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Original article

Online health information and pediatric treatment decisions: A study of generation Y parents

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Abstract. *Background and aim of the work:* E-health has generated benefits and challenges, such as spreading false information online. This study investigated the impact of online health research on the treatment and diagnosis of children aged 0 to 12 whose guardians belong to Generation Y, examining interference in the doctor-patient relationship and the influence of socioeconomic factors. The practical implications of these findings are significant, as they can guide communication strategies, provide reliable information, and promote collaboration between professionals and patients. *Methods:* A descriptive cross-sectional study carried out in a hospital in the interior of São Paulo between 2022 and 2023. Participants aged 32 to 42, responsible for children aged 0 to 12, answered a questionnaire on health research habits. We performed the statistical analysis using descriptive statistics, Spearman's correlation, and the Mann-Whitney test. *Results:* Our sample of 101 participants was predominantly female (80.2%) and heterogeneous in age, marital status, skin color, schooling, and occupation. The use of cell phones to access the internet was predominant (100%), and 34% always searched for health information online. Most found the information understandable (51.4%) and valuable (58.6%) but were cautious about its reliability. We found correlations between demographic data and the importance of different sources. *Conclusions:* The study contributes to understanding online health information-seeking habits and behaviors. (www.actabiomedica.it)

Key words: health information seeking, physician-patient relations, medicine, telemedicine, internet

Introduction

The integration of medicine with smart devices and the internet, known as e-health, has the potential to enhance doctor-patient interaction (1). Technological advancements in healthcare have brought significant benefits, such as improved management of chronic diseases and increased treatment adherence. However, these developments also present challenges, including the usability of technologies and the dissemination of false information on the internet (2).

The increase in internet access by the Brazilian population, as evidenced by the Continuous National Household Sample Survey (PNAD) conducted by the Brazilian Institute of Geography and Statistics (IBGE) in the fourth quarter of 2019, demonstrates that 78.3% (143.5 million) of the population above ten years old uses the internet (3). This growth, compared to previous years (64.7% in 2016), reflects the expansion of access to information. However, the instant communication facilitated by the internet also amplifies the spread of false information (4).

In a context where scientifically based information can be challenging to understand, fake news and studies with sensational appeal are gaining ground. This situation can undermine the doctor-patient relationship when there is a conflict between information acquired virtually and the professional's experience (5). Patients often seek out different professionals until they find one who aligns with the narrative they have constructed through their research (6), prioritizing answers that correspond to their emotional desires rather than considering the clinical evidence presented by the professionals caring for them (7).

The evolution of technology aims to make access to information more accessible to everyone, as evidenced by the growing ease of use of information search engines such as Google, Bing, and Yahoo (8). On the other hand, medicine is following the opposite path, characterized by increasing specificity and complexity, with the proliferation of subspecialties. Despite the abundance of available information, patients may not fully understand their symptoms, making consultation with a suitably qualified professional essential to ensure an accurate diagnosis and appropriate treatment (8,9).

The presence of physicians in society is crucial, especially for individuals belonging to disadvantaged social groups who face difficulties obtaining relevant health information despite increasing access to information (8,9). This disparity in access to information is even more evident among older patients, who seek less health information online. Socioeconomic factors, such as income, education, and access to technology, contribute to these inequalities, limiting the ability of these groups to obtain reliable and updated health information (10,11).

E-health, which involves information and communication technologies, represents hope to reduce disparities in access to information and improve medical care for marginalized groups (12). Telemedicine, for example, can facilitate access to medical consultations and health guidance for populations living in remote areas or experiencing mobility problems (13). However, for the e-health approach to be practical, it is essential to overcome several barriers, such as limitations of access to technology, digital literacy, trust in online information, and the cultural adaptation of digital health resources (9,14). Furthermore, it is necessary to train health professionals to use these tools and guide patients on their appropriate use (15).

Parents' decision-making about medical care for their children based on information obtained on the Internet is a crucial aspect in this context (15). The increase in internet access and the availability of online health information has led parents to turn to the internet for guidance on their children's health. However, the quality and reliability of online information can vary widely, potentially leading to wrong decisions or harming children's health (16). Misinformation and false health news that spreads fast on social media can negatively impact parents' decision-making (17), as exemplified by vaccine hesitation fueled by inaccurate information and conspiracy theories shared online (18).

To mitigate these challenges, health professionals must be prepared to help parents navigate online health information and make informed decisions (19). Establishing open and reliable communication, providing evidence-based information, and addressing any concerns or misconceptions influenced by online information are essential (20,21). Parents need to be able to critically evaluate information on the Internet and identify reliable sources (22), requiring investments in digital health education initiatives. Public policies and collaborations among governments, health organizations, and social media platforms are also crucial to combat misinformation and promote the dissemination of accurate, evidence-based information (23).

Thus, the present study aimed to investigate the impact of research on health and disease on the internet in the treatment and diagnosis of children from 0 to 12 years whose parents belong to Generation Y, who are between 32 and 42 years old. In addition, we examined possible interferences in the doctor-patient relationship. We also sought to analyze the influence of socioeconomic levels, schooling, and degree of kinship in the search for information on children's health and identify and classify the primary means of research used by laypeople in obtaining medical information.

Methods

Study design and setting

We conducted a descriptive cross-sectional epidemiological study at the second-largest teaching hospital in Brazil, located in São Paulo, from May 2022 to March 2023. Participants' data were collected at the hospital's Pediatric Outpatient Clinic.

Study Population and Sampling

The research sample comprised individuals of both genders aged 32 to 42 years, having at least one child, and children of both genders aged 0 to 12 years. All participants voluntarily agreed to participate in the study and provided their consent by signing the Free and Informed Consent Form (FICF).

Data Collection and Questionnaire

For this project, we utilized a questionnaire tailored to our specific needs, considering the insights from Tan's (2017) research (4), which emphasized the opportunity for enhancing the doctor-patient relationship through online health information search. The questionnaire was divided into two primary sections:

1. General data: This section collected demographic information such as age, gender, marital status, skin color, education level, occupation, socioeconomic level, number of children, relationship to the child, and age of the child.
2. Behaviors related to health and disease research: This section focused on participants' internet usage habits and their behaviors related to searching for health information online. It included questions on the frequency of internet access, devices used to access the internet, frequency of searching for health information online, perceived comprehensibility and value of online health information, use of online health information during medical consultations, physicians' reactions to patients' online research, post-consultation research habits, use of online information for second opinions and treatment decisions, trust in online health information, preferred search engines and websites, and the impact of the internet on information dissemination during the COVID-19 pandemic. Some examples of items in this section include:
   - How often do you use the internet to search for health information?
   - Do you find the health information you access online easy to understand?
   - Have you ever used information from the internet to discuss with your doctor during a consultation?
   - Do you trust the health information you find on the internet?

The collected information was then documented in Microsoft Excel for further analysis.

Data Analysis

Data analysis was performed using the IBM SPSS Statistics software, version 29 (IBM Corporation, NY, USA) (24), and the R programming language (R Core Team, 2015) (25). Exploratory data analysis included descriptive statistics such as mean, standard deviation, percentiles, minimum and maximum values for numerical variables, and number and proportion for categorical variables. Descriptive statistics were used to assess the behavior of continuous variables (24,25).

Spearman's correlation analysis was carried out to check the correlation between discrete and ordinal variables; the results were expressed by Spearman's correlation coefficient and its respective 95% confidence interval (11). Ordinal variables were compared between two groups using the Mann-Whitney test (26), and the effect size was calculated using the Cliff Delta measure. This measure estimates the probability of a randomly selected observation from one group being greater than a randomly selected observation from the other group minus the reverse probability (CLIFF, 1996) (27). The values were interpreted according to the classification proposed by Siegel and colleagues (2006) (28).

Ethical considerations

This study followed the ethical precepts established by Resolution 466/12 of the National Health Council (CNS) and was evaluated and approved by the Ethics and Research Committee of FAMERP (CAAE 59442022.5.0000.5415).

Results and discussion

Demographic characteristics

This study presents the demographic characteristics of a group of 101 participants. Most participants were women (80.2%, n = 81), with an average age of 36 years. Among these women, 57.4% (n = 58) were married, and 57.5% (n = 58) identified as non-white. The majority of participants had up to 2 children (69.3%, n = 70), with 42.6% (n = 43) of the children being under one year old. Most participants identified their relationship to the child as either father or mother (93.1%, n = 94). Table 1 provides a detailed overview of the sociodemographic data, kinship, age of the child, and health system.

Table 1. Sociodemographic data, kinship, age of the child, health system.

Variable	**n = 101**
Age,years	36 (32 - 42)
Gender, n (%)	
Male	20 (19.8)
Female	81 (80.2)
Marital Status, n (%)	
Maried	58 (57.4)
Single	32 (31.7)
Separated/divorced	9 (8.9)
Other	2 (2.0)
Skin color, n (%)	
White	43 (42.6)
Brown	43 (42.6)
Black	15 (14.9)
Schooling, n (%)	
Complete Primary/Elementary and Middle education	8 (7.9)
Incomplete Primary/Elementary and Middle education	15 (14.9)
Incomplete High school	11 (10.9)
Complete High School	52 (51.5)
Incomplete Higher Education	6 (5.9)
Complete Higher Education	6 (5.9)
Complete Postgraduate Degree	2 (2.0)
Occupation, n (%)	
Housewife	29 (28.7)
Student	3 (3.0)
Waged	29 (28.7)
Self-employed	38 (37.6)
Retired	2 (2.0)
Socio-economic level, n (%)	
No income	3 (3.0)
Up to one NMW*	5 (5.0)
from 1 to 3 NMW	20 (19.8)
from 3 to 6 NMW	9 (8.9)
from 6 to 9 NMW	1 (1.0)
I prefer not to declare	63 (62.4)
Number of children, n (%)	
1	29 (28.7)
2	41 (40.6)
3	21 (20.8)
4 or more children	10 (9.9)
Child's kinship, n (%)	
Father/Mother	94 (93.1)
Grandfather/Grandmother	4 (4.0)
Others	3 (3.0)
Age of the child, n (%)	
≤ 1 year	43 (42.6)
1 - 3 years	8 (7.9)
4 - 6 years	11 (10.9)
7 - 9 years	12 (11.9)
10 - 12 years	27 (26.7)

Notes: The categorical variables are presented in number (percentage) as part of the Descriptive Statistics analysis.*National Minimum Wage.

The study reveals noteworthy patterns in internet usage among participants. Cell phones were the primary means of internet access (100%, n = 101), with a significant majority (75.2%, n = 76) accessing the internet at least once per hour. Notably, 34.0% (n = 34) of participants reported always using the internet to search for health-related information, highlighting a strong reliance on this resource. Moreover, most interviewees found the health information they accessed online to be comprehensible (51.4%, n = 36) and valuable (58.6%, n = 41).

Use of Online Health Information in medical consultations

Regarding the use of health information found on the internet, 34.3% (n = 24) of the participants employed all of the researched information during their medical consultations. The majority of physicians (64.9%, n = 37) were reported to have never been professionally upset by comments made by parents or guardians about seeking additional information online regarding their child's treatment. Additionally, 29.7% (n = 30) of the participants consistently reported accessing the internet for more information about the service provided after consultations.

Attitudes towards Online Health Information

Most participants (68.8%, n = 55) have not used information from the internet to seek second medical opinions. However, a small percentage (7.5%, n = 6) always rely on this information for second opinions. Regarding treatment decisions, the majority (83.8%, n = 67) have not made any changes based on online information. These findings suggest a range of attitudes toward utilizing online resources in healthcare.

The study found that 43.8% of participants only believe online health information to be correct occasionally, while 51.3% trust the information only if it comes from a specific website. Only 5% of participants believe that online health information is always accurate. Google was the preferred search engine for 97.5% of participants, while Instagram and the Medical Association Page were less frequently utilized (1.3% each).

Correlation analysis

We employed the Spearman correlation coefficient to examine the relationship between demographic factors and the importance given to various sources of information. A weak inverse correlation was found between education level and the importance given to "friends and family" as an information source.

Table 2 reveals a positive correlation of low intensity between the number of children and the importance given to "friends and family members" as a source. An inverse correlation of low intensity a salso noted between the number of children and the importance attributed to "Other health professionals," such as nurses and psychologists.

Table 2. Correlation analysis between the number of children and the importance of information sources for research on the child's condition (n = 101).

Number of Children				
Source of information	**Spearman**	**p value**	**95% CI LL**	**95% CI UL**
Friends and/or Family	0.227	0.023	0.030	0.406
Information pamphlets available in health centers	0.122	0.224	-0.076	0.311
Books related to medicine (e.g., healthy habits, etc.)	0.061	0.545	-0.136	0.254
Internet	0.069	0.490	-0.128	0.262
Other health professionals (such as nurse, psychologist, etc.)	-0.277	0.005	-0.452	-0.083
Physician specialist (such as otorhinolaryngologist, dermatologist etc.)	-0.195	0.051	-0.378	0.002
Pediatrician	-0.072	0.475	-0.264	0.126

No notable variations in the importance assigned to the information sources were found based on gender. However, a significant difference was detected in the importance assigned to the “Pediatrician” source among different skin color groups, with those of brown/black skin color assigning less importance to this source. This difference was deemed minor, as evidenced by the Cliff Delta measure (-0.202).

A moderate positive correlation was found between the importance ascribed to “friends and family members” and the importance ascribed to “Information leaflets available at health centers.” Conversely, a strong negative relationship was found between individuals’ reliance on friends and family members and their reliance on healthcare practitioners, specialist physicians, and pediatricians.

Discussion and conclusions

This study provides valuable insights into the demographics, internet usage patterns, and behaviors related to searching for health information online among a diverse sample of 101 participants. The sample encompassed a range of ages, genders, marital statuses, skin colors, educational levels, and occupations, offering a comprehensive understanding of the dynamics surrounding online health information seeking.

Our findings align with previous research, such as Moretti et al. (2012) (29) and Mafra et al. (2021) (30), which reported a high percentage of female users seeking health information online. The rise in mobile phone usage for internet access suggests that individuals increasingly rely on their mobile devices as their primary source of information, with participants accessing the internet multiple times per hour. This trend is supported by the TIC Domicílios Brasil survey (2023) (32), which found that approximately 156 million Brazilians are internet users, with 90% accessing the internet through their smartphones.

The use of online health information during medical consultations has become increasingly popular, as evidenced by Garrido et al.’s (2019) (33) research, which found that a vast majority of parents (88%) whose children were receiving treatment at a Neurological Pediatrics Center in Brazil turned to the internet for health-related information. Our study also noted that most participants used smartphones to access such information and acknowledged the need for professional guidance, being willing to modify their treatment based on physicians’ recommendations.

The analysis of attitudes towards utilizing health information found online revealed that many participants integrate such information into their medical consultations, indicating a proactive approach to managing their health (34,35). However, healthcare providers should be prepared to address patients who reference online sources and offer appropriate guidance (36). Most individuals adhere to the advice and treatment prescribed by their healthcare providers despite accessing online resources, revealing a healthy equilibrium between online information consumption and trust in medical professionals (37).

Healthcare providers should proactively assist patients in assessing health information found on the internet (39), suggesting reliable sources and educating patients on the potential dangers of following unverified health advice (40,41). Physicians should engage in respectful, evidence-based dialogue with patients regarding the information they come across online and address any misunderstandings or concerns (21).

Our study demonstrates a positive relationship between education level and research habits, aligning with previous research by Luo et al. (2022) (42) and Looper et al. (2021) (43). Xiong et al.’s (2021) (44) study further reinforces the idea that higher education positively correlates with successful online information searches, supporting concerns expressed by doctors in previous research regarding patients’ limited ability to interpret health and disease information online (45).

The internet and social networks offer numerous benefits, such as easy access to government communications and guidelines, informative infographics, and the ability to follow directives from trusted sources (46). However, the internet also poses significant risks due to the vast amount of information generated in short periods, including false content, unverified statistical data, and incorrect opinions shared by digital influencers (47). The impact of social media on health information seeking behavior has been extensively studied, with systematic reviews highlighting both the benefits and challenges associated with this trend (54).

The proliferation of misinformation and fake news on the internet has posed a substantial obstacle to public health, particularly amidst the COVID-19 pandemic (48). Inaccurate or misleading information can result in risky behaviors, vaccine hesitancy, and a lack of confidence in health authorities (49,50). The impact of celebrities and digital influencers on spreading health information is also a growing concern, as they often share personal opinions or information that lacks scientific evidence (51,52). Strategies for combating health misinformation on social media have been explored in qualitative studies, emphasizing the perspectives of health professionals (55)

To effectively combat health misinformation spread on the internet, a multi-pronged strategy is required, including digital health education initiatives (39), healthcare providers addressing erroneous information during consultations (37), and collaboration between social media platforms and governing bodies to identify and remove false or misleading content (17). Prioritizing the widespread distribution of accurate and substantiated health information through trustworthy channels is also imperative (53). The role of digital health literacy in online health information seeking has been investigated in cross-sectional surveys, highlighting the importance of equipping individuals with the skills necessary to navigate and evaluate online health resources(56).

While the internet provides valuable resources for individuals seeking information on their health, the prevalence of misinformation and fake news presents a serious concern. Health professionals, social media platforms, governments, and individuals must work collaboratively to combat misinformation and ensure reliable and accurate health information is disseminated.

It is important to consider the study's limitations, including the sample size and reliance on self-reported data. Future investigations can delve deeper into the underlying reasons for seeking health information online and analyze how this information affects decision-making and the doctor-patient relationship. Studies involving larger and more diverse samples can offer valuable insights into differences in behaviors and habits related to online health information searches across demographics and socioeconomic groups.

In conclusion, this study offers valuable insights into the demographics, internet usage patterns, and behaviors related to searching for health information online. The findings emphasize the growing trend of using mobile phones to access the internet, focusing on health information. Various trends exist in how people use online information for healthcare purposes, with a significant number of participants incorporating their research findings into medical consultations. The study identified interesting associations between demographic data and the importance given to different sources of information, highlighting the need for healthcare providers to proactively assist patients in assessing online health information and engaging in evidence-based dialogue to address any misunderstandings or concerns. As e-health becomes increasingly prevalent, it is critical to address the issue of parental decision-making based on online information, ensuring that they have access to reliable guidance and support from health professionals to make informed decisions about their children's care.

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Conflict of Interest: Each author declares that they do not have any trade associations (for example, consultancies, shareholding, shareholding, patent/licensing agreement) that may represent a conflict of interest about the submitted article.

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