

ARTICLE



The impact of misinformation on patient perceptions at a men's health clinic: a cross-sectional study

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Misinformation is a rising concern for providers and patients alike. We aimed to assess where patients acquire information prior to their andrological urologic appointment and assess patients' perception regarding the reliability of this information. A cross-sectional study was conducted at an outpatient men's health clinic between June and August of 2022 with questionnaires distributed to adult males seen for their primary visit. The study included 314 consenting adult patients who independently completed the questionnaire (mean age: 51.2 ± 17.2). Overall, 55.1% of patients indicated they searched for their condition online. However, 39.2% and 27.7% of respondents agreed and strongly agreed, respectively, that misinformation is a concern when searching for health information. Only 59.9% of patients discussed their concerns with others and those that did not chose not wanting to (65.1%) as their top choice. However, 27.4% of respondents were embarrassed to do so. Finally, 38.2% and 12.4% of patients agreed and strongly agreed, that learning information prior to your appointment affects their relationship with the physician. These findings emphasize the need for urologists to be aware of where their patients are gathering health information and to address concerns regarding misinformation.

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INTRODUCTION

Misinformation, and particularly health misinformation, has become a pervasive issue in society and within the medical community [1, 2]. Misinformation is defined as the spread of false information, irrespective of the intent, and has become increasingly prominent due to the nature of today's information channels [3]. The repercussions of misinformation are significant and global entities have recently started acknowledging this ever-growing issue. For example, in February 2020 the World Health Organization declared a COVID-19 'infodemic' in an attempt to combat this phenomenon [4]. The spread of false information among patients has created confusion and mistrust that influences their interactions with the healthcare system and care providers [2, 5]. Although misinformation has been acknowledged as a broad issue in healthcare, there is scarce evidence about its prevalence and effect in certain areas of health and medicine. Studies have shown variability with regards to the accuracy of information on social media platforms such as YouTube and TikTok [6].

Sexual health is an essential aspect of overall health and wellbeing, yet it is often stigmatized and under-discussed [7]. As a result, individuals may seek health information through various sources, including social media platforms, online forums, and other informal channels [8]. However, such sources are not always reliable or accurate, leading to the spread of misinformation that can be harmful to patients' health and wellbeing [9]. Given the pervasiveness of sexual health misinformation, it is crucial to understand where patients are acquiring information related to their sexual health and how much they trust their sources. By

doing so, healthcare professionals can better identify gaps in knowledge and provide evidence-based, accurate information to patients.

The objective of this study is therefore to identify where patients are acquiring information relevant to their sexual health and andrological concerns, assess how much they trust their channels of information, and assess patient-reported perceptions related to this misinformation prior to their appointment or procedure. We hypothesize that a majority of patients are seeking to find high-quality, credible material regarding their health concerns created by healthcare professionals due to increasing misinformation.

METHODS

A cross-sectional study was conducted to evaluate where patients obtain information prior to their appointment with a urologist and assess their perception of the reliability of the information. Approval for this study was obtained from the University of Manitoba's Health and Research Ethics Board (HS25526) and was conducted at an outpatient, office-based urology clinic in Winnipeg, Manitoba, Canada.

Study population and data collection

Between June and August of 2022, every new adult male patient (>18 years old) presenting to the clinic was approached to be enrolled and consented in the waiting room prior to their appointment. Enrolled patients independently completed a questionnaire consisting of a Likert scale, short answer, and multiple-choice questions in the context of baseline demographics, online search strategies, and perceptions regarding misinformation (Appendix 1).

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Patients were excluded if they did not provide consent, had previously filled out the questionnaire at a prior visit, and if they were unable to independently complete the questionnaire.

Statistical analysis

Each Likert-scored question was evaluated on its original five-point scale by a Chi-Square Goodness of Fit Test. A p -value < 0.05 was considered to indicate there was a statistically significant deviation from the normal Chi-Square distribution, caused by a non-neutral participant preference. Multiple linear regression was performed to determine causative factors for Likert responses. All central tendencies were reported as means and the measure of variance is standard deviation unless otherwise stated. All statistical analyses were performed using R version 4.0.3, and figures were rendered using the ggplot2 package in RStudio version 1.3.1093.

RESULTS

Participant demographics

The mean age of the 314 participants surveyed was 51.2 ± 17.2 years old (range: 19–87) with demographic information shown in Table 1. 78% ($n = 245$) of participants were either married or in a common-law relationship. The proportion of participants that completed post-graduate education was 13.1% ($n = 41$), while 41.7% ($n = 131$) completed an undergraduate degree, 36.3%

($n = 114$) completed high school, and 8.9% ($n = 28$) did not complete high school. The geographic distribution of participants was such that 65.2% ($n = 205$) of the participants lived in urban areas and 34.7% ($n = 109$) lived rurally. 5.4% ($n = 17$) participants self-identified as indigenous, 1.3% ($n = 4$) preferred not to say and 93.3% ($n = 293$) did not self-identify as indigenous. The most common reason for patients' appointments is shown in Table 1, including benign prostatic hyperplasia (12.7%) and Peyronie's Disease (10.8%), followed by erectile dysfunction, orchalgia, and prostate cancer screening (9.6% each). The largest proportion of patients reported being seen for "other" concerns (24.5%), meaning they were seen for miscellaneous conditions that were not prevalent enough to be included in the questionnaire.

Participant behaviour patterns

The proportion of patients indicating they researched their condition using the internet was 55.1%. A majority of these patients indicated they used Google (87.8%), followed by Mayo Clinic/Johns Hopkins (31.7%), followed by WebMD (24.4%), with information sources shown in Table 1. Those who did not report preferring information from a doctor (61.6%), being unable to trust online sources (22%), and not knowing where to look (13.8%) as the top reasons. The proportion of patients who discussed their condition with friends was 59.9%, and the primary reason for those who did not discuss it with friends was that they did not want to (65.1%), however, 27.4% of respondents indicated they were embarrassed to do so. 8.9% of patients chose not to discuss with their partner, with 56.6% reporting that their primary reason for this was not wanting to. Similarly, 38.9% of respondents were embarrassed to do so.

Participant perceptions about medical misinformation

The mean level of concern about misinformation held by the participants was $3.9 (\pm 0.9)$ indicating a significant skew towards agreement and strong agreement (Fig. 1A, $\chi^2 = 171.6$, $p < 0.0001$). Participants indicated that they believe they can identify false information, with a significant skew towards the agreement, with a mean score of $3.6 (\pm 0.7)$ (Fig. 1B, $\chi^2 = 326.3$, $p < 0.0001$). Patients agreed (3.5 ± 1) that learning information prior to their appointment does significantly affect their relationship with their doctor (Fig. 1C, $\chi^2 = 151.8$, $p < 0.0001$). Patients' beliefs were also skewed towards agreement (3.6 ± 0.8) that they should search for medical information (online) prior to their appointments or procedures (Fig. 1D, $\chi^2 = 231.1$, $p < 0.0001$). No demographic factors were found to significantly impact participant opinion via multiple linear regression. Select patient comments regarding their perceptions about medical misinformation are highlighted in Table 2.

DISCUSSION

The prevalence of online misinformation has increased significantly over the years, with many people turning to the internet for health-related information [10]. While online resources can provide valuable information, they may also contain inaccurate or misleading information, which can have consequences for patients. Misinformation is of particular concern, as it can impact a patient's quality of life and may lead to unnecessary psychological distress [11]. Given the sensitive nature of urologic and andrological concerns, this impact may be more profound. Our study is the first to assess patient perceptions of online misinformation related to urologic and sexual health.

The high prevalence of sexual health misinformation, combined with our findings on patient perceptions of online health information, is a cause for concern [2, 12, 13]. We discovered that a significant number of patients believe that they should conduct independent research to gather information about their health concerns before their appointment with their physician.

Table 1. Patient demographic information and information sources for patients who search for their concerns online.

Age \pm SD (years)	51.2 \pm 17.2 years old
Highest education completed	
Postgraduate degree	13.1% ($n = 41$)
Undergraduate degree or diploma	41.7% ($n = 131$)
Secondary/high school	36.3% ($n = 114$)
Did not complete secondary/high school	8.9% ($n = 28$)
Location of residence	
Urban	65.3% ($n = 205$)
Rural	34.7% ($n = 109$)
Relationship status	
Married/Common-Law	78% ($n = 245$)
Single	22% ($n = 69$)
Reason for appointment	
Hematuria	1% ($n = 3$)
Peyronie's Disease	10.8% ($n = 34$)
Enlarged prostate	12.7% ($n = 40$)
Erectile dysfunction	9.6% ($n = 30$)
Infertility	10.5% ($n = 33$)
Low testosterone	4.5% ($n = 14$)
Orchalgia	9.6% ($n = 30$)
Vasectomy	5.4% ($n = 17$)
Vasectomy reversal	0.6% ($n = 2$)
Prostate cancer screening	9.6% ($n = 30$)
Other	24.5% ($n = 77$)
Did you search up your condition online	
Yes	55.1% ($n = 173$)
No	44.9% ($n = 141$)
If yes, where did you find information?	
Google	87.8% ($n = 158$)
Mayo clinic/Johns Hopkins	31.7% ($n = 57$)
WebMD	24.4% ($n = 44$)
YouTube	5.6% ($n = 10$)

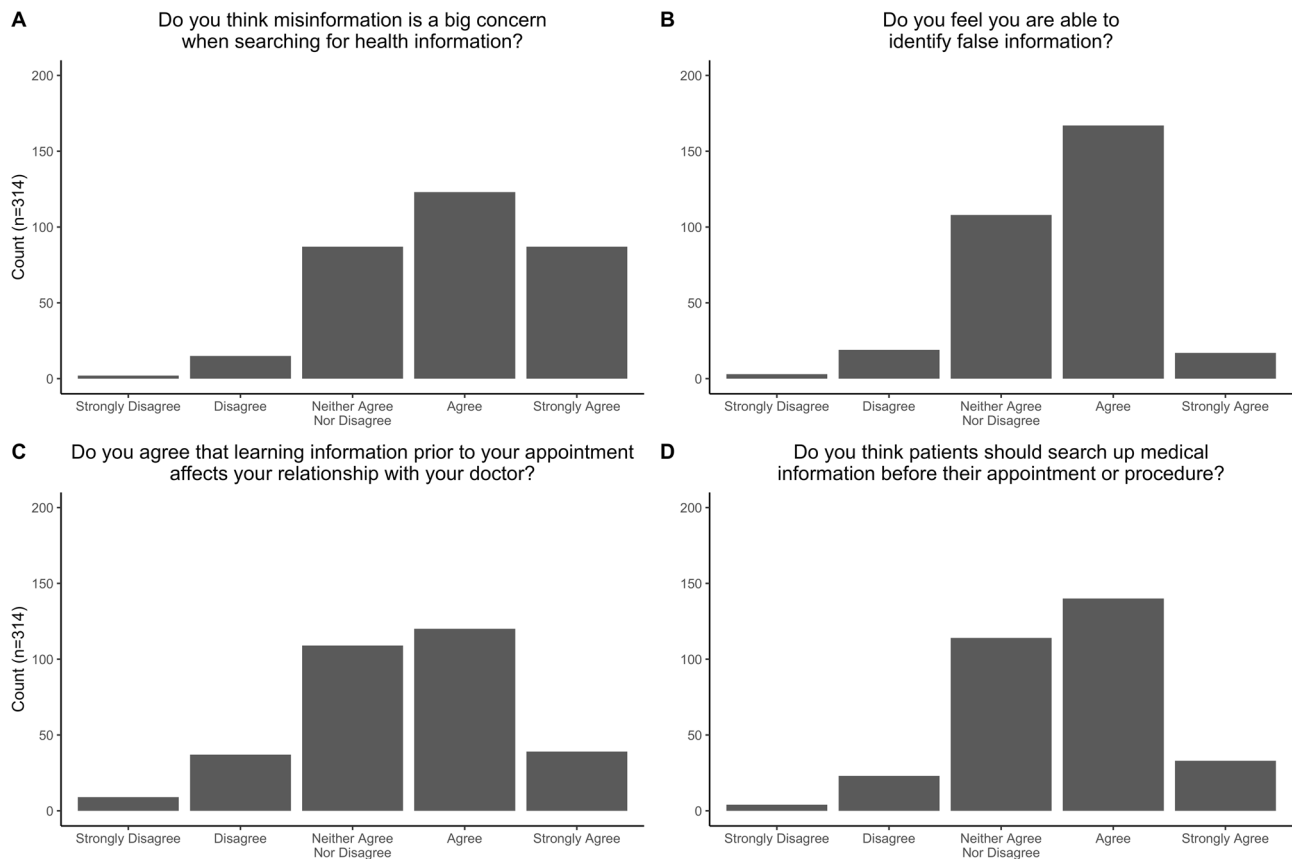


Fig. 1 Likert scale survey responses for select questions. Likert scale regarding patient concern about misinformation (A), perceived ability to identify misinformation (B), the perceived impact of prior self-researched information on the patient-doctor relationship (C), and whether patients should research medical information before their appointments or procedures (D). All responses were given according to level of agreement with 1 = Strongly Disagree and 5 = Strongly Agree. *Chi Squared Goodness of Fit Testing.

Table 2. Representative patient comments about searching for information and perceptions of misinformation.

- I feel that men in my age group feel inhibited about discussing sex-related matters because most are not engaged in sexual activity.
- Any information is good information to determine an open understanding of all information to help critical thinking of good and bad information.
- I think it can be beneficial to the patient to do some research in order to prepare themselves for their appointment but ultimately you should consult the results of your research with your doctor to confirm these results.
- I find it unfortunate that there isn't much information about male infertility and I hope this changes in the years to come
- It's taking an extremely long time to get the issues seen by the correct specialist

However, most patients also expressed their concerns about the widespread pervasiveness of misinformation, consistent with the existing literature on the subject [2, 12]. The main cause for concern is that patients seem to believe they can distinguish between accurate and inaccurate information. Although the majority of patients in our study held this belief, it's widely accepted that patients often struggle to identify misinformation for a number of reasons [9, 13]. With the flood of online health information, patients can quickly become overwhelmed and develop a false sense of security if they hold this belief [10]. These findings highlight the need to address the presence of sexual health misinformation and provide patients with trustworthy resources that empower them to make informed decisions about their health.

The demographics of our study population are worth noting. With our sample being comprised entirely of males, this raises important questions about the potential stigma surrounding sexual health discussions among men. In many societies, men may feel

uncomfortable or ashamed when talking about sexual issues, which can lead to a lack of knowledge and understanding of their own health needs [14]. This was consistent with our study's findings, which highlighted that many patients do not discuss their concerns with others simply because they do not want to. More importantly, feeling embarrassed to discuss with their partner or friends was a leading reason. In addition, the average age of the participants in our study was over 50 years old. This is important because previous work has primarily focused on the impact of misinformation among younger patients who were believed to access the internet more often for health-related information [15]. Our study highlights that older patients also frequently use internet resources as a major source of health information. Furthermore, there are a variety of resources being used. The frequent use of many resources underscores the need for reliable and accessible online resources that also cater to this age group.

Prior literature has established the widespread prevalence of online health information in the field of urology, with emphasis

on social media platforms like TikTok, YouTube, and Instagram. However, these studies have also discovered a concerning amount of misinformation regarding urologic and sexual health, covering various topics, including prostate cancer, bladder cancer, testicular cancer, delayed ejaculation, testosterone-related concerns, male infertility, erectile dysfunction, and semen retention [12, 16–20]. Despite the abundance of posts and videos related to these topics, misinformation still dominates online content. Studies have consistently revealed the alarming presence of inaccurate information, which could significantly harm individuals who may rely on these sources for guidance and advice. It is also noteworthy that the majority of posts and videos are from non-physicians, with only a minority of content created by qualified medical professionals [12]. This presents an excellent opportunity for physicians to create content and offer their patients high-quality, evidence-based information. A recent study by Dubin et al. 2022 found that physicians' involvement in online content creation was minimal and comprised ~10% of the content, suggesting that they can play a crucial role in improving the dissemination of reliable health information. By creating accurate and engaging online content, physicians can ensure patients access trustworthy health information, ultimately improving health outcomes.

Newer tools may be useful in combating the problem of misinformation among urology patients. Some possible approaches are to provide reliable information through brochures available in clinics, or by granting access to online video sources such as WellPrept that offer accurate information in an easily accessible format that the physician previously validates in advance for a wide range of questions, concerns, or frequently misunderstood topics [21]. These interventions can help patients avoid turning to unreliable sources and also increase clinical efficiency by reducing the burden on physicians who may be facing time constraints when discussing diagnoses and treatment options with patients [22]. Additionally, providing patients with trustworthy sources of information can assist those who may have questions but feel hesitant to ask them during appointments or questions that arise after their appointment.

The limitations of our study include that when assessing for reason for appointment in the questionnaire, a large proportion of patients (24.5%) indicated the reason for their visit was "other". Despite a list of 12 common urological presentations to choose from, the high prevalence of patients voting 'other' suggests that our questionnaire may have been limited in this section with options. Furthermore, while it was ensured the survey was only administered once to new patients, patients who may have been previously treated at another urologic center for other conditions may have been included in the study, potentially impacting the results. Finally, our study was limited in its breadth as it was conducted at a single center, with a collection period of only three months. Future studies assessing patient perceptions of reliable information vetted by physicians and quantitatively measuring patients' understanding of the information are suggested to determine which distribution methods for correct information are most valuable and impactful for patients.

In conclusion, our study highlights that in an older cohort of male patients, the majority use the internet to obtain health information but still have significant concerns regarding the prevalence of misinformation. Despite this, the majority of patients believe they can correctly identify misinformation. However, this may lead to a false sense of security and a subsequent reliance on false information. By utilizing innovative interventions, clinicians can proactively meet patient needs and ensure that they receive accurate information. Providing reliable and accessible sources of information can improve patient outcomes and help reduce the prevalence of misinformation in urology patients.

DATA AVAILABILITY

Data obtained is available from the authors upon reasonable request and with permission of the authors.

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AUTHOR CONTRIBUTIONS

KP was responsible for conception and design, acquisition, analysis, interpretation of data, drafting, revising, and final approval of the work. DSB was responsible for acquisition, analysis, interpretation of data, drafting, revising, and final approval of the work. MGVI was responsible for analysis, interpretation of data, drafting, revising, and final approval of the work. PP was responsible for conception and design,

acquisition, analysis, interpretation of data, drafting, revising, and final approval of the work. All authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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COMPETING INTERESTS

PP is a consultant for Boston Scientific. The remaining authors declare no competing interests.

ETHICAL APPROVAL

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ADDITIONAL INFORMATION

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