# Parental Use of the Internet to Navigate Online Health Information for Their Children: An Indonesian Context

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## ABSTRACT

Hemoglobin A1c (HbA1c) measurement is recommended as the gold standard in long-term blood sugar monitoring the diabetes patients because the fasting blood sugar (FBG) pattern alone cannot provide accurate information regarding the blood sugar variability true picture in type 2 Diabetes mellitus (T2DM) patients. However, many patients have limited access to HbA1c testing for financial reasons. It is necessary to know the relationship between HbA1c and GDP, and the factors that influence it, especially the research participant characteristics. This analytic observational study with a cross-sectional design involved 100 participants from T2DM patients in the hospital, outpatient clinics, and communities in Yogyakarta Province from January-May 2020. The HbA1c and FPG measurement was carried out using capillary blood samples by the research team. Characteristic data were obtained through direct interviews with participants, then analyzed using SPSS version 25 for windows, using the *chi-square, Kolmogorov-Smirnov, and Spearman's rho* test. The results showed that FPG was significantly positively correlated with HbA1c with moderate correlation criteria (r=0.74, *P-value*<0.0001). FPG showed a significant negative correlation to the glucometer ownership variable (r=-0.22, *P-value*= 0.04), and was independent of other parameters. Meanwhile, HbA1c significantly negatively correlated with age (r=-0.26, *P-value*=0.01), education level (r=-0.22, *P-value*=0.04), comorbidity (r=-0, 24, *P-value*=0.02), routine drug consumption (r=-0.29, *P-value*=0.01) and the ownership of glucometer (r=-0.26, *P-value*=0.01), but independent of gender, smoking status, daily menu, and physical exercise. It can be concluded that both GDP and HbA1c can be used as a reference for assessing glycemic status.
Keywords: correlation; HbA1c; fasting plasma glucose; participant characteristic

## INTRODUCTION

It has been evident that the internet has been used as a major information source across the globe including Indonesia. Indonesia is among the countries with the highest number of internet users in the world. In reference to statistics data, there were around 185 million active internet users in this country in 2019 and this number is forecasted to rise to more than 256 million by 2025 [1]. It is inconvertible that recently people tend to navigate online information for many purposes including seeking health information [2-4]. In the digital era, the internet has considerably changed the way people search and receive health information.

People's behavior in the healthcare domain has shifted from passive information receivers mainly from healthcare professionals' advice to active online information seekers [5]. Understandably, internet-resourced health information becomes increasingly more common among many people nowadays including parents of children. Before admitting their children to health care facilities, they navigate information online to be informed about the reason for consultation or consult the information they found with doctors [6-8]. According to a study in Austria, more than one in five parents used the internet to obtain child health information before attending a general pediatric outpatient clinic. That study highlighted an essential finding that the use of online information by parents to support health decisions to utilize healthcare service was mainly observed if the children had acute medical conditions [9].

Health decision to some extent is influenced by the source of information. It is worth noting that the decision to choose the information source is dependent on many factors. In the case of child health, parents play a predominant role, yet it remains unclear as to parental characteristics that determine the selection of digital platforms for searching

health information [10]. Thus, it is essential to investigate the parental characteristics that may affect the choice of information sources. Further, the source of information may correlate considerably with the quality of the information provided. However, internet-sourced health information varies in quality. The content quality of digital sources is a major concern in many studies [8,11]. In addition, the knowledge of parents regarding the quality of website contents and their confidence in using the information to make health decisions have also been investigated previously and the studies uncovered varying results [12,13].

Studies investigating online health information seeking by parents are abundant, particularly those undertaken in developed countries. By contrast, limited studies on the respective issues have been done in less developed countries. In the Indonesian context, it remains unclear as to online health information resources which are commonly used by parents and the type of health information searched for this purpose. Thus, this study aimed to explore the demographics of online health information-seeking parents and the type of information sought by the parents related to children's healthcare needs and the relationship between the demographics and the online sources.

## METHODS
### Study Design and Sample

A cross-sectional two-month study with purposive sampling was conducted in two primary health centers (PHC) in West Jakarta. The inclusion criteria of the respondents were parents of acutely ill children seeking online health information before visiting PHC and residents of West Jakarta. The respondents were excluded if they disagreed to participate in the study. For sample size estimation, Krejcie and Morgan's formula was used [14]. Based on the preliminary data from the study site, there were approximately 1,200 pediatric patient visits per month in each PHC. Based on a calculation using Krejcie and Morgan's

formula, for a given population of 2,400 a sample size of 331 would be required to represent the population. To anticipate the rejection rate of the potential respondents, an extra 45% was added to sample size estimation to bring the final sample size to 478 respondents. The study was approved by the Institutional Ethics Committee (No: B/2308/1/2020/KEPK). Written informed consent was obtained from the respondents before parent interviews. Participation was completely voluntary, and the respondents could refuse to participate in the study without any adverse consequence.

### Data collection and Analysis

An anonymous and validated respondent-administered questionnaire was used as the instrument to gather data from respondents. The questionnaire was adopted from Sebelefsky *et al*'s study [6]. The questionnaire consisted of three sections. Section 1 collected information on the socio-demographic of parents and their children (parents: age, gender, educational attainment, employment status, number of children; children: age, gender, presenting symptoms). Section 2 and 3 gathered data on the online sources (options: Google, Yahoo, Bing, Baidu, Wikipedia, Website run by a doctor, Wikipedia, blog and other) and the types of digital information (causes of disease, severity, transmission probability, treatment, medicine's side effects preventive measures) sought by the respondents, respectively. The respondents were invited to participate in the study while awaiting consultation. Only one parent per family could complete the questionnaire. The questionnaire required approximately 5-10 minutes to complete. Univariate descriptive statistics were applied to describe the socio-demographic characteristics, online information sources, and types of digital information. The relationship between the parents' socio-demographics and the online information sources was tested using the Chi-Square test. Statistical significance was established at $p<0.05$ for the test.

**Table I. Characteristics of the study parents and their children (N=478)**

| Characteristics | No. (%) |
|---|---|
| **Parental gender** | |
| Mother | 288 (60.2) |
| Father | 190 (39.8) |
| **Age of respondents (years)** | |
| 17-25 | 60 (12.6) |
| 26-35 | 276 (57.7) |
| 36-45 | 135 (28.2) |
| 46-55 | 7 (1.5) |
| **Respondents' education level** | |
| Elementary | 11 (2.3) |
| Secondary | 362 (75.7) |
| Tertiary | 105 (22.0) |
| **Employment status** | |
| Unemployed | 242 (50.6) |
| Self-employed | 74 (15.5) |
| Employee | 162 (33.9) |
| **Number of children** | |
| 1 | 160 (33.5) |
| 2 | 178 (37.2) |
| >2 | 140 (29.3) |
| **Child's gender** | |
| Male | 326 (68.2) |
| Female | 152 (31.8) |
| Age of child (years) | |
| 0-5 | 326 (68.2) |
| 6-12 | 152 (31.8) |
| **Presenting problems** | |
| Respiratory symptoms | 166 (34.7) |
| Fever | 100 (20.9) |
| Toothache | 82 (17.2) |
| Gastrointestinal symptoms | 77 (16.1) |
| Others | 53 (11.1) |

## RESULT AND DISCUSSION

Socio-demographic characteristics of parents and their children are described in Table I. As shown in Table I, most of the respondents were mothers (60.2%) which were unsurprising as mothers took more responsibility for the family health than fathers. More than two-thirds of the respondents were secondary school graduates (75.7%) and had 1-2 children (70.7%). Most of them were aged 26-35 years (57.7%) and were unemployed i.e. housewives (50.6%). About

child's characteristics, more than two-thirds were males and aged younger than 5 years. The most common presenting complaints were respiratory tract-related symptoms and fever.

Sources of health information may shape patients' health beliefs and influence their health behavior and decisions [18]. It is of importance to explore the variety of online sources searched by parents for the child's health condition. As illustrated in Figure 1, the search engine Google (61.0%) was
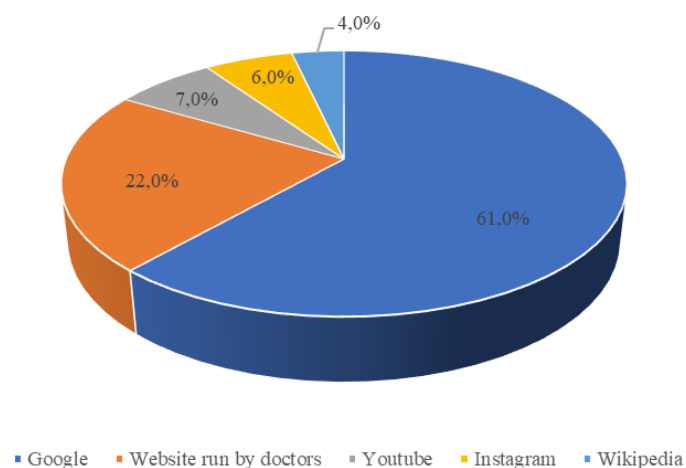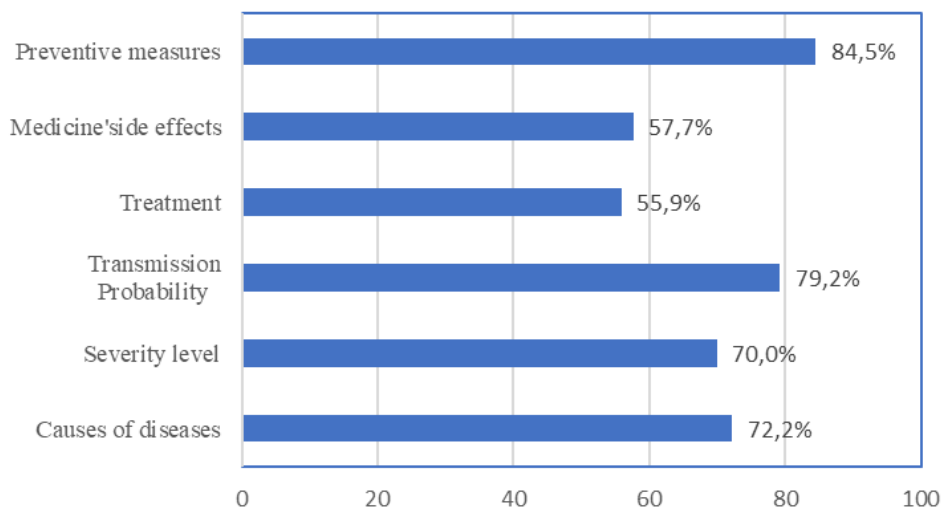
**Figure 1. Sources of online health information searched by the study parents**

predominantly the most frequently used digital media by parents before attending PHC, followed by websites run by doctors (22.0%). Popular social media e.g. Youtube, Instagram were chosen by a few respondents as less than 15% of the study parents chose the aforementioned platforms. It appeared that the study parents perceived social media platforms were possibly less suitable for health information navigation. Further, this result highlighted the issue of e-health literacy level among the parents a few of them preferred more reliable online resources like healthcare professional-administered official websites. This finding was not unique to our study. Some studies also observed less robust online sources as the most commonly consulted digital media [9, 15-17]. Corresponding to our finding, studies conducted in other countries including Austria [9], Australia [16,] and United Kingdom [17] uncovered Google as the most frequent online resource used by parents to navigate child health information. This finding, nonetheless, was unsurprising given Google's extensive market share and familiarity worldwide. Likewise, the preference of popular yet less reliable digital sources was documented in a Chinese study with online encyclopedias (i.e. Wikipedia) being the most frequent website used by the respondents [15]. Online encyclopedias like Wikipedia were often regarded as preferred

online sources as they delivered information in an easy-to-understand manner even for complex health topics [19]. On the contrary, Sebelefsky *et al* found websites run by doctors and the official home page of the study clinic were accessed more frequently than less robust sources like Google and Wikipedia [6].

A variety of online health information was navigated by the respondents (Figure 2). The causes of the diseases, transmission probability, severity level, and preventive measures were the predominant information sought by the respondents. Additionally, information related to treatment and medicines' side effects were searched by more than half of the study parents. It is important to note that during their online navigation, parents were likely to search for additional information related to their health, yet this study did not specify further the extent and the amount of information sought by them for that purpose. A similar figure was seen in some studies done by Wong *et al* [15], Sim *et al* [17,] and Skranes *et al* [20] in which they uncovered information on symptoms, disease, and medication, preventive modality through the implementation of a healthy lifestyle as the commonest digital information sought by the respondents.

The present study revealed no significant relationship between any parental socio-demographics and the types of online

**Figure 2. Types of online health information navigated by the respondents**

sources (Table II). In this sense, socio-demographic characteristics of the parents were unlikely to affect the preference of digital health information media as the preferences spanned across the characteristics. It is quite challenging to find similar studies specifically focusing on the determinants of parental demographic characteristics on the selection of health information sources. Abundant studies mostly investigated the predictors of online health information navigation among parents. When comparing our findings with that of limited existing studies, the results varied considerably. According to a study by Yasin *et al* [21], females were found to have higher e-health information quality perception than males. In this sense, females were more judicious and involved in the quality evaluation of e-health websites than males. Prestin *et al* found that better-educated people (i.e. at least a college degree) were likely to search information from online support groups than other sources [10]. Meanwhile, other studies documented young mothers with high education levels preferred to use social networking sites and blogs for health-related activities [22,23]. It can be inferred that educational attainment could not solely act as the predictor for online health information seeking. Presumably, more education had a positive influence on information-seeking

behavior. More educated people were usually better at interpreting the available information and making an informed choice of healthcare [24]. People with high education levels were expected to select reliable online sources (e.g. healthcare official websites), yet the evidence was not consistent with the assumptions. Despite the different findings in the aforementioned studies, our results were following that of Harris *et al*'s study where they could not find any sole demographic factor as the determinant of online health information sources. It was likely that health information seeking was predicted by the combination and interaction between the demographics instead of the single characteristic [25].

This study contributes to the growing body of knowledge exploring the online health information seeking among parents before consulting their children's condition with primary care doctors. Most parents in this study used digital platforms especially popular search engines to navigate a range of health information on their children's needs. The result of the present study can best inform frontline healthcare professionals and public health educators to facilitate and empower parents to identify reliable online sources. Some studies found that nearly all parents were skeptical as to the correctness of the

**Table II. Cross tabulation of Parental Socio-Demographics and Sources of Online Health Information (N=478)**

| Characteristics | No. (%) | Sources of Online Information, No. (%) | | | | | P-value[a] |
| | | Google | Websites run by doctors | Youtube | Instagram | Wikipedia | |
|---|---|---|---|---|---|---|---|
| **Parental gender** | | | | | | | 0.154 |
| Mother | 288 (60.2) | 174 (60.4) | 55 (19.1) | 24 (8.3) | 23 (8.0) | 12 (4.2) | |
| Father | 190 (39.8) | 117 (61.6) | 49 (25.8) | 11 (5.8) | 8 (4.2) | 5 (2.6) | |
| **Age of respondents (years)** | | | | | | | 0.993 |
| 17-25 | 60 (12.6) | 37 (61.7) | 14 (23.3) | 3 (5.0) | 4 (6.7) | 2 (3.3) | |
| 26-35 | 276 (57.7) | 170 (61.6) | 57 (20.7) | 23 (8.3) | 16 (5.8) | 10 (3.6) | |
| 36-45 | 135 (28.2) | 80 (59.3) | 31 (23.0) | 9 (6.7) | 10 (7.4) | 5 (3.7) | |
| 46-55 | 7 (1.5) | 4 (57.1) | 2 (28.6) | 0 | 2 (14.3) | 0 | |
| **Respondents' education level** | | | | | | | 0.316 |
| Elementary | 11 (2.3) | 9 (81.8) | 0 | 0 | 2 (18.2) | 0 | |
| Secondary | 362 (75.7) | 218 (60.2) | 86 (23.8) | 25 (6.9) | 19 (5.3) | 14 (3.9) | |
| Tertiary | 105 (22.0) | 64 (60.9) | 18 (17.1) | 10 (9.5) | 10 (9.5) | 3 (2.9) | |
| **Employment status** | | | | | | | 0.748 |
| Unemployed | 242 (50.6) | 144 (59.5) | 63 (26.0) | 14 (5.8) | 12 (5.0) | 9 (3.7) | |
| Self-employed | 74 (15.5) | 41 (55.4) | 15 (20.3) | 8 (10.8) | 7 (9.5) | 3 (4.1) | |
| Employee | 162 (33.9) | 106 (65.4) | 25 (15.4) | 14 (8.6) | 12 (7.4) | 5 (3.1) | |
| **Number of children** | | | | | | | 0.349 |
| 1 | 160 (33.5) | 90 (56.3) | 37 (23.1) | 14 (8.8) | 10 (6.3) | 9 (5.6) | |
| 2 | 178 (37.2) | 118 (66.3) | 34 (19.1) | 12 (6.7) | 10 (5.6) | 4 (2.2) | |
| >2 | 140 (29.3) | 83 (59.3) | 33 (23.6) | 9 (6.4) | 11 (7.9) | 4 (2.9) | |

online information and more than two-thirds clarified the searched information with their pediatricians [26-28]. Online information is often complex, and a higher health literacy level is required so the parent can gather a comprehensive understanding of pediatric health information. In this sense, healthcare professionals should have competencies in assessing the quality of online health information so they will be able to transfer the knowledge to their patients [15].

The results of our research should be interpreted with caution due to some limitations. Firstly, this study may suffer from reporting bias as parents completed their questionnaire on their own, and explanations were only given if the respondents were uncertain. Secondly, this study only involved two PHCs in West Jakarta so the results might not be adequately extrapolated to other settings. Nevertheless, the current study provides insights on the use of the internet among parents to be informed about the reason for consultation. This study reflects the internet health information-seeking behavior of parents particularly related to online health information types and digital sources to navigate the information.

**CONCLUSION**

A range of disease-related basic information is used by most parents to be informed before consulting with doctors in primary healthcare facilities. The link between parents' characteristics and the selection of digital media could not be determined. This study provides a picture of parental online health information seeking for primary

healthcare professionals and public health educators to understand the navigational needs of parents for health information in the internet age.

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