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ADVERSE EFFECTS OF ORAL CONTRACEPTIVES: AN ANALYSIS OF THE INFORMATION AVAILABLE TO THE POPULATION ON GOOGLE

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Abstract: It is known that around 88% of women with an active sex life use some form of contraception. These can be categorized into two main groups: reversible and definitive. Among the reversible methods, oral contraceptives are the most widely used by Brazilian women. Despite being widely used, oral contraceptives can cause a number of adverse effects in their users, which can lead them to seek information about these drugs on internet search engines. The aim of this study was to assess the quality of information about the adverse effects of oral contraceptives available on the *Google* search platform. This is a descriptive study. The choice of *Google* as the search source was based on its popularity in Brazil. Thus, certain expressions were used as search descriptors, based on the following question: "What are the adverse effects of oral contraceptives?". The first 10 search results for each expression were considered for data analysis. To analyze the quality of the information on the sites, three criteria were established (technical, comprehensiveness and accuracy) containing quality indicators. A *checklist* was drawn up which assigned a score out of 10 to each indicator, giving a maximum *score* of 100 points. A total of 36 websites were analyzed. Analysis of the results showed that the population has access to information about the adverse effects of oral contraceptives via *Google*. The websites obtained an average score of 64%, showing that the quality of the information is average, but the main problems associated with inadequate/incomplete information were related to the lack of information about the person technically responsible for the article, the lack of citation of the bibliographic sources used and the lack of mention of the need for the drug to be prescribed by a health professional. In addition, the majority of websites point to the prevention of pregnancy as the only therapeutic benefit of oral contraceptives. The most frequently cited adverse

effects were cardiovascular problems, headaches, nausea, breakthrough bleeding and lack of libido. Despite the existence of several websites that discuss the adverse effects of oral contraceptives, it is necessary to provide more appropriate information on digital media for the population to access, especially on *Google*. In addition, there is a lack of clarification about the need for the drug to be prescribed by a health professional, which can put the population at risk of self-medication and exacerbate the appearance of adverse effects.

Keywords: contraception, combined oral contraceptive, single oral contraceptive, prescription.

INTRODUCTION

Since its emergence in the 1980s, the internet has been one of the main tools for finding and accessing information and has reached unimaginable potential as a source of knowledge. Today, you can find out about everything and everyone, at any time of the day, from anywhere in the world. As this technology becomes more accessible, the number of internet users grows exponentially (Garbin; Neto; Guilam, 2008; Melo; Fonseca; Silva, 2017; Dubowicz and Schulz, 2015)

The rapid spread of the Internet has resulted in a wide availability of health information, allowing a large part of the lay public to use the network for self-diagnosis and self-medication, or to carry out this practice on third parties. There is concern among health professionals about how the population uses the information they receive via the Internet, since misinterpretations that lead to self-diagnosis and/or self-medication can have a direct impact on the patient's therapeutic approach and clinical evolution. This problem can arise due to insufficient health knowledge, the complexity of the technical information provided and the poor quality of the sources (Agarwal *et al.*, 2021; Laurent *et al.*, 2012).

With greater availability, internet use has increased significantly among all age groups (Dubowicz and Schulz, 2015), but it is known that women search for more health information on the internet than men (Garbin; Neto; Guilam, 2008). These searches may be related to a particular disease or the use of medication, especially drugs used globally, such as contraceptives for birth control (Agarwal *et al.*, 2021; Neumark *et al.*, 2012).

Contraception can be defined as an intervention, pharmacological or non-pharmacological, aimed at preventing pregnancy after sexual intercourse (Teal and Edelman, 2021). It is estimated that of the 1.9 billion women of reproductive age, corresponding to the 15-49 age group, approximately 1.1 billion do family planning and are active users of contraceptive methods (United Nations, 2022).

Hormonal contraceptives have a high adherence rate, which can be attributed to their high efficacy, low failure rate and different routes of administration, such as oral, intramuscular, subdermal and transdermal implants, and associated with intrauterine systems (Brito; Nobre; Vieira, 2011). Among the variety of pharmaceutical forms, oral contraceptives are the most widely used method of hormonal contraception among women of reproductive age in Brazil and worldwide (United Nations, 2022).

In addition to the classic therapeutic effect of preventing conception, oral contraceptives have a number of other additional properties, which contributes to their being the most widespread contraceptive method on a global scale (Febrasgo, 2015). However, despite their benefits, combined oral contraceptives have several adverse effects related to their use, including headaches, breast tenderness, dizziness, mood swings and weight gain. As for the isolated formulations, they can cause other adverse effects, such as prolonged bleeding or amenorrhea, acne, formation of

ovarian cysts, changes in sexual desire (libido) and headaches and breast pain (de Melo, 2010; NHS, 2024).

Because these drugs mimic endogenous hormones, they can cause a series of adverse effects and physiological changes, which makes it essential for users to be prescribed and monitored by specialized professionals. However, considering that *online* search platforms, especially *Google*, are popular and have become consolidated as the main sources of information, especially on health, it is important to evaluate the quality of the content made available to the population. This is because they can influence decision-making, encourage self-medication and the incorrect use of medication, which increases the risk of adverse reactions, unwanted pregnancies and failure in the family planning strategy

Therefore, the internet can be a major risk in the area of health when there is a lack of knowledge of the guidelines for identifying the quality standards of the pages present in search systems (Biruel, 2018).

The aim of this study is therefore to assess the quality of information on the adverse effects of oral contraceptives available on the *Google* search platform.

MATERIAL AND METHODS

This is descriptive research, in which the researcher records and describes the facts without intervening in them, describing events without manipulating them

With regard to the choice of digital media to analyze the existence and quality of information disseminated on the adverse effects of oral contraceptives, *Google* was chosen because of its notorious popularity in Brazil when it comes to searching for information.

Thus, the following expressions were used in the *Google* search engine 1) what are the adverse effects of oral contraceptives (what are the adverse effects of oral contraceptives /

what are the side effects of oral contraceptives / what are the side effects of oral contraceptives / what are the adverse effects of contraceptive pills / what are the side effects of contraceptive pills), 2) is oral contraception bad for you? (Is oral contraception bad? / Is the pill bad?) 3) What are the risks of oral contraceptives? (What are the risks of oral contraceptives? / What are the risks of the pill?).

The expressions were searched without the use of signs and quotation marks, given that the public generally doesn't use them in their searches. As a result, only the first ten search results in which the above key expressions were used were considered.

The information found on the search platform was organized by looking at the a) title of the article, b) date of publication, c) page maintainer and d) link to the article. After organizing and carrying out an initial analysis of the information contained in the publications, only those with content related to the topic were selected for analysis.

In the analysis stage, the criteria and indicators used were adapted from Neto *et al.* (2017) and Mendonça and Neto (2015), as shown in Table 1. Each indicator could be answered "yes" or "no" and the site scored 10 points when the answer was "yes". In this way, each publication could reach the maximum score of 100 points. The analyses were carried out by two different researchers and the arithmetic mean of the scores was taken for each site.

RESULTS AND DISCUSSION

A total of 36 websites were analyzed after searching for the expressions in the *Google search engine*. Considering that the first 10 results were evaluated and that the search expressions were similar, certain sites appeared repeatedly, so with each new search, only the new sites that had not yet been analyzed were considered. After the search, the sites were analyzed and given a score, as shown in Table 2.

In the search carried out using the term "What are the adverse effects of oral contraceptives" and similar expressions, out of 18 websites, 14 dealt with the adverse effects of oral contraceptives, two presented hormonal contraceptive methods in general, one dealt with the neuropsychiatric adverse effects caused by hormonal contraceptives and the remaining publication had as its main subject, the difference between the formulations of combined oral hormonal contraceptives and the comparison between the dosages of estrogen and progestin.

In relation to the search carried out with the expression "Oral contraceptives are bad for you" and similar expressions, of the 15 sites analyzed in total, 12 dealt with the adverse effects of oral contraceptives, two dealt specifically with the morning-after pill and not oral contraceptives and were removed from the analysis, and one talked directly about cardiovascular risk as an adverse effect. During the search, publications appeared that corresponded to results retrieved when the search was carried out with the first expression.

When the term "What are the risks of oral contraceptives" and similar expressions were used in the search, a total of six sites were analyzed, one dealt with the incorrect use of the morning-after pill (and was removed from the analysis), the remaining corresponded to research on the adverse effects of oral contraceptives, three of which were specific to combined oral contraceptives.

The survey revealed an average score of 64% for the websites analyzed, considering the *checklist* scores. The analysis of the results showed that the population has access to information about the adverse effects of oral contraceptives when searching for expressions directly related to the subject, and that the quality of the information is relatively adequate, but incomplete, which can be a problem for the lay public

Criteria	Indicator
Technical	Does the site display the RESPONSIBLE?
	Is there any information about the person responsible?
	Does it include the date of the last PUBLICATION/Update?
	Is the site free of commercial PROPAGANDA?
Scope	Do you have information on health risks (adverse effects)?
	Do you have any information on the health benefits?
Accuracy	Is the content scientifically based on up-to-date studies, research, protocols, consensus or clinical practice?
	Does the site present the sources that support the information available?
	Is the language suitable for the target audience?
	Does the site notify you of the need for a consultation/prescription by a health professional?

Table1 . Criteria and indicators for evaluating *Google* pages.

Search expressions	Website	Matter	Final average
What are the adverse effects of oral contraceptives?	MSD Manual	"Oral contraceptives	100
What are the adverse effects of oral contraceptives?	MSD	"Hormonal methods of contraception	90
What are the adverse effects of oral contraceptives?	Tua saúde (Rede D'or Group)	"9 side effects of contraceptives (and what to do)"	85
Is oral contraception bad for you?	Healthy Living: The Einstein Blog	"Contraceptives: how they work, their risks and benefits	85
Is oral contraception bad for you?	Bayer Gineco	"Birth control pills	80
What are the adverse effects of oral contraceptives?	CHN (Niterói Hospital Complex)	"Contraceptive pill: see its effectiveness, adverse effects and indications"	80
What are the risks of oral contraceptives?	USP Newspaper	"What do female medical students know about the risks and benefits of combined oral contraceptives?"	80
What are the adverse effects of oral contraceptives?	MD. Health	"10 side effects of the contraceptive pill"	80
What are the risks of oral contraceptives?	Medway	"Find out about the risks of combined hormonal contraception!"	80
What are the side effects of contraceptive pills?	NAV	"Birth control pills: how they work, their effectiveness and how to take them	80
What are the adverse effects of oral contraceptives?	Amil One	"Oral contraceptive use: understand the side effects"	75
What are the adverse effects of oral contraceptives?	Dentalis Always at Hand	"Top 10 side effects of oral contraceptives	70
Is the pill bad for you?	Arnaldo Vieira de Carvalho Foundation	Is birth control bad for you?	70
What are the adverse effects of oral contraceptives?	Globo (gshow)	"10 side effects of the contraceptive pill that every woman needs to know about, and what to do about it"	70
Is the pill bad for you?	Healthy Longevity Group	"Contraceptives and the risk to women's health	70
What are the risks of the pill?	USP newspaper	"For professor, benefits of contraceptives outweigh the risks"	70
Is oral contraception bad for you?	Federal District Health Department	"Myths and truths about oral contraceptives"	70
What are the side effects of oral contraceptives?	Pfizer	"Learn about hormonal contraceptive methods"	65
Is oral contraception bad for you?	Brazil School	"Risks of oral contraceptives	60

What are the adverse effects of oral contraceptives?	Alphamed	“Contraceptives: what are the side effects?”	55
What are the adverse effects of oral contraceptives?	VHL Primary Health Care	“What is the difference between oral combined hormonal contraceptive formulations comparing estrogen and progestogen dosages and the associated side effects?”	60
What are the side effects of oral contraceptives?	Medscape	“Neuropsychiatric side effects of hormonal contraceptives: more common than you think!”	60
What are the risks of oral contraceptives?	UOL World Education	“Risks of oral contraceptives”	60
Is oral contraception bad for you?	Estadão	“Contraceptives: risks, benefits and how they work”	55
What are the risks of oral contraceptives?	Rio de Janeiro State Government Health Department	“Contraceptives: be aware of the risks and precautions”	55
What are the risks of oral contraceptives?	ANVISA	“Combined Oral Contraceptives: risk of thromboembolic events. Information for prescribers”	50
What are the adverse effects of oral contraceptives?	Fetal Center	“Oral contraceptives: a choice with risks”	50
Is oral contraception bad for you?	UOL	“Risks of indiscriminate use of the contraceptive pill”	50
Is oral contraception bad for you?	Hcor	“Birth control pills: a hidden cardiovascular risk”	45
Is oral contraception bad for you?	Oswaldo Cruz Hospital	“Thrombosis caused by contraceptives”	45
Is the pill bad for you?	Metropolis	“Is continuous use of the contraceptive pill harmful? Expert answers”	45
Is oral contraception bad for you?	Natural Life	“Are contraceptives bad for you? Find out how they affect your health”	45
What are the adverse effects of birth control pills?	Medcel Blog	“How does the contraceptive pill work? Learn all about the contraceptive method”	40
What are the side effects of oral contraceptives?	MedRaupp Clinic	“The seven most common side effects caused by contraceptives”	40
Is oral contraception bad for you?	USP newspaper	“Incorrect use of oral contraceptives can cause serious problems”	40
What are the adverse effects of birth control pills?	Hipolabor PHARMA today	“Learn about the side effects of contraceptives”	35

Table2 . Classification of websites.

The main problems associated with inadequate/incomplete information were related to the lack of information about the person technically responsible for the article, the lack of citation of the bibliographical sources used, the lack of mention of the need for the drug to be prescribed by a health professional and the existence of commercial advertising. In addition, the majority of websites point to the prevention of pregnancy as the only therapeutic benefit of oral contraceptives.

Of the 36 websites analyzed, 15 did not identify the person responsible for preparing the information content, while 26 did not provide any further information about them, such as their training and qualifications. A study by Neumark *et al* (2012), which evaluated *online* health information on Hebrew-language *websites*, found that approximately 58.6% of the websites evaluated provided information on the qualifications and experience of the person responsible for the article. This shows that the Hebrew sites had very similar quality criteria to the Portuguese sites evaluated in this study, which was 58.3%.

According to Mendonça and Neto (2015), websites that have not been evaluated by a health professional may contain incorrect, incomplete or incomprehensible information for a lay person, as a reader who does not have the appropriate knowledge will not be able to tell the difference between correct and wrong information. Fogg *et al* (2002) observed that this is directly related to the institution that owns the site, because when it is an educational (.edu), institutional (.org) or governmental (.gov) site, it will have more credibility in its information than a personal site, as well as being better accepted if it allows the reader to contact the site manager. It can be seen in this research that several sites considered to be of high quality obtained a final average below what was expected, such as the sites of federal universities and health agencies, for example. The only site that obtained the maximum average (100 points) had a subject aimed at health professionals and not the lay population. The same site was also the only one to score 90 points, with an article aimed at the lay population.

Furthermore, the lack of information about the author of the article can lead to a risk that the article is *fakenews* and that it was not written by a natural person, especially with the increase in content written by artificial intelligence. In addition to the doubt about the author's professionalism, which directly interferes with the health of the patient who will be using the site as a means of obtaining relevant information, since if they are not identified, they cannot be held responsible for the content.

According to Darmoni *et al.* (2004), the author of an article, in addition to being identified, must provide a precise description of their areas of specialization and qualification, so that the reader can check whether the information contained on a given platform corresponds to the areas of specialization mentioned by them, and assess the credibility of

an information source on the Internet. Furthermore, identifying the source responsible for the site and, more specifically, for each document within it, is essential, as a reliable site must include detailed information about the individual or institution responsible for the content presented, along with pertinent references

As for the scientific basis of the content of the 36 websites analyzed, 26 did not present the sources that support the information available, being one of the indicators that obtained the most "no" markers during the research. In addition, 10 did not show the date of publication/update. These facts directly interfere with the credibility of the information presented, since even if the author is a health professional and the *website* presents their information, it is necessary to explain the sources used by this professional to dissertate the content.

According to Neumark *et al.* (2012), a *website's* credibility parameters such as the presence of references, the date the content was created, the date it was updated and information based on scientific evidence are essential, as helps the reader to identify the interests that influence the content present in the article and to check whether it is in line with what they are looking for.

It was found that only 20 of the 36 websites analyzed described the need to seek a health professional to introduce the use of oral contraceptives. It is extremely important that users of hormonal contraceptives are prescribed by a health professional, since an individualized assessment allows for better care, studies the cardiovascular history, the risk-benefit ratio, instructs on adverse effects, guides the choice of medication, whether it is a combined or isolated contraceptive, establishes the dosage, and identifies possible drug interactions that could compromise the effectiveness of the method and culminate in an unwanted pregnancy (Casagrande, 2004; Kemmerem, 2001)

This monitoring is essential, because although medication is a pharmaceutical product that has been technically obtained or prepared, for prophylactic, curative, palliative or diagnostic purposes, as set out in Law 5991 of December 17, 1973, when used irrationally, it can cause great damage to health, poisoning and can lead to death (Mota *et al.*, 2012)

Most websites generalize the information, not explaining the difference between single and combined contraceptives, and when they describe adverse effects, they don't specify which type of contraceptive they are attributed to. Despite having similar adverse effects (de Melo, 2010), some oral contraceptives are more associated with certain types of risks, such as combined contraceptives and cardiovascular risks (WHO, 2015). Assuming that websites provide limited and often only introductory information on a given subject, it is possible that information on the classification of single or combined contraceptives, and their respective adverse effects, was not covered because it is specific knowledge that can be clarified through the guidance of a health professional in the office. However, since these concepts are not covered on the *site*, the recommendation that the reader and possible contraceptive user seek specialized care for prescription and guidance should be part of the content of the article.

In their study on the quality of information on Hebrew websites about oral contraceptives, Neumark *et al.* (2012) showed that approximately 65.5% of the websites stated that it was necessary to seek advice from a health professional and that the information they contained would not replace the need for an individual prescription

In addition, the authors noted that approximately 86% of the websites they evaluated provided information on general use, efficacy, safety and reversibility, but that many did not provide complete information or provided

inaccurate instructions, such as what to do when a pill is forgotten and when there is a need to use support methods (Neumark *et al.*, 2012). This data ties in with the findings of the present study, which found that 15 of the 36 websites presented only the prevention of pregnancy as a benefit, with many risks and only one benefit for such a complex drug. In addition, many do not describe the risks and do not provide guidance on administration, which can lead to use that is inappropriate to the patient's health conditions, leading to adverse effects.

Of the 36 sites analyzed, only 26 were free of advertisements. This fact directly interferes with the reader's obtaining information, since it is a health article and depending on the advertisement, it can have a negative influence, as well as hindering the viewing of information. According to Ramos *et al.* (2020), the presence of advertisements can be considered a distraction for the reader, who often needs to close images and videos in order to view the full article. In their study, almost half of the *websites* analyzed (47.5%) featured advertisements.

All the indicators analyzed in this study are relevant for evaluating *websites* and enabling possible improvements in the quality of what is available to the population on the *Google* search engine. Neto *et al.* (2017) suggest that analyzing the quality of information is an important factor in helping website managers to identify strengths and weaknesses and improve the quality of their information, as the knowledge disseminated on the *internet* can be very useful in promoting health, which is why it is important to certify these sites with quality seals, ensuring that the population has access to quality information.

CONCLUSION

Based on the research into the quality of the information on *websites* about the adverse effects of oral contraceptives, it was concluded that they have an average quality of 64%. There needs to be a greater supply of appropriate information on digital media for the population to access the subject, especially on the *Goo-*

gle search engine. In addition, there is a lack of clarification about the need for the drug to be prescribed by a health professional, about the risks of using the drug and there is also a lack of correct, complete and understandable information, which can put the population at risk of self-medication and exacerbate the appearance of adverse effects.

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