Research Article

Assessment of the Quality of Internet-Based Health Information in the Indonesian Language about Polycystic Ovarian Syndrome

Kajian Kualitas Informasi Kesehatan Berbasis Internet Berbahasa Indonesia tentang Sindrom Ovarium Polikistik

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Abstract

Objective: To investigate health information quality about PCOS on the internet in Indonesian language.

Methods: Top website from two separate search engines (Google and Bing) was collected using the keyword of "sindrom ovarium polikistik" (polycystic ovarian syndrome). Analysis of health information quality on those websites was performed.

Results: Sixty-nine websites were included for analysis. The majority of those websites have good information quality in terms of content accuracy and website credibility. There was no difference in quality between the two search engines. The website was found at the top two pages in each search engine to have better quality than the later pages (p=0.02). The educational website had better quality (p=0.05). The website made by healthcare organizations had better quality (p=0.04). The non-commercial website had better information quality (p=0.01).

Conclusions: Criteria affecting health information quality on the internet were as follows: found at the top two pages on a search engine; educational website; made by healthcare organization; and non-commercial purpose.

Keywords: health information quality, Indonesian language, internet-based, polycystic ovarian syndrome.

Abstrak

Tujuan: *Untuk melakukan kajian kualitas informasi kesehatan tentang PCOS di internet dalam Bahasa Indonesia.*

Metode: *Situs web teratas dari dua mesin pencari terpisah (Google dan Bing) dikumpulkan dengan menggunakan kata kunci "sindrom ovarium polikistik". Analisis kualitas informasi kesehatan pada situs-situs tersebut telah dilakukan.*

Hasil: *Enam puluh sembilan situs web dimasukkan untuk analisis. Mayoritas situs web tersebut memiliki kualitas informasi yang baik dalam hal akurasi konten dan kredibilitas situs web. Tidak ada perbedaan kualitas antara kedua mesin pencari tersebut. Situs web ini ditemukan pada dua halaman teratas di setiap mesin pencari memiliki kualitas yang lebih baik daripada halaman-halaman selanjutnya (p = 0,02). Kualitas situs web berbasis pendidikan menunjukkan hasil lebih baik (p = 0,05). Kualitas website yang dibuat oleh organisasi kesehatan menunjukkan hasil lebih baik (p = 0,04). Situs web non-komersial memiliki kualitas informasi yang lebih baik (p = 0,01).*

Kesimpulan: *Kriteria yang mempengaruhi kualitas informasi kesehatan di internet adalah sebagai berikut: ditemukan pada dua halaman teratas pada mesin pencari; situs web berbasis pendidikan; dibuat oleh organisasi kesehatan; dan tujuan non-komersial.*

Kata kunci: *bahasa indonesia, berbasis internet, kualitas informasi kesehatan, sindrom ovarium polikistik.*

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INTRODUCTION

Polycystic Ovary Syndrome (PCOS) is the most common endocrine disorder affecting women of reproductive age, with a prevalence of up to 10%.[1] This prevalence rate varies based on the criteria used. Based on the criteria of NIH / NICHD, it shows that SOPK affects 4-8% of women of reproductive age. However, when the Rotterdam criteria are used, the prevalence rate jumps two to three times.[2]

The prevalence of PCOS varies greatly in various populations. In Indonesia, around 4-6% of women of reproductive age experience PCOS, and women with infertility due to anovulation cause, of 75% are caused by PCOS. In one study in Surabaya, it was found that the prevalence of PCOS in women of reproductive age was 4.5% [3]

The high prevalence of PCOS is influenced by various factors. Conditions associated with increased prevalence of PCOS are among others obesity, insulin resistance, type I and type II diabetes mellitus, and oligo-ovulatory infertility.[4] An increase in obesity and diabetes mellitus, high-calorie food intake, and sedentary lifestyle are thought to be factors influencing the increase in the incidence of PCOS in Indonesia.[3,5-7] However, some women are diagnosed late with PCOS, and it is important for doctors to look for typical signs of PCOS, for example, irregular menstruation, hirsutism, infertility, and family history.[8, 9]

In women with PCOS, there are often a variety of physical and mental health disorders, both short and long term. These disorders include a decrease in quality of life due to mood disorders, decreased sexual satisfaction, weight gain, acne, and alopecia. SOPK also increases the risk of coronary heart disease.[10] In SOPK patients, there is also an increase in the number of depression and anxiety disorders, which ultimately affects confidence.[11-14]

The magnitude of the impact of this disease on patients makes patients have a great need for adequate information. Information obtained by patients from doctors is varied and inadequate, so patients are often dissatisfied with the information provided. Adequate information will allow compliance in improving the lifestyle and independence of patients to determine appropriate treatment management and determine the right choice of therapist according to their expectations.[15] This is what makes patients seek information from other sources, especially the internet.[16]

However, the quality of information about the management of PCOS available on the internet is very diverse. Most sites have included sufficient information about PCOS, both in terms of symptoms and signs, diagnosis, long-term risk, initial management, and education in seeking medical help. However, many sites do not include references and sources of information obtained, even information material that is written is often not based on valid research. In addition, patient information from official organizations, such as WHO, usually does not appear on the first page of a search engine.[17]

Indonesia is one of the countries with the most internet users in the world. However, research on the quality of health information, especially PCOS, available from the internet has never been done. In fact, internet social media networks are very effective as a media for channelling information, especially in adolescents and reproductive ages.[18] For this reason, it is necessary to conduct research on the quality of information about Indonesian language SOPK available from the internet.

METHODS

This research is a cross-sectional study. The research sample was taken in a span of 3 months between September and December 2018 in Jakarta. Inclusion criteria in this study included Indonesian-language internet sites, discussing about polycystic ovary syndrome, and occupying the top list of search results on search engines. Exclusion criteria include internet sites that do not focus primarily on PCOS, and only mention PCOS by chance, have been included in the search results list on previous search engines, paid sites, and sites that only function as media uploading files (file hosting). The sampling is done by consecutive sampling method.

In searching, two search engines are used most often. Then we enter keywords in the search box in the search engine. The search results are then included as a research sample for sorting. The keywords entered in the search engine are: "polycystic ovary syndrome" OR SOPK OR PCOS. The assessment is carried out by the researcher, using instruments that have been made, and then analyzing the data.

Data analysis was performed using SPSS 17. The calculation score was done by univariate descriptive analysis to determine the distribution and normality. Quality assessment is presented in the form of a percentage of each component

of the entire site. Assessment of the quality of internet sites is rated as average (if the distribution is normal) or mode (if the distribution is not normal) is presented in the form of proportions to the maximum value and categorized according to the total value. Analysis of the differences in each group of sites was done by comparing the mean scores of the groups with the one way ANOVA method. On the variables that found significant differences, a post hoc follow-up analysis was performed using the LSD method.

RESULTS

Two search engines are used in research (www.google.com and www.bing.com). The settings in the search engine are adjusted by only displaying search results on Indonesian sites. Search results are displayed with 20 links per results page.

The initial search returned 1.050.000 pages on Google and 52.200 pages on Bing. Sample selection was done on the first 5 pages based on the display of search results on each search engine. In total there were 200 sites (100 sites each on each search engine). A total of 131 sites were included in the exclusion criteria, of which 52 sites did not focus on discussing PCOS, 1 paid site, 12 sites were duplicated search results, and 66 sites only functioned as scientific file upload sites. There were 69 sites that could be taken as samples for analysis.

Sites were grouped according to search engine types, namely Google and Bing. Site grouping was also done based on the order in which they appear on search engines. Then grouped by type of site, including news sites or mass media, blogs, forums or social media, and educational sites. In addition, it was also classified by type of site creator, namely individuals, health organizations, and non-health organizations. Sites were also grouped according to the type of site commercialization, namely sites that were commercial and non-commercial. (see Table 1)

Tabel 1. Characteristics of Internet Site Samples that are Assessed

Site characteristics	Amount (%)
Search engine	
Google	31 (45)
Bing	38 (55)
Order of appearance	
Page 1	14 (20)
Page 2	12 (17)
Page 3	12 (17)
Page 4	20 (30)
Page 5	11 (16)
Type of site	
News	9 (13)
Blog	41(59)
Education	17 (26)
Social media	2 (3)
Author	
Individual	39 (56)
Non-health organization	17 (25)
Health organization	13 (19)
Commercialization	
Commercial	33 (48)
Non-commercial	36 (52)

In general, assessments of content accuracy and site credibility score was above 60. In the category of content accuracy, two things were assessed, namely the appropriateness of the content with clinical guidelines and the inclusion of references on the site. Overall, most sites were sufficiently in line with clinical guidelines and include references quite well. In the credibility category, the assessment was carried out covering four aspects, namely the clarity of the author's name, the existence of control from the *Mitra Lestari*, the renewal of the site, and the clarity of contact info that can be contacted. Based on these criteria, most sites were good enough to mention the author's name, site updates, and clear contact info. However, ratings in terms of *mitra bestari* still got unfavourable scores on most sites. (see Table 2).

Table 2. Percentage of Site Suitability with Good Judgment According to Criteria

Site characteristics	Amount (%)
Content accuracy	
Clinical guide	47 (68)
Reference	35 (51)
Credibility	
Author	50 (72)
Mitra Bestari	33 48)
Novelty	40 (58)
Contact info	64 (93)

Assessment of the accuracy of medical information listed on sites that discuss polycystic ovary syndrome were grouped into 11 topics, including definitions, pathogenesis, symptoms and signs, investigations, management of lifestyle modification, medical, invasive procedures, and possible complications, namely infertility, endometrial malignancies, metabolic disorders, and cardiovascular disease. Overall, most sites included the information above (see Table 3).

Table 3. Compatibility of Medical Information with Clinical Guidelines on Indonesian Language Sites

Site characteristics	Amount (%)
Definition	66 (96)
Pathogenesis	65 (94)
Clinical signs and symptoms	69 (100)
Investigations	39 (57)
Lifestyle modification	49 (71)
Medical	51 (74)
Invasive procedure	24 (35)
Infertility	62 (90)
Endometrial malignancy	34 (49)
Metabolic disorders	53 (77)
Cardiovascular disorders	47 (68)

The assessment of the quality of information on the site was analyzed on 5 groups of sites, which were divided based on search engines, the order of page views, site types, site builders, and site commercialization. In the search engine group, no difference in site quality was found between Google and Bing (p = 0.21), while the other groupings found significant differences between groups of sites (see table 4).

Table 4. Comparative Analysis of Site Information Quality Scores

Group	Accuracy	*P-value*	Credibility	*P-value*
Search engine		0.21		0.35
Google	68.4±17.1		72.8±12.1	
Bing	63.4±16.2		69.7±15.0	
Display page		0.02		0.83
Page 1	71.0±15.5		73.2±13.9	
Page 2	76.8±10.2		73.6±16.6	
Page 3	60.6±17.7		72.2±68.3	
Page 4	60.5±18.0		13.5±13.5	
Page 5	61.6±14.5		71.4±13.8	
Type of site		0.05		<0.01
Blog	63.8±15.8		64.8±9.7	
News	62.3±16.6		86.1±5.8	
Education	73.8±14.4		80.3±13.4	
Social Media	50.0±39.2		54.1±17.6	
Author		0.04		<0.01
Individual	62.8±18.1		62.8±9.5	
Non-health organization	62.7±14.4		81.8±9.8	
Health organization	74.5±13.1		77.4±14.3	
Commercialization		<0.01		0.02
Commercial	58.8±16.2		71.1±13.8	
Non-commercial	72.2±14.5		67.5±13.1	

In groups that had significant differences in judgment, further analysis was performed using the post hoc method. In the display page group, it was found that sites occupying the first and second pages had better quality compared to the third, fourth and fifth pages. In the type of site groups, the quality of educational sites was better than news sites, blogs, and social media. Based on site creators, sites created by health organizations were of better quality than sites created by private individuals and non-health organizations. In addition, non-commercial sites had better quality than commercial sites.

DISCUSSION

This research shows that information available on the internet about polycystic ovary syndrome is widely available in Indonesian. In total, there are one million Indonesian-language pages that provide information about PCOS. However, this number is far smaller compared to the results of English search pages which reached 34.4 million pages.[19] This is understandable because globally Indonesian internet users are at 4.1%, while English-speaking users occupy the top position with the proportion of 25.4%.[20]

In Google search engine, there are more initial search results than Bing, but most of the search results on Google fall into the exclusion criteria because they display the results in the form of paper files uploaded to the upload site. Basically, search engines work by matching keywords entered, with site data in their database. A list of sites deemed relevant will be displayed in a certain order (ranking). The difference in the number of search results and the order of appearance on each search engine is different from each other,

due to differences in the algorithms that are owned. [21,22]

The sample population in this study came mainly from Internet sites of the blog type, which originated not from health organizations. Different populations were found in similar studies with English-language sites, which found most of the internet site samples were made by official organizations engaged in the health sector (eg PubMed, Uptodate, Mayoclinic, NHS, and AAFP). [17,23]

In this study, it was found that most of the sites provided good information in terms of definitions of PCOS, clinical symptoms and signs, lifestyle management, and complications in the form of infertility. Different results were obtained in study [17], most of the information submitted by the site included a preliminary examination, supporting examinations that must be undertaken, preventive measures, and the risk of complications in the form of diabetes mellitus and endometrial cancer. Similar findings were also where most sites discussed the symptoms and signs of PCOS, the method of diagnosis, treatment options, and complications along with diabetes mellitus and cardiovascular disease.[23]

Site quality assessment was carried out on 69 samples. The majority of sites have good or reasonably good quality information. When compared with similar studies on English-language sites, similar results were obtained. In a study which found 73% of sites had a score of ≥70,[23] with an average score of 73.2. However, there are differences in the instruments performed, as well as a smaller number of samples. In addition, the study did not classify the site into either good or bad categories. In addition to using instruments made by researchers, the study also saw certification by an independent health website appraisal agency (Health On the Net / HON)[24]. The results obtained 8 of 15 sites (53%) are well certified.

Different results were obtained when compared to research of the 15 site samples that discussed PCOS,[17] it was found that the quality of the information conveyed was still low. The assessment is done by looking at the accuracy of the content and other aspects including reference sources, the present of the site, and the existence of the editor's review. However, there is no mention of the evaluation criteria included in the classification of whether or not a site. In terms of content accuracy, there are no sites that contain complete information as a whole. Obtained sites that have content accuracy> 70% by 5 out of 15 sites (33%). As a consequence, patients cannot rely on information about PCOS only on one side, because each site presents complementary information.

Google is the most used search engine in the world, with Bing (which has acquired Yahoo) ranked second. The tendency of patients to read certain sites can be influenced by the order in which they appear on the results page. Research shows that most internet users only visit sites that occupy the top 10 positions in the search results display.[25]

Similar research on the quality of health sites that discuss breast cancer, [26] says that each search engine uses different methods of prioritizing sites that are displayed in search results. Both Google and Bing as a whole display site with ratings that are not significantly different. There is a relationship between the order of appearance in the top search results page and the quality of information contained on the site [27].

In site grouping by site type, significant differences in site quality are found between blog, education, news and social media sites. Significant assessment differences were also found in the grouping of sites based on-site builders, which were grouped into personal, non-health organizations, and organizations engaged in the health sector. Similar results were obtained in studies regarding health information in children. From a total of 500 sites,[28] it was found 39% gave the right answer, 11% of the sites gave incorrect answers, and 49% of the sites did not give an answer. Based on the types of sites available, the official website of the government has the highest level of accuracy (100%), followed by educational sites (85%). Unofficial sites have a lower accuracy rate (80%), with unofficial sites for commercial purposes having the lowest accuracy rating (0%). However, in this research only descriptive analysis was carried out and no comparative analysis of site quality was carried out. In addition, it does not explain the evaluation criteria and appraisal tools used.

In this study, there are significant differences both in content accuracy criteria and site credibility in commercial and non-commercial site groups. This is because on commercial sites aim to attract patients to use the services offered by these sites so that it focuses on the appearance and lack of good faith in writing health information sites.[29] Similar results were obtained who examined information on chronic

pain on the Internet. In the study obtained overall information on the internet of medium quality[30]. In a univariate analysis, it was found that there are potential commercial benefits related to the quality of health information on internet sites.

CONCLUSION

The distribution of quality information about polycystic ovary syndrome on Indonesian-language sites is mostly of good quality. There is no significant difference in the quality of information between sites grouped by search engines. A site that has good quality comes from the first two pages of search results, the type of education site, made by health organizations, and is non-commercial.

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