritus University of Thrace, Alexandroupolis 68100, Greece

Dimitrios C Cassimos, Department of Pediatrics, Alexandroupolis University Hospital, Alexandroupolis 68100, Greece

Konstantinos Skarentzos, Student of Medicine, Alexandroupolis University Hospital, Alexandroupolis 68100, Greece

Panagoula Oikonomou, Christina Nikolaou, Department of Surgery, Alexandroupolis University Hospital, Alexandroupolis 68100, Greece

Artemis Angelidou, Student of Molecular Biology, Alexandroupolis University Hospital, Alexandroupolis 68100, Greece

George Koufopoulos, Department of Surgery, Laiko General Hospital, Athens 11527, Greece

Katerina Kambouri, Department of Pediatric Surgery, Alexandroupoli University Hospital, Democritus University of Thrace, Alexandroupoli 68132, Greece

Corresponding author: Katerina Kambouri, MD, PhD, Assistant Professor, Department of Pediatric Surgery, Alexandroupoli University Hospital, Democritus University of Thrace, Dragana, Alexandroupoli 68132, Greece. kampouri@med.duth.gr

Abstract

BACKGROUND

The internet is a valuable tool for access to health-related information. There is limited literature regarding its use by parents of children with surgical conditions.

AIM

To investigate internet usage by parents seeking information about the surgical conditions of their offspring in relation to epidemiological factors such as family residential area and parental educational level and to subsequently review the literature regarding this topic.

selected by an in-house editor and fully peer-reviewed by external reviewers. It is distributed in accordance with the Creative Commons Attribution NonCommercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, and build upon this work noncommercially and license their derivative works on different terms, provided the original work is properly cited and the use is noncommercial. See: <http://creativecommons.org/licenses/bync/4.0/>.

Manuscript source: Invited manuscript

Specialty type: Pediatrics

Country/Territory of origin: Greece

Peer-review report's scientific quality classification

Grade A (Excellent): 0
Grade B (Very good): 0
Grade C (Good): 0
Grade D (Fair): 0
Grade E (Poor): 0

Received: March 16, 2021

Peer-review started: March 16, 2021

First decision: May 6, 2021

Revised: May 20, 2021

Accepted: August 19, 2021

Article in press: August 19, 2021

Published online: September 9, 2021

P-Reviewer: Singh A

S-Editor: Fan JR

L-Editor: Filipodia

P-Editor: Yuan YY



METHODS

An anonymous questionnaire about internet usage was completed by eligible parents of children who were admitted to our clinic for minor surgical procedures during a six-month period.

RESULTS

Our results demonstrated that the internet has been mostly used by mothers for children's health information. Google was the most commonly used search engine, while pediatricians were the first parental choice for 'live' information. Only one-quarter of the parents informed their doctor about the information found online. Nine of ten parents had a positive opinion of an official website managed by the doctors of our clinic. Our results mostly agreed with the international literature.

CONCLUSION

In conclusion, the establishment of official websites (designed and managed by specialists) that parents can access to receive appropriate health information is mandatory in the internet era.

Key Words: Internet; Child; Health; Mothers; Fathers

©The Author(s) 2021. Published by Baishideng Publishing Group Inc. All rights reserved.

Core Tip: The internet is a valuable tool for accessing health-related information. Parents of children with forthcoming surgery often seek online information about the specific conditions and symptoms of their children. Herein, we describe the influence of education and residence on the parental search for pediatric surgical information on the internet in a multicultural region of northern Greece, and we compare our results with the recent literature.

Citation: Aggelidou M, Deftereos SP, Cassimos DC, Skarentzos K, Oikonomou P, Angelidou A, Nikolaou C, Koufopoulos G, Kambouri K. Influence of education and residence on the parental search for pediatric surgical information on the internet. *World J Clin Pediatr* 2021; 10(5): 93-105

URL: <https://www.wjgnet.com/2219-2808/full/v10/i5/93.htm>

DOI: <https://dx.doi.org/10.5409/wjcp.v10.i5.93>

INTRODUCTION

Fifty years have passed since the onset of the internet, and the increase in numbers of people who access it worldwide is remarkable. According to the hellenic statistical authority, the last decade (2009–2018) saw a 100.8% increase in internet access at home. In Greece, more than 76.5% of homes accommodate internet access. The vast majority of adults (96.6%) use the internet more than once a week, and the internet is a popular source of health-related information[1]. Recent studies have demonstrated that up to 91% of adults access online sources of health information[2-4]. In Greece, the proportion of internet health users increased from 23% in 2007 to 65.2% in 2018[1,5]. Parents of children with chronic medical conditions are motivated by a desire to increase their knowledge and relieve their anxiety[6-13]. Nevertheless, there is limited literature regarding the use of the internet for pediatric surgical conditions[4,14-17]. Previous studies in Europe have shown that the use of the internet for health information varies significantly in different parts of the continent[5,18]. No similar studies have been recorded in South Europe, a region with diverse cultural and socioeconomic environments. Previous studies on parental internet exploration have mostly focused on three parameters: (1) Identification of the websites used; (2) Evaluation of the information found in relation to its readability and accuracy; and (3) The influence of the information on the parents' decisions to visit the emergency department when their child is sick[6-9]. The objectives of this study were first to evaluate the epidemiological characteristics of parents in relation to the magnitude of

internet usage for health-seeking information and second to review the literature regarding this topic.

MATERIALS AND METHODS

Participants

The survey was conducted from January 2018 to June 2018 in the Department of Pediatric Surgery, Alexandroupolis University Hospital, Greece. Eligible participants were parents of children (ages: 0–14 years) who were admitted to our clinic for minor elective surgical treatment (herniotomy, orchidopexy, hypospadias repair, circumcision) or emergency surgery (appendectomy, gonadal torsion, traffic accident, or fall-related injuries) and lived in the regions of Eastern Macedonia and Thrace. We excluded illiterate parents and parents who had already been included in the study group. Additionally, we excluded parents of children with chronic health problems and those of children who were admitted for major surgical procedures due to their increased anxiety. If both parents were present, only one of them could complete the questionnaire. In this cohort study, parents were divided into two categories according to their residency (urban or rural).

Questionnaire

The questionnaire was designed by MA and KK (authors) and was anonymous and voluntary. The questionnaire was designed and adjusted according to the characteristics and needs of people of our region regarding the difficulties they confront in communicating with a hospital doctor to accomplish sufficient and satisfactory medical information. In this region, with many scattered and isolated villages, the inhabitants form a multicultural society with different habits. The questionnaires were designed to be simple, unthreatening and easy to complete. There was no need for stratification, and the questionnaire consisted of a paper that required approximately 4 to 6 min to complete. It included 17 questions addressing three areas: (1) The use of the internet and its accessibility at home/work/elsewhere. Personal computers (PCs) at home, frequency of internet use, engagement in social media, parental engagement in social media and parental groups; (2) The use of the internet for access to medical information by family members, the use of the internet on a regular basis and 24 h prior to admission and which search engines were used; and (3) The use of the internet by parents addressing information for a specialist pediatric surgeon, other sources of information and the need for an official website with online, up-to-date medical information. In addition, there were questions about demographic data [gender, age and parental educational level, family income, residence, child insurance, type of admission (elective or emergency)]. The questionnaire was in Greek. Nevertheless, the option for a questionnaire written in Turkish was offered for some parents who were more fluent in that language. To reduce bias from the influence of medical staff of our clinic on the participants, a team consisting of two doctors and two medical students from the university was responsible for distributing these questionnaires (in paper) to the parents. The parents, if they agreed to participate, were asked to complete and return the questionnaires up to the day after their child's admission.

Sample size derivation and statistical analysis

With 600 admissions for minor surgical treatment in the University Pediatric Surgery Clinic annually, 234 completed questionnaires were required to achieve a 5% margin of error with a 95% confidence interval[19]. The main emphasis was on parents who searched the internet for children's health-related information in the past (202/235, 86%). Two parameters were analyzed: (1) The residence of the family; and (2) The educational level of the parent who searched the internet for child-related medical information. Descriptive statistics such as frequency, proportions, chi-squared test for categorical variables, and Mann-Whitney U test [nominal scale, when the point of interest was the residence (urban or rural)] or Kruskal-Wallis H (nominal scale, when the point of interest was the education level of the parent; categorized into three groups: (1) Completed high school or less; (2) Completed college or some college; or (3) Advanced degree or beyond) were employed to analyze data. We used R software (version 3.4.1), and a *P* value < 0.05 was considered statistically significant. The study was completed with a review of the existing literature on this topic.

Review of literature

Study design and inclusion criteria: The inclusion and exclusion criteria were defined before the initiation of the research. Only research studies were included. Commentaries, conference abstracts, any type of review, editorials, letters to the editor, case series, and case reports were not considered. The selection criteria were defined by applying the problem/population, intervention, comparison, and outcome framework. Participants included parents or guardians of children who required pediatric surgeon management. Intervention consisted of telephone interviews, live interviews, questionnaires or surveys. Any comparison between different populations was acceptable. Desired outcomes were socioeconomic status; residence (urban or rural area); internet usage; internet search platforms; internet sites and any other result reported in the questionnaire, survey or interview.

Literature search strategy and study selection: A literature search was performed based on the PubMed and Cochrane libraries using the following search terms: Internet health service; internet health information; internet; network; net; search; E-health; e-mail; mail; parents; guardians; family; questionnaire; survey; interview; pediatric; pediatric; and pediatric surgery. Articles published in English were retrieved from inception to October 2020. The records found were checked for duplicates. Then, the remaining articles were screened. Any article that met our criteria was included.

RESULTS

Demographics

All parents completed the questionnaire (235 of 235, 100%). Two hundred two (86%) parents searched the internet for children's health-related information. Descriptive data for all participants are presented in [Table 1](#).

Family residence and parental internet usage

Internet usage and accessibility. There was a statistically significant difference between parents living in urban and rural areas regarding several parameters ([Table 2](#)): (1) Internet access according to the location of the participants. Most of the parents in urban and rural districts (95.2% and 86.6%, respectively) had internet access at home. Nevertheless, only 1.9% of urban residents used the internet elsewhere as well (library, internet cafes, friend's home), and 9.3% of rural residents used the internet elsewhere ($P = 0.022$); (2) Ownership of PC at home. Only 7.6% of the city homes did not possess a PC in comparison to 27.8% of rural homes ($P = 0.0001$); (3) Frequency of internet usage. The usage of the internet was more than once a week among 94.3% and 85.6% of parents in urban and rural areas, respectively. However, the relevant percentages for internet usage less than three times per month were 5.7% and 14.4%. ($P = 0.038$); and (4) Participation in parents' groups on social media. Participation in parental social media groups varied significantly in the two groups: 66.7% in urban areas and 34% in rural areas ($P < 0.0001$).

Internet usage to access medical information. Almost half of the parents (42.1%) searched for medical information 24 h prior to admission, but 49.5% had doubts about this information. There was a statistically significant difference between parents living in urban or rural areas with respect to several parameters, as shown in [Table 3](#): (1) Regular internet search activity for basic medical information in the past. Almost nine of ten parents (86.7%) from urban areas searched the internet for medical conditions on a regular basis, in contrast to 67% of parents from rural areas ($P = 0.0009$); and (2) Search engines. Multiple answers were possible. Google was the most frequently used search engine by both groups. Parents from urban districts used Wikipedia more often (23.8%) than those from rural areas (12.4%). Rural area participants (12.4%) searched through other unspecified engines, while only 2.9% of the urban area participants used other unspecified engines ($P = 0.0078$).

Internet usage and examination by a pediatric surgeon. Comparing online sources of information with the information provided by a pediatric surgeon, 67.8% of the parents found both sources to be consistent. There were statistically significant differences between parents living in rural and urban areas with respect to several parameters, as shown in [Table 4](#): (1) Searching the internet for a specialist before an appointment. Half the parents from rural areas (50.5%) searched for a specialist before their decision for an appointment, while only 32.4% of those from urban areas did so ($P = 0.008$); (2) Informing the doctor about the internet search. A great percent of parents from urban sites (29.5%) communicated with the specialists regarding their

Table 1 Demographic data of all participants (*n* = 235), *n* (%)

Demographic characteristics	All parents (<i>n</i> = 235)
Accompanying parent	
Mother	145 (61.7)
Father	90 (38.3)
Age of father, median (range)	40 (27-57)
Age of mother, median (range)	36 (21-52)
Family condition	
Married	222 (94.5)
Divorced/Single	13 (5.6)
Educational level of father	
Completed high school or less	148 (63)
Completed college or some college	53 (22.6)
Advanced degree or beyond	34 (14.5)
Educational level of mother	
Completed high school or less	118 (50.2)
Completed college or some college	73 (31.1)
Advanced degree or beyond	44 (18.7)
Gross household income in Euro	
Less than 10000 €	98 (41.7)
10000 €-25000 €	101 (43)
25000 €-40000 €	31 (13.2)
Greater than 40000 €	5 (2.1)
Residence	
Rural	111 (47.2)
Urban	124 (52.8)
Insurance of child	
Public (government)	214 (91.1)
Private/no insurance	21 (8.9)
Type of admission	
Emergency	114 (48.5)
Elective	121 (51.5)

results from their internet search, in contrast to only 17.5% of parents from rural areas ($P = 0.045$); and (3) The need for an official website. Parents (97.1%) from urban sites believed that an official website managed by doctors from the clinic would be helpful, while 85.6% of parents from rural areas agreed with this opinion ($P = 0.003$).

Educational level of parents who performed research for medical information

Internet usage and accessibility. Regardless of education level, 90.1% of all parents used the internet more than once a week. There were statistically significant differences when comparing the results between parents from rural and urban areas with respect to several parameters, as shown in **Table 5**: (1) Ownership of a PC at home. All participants (100%) with an advanced degree owned a PC, in contrast to 92.1% of the parents with a college degree and 70.9% of the parents with a high school diploma ($P < 0.0001$); and (2) Participation in parental groups on social media. Participation in parental groups on social media was higher among parents with college degrees (71.4%) than among those with high school degrees (37.9%) and university

Table 2 Internet usage and accessibility regarding the residence (*n* = 202), *n* (%)

	Rural residence, <i>n</i> = 97	Urban residence, <i>n</i> = 105	Total	<i>P</i> value
Internet access				
At home	84 (86.6)	100 (95.2)	184 (91.1)	0.022
At work	23 (23.7)	39 (37.1)	62 (30.7)	
Elsewhere	9 (9.3)	2 (1.9)	11 (5.4)	
Personal computer at home				
Yes	70 (72.2)	97 (92.4)	167 (82.7)	0.0001
No	27 (27.8)	8 (7.6)	35 (17.3)	
Frequency of Internet usage				
Daily/1-3 times per week	83 (85.6)	99 (94.3)	182 (90.1)	0.038
1-3 times per month/rare	14 (14.4)	6 (5.7)	20 (9.9)	
Engaging in social media (Facebook, Twitter, Instagram)				
Yes	79 (81.4)	86 (81.9)	165 (81.7)	0.93
No	18 (18.6)	19 (18.1)	37 (18.3)	
Are you member of parents groups in social media?				
Yes	33 (34)	70 (66.7)	103 (51)	< 0.0001
No	64 (66)	35 (33.3)	99 (49)	

degrees (52.8%) ($P = 0.0001$).

Internet usage to access medical information. Google was the most commonly used search engine by the three groups (85.6%), followed by Wikipedia (18.3%). There was a statistically significant difference between parents living in urban and rural areas with respect to several parameters, as shown in Table 6: (1) Regular internet search activity for basic medical information in the past. One of three parents (35.9%) from the lower education level never previously searched the internet for medical information, in contrast to parents with a college (6.3%) or an advanced degree (13.9%) ($P < 0.0001$); (2) Internet usage the day before admission. Parents with a higher education level were less likely to search the internet prior to admission (19.4%) than parents with medium (54%) and lower (42.7%) education levels ($P = 0.004$); and (3) Website validity. Most parents from the higher education levels (77.8%) negatively evaluated the websites in terms of validity. The evaluation from the two other groups was not decisive ($P = 0.0009$).

Internet usage and examination by a pediatric surgeon. Regardless of the education level of parents, 41.1% of all participants searched for a specialist on the internet. There was a statistically significant difference in parents living in urban and rural areas with respect to several parameters (Table 7): (1) Informing the doctor about the internet search. We noticed that parents from higher education levels (advanced degree or higher) were less likely to inform doctors about the medical information they found online (8.3%), in contrast to parents who had college degrees (23.8%) and high school diplomas (29.1%) ($P = 0.041$); (2) Agreement between information provided by the doctor and that from the internet. A total of 55.3% of the parents from the lower, 85.7% from the medium and 72.2% from the higher educational level thought information found on the internet and that provided by the doctor were compatible ($P = 0.0002$); and (3) The need for an official website. All parents from all educational groups consisting of an advanced degree or higher and who completed college or some college (100%) agreed that an official website is necessary for reliable information, while 83.5% of parents from the lower education level agreed with this opinion ($P = 0.0001$).

Other interesting results

Regardless of the education levels and the residence of the parents, several factors were generally applicable: (1) Most parents (81.7%) were actively engaged in social media (Facebook, Twitter, Instagram); (2) The family member most likely to search the internet for children's health information was the mother (73.8% when the comparison

Table 3 Internet usage to access medical information regarding the residence of the family ($n = 202$), n (%)

Rural residence, <i>n</i> = 97		Urban residence, <i>n</i> = 105	Total	<i>P</i> value
Previous medical information searching on Internet				
Yes	65 (67)	91 (86.7)	156 (77.2)	0.0009
No	32 (33)	14 (13.3)	46 (22.8)	
Internet usage in 24 h prior to admission				
Yes	40 (41.2)	45 (42.9)	85 (42.1)	0.81
No	57 (58.8)	60 (57.1)	117 (57.9)	
Which family member searched on Internet mostly?				
Mother	68 (70.4)	81 (76.7)	149 (73.8)	0.25
Father	29 (29.6)	24 (23.3)	53 (26.2)	
Search engines used				
Google	80 (82.5)	93 (88.6)	173 (85.6)	0.0078
Wikipedia	12 (12.4)	25 (23.8)	37 (18.3)	
Other	12 (12.4)	3 (2.9)	15 (7.4)	
Do you trust the websites in terms of validity?				
Yes	53 (54.6)	49 (46.7)	102 (50.5)	0.26
No	44 (45.4)	56 (53.3)	100 (49.5)	
Were the health information comprehensive?				
Yes	75 (77.3)	71 (67.6)	146 (72.3)	0.12
No	22 (22.7)	34 (32.4)	56 (27.7)	
Level of satisfaction with the medical information				
High	21 (21.6)	25 (23.8)	46 (22.8)	0.12
Medium	70 (72.2)	56 (53.3)	126 (62.4)	
Low	6 (6.2)	24 (22.9)	30 (14.9)	

was according to residence and 68.3% when the comparison was according to the educational level of the parent who searched the internet); (3) Evaluation of the websites in terms of comprehension. Most parents (72.3%) stated that they understood completely, or they thought they understood, the information provided; (4) Level of satisfaction with medical information. Only two of ten parents (22.8%) were satisfied/very satisfied with the medical information they found; and (5) Other resources for health information. Multiple answers were possible. Most parents (97.5%) approached a pediatrician or a general practitioner (GP) for health information about their child's condition. The next most popular source of information consisted of friends and family (37.6%).

Review of the literature

The combined search identified 12 articles that matched our criteria[4,6-8,10-13,16,17,20,21]. In the recent literature, it is stated that highly educated parents are more likely to search online for child-related information on a regular basis (52.2%–97.7%) and less likely to search 24 h prior to admission of their child (11.8%–21%). Although parents from lower education levels were less likely to search the internet on a regular basis (64.1%), they were more likely to use the internet for health-related information 24 h prior to the child's admission (47.2%). In contrast, the proportion of parents from the higher education levels was 86.1% and 19.4% regarding searching on a regular basis and searching 24 h prior to child admission, respectively. It was also reported that lower rates of internet accessibility and PC ownership in rural districts made parents from these areas less likely to search the internet on a regular basis (67%) than parents from urban sites (86.7%)[7,8,10,11,16]. Russo *et al*[20] reported that parents who lived more than 44 km from the hospital were twice as likely to search online for information about their child's surgery than those who lived closer to the hospital[20].

Table 4 Internet usage and examination by a pediatric surgeon regarding the residence of the family (n = 202), n (%)

	Rural residence, n = 97	Urban residence, n = 105	Total	P value
Other medical information resources				
Pediatrician/GP ¹	95 (97.9)	102 (97.1)	197 (97.5)	0.13
Friends and family	27 (27.8)	49 (46.7)	76 (37.6)	
Parents groups	9 (9.3)	8 (7.6)	17 (8.4)	
Search for a specialist				
Yes	49 (50.5)	34 (32.4)	83 (41.1)	0.008
No	48 (49.5)	71 (67.6)	119 (58.9)	
Did you inform the specialist about the Internet search?				
Yes	17 (17.5)	31 (29.5)	48 (23.8)	0.045
No	80 (82.5)	74 (70.5)	154 (76.2)	
Was the information found on the Internet the same as the one given by the doctor?				
Yes	63 (64.9)	74 (70.5)	137 (67.8)	0.4
No	34 (35.1)	31 (29.5)	65 (32.2)	
Need for an official website, n				
Yes	83 (85.6)	102 (97.1)	185 (91.6)	0.003
No	14 (14.4)	3 (2.9)	17 (8.4)	

¹GP: General practitioner.

Regarding search engines, parents mostly used Google and Wikipedia to locate medical websites[4,8,11,12,16,21]. The evaluation of the websites in terms of validity and general level of satisfaction of the information provided was low, especially when the education level of the parents was higher. Several authors have also reported that the quality of medical information found on the internet was poor, which may cause misinformation[6,11-13]. In contrast, Semere *et al*[16] reported that 98% of parents agreed or somewhat agreed that the information was comprehensible[16]. Regarding other sources of medical information, it was reported that pediatricians and GPs were mainly consulted according to several authors who studied the health information seeking behavior of parents[8,11,12,17]. Some studies conclude that there is a predominance of friends and family instead of pediatricians[4,10,13]. Wong *et al*[4] reported a similar conclusion that only 35.5% of the parents informed the doctor about online medical information because the doctor had already included it in his consultation[4]. Another reason why they were hesitant to discuss the information they found with their doctor might have been the warnings from doctors about the validity of the health-related webpages[21]. A consistency rate of 95.2% was reported when the information found on the internet and the information provided by the doctor were compared[4]. Furthermore, several authors pointed out the overwhelming interest of parents on websites provided by doctors or hospitals[8,10-12,16].

DISCUSSION

The results of this study confirm that the internet is a rapidly growing source of medical information, and parents are using it for child-related health information to make significant decisions regarding their child's health[4,11,12,16]. Parental internet access at home ranged from 84.5% to 100% and 86.6% to 95.2% in relation to education level and location of residence, respectively. The vast majority (82.7%) owned a PC at home. They used the internet more than once a week in 90.1% of the sample, while 81.7% participated in social media. Half the study group (51%), mostly parents in urban sites with college and university degrees, were members of health-related support and parental support groups. Our study was in contrast to a study concluding that parents of children living a long distance (≥ 44 km) from a hospital were twice as likely to search online for information about their child's forthcoming surgery than

Table 5 Internet usage and accessibility regarding the educational level of the parent (n = 202), n (%)

	Completed high school or less, n = 103	Completed college or some college, n = 63	Advanced degree or beyond, n = 36	Total	P value
Internet access					
At home	87 (84.5)	61 (96.8)	36 (100)	184 (91.1)	0.27
At work	27 (26.2)	20 (31.7)	18 (50)	65 (32.2)	
Elsewhere	7 (6.8)	4 (6.3)	0	11 (5.4)	
Personal computer at home					
Yes	73 (70.9)	58 (92.1)	36 (100)	167 (82.7)	< 0.0001
No	30 (29.1)	5 (7.9)	0	35 (17.3)	
Frequency of Internet usage					
Daily/1-3 times per week	88 (85.4)	61 (96.8)	33 (91.7)	182 (90.1)	0.055
1-3 times per month/rare	15 (14.6)	2 (3.2)	3 (8.3)	20 (9.9)	
Engaging in social media (Facebook, Twitter, Instagram)					
Yes	84 (81.6)	53 (84.1)	28 (77.8)	165 (81.7)	0.73
No	19 (18.4)	10 (15.9)	8 (22.2)	37 (18.3)	
Are you member of parents groups in social media?					
Yes	39 (37.9)	45 (71.4)	19 (52.8)	103 (51)	0.0001
No	64 (62.1)	18 (28.6)	17 (47.2)	99 (49)	

those who lived closer to a hospital[20]. In our study, this result probably occurred because families that live far from a hospital are those from rural areas where the parents are simpler and trust without doubt the hospital doctors, and additionally, the internet in their areas is not easily accessible. In our study, most mothers searched the internet regardless of their education level (68.3%) or residence (73.8%). Nevertheless, this result is in line with findings from previous studies[4,5,8,10]. Our questionnaire-based study found that the most commonly used search engines by parents were Google (85.6%) and Wikipedia (18.3%), who are less familiar with child-specific websites managed by specialists and hospitals or because they are not aware of what constitutes good health information. These results coincide with previous studies[4,8,11,12,16,21]. On the one hand, the evaluation of websites in terms of comprehension in our study was high since 72.3% of the parents understood or thought that they understood the online medical information. This finding agrees with the results from a study by Semere *et al*[16] in which 98% of parents agreed or somewhat agreed that the information was comprehensible[16]. In contrast, several studies have shown that the quality of medical information found on the internet is poor and that the results are misleading[6,11-13]. In addition to the internet, other resources for medical information according to our study were mainly pediatricians and GPs (97.5%) regardless of the education level or residence of the parents, while friends and family members were the next most frequently used resources, mostly from urban residents (46.7%), with lower EL (43.7%). The same conclusions were reported by several authors who studied the health information-seeking behavior of parents[5,8,11,12,17], in contrast to other studies in which there was a predominance of friends and family instead of pediatricians[4,10,13]. One study reported that nearly one-third of the parents discussed the information that they found online with their doctors[4]. Our study showed that the higher the education level of the parents, the less likely they were to inform the doctor about their internet searches. Additionally, urban residents discussed the child's health-related information more often (29.5%) than parents from rural sites (17.5%). When comparing the information found on the internet and that provided by the doctor, only half the parents from the lower education level (55.3%), 85.7% with college degrees, and 72.2% with advanced degrees found both sources to be consistent. Wong *et al*[4] reported a consistency rate of 95.2%[4]. Several authors have noted the

Table 6 Internet usage to access medical information regarding the educational level of the parent ($n = 202$), n (%)

	Completed high school or less, <i>n</i> = 103	Completed college or some college, <i>n</i> = 63	Advanced degree or beyond, <i>n</i> = 36	Total	<i>P</i> value
Previous medical information searching on Internet					
Yes	66 (64.1)	59 (93.7)	31 (86.1)	156 (77.2)	< 0.0001
No	37 (35.9)	4 (6.3)	5 (13.9)	46 (22.8)	
Internet usage in 24 h prior to admission					
Yes	44 (42.7)	34 (54)	7 (19.4)	85 (42.1)	0.004
No	59 (57.3)	29 (46)	29 (80.6)	117 (57.9)	
Which family member searched on Internet mostly?					
Mother	67 (65)	48 (76.8)	23 (63)	138 (68.3)	0.27
Father	36 (35)	15 (23.2)	13 (37)	64 (31.7)	
Search engines used					
Google	86 (83.5)	53 (84.1)	34 (94.4)	173 (85.6)	0.74
Wikipedia	15 (14.6)	15 (23.8)	7 (19.4)	37 (18.3)	
Other	12 (11.7)	7 (19.4)	3 (8.3)	22 (10.9)	
Do you trust the websites in terms of validity?					
Yes	58 (56.3)	36 (57.1)	8 (22.2)	102 (50.5)	0.0009
No	45 (43.7)	27 (42.9)	28 (77.8)	100 (49.5)	
Were the health information comprehensive?					
Yes	76 (73.8)	48 (76.2)	22 (61.1)	146 (72.3)	0.24
No	27 (26.2)	15 (23.8)	14 (38.9)	56 (27.7)	
Level of satisfaction with the medical information					
High	22 (21.4)	18 (28.6)	6 (16.7)	46 (22.8)	0.051
Medium	69 (67)	38 (60.3)	19 (52.8)	126 (62.4)	
Low	12 (11.7)	7 (11.1)	11 (30.6)	30 (14.9)	

overwhelming interest of parents on websites provided by doctors or hospitals[8,10-12,16]. Our study demonstrated that the vast majority of parents (91.6%) supported the idea of an official website designed and managed by the doctors of our clinic in which they would be able to find reliable and accurate child-related information.

Limitation

Our study included parents of children who were admitted to our clinic but excluded those who were not. It would be interesting to determine parent behaviors when they are not stressed out by their child's hospitalization.

CONCLUSION

Our study is in line with the international literature with some minor deviations. This demonstrates that most parents use the internet to query child-related surgical problems. Internet access is difficult in rural areas of northeastern Greece, probably because many of these regions are isolated mountainous areas where the majority of the population is engaged in agricultural work and has different cultural habits. After

Table 7 Internet usage and examination by a pediatric surgeon regarding the educational level of the parent who searched on the Internet (*n* = 202), *n* (%)

	Completed high school or less, <i>n</i> = 103	Completed college or some college, <i>n</i> = 63	Advanced degree or beyond, <i>n</i> = 36	Total	<i>P</i> value
Other medical information resources					
Pediatrician/GP	98 (95.1)	63 (100)	36 (100)	197 (97.5)	0.11
Friends and family	45 (43.7)	20 (31.7)	11 (30.6)	76 (37.6)	
Parents groups	8 (7.8)	9 (14.3)	0	17 (8.4)	
Search for a specialist					
Yes	42 (40.8)	31 (49.2)	10 (27.8)	83 (41.1)	0.11
No	61 (59.2)	32 (50.8)	26 (72.2)	119 (58.9)	
Did you inform the specialist about the Internet search?					
Yes	30 (29.1)	15 (23.8)	3 (8.3)	48 (23.8)	0.041
No	73 (70.9)	48 (76.2)	33 (91.7)	154 (76.2)	
Was the information found on the Internet the same as the one given by the doctor?					
Yes	57 (55.3)	54 (85.7)	26 (72.2)	137 (67.8)	0.0002
No	46 (44.7)	9 (14.3)	10 (27.8)	65 (32.2)	
Need for an official website					
Yes	86 (83.5)	63 (100)	36 (100)	185 (91.6)	0.0001
No	17 (16.5)	0	0	17 (8.4)	

GP: General practitioner.

this survey and this review, the next developmental step that the medical community must support is clear. This is the creation of an easy-to-use (even by people with a low educational level) official website from which the parents could access appropriate health information to give substantial answers to their questions and by which they could contact online medical staff and address their questions. Parents will be reassured about their decisions regarding the right time to visit the hospital and consult the doctor they choose for their child's conditions.

ARTICLE HIGHLIGHTS

Research background

The internet is a valuable tool for access to health-related information. There is limited literature regarding its use by parents of children with surgical conditions.

Research motivation

Our study describes the influence of education and residence on the parental search for pediatric surgical information on the internet in a multicultural region of northern Greece, and we compare our results with the recent literature.

Research objectives

The objectives of this study were first to evaluate the epidemiological characteristics of parents in relation to the magnitude of internet usage for health-seeking information and second to review the literature regarding this topic.

Research methods

In this study, an anonymous questionnaire about internet usage was completed by eligible parents of children who were admitted to our clinic for minor surgical procedures during a six-month period. And the literature was reviewed.

Research results

The results of this study demonstrated that the internet has been mostly used by mothers for children's health information. Google was the most commonly used search engine, while pediatricians were the first parental choice for 'live' information.

Research conclusions

The establishment of official websites that parents can access to receive appropriate health information is mandatory in the internet era.

Research perspectives

It would be interesting to determine parent behaviors when they are not stressed out by their child's hospitalization in the future.

REFERENCES

- 1 **Hellenic Statistical Authority.** Research on the use of information and communication technologies by households and people: Year 2018, Hellenic Statistical Authority. [cited 5 March 2021]. Available from: <http://www.statistics.gr/>
- 2 **Fox S.** Pew Internet & American Life Project. (2011). Health Topics. [cited 5 March 2021]. Available from: <https://www.science-open.com/document?vid=02f07b75-77e5-40ae-a995-e83c67ba320c>
- 3 **McDaid D,** Park A. Online Health: Untangling the Web. Bupa. (2010). [cited 5 March 2021]. Available from: <https://core.ac.uk/display/217818>
- 4 **Wong MKY,** Sivasegaran D, Choo CSC, Nah SA. Parental Internet Use and Health Information Seeking Behavior Comparing Elective and Emergency Pediatric Surgical Situations. *Eur J Pediatr Surg* 2018; **28**: 89-95 [PMID: 28662533 DOI: 10.1055/s-0037-1604021]
- 5 **Andreassen HK,** Bujnowska-Fedak MM, Chronaki CE, Dumitru RC, Pudule I, Santana S, Voss H, Wynn R. European citizens' use of E-health services: a study of seven countries. *BMC Public Health* 2007; **7**: 53 [PMID: 17425798 DOI: 10.1186/1471-2458-7-53]
- 6 **Wainstein BK,** Sterling-Levis K, Baker SA, Taitz J, Brydon M. Use of the Internet by parents of paediatric patients. *J Paediatr Child Health* 2006; **42**: 528-532 [PMID: 16925539 DOI: 10.1111/j.1440-1754.2006.00916.x]
- 7 **Goldman RD,** Macpherson A. Internet health information use and e-mail access by parents attending a paediatric emergency department. *Emerg Med J* 2006; **23**: 345-348 [PMID: 16627833 DOI: 10.1136/emj.2005.026872]
- 8 **Shroff PL,** Hayes RW, Padmanabhan P, Stevenson MD. Internet Usage by Parents Prior to Seeking Care at a Pediatric Emergency Department: Observational Study. *Interact J Med Res* 2017; **6**: e17 [PMID: 28958988 DOI: 10.2196/ijmr.5075]
- 9 **Sebelesky C,** Karner D, Voithl J, Klein F, Voithl P, Böck A. Internet health seeking behaviour of parents attending a general paediatric outpatient clinic: A cross-sectional observational study. *J Telemed Telecare* 2015; **21**: 400-407 [PMID: 26026180 DOI: 10.1177/1357633X15583431]
- 10 **Sebelesky C,** Voithl J, Karner D, Klein F, Voithl P, Böck A. Internet use of parents before attending a general pediatric outpatient clinic: does it change their information level and assessment of acute diseases? *BMC Pediatr* 2016; **16**: 129 [PMID: 27538782 DOI: 10.1186/s12887-016-0677-8]
- 11 **Pehora C,** Gajaria N, Stoute M, Fracassa S, Serebale-O'Sullivan R, Matava CT. Are Parents Getting it Right? *Interact J Med Res* 2015; **4**: e12 [PMID: 26099207 DOI: 10.2196/ijmr.3790]
- 12 **Khoo K,** Bolt P, Babl FE, Jury S, Goldman RD. Health information seeking by parents in the Internet age. *J Paediatr Child Health* 2008; **44**: 419-423 [PMID: 18564080 DOI: 10.1111/j.1440-1754.2008.01322.x]
- 13 **van der Gugten AC,** de Leeuw RJ, Verheij TJ, van der Ent CK, Kars MC. E-health and health care behaviour of parents of young children: a qualitative study. *Scand J Prim Health Care* 2016; **34**: 135-142 [PMID: 27063729 DOI: 10.3109/02813432.2016.1160627]
- 14 **Chen LE,** Minkes RK, Langer JC. Pediatric surgery on the Internet: is the truth out there? *J Pediatr Surg* 2000; **35**: 1179-1182 [PMID: 10945690 DOI: 10.1053/jpsu.2000.8723]
- 15 **Bezner SK,** Hodgman EI, Diesen DL, Clayton JT, Minkes RK, Langer JC, Chen LE. Pediatric surgery on YouTube™: is the truth out there? *J Pediatr Surg* 2014; **49**: 586-589 [PMID: 24726118 DOI: 10.1016/j.jpedsurg.2013.08.004]
- 16 **Semere W,** Karamanoukian HL, Levitt M, Edwards T, Murero M, D'Ancona G, Donias HW, Glick PL. A pediatric surgery study: parent usage of the Internet for medical information. *J Pediatr Surg* 2003; **38**: 560-564 [PMID: 12677566 DOI: 10.1053/jpsu.2003.50122]

- 17 **Manganello JA**, Falisi AL, Roberts KJ, Smith KC, McKenzie LB. Pediatric injury information seeking for mothers with young children: The role of health literacy and ehealth literacy. *J Commun Healthc* 2016; **9**: 223-231 [PMID: [29051785](#) DOI: [10.1080/17538068.2016.1192757](#)]
- 18 **Spadaro R: Eurobarometer 58.0.** European Union Citizens and sources of information about health. EORG. [cited 5 March 2021]. Available from: <https://europa.eu/eurobarometer/screen/home>
- 19 **Israel GD (1992).** Determining Sample Size. University of Florida Cooperative Extension Service, Institute of Food and Agriculture Sciences, EDIS. [cited 5 March 2021]. Available from: <https://edis.ifas.ufl.edu/>
- 20 **Russo L**, Campagna I, Ferretti B, Pandolfi E, Ciofi Degli Atti ML, Piga S, Jackson S, Rizzo C, Gesualdo F, Tozzi AE. Online health information seeking behaviours of parents of children undergoing surgery in a pediatric hospital in Rome, Italy: a survey. *Ital J Pediatr* 2020; **46**: 141 [PMID: [32993748](#) DOI: [10.1186/s13052-020-00884-7](#)]
- 21 **Nogueira Júnior JF**, Hermann DR, Silva ML, Santos FP, Pignatari SS, Stamm AC. Is the information available on the Web influencing the way parents see ENT surgical procedures? *Braz J Otorhinolaryngol* 2009; **75**: 517-523 [PMID: [19784420](#) DOI: [10.1590/S1808-86942009000400009](#)]



Published by **Baishideng Publishing Group Inc**
7041 Koll Center Parkway, Suite 160, Pleasanton, CA 94566, USA

Telephone: +1-925-3991568

E-mail: bpgoffice@wjgnet.com

Help Desk: <https://www.f6publishing.com/helpdesk>

<https://www.wjgnet.com>

