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Contents

Viewpoints

- Are We Sure We Fully Understand What an Infodemic Is? A Global Perspective on Infodemiological Problems ([e36510](#))
Alessandro Rovetta, Lucia Castaldo. 4
- Sexual Health Assessment Is Vital to Whole Health Models of Care ([e36266](#))
Alex Uzdavines, Drew Helmer, Juliette Spelman, Kristin Mattocks, Amanda Johnson, John Chardos, Kristine Lynch, Michael Kauth. 14

Peer-Review Reports

- Peer Review of "Representing Physician Suicide Claims as Nanopublications: Proof-of-Concept Study Creating Claim Networks" ([e39859](#))
Anonymous. 25
- Peer Review of "Representing Physician Suicide Claims as Nanopublications: Proof-of-Concept Study Creating Claim Networks" ([e39860](#))
Anonymous. 27
- Peer Review of "Representing Physician Suicide Claims as Nanopublications: Proof-of-Concept Study Creating Claim Networks" ([e39886](#))
Eric Chan. 29
- Peer Review of "Representing Physician Suicide Claims as Nanopublications: Proof-of-Concept Study Creating Claim Networks" ([e39889](#))
Ariel Soares Teles. 32
- Peer Review of "Representing Physician Suicide Claims as Nanopublications: Proof-of-Concept Study Creating Claim Networks" ([e40299](#))
Anonymous. 34
- Peer Review of "Are We Sure We Fully Understand What an Infodemic Is? A Global Perspective on Infodemiological Problems" ([e39928](#))
Nabi Nazari. 36

Peer Review of "Are We Sure We Fully Understand What an Infodemic Is? A Global Perspective on Infodemiological Problems" (e40305)
 Anonymous. 40

Peer Review of "Are We Sure We Fully Understand What an Infodemic Is? A Global Perspective on Infodemiological Problems" (e40822)
 Gunther Eysenbach. 41

Peer Review of "Sexual Health Assessment Is Vital to Whole Health Models of Care" (e39927)
 Cynthia Darling-Fisher. 43

Peer Review of "Sexual Health Assessment Is Vital to Whole Health Models of Care" (e40023)
 Anonymous. 45

Peer Review of "Sexual Health Assessment Is Vital to Whole Health Models of Care" (e40301)
 Anonymous. 47

Peer Review of "Waiting Time and Patient Satisfaction in a Subspecialty Eye Hospital Using a Mobile Data Collection Kit: Pre-Post Quality Improvement Intervention" (e40444)
 Alexandros Argyriadis. 49

Peer Review of "Waiting Time and Patient Satisfaction in a Subspecialty Eye Hospital Using a Mobile Data Collection Kit: Pre-Post Quality Improvement Intervention" (e40448)
 Haleh Ayatollahi. 51

Peer Review of "Waiting Time and Patient Satisfaction in a Subspecialty Eye Hospital Using a Mobile Data Collection Kit: Pre-Post Quality Improvement Intervention" (e40574)
 Anonymous. 53

Peer Review Report

Peer Review of "Are We Sure We Fully Understand What an Infodemic Is? A Global Perspective on Infodemiological Problems" (e40303)
 Anonymous. 38

Authors' Response to Peer Reviewss

Authors' Response to Peer Reviews of "Representing Physician Suicide Claims as Nanopublications: Proof-of-Concept Study Creating Claim Networks" (e40158)
 Tiffany Leung, Tobias Kuhn, Michel Dumontier. 55

Authors' Response to Peer Reviews of "Sexual Health Assessment Is Vital to Whole Health Models of Care" (e40159)
 Alex Uzdavines, Drew Helmer, Juliette Spelman, Kristin Mattocks, Amanda Johnson, John Chardos, Kristine Lynch, Michael Kauth. 66

Authors' Response to Peer Reviews of "Waiting Time and Patient Satisfaction in a Subspecialty Eye Hospital Using a Mobile Data Collection Kit: Pre-Post Quality Improvement Intervention" (e40453)
 Mathew Mbwogge, Nicholas Astbury, Henry Nkumbe, Catey Bunce, Covadonga Bascaran. 71

Authors' Response to Peer Reviews

Authors' Response to Peer Reviews of "Are We Sure We Fully Understand What an Infodemic Is? A Global Perspective on Infodemiological Problems" ([e40636](#))

Alessandro Rovetta, Lucia Castaldo. 62

Original Papers

Representing Physician Suicide Claims as Nanopublications: Proof-of-Concept Study Creating Claim Networks ([e34979](#))

Tiffany Leung, Tobias Kuhn, Michel Dumontier. 76

Waiting Time and Patient Satisfaction in a Subspecialty Eye Hospital Using a Mobile Data Collection Kit: Pre-Post Quality Improvement Intervention ([e34263](#))

Mathew Mbwogge, Nicholas Astbury, Henry Nkumbe, Catey Bunce, Covadonga Bascaran. 85

Viewpoint

Are We Sure We Fully Understand What an Infodemic Is? A Global Perspective on Infodemiological Problems

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Abstract

Infodemic is defined as an information epidemic that can lead to engaging in dangerous behavior. Although the most striking manifestations of the latter occurred on social media, some studies show that disinformation is significantly influenced by numerous additional factors, both web-based and offline. These include social context, age, education, personal knowledge and beliefs, mood, psychological defense mechanisms, media resonance, and how news and information are presented to the public. Moreover, various incorrect scientific practices related to disclosure, publication, and training can also fuel such a phenomenon. Therefore, in this opinion article, we seek to provide a comprehensive overview of the issues that need to be addressed to bridge the gap between science and the public and build resilience to the infodemic. In particular, we stress that the infodemic cannot be curbed by simply disproving every single false or misleading information since the belief system and the cultural or educational background are chief factors regarding the success of fake news. For this reason, we believe that the process of forming a critical sense should begin with children in schools (ie, when the mind is more receptive to new ways of learning). Furthermore, we also believe that themes such as scientific method and evidence should be at the heart of the university education of a future scientist. Indeed, both the public and scientists must be educated on the concepts of evidence and validity of sources, as well as learning how to dialogue appropriately with each other. Finally, we believe that the scientific publishing process could be greatly improved by paying reviewers for their work and by ceasing to pursue academic success at all costs.

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KEYWORDS

communication; conspiracy; COVID-19; education; fake news; infodemic; infodemiology; mass media; public health; risk perception; science

Infodemiology

Infodemiology was defined by Gunther Eysenbach “the science of distribution and determinants of information in an electronic medium, specifically the Internet, or in a population, with the ultimate aim to inform public health and public policy” [1,2]. The term was deliberately coined to recall epidemiology. Consequently, infodemic (ie, “epidemic” of information) represents the uncontrolled dissemination of information, including false or confusing information, during a disease outbreak [3-5]. To date, there is no univocal cataloging of the various types of infodemic information. For instance, disinformation is sometimes defined as the intersection between misinformation (eg, the creation of misleading content and false causal connections between phenomena) and malinformation (eg, leaks, harassment, and hate speech) [5]. On the contrary, Wang et al [4] argue that when the dissemination is voluntary and takes place for malicious purposes, we speak of disinformation; otherwise (ie, when it is unintentional and accidental) we speak of misinformation. Some authors enclose both meanings in the unique term “dismisinformation,” while others adopt the sometimes-criticized expression “fake news” [4,5]. Specifically, O’Hair et al [5] formally define dismisinformation as “any message or a set of messages that represent a meaning complex discrepant from or incompatible with a sender’s intent and/or a relatively informed or expert consensual evidentiary state.” In this regard, it is essential to point out that these denominations can include false news, polarized content, satire, misreporting, commentary, persuasive information, and citizen journalism [6]. In this paper, we will adopt the O’Hair et al [5] convention. Phenomena such as malinformation and conspiracy hypotheses will therefore be included in the concept of dis-misinformation. The importance of the infodemiological approach has always been known in the scientific community but was established definitively during the COVID-19 pandemic. In this regard, 132 states have signed an international document to guarantee their commitment to combat the COVID-19 infodemic as this has often resulted in damage of epidemiological and economic nature [3]. In this perspective paper, we address infodemiological issues, which, in our opinion, have been largely neglected by a significant fraction of the scientific community. Specifically, we will provide arguments to support the fact that the concept of dismisinformation is broader and more complex than it may seem at first glance.

Effects of Communications on the Lay Neutral Public

Although infodemics cannot exist without dismisinformation, it is necessary to consider that even correct information (ie, based on facts and scientific evidence) contributes to its spread. Indeed, the juxtaposition of conflicting information only aggravates the negative influence on the lay public [7]. Such a contrast can arise and grow on two different levels: the dichotomy of reliable and unreliable news (Level 1, eg, scientific evidence versus dismisinformation) and the scientific debate (Level 2, eg, differing predictions based on preliminary data).

Notable cases occurred during the COVID-19 pandemic. For example, fake news has emerged about the laboratory creation of SARS-CoV-2 as a virological weapon despite the scientific literature supporting the absence of voluntary manipulation [8]. Even more striking was the alleged correlation between 5G and the COVID-19 spread [9]. A well-trained scientist understands that such news is fake since the peer-reviewed scientific literature is, in the vast majority of cases, in agreement on the nonexistence of such phenomena. However, we must strive to put ourselves in the shoes of an inexperienced person. In particular, on average, a layperson does not have the basis for knowing the concept of “peer review” or “meta-analysis” and can distinguish the reliability of a source only up to a certain point. Let us take a concrete example. I turn on the television and hear about the side effects of COVID-19 vaccines [10]. Therefore, I start looking for details on the web, finding reassurance from my health organization [11]. Some time later, a friend of mine shares a video on Facebook where a doctor (or similar) talks about the severe damage of vaccines, denouncing an international conspiracy. Searching for information on the web, I find an article from the ByoBlu news channel, which confirms the doctor’s words; meanwhile, the vaccine debate becomes hot on talk shows [10]. Then, now in a panic, I ask for help from my general practitioner, who turns out to be a convinced “anti-vaxxer” [12,13]. Hence, I decide not to vaccinate myself, and I advise my family and friends against vaccines. Unfortunately, this is a realistic scenario, as evidenced by the sources mentioned. Furthermore, the above example makes the distinction of Level 1 from Level 2 extremely relevant and subtle. In fact, who is to blame for this irrational reaction? To have a reasoned answer, we need to analyze what happened. First of all, we must consider that the influence of mass media on the population is still extremely high today [14]. Secondly, the conflicting reports, even coming from doctors and scientists, create confusion and diminish trust in the authorities [3]. Rationality gives way to anxiety and fear, increasing the likelihood of assuming harmful behaviors, in this case, not being vaccinated against COVID-19 [3,15]. Indeed, vaccine hesitancy is fueled by the constant discussion on their side effects due to the cognitive distortion of risk perception [10,16]. Such a distortion is reinforced by the fact that sensationalistic headlines can create a bias in reading or listening to the news, and the emotional impact on risk perception is, on average, much higher than that of a logical argument [17,18]. Therefore, the explanations of these phenomena are to be divided between inappropriate communication and personal unpreparedness. While the reasons for writing shocking titles and reporting news with unnecessary emphasis are related to acquiring more audience and clickbaiting [19], the personal inability to process information rationally does not derive simply or solely from one’s willingness not to. In this regard, the World Health Organization (WHO) has firmly stated that we must build resilience to infodemics [3]. Currently, we believe that national school programs are generally inadequate to form the critical and analytical sense necessary to weigh the risk perception based on the available scientific evidence. Specifically, we believe people are not guided and educated on how to judge the trustworthiness of a source. Moreover, even teachers and professors are not prepared to deal with such a vast and

complicated topic. Therefore, we believe that the first fundamental step in addressing the future infodemic is creating a school program suitable for the formation of resilience to disinformation (Point 1). As a matter of fact, changing a psychological or behavioral attitude beyond a specific age group becomes difficult [20-23], which requires acting on the malleable minds of young people to help them become whole and independent people. Similar conclusions on the importance of health education for children and young people were reached by MacDonald et al [24]. These strategies must be added to what is already being carried out to combat the infodemic [3].

The Plague of Conspiracy Hypotheses

Conspiracy thinking originates from questionings of various kinds, including epistemic, existential, and social [25]. There is evidence that these attitudes are the aberration of mechanisms useful for the human race's survival, such as pattern recognition, agency detection, threat management, alliance, and dangerous coalitions detection [26]. For instance, the rejection of medical science is caused by complex and unconscious phenomena, including but not limited to illusory truth phenomenon (repeated exposure to falsehood can prime us to accept it implicitly), the availability heuristic (we afford more weight to more readily recalled information, even when this might be misleading), and the fallacy of anecdotal vividness (we tend to react more viscerally to emotive claims than more sober-headed analysis) [27]. Moreover, the Dunning-Kruger effect, which states that incompetents overestimate their knowledge on a particular topic, feeds the conspirationism [28]. This makes communication with these people very difficult as they are excessively prejudicial and do not have the technical means to understand why they are wrong. The press and media coverage of fake news does not help, as confirmatory biases drive conspirationists [10]. In these cases, the implementation of infoveillance and content removal systems such as those adopted by social platforms could be the only way to limit, at least temporarily, the infodemic on the web [14]. Nonetheless, as discussed in the previous section, conspiracy hypotheses also come from people expected to demonstrate high competence (eg, doctors and scientists). The most striking case is that of Nobel Laureate Luc Montagnier, a staunch supporter of the no-vax movement who has fostered the hypothesis that SARS-CoV-2 was born from a voluntary manipulation of HIV [29,30]. Such incidents have been far from isolated, as evidenced by many professors, doctors, and nurses demonstrating skepticism and unfounded views on vaccines [12,13,31]. In particular, Paris et al [31] highlighted the devastating impact of media communication about vaccine side effects on the class of health care workers. In this regard, it is crucial to keep in mind that it is often the social context (eg, an ingrained belief system) that makes conspiracy theorists appealing to the public [32]. At the same time, Heyerdahl et al [33] showed that fear of peer judgment prompted many health care professionals not to express their doubts about COVID-19 vaccination. This evidence exhibits that not even these people's scientific training has been sufficient to manage the infodemic. Furthermore, conspiracy and dread often mix in a murky sea that makes them almost indistinguishable. Therefore, we believe that scientific training

should focus more on adopting the scientific method and analyzing sources' reliability (Point 2). Specifically, a science graduate should master the concept of "degrees of evidence" (eg, original article vs meta-analysis) and the credibility of a source (eg, nondeposited preprint vs peer-reviewed article). On this point, we also believe it is essential that the principle of authority be minimized; the conviction of being an expert in the sector must not induce us to think that we can ignore the most recent scientific evidence. A scientist is a real scientist only if they are constantly willing to question what they know based on the most updated literature.

Problems in Scientific Communication

Beyond the glaring errors of the press and conspiratorial characters, including scientists, we must ask ourselves the following: has the communication from the scientific community been adequate? On January 14, 2020, the WHO wrote on the official Twitter account "Preliminary investigations conducted by the Chinese authorities have found no clear evidence of human-to-human transmission of the novel #coronavirus (2019-nCoV) [...]" [34]. This statement means that, at the moment, the scientific community does not know if the novel coronavirus 2019-nCoV can be transmitted from human to human. The subsequent day, Maria Van Kerkhove stated in a press conference "From the information that we have it is possible that there is limited human-to-human transmission, potentially among families, but it is very clear right now that we have no sustained human-to-human transmission" [35,36]. The first part of the statement is very cautious, as it is weighted on expressions such as "From the information that we have" and "it is possible." On the contrary, the second sentence alludes to an implausible possibility, that is, that there is clear evidence to affirm that the virus is not transmitted easily from person to person. In fact, this affirmation was soon denied not only by robust evidence of transmission from symptomatic infected patients but also from presymptomatic and asymptomatic patients [37-39]. Information channels with a large audience shared this news adding further inaccuracies. For example, Reuters published 2 articles with the same title 5 minutes apart. In the first, the opening sentence used the verb "has [limited transmission]" [40], while in the second (the US version), the wording "may have" was adopted [41]. In summary, we have confusing, slightly inaccurate, and covertly contradictory information presented to an inexperienced audience. Even worse is the media debate that arose before the pandemic outbreak in Europe. For example, in Italy, scientists provided diametrically opposed opinions on the severity of COVID-19, breaking public opinion in half [10,14]. This contributed to the emergence of serious protests when the implementation of lockdowns was requested, which proved to be a fundamental tool in cutting down the number of cases and saving millions of lives [42]. In such delicate times, words are just boulders and must be chosen carefully. Indeed, communication errors of this type can provide material for conspiracy hypotheses and confuse the public trying to orient themselves within a new dramatic and unusual situation. Beyond the mistakes of the press for which they are not responsible, scientists have a moral obligation to predict the public reaction to certain circumstances as they possess an

additional intellectual tool, that is, the scientific method. When it is necessary to communicate sensitive information, it would be advisable to write the texts or at least the essential passages of the latter to ensure the greatest possible clarity and precision. Furthermore, when consulted, doctors and professors must behave scientifically, that is, base their claims on the degree of evidence available in the literature (Point 3). In this respect, we would like to share the experience and thoughts of one of the authors.

On several occasions during COVID-19, I have had discussions with some scientists who were well-known faces of the web and Italian television. The latter's nature concerned an aspect that I consider of absolute communicative importance: the scientific validity of public statements. For example, many argued COVID-19-related opinions on their Facebook public profiles based on a single preprint without specifying that those results were not peer reviewed nor confirmed by other literature. One of them even replied that this clarification was unnecessary since he was a peer reviewer, as if a single reviewer could replace the entire peer-review process that includes two or more reviewers—depending on the topic's relevance—and an editor's final judgment. What surprises me is the arrogance of people who think they can be above the scientific method and community because they have an academic title or role. All this while we have had direct proof that even Nobel laureates can assert dangerous unscientific nonsense. What lesson is being taught to the public by acting this way? Such an excessive usage of the principle of authority distances us from facts and credible communication and urges the public to give importance to the individual rather than the available evidence. [AR]

Current Challenges in Scientific Publishing and Disclosure

Returning to the previous section, we ask ourselves, “what is the reason that prompts scientists to share comments on preprints or other forms of nonpeer-reviewed literature?” During the COVID-19 pandemic, rapid and timely interventions were significant public health challenges [43]. Since COVID-19 depends on many factors and comorbidities and the variants of concern can substantially change its behavior [44-46], having reliable updated data in short times is an essential aspect of containing outbreaks. Unfortunately, the peer review and publication processes are inadequately slow to face a health crisis properly. Huisman et al [47] found that only 13%-16% of papers covering medicine, natural sciences, and public health were accepted within 1 month, and the average acceptance time ranged from 12 to 14 weeks [47]. In our experience as reviewers and authors for over 50 scientific journals during the COVID-19 pandemic, we encountered very long publication times, even for articles with a high scientific impact (eg, side effects of COVID-19 vaccines). Therefore, we understand and agree on the need to comment on preliminary findings as long as it is openly stated that these results are uncertain, and the meaning

of “preprint” is clearly explained to the public. Furthermore, national and supranational agencies such as the Centers for Disease Control and Prevention (CDC), the European Medicines Agency (EMA), Food and Drug Administration, and the WHO are constant sources of up-to-date, internally reviewed data and can be consulted to obtain credible and calibrated news on the available evidence. Finally, we firmly believe that peer reviews should give absolute priority to Methods and Results over other sections, and journals should report methodological acceptance of the manuscript publicly. By doing so, researchers in the field—who are unlikely to need the Introduction and Discussion sections to understand and contextualize the paper—could receive new data more promptly. We must remember that science, especially medicine, saves lives. Delaying the publication of a manuscript for aesthetics, layout, or sections not essential for its reproducibility is just an unjustifiable academic caprice. Unfortunately, as things stand, a peer reviewer is required to report these aspects, and journals should be the ones to change their editorial policy.

Alongside this, the scientific community has to deal with internal situations. The first we want to discuss is predatory publication. Predatory journals offer rapid publication times at meager costs, making them very attractive to independent researchers who do not have funds available. However, these apparent benefits arise from poor or bogus peer-review processes [48]. Hence, the researchers identified various strategies to combat this phenomenon, including creating lists of predatory scientific journals and publishers and bibliographic abstracting and indexing [49,50]. Nonetheless, the inclusion criteria in predatory blacklists have always been the subject of criticisms and controversies, and predatory publications have managed to slip into prestigious repositories such as PubMed [51,52]. Therefore, there is no foolproof way but only general indications to recognize and avoid predatory publishers. The predatory phenomenon could be provoked and sustained by the success of the open access publishing method or the excessive editorial costs of renowned journals [53,54]. Nevertheless, even the rush to publish their results can push an author to choose alternative routes to standard publication. The second issue we want to discuss concerns the scientific role of peer review. Specifically, peer review is a fundamental procedure to ensure the accuracy of manuscripts published in scientific journals [55]. The independent judgment of 2 or more expert scientists not involved in the study examined and without conflicts of interest is a first step to skim the literature from gross errors. At the same time, a single article with new results is always a low degree of evidence until other studies confirm its findings. In fact, peer review still presents several flaws, including a possible low agreement between the referees [56-58]. In confirmation of this, it is not surprising to find numerous withdrawn articles [59]. Therefore, peer review is not and cannot be the final judgment on a scientific paper. Based on these premises, Adler [60] has proposed a quick review method that also includes a postpublication review. Yet this approach was not unanimously accepted by the scientific community. Checco et al [61] recently proposed semiautomated artificial intelligence peer review systems capable of assisting the reviewer and improving the review quality, but the authors conclude that there are still concerns to be settled. The third issue we want to highlight

regards the conflict of interest of journal publications and the unpaid contribution of peer reviewers. Peer review is a time-consuming and challenging process. Some researchers believe paying reviewers could facilitate shoddy reviews with the sole scope of getting the money reward [62]. In this regard, the authors of this paper—and many other scientists [62]—consider this statement to be simply false for various reasons, including the following: First, reviewers are selected by editors responsible for judging their reliability; second, the same criticism can also be raised for unpaid reviews as a referee could carry out hasty reports to obtain easy certification for personal prestige and curriculum. Third, paid reviewers would transform peer review into a real job with merit-based selection. In this regard, getting paid to conduct a review could increase the competition for top-notch reviews. Moreover, we believe that it would be far more rewarding and fairer for reviewers to have their work generate income. In our experience, a concrete example is that of JMIR Publications; if the editor evaluates the review of a paper to be of sufficient quality, the reviewer can earn up to 100 dollars to spend to publish in one of their journals [63]. Even if it is something very distant from a real waged job, this can be a first step in proving that the model is perfectly sustainable. Beyond that, we consider the association “paid reviewer-compromised review” hypocritical within the current editorial context. Indeed, the paid publication itself is basically a conflict of interest since journals only receive money if the articles are published. For instance, the standard policy of publishers asserts that a paper retraction does not involve the return of the article process charge to the authors (ie, editors may be motivated to publish regardless of the quality of the manuscript) [64]. Notwithstanding that, forcing the public to pay to read is not an acceptable solution if the goal is to keep the scientific community and the population updated on the latest evidence. The question, therefore, is “what to do then?” The open-access model is now widespread, and there is sufficient evidence that paying reviewers does not compromise the scientific quality of manuscripts. Since science continues to work, we believe that this is the right way to follow, with the awareness that the final judgment comes from the scientific community and not from the peer review. The fourth critical aspect concerns the search for scientific prestige. Many authors are convinced that metrics such as impact factor and number of citations are quality indices, while a vast scientific literature demonstrates that such indices are unreliable and can even be misleading [65]. Two of the main reasons are that impact factor is primarily influenced by outliers (ie, very few papers with very high citations), and the citations could reflect more the media success of an article than its quality (ie, more in-depth articles may not be known). In addition, it is necessary to consider why a paper was cited (eg, many citations concern introductory outline aspects). Just as the first duty of peer reviewers is not to be influenced by the prestige of the authors, the first duty of researchers is not to be affected by the reputation of journals when asked to evaluate the scientific content of a paper. As proof of this, numerous preprints have received thousands of positive citations inherent to the methodology adopted [66]. But the obsessive pursuit of prestige can also plague publishers. For instance, editorial reluctance to publish negative or null results can strongly bias literature [67,68].

Regarding all this, we support the healthy desire to be deemed great scientists and receive well-deserved gratifications as long as these do not lead to scientific discrimination and bias. However, considering the above evidence, part of the scientific community seems more interested in self-achievements rather than facts, and we need to change this. The fifth and final point concerns the secrecy of peer reviews. On January 16, 2020, Thijs Kuiken was contacted by “The Lancet” journal to review a paper within 48 hours [69]. The research showed strong evidence that SARS-CoV-2 was transmissible between humans, but the reviewer was expected to keep silent to protect the integrity of the evaluation and the authors’ and journal’s rights. Nonetheless, Thijs Kuiken faced this ethical dilemma with courage and conscientiousness and found a way to communicate the data to the WHO quickly. This episode testifies that the omission of essential public health information must be viewed as full-fledged disinformation. We stress that rapid medical evidence can save human lives and must be prioritized above everything else, especially during health crises. Failure to immediately communicate novel results to the authorities worldwide is a serious wrongdoing, and we must avoid it in the proximal future. Therefore, a standard procedure to deal with these exceptional situations must be designed and implemented as soon as possible.

Degrees of Reliability and Final Recommendations

The concepts of degree (or level) of evidence have long been addressed in the literature and differ by health discipline [70]. Various changes have been made over time, attempting to improve the standard classifications [71]. Despite this, as shown in the previous sections, this element is culpably left out in most public statements. Further critical issues arise when presenting sensitive information to the public; indeed, it is not just a matter of communicating the degree of evidence (eg, original article vs meta-analysis) but also its credibility (eg, publication in a predatory journal vs publication in a legitimate journal). Therefore, the public should be educated on what we have termed “degree of reliability,” that is, a scale that considers both the level of evidence and the credibility of scientific works. Doing so would limit the damage of conflicting information since not all pieces of information would have the same reliability anymore. Therefore, we recommend that health agencies establish a standard classification of degrees of reliability that can be adopted internationally for each discipline by each practitioner. In the meantime, all medical professionals should adopt and specify the scale they deem most appropriate before expressing public statements on sensitive topics. As regards other types of information (eg, facts and fake news checks), we propose the following 6 hierarchy of degrees of reliability, starting from the letter “F” all the way to the letter “A.”

1. Class F: regardless of their authority, personal opinions must be ranked with the lowest degree of evidence. This is necessary to ensure consistency in class attribution. In particular, the authority principle must be minimized to prevent unjustified claims (eg, Montagnier) from sowing

- doubt, fear, and false information. Therefore, all conclusions that have not been moderated or peer reviewed fall into this category.
2. Class E: preprint moderation avoids the circulation of very serious fake news in the scientific world, but it is not comparable to a peer-review process. Indeed, a large number of preprints fueling conspiracy theories and unjustified assumptions have been unearthed [72]. Therefore, although the probability of finding infodemics is lower than the previous category, moderated preprints do not represent sufficient evidence to make scientific and especially medical claims. Besides, it is essential to consider that screening criteria are not uniform between the various preprint platforms; for instance, medRxiv and bioRxiv repositories operate stricter selection criteria about COVID-19 than other databases [73]. Hence, it is also necessary to consider this aspect when evaluating the classification level.
 3. Class D: this category encompasses academic journals not yet indexed in recognized databases (eg, due to their novelty) and not listed among predatory journals (eg, Beall's List). The degree of evidence is sufficient to expose assessments to the public, provided that it is specified that these are premature analyzes. Furthermore, inclusion in this class implies that an extensive literature search has been implemented, ascertaining the absence of known opposite results. If the number of articles reporting contrary findings is comparable, then the scientist is required to express a personal judgment (eg, comparing the validity of the 2 studies on their scope); in this case, the quality of the evidence is class E. If the number of articles supporting contrary results is significantly greater, then the scientist is required to make a personal judgment and present the quality of the evidence as class F.
 4. Class C: the criteria of point D apply, but the probability of disseminating infodemic material further decreases thanks to bibliographic indexing.
 5. Class B: the criteria of point C apply, but there must be at least 3 agreeing articles. Evidence proposed by recognized health agencies (eg, EMA, CDC, and WHO) can fall into this category.
 6. Class A: the criteria in point B apply, but the articles must be systematic meta-analyses or reviews. Evidence proposed by recognized health agencies (eg, EMA, CDC, and WHO) can fall into this category.
- We stress that this scale is indicative and needs to be further elaborated by the scientific community, including all the particular cases that have escaped us, for improving the basic setting. However, we believe it can serve as a general guideline, showing a possible way forward to limit the infodemic drastically. Indeed, the simple fact of specifying the sources and the type of evidence proposed can give the public an idea of the news' relevance and weight (Table 1).
- A colored version of Table 1, useful for dissemination, is presented as Multimedia Appendix 1.

Table 1. Scientific communication quality classes.

Class quality	Color-related name	Complete name	Evaluation description
F	Red	Opinion (very poor reliability)	Based on raw data, personal experience, or preprint not deposited on accredited preprint repositories.
E	Orange	Indexed novel preprint (poor reliability)	Based on a new preprint deposited on one or more accredited preprint repositories.
D	Yellow	Unindexed new article (uncertain reliability)	Based on a new article not deposited on accredited article repositories. Known predatory journals are excluded.
C	Green	Indexed article (fair reliability)	Based on 1 or 2 articles deposited on one or more accredited article repositories or affirmed antihoax nongovernment websites.
B	White	Evidence (good reliability)	Based on 3 or more ^a articles or highly and properly cited preprints deposited on accredited article repositories or accredited gray literature.
A	Azure	Confirmed evidence (very good reliability)	Evaluation based on systematic review articles or meta-analyses deposited on accredited article repositories or accredited gray literature.

^aThis number may change depending on the importance of the evidence (eg, much more evidence may be required on drug-related information).

Conflicts of Interest

None declared.

Multimedia Appendix 1

Scientific communication quality classes. The marked line highlights the sufficiency threshold. (a) This number may change depending on the importance of the evidence (eg, much more evidence may be required on drug-related information).

[PDF File (Adobe PDF File), 64 KB - [xmed_v3i3e36510_app1.pdf](#)]

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Abbreviations

CDC: Centers for Disease Control and Prevention

EMA: European Medicines Agency

WHO: World Health Organization

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Viewpoint

Sexual Health Assessment Is Vital to Whole Health Models of Care

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Abstract

Sexual health is the state of well-being regarding sexuality. Sexual health is highly valued and associated with overall health. Overall health and well-being are more than the absence of disease or dysfunction. Health care systems adopting whole health models of care need to incorporate a holistic assessment of sexual health. This includes assessing patients' sexual orientation and gender identity (SOGI). If health systems, including but not limited to the Veterans Health Administration (VHA), incorporate sexual health into whole health they could enhance preventive care, promote healthy sexual functioning, and optimize overall

health and well-being. Assessing sexual health can give providers important information about a patient's health, well-being, and health goals. Sexual concerns or dysfunction may also signal undiagnosed health conditions. Additionally, collecting SOGI information as part of a sexual health assessment would allow providers to address problems that drive disparities for lesbian, gay, bisexual, transgender, queer, and similar minority (LGBTQ+) populations. Health care providers do not routinely assess sexual health in clinical practice. One barrier is a gap in communication between patients and providers. Providers cite beliefs that patients will bring up sexual concerns themselves or might be offended by discussing sexual health. Patients often report an expectation that providers will bring up sexual health and being comfortable discussing sexual health with their providers. Within the VHA, the lack of a sexual health template within the electronic health record (EHR) adds an additional barrier. The VHA's transition toward whole health and updates to its EHR provide unique opportunities to integrate sexual health assessment into routine care. We highlight system modifications to address this within the VHA. These examples may be helpful for other health care systems interested in moving toward whole health. It will be vital for health care systems integrating a whole health approach to develop both practical and educational interventions to address the communication gap. These interventions will need to target both providers and patients in health care systems that transition to a whole health model of care, not just the VHA. Both the communication gap between providers and patients, and the lack of support within some EHR systems for sexual health assessment are barriers to assessing sexual health in primary care clinics. Routine sexual health assessment would benefit patient well-being and present an opportunity to address health disparities for LGBTQ+ populations. Health care systems (ie, both the VHA and other systems) can overcome these barriers by implementing educational interventions and updating their EHRs and back-end data structures. VHA's expertise in developing and implementing health education interventions and EHR-based quality improvements may help inform interventions beyond VHA.

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KEYWORDS

sexual health; sexual health assessment; veteran; health equity; health assessment; whole health model; communication; communication barrier; technological barrier; health care; sexuality; sexual orientation; gender identity; sex; gender; model; care; barrier; well-being; comfort; assessment; EHR; electronic health record; quality; equity

Introduction

Most people, including veterans (individuals who have served in the Armed Forces, regardless of combat exposure, and who are no longer on active duty after receiving an honorable discharge from military service), are sexually active and value their sexuality [1]. In a US study, 50% of sexually active men and 40% of women rated sexual health as highly important; and self-reported health was closely correlated with perceived importance of sexual health [2]. The World Health Organization defines *sexual health* as:

...a state of physical, emotional, mental and social well-being in relation to sexuality; (...) not merely the absence of disease, dysfunction or infirmity. Sexual health requires a positive and respectful approach to sexuality and sexual relationships, as well as the possibility of having pleasurable and safe sexual experiences. [3].

Sexuality is defined as:

...a central aspect of being human throughout life and encompasses sex, gender identities and roles, sexual orientation, eroticism, pleasure, intimacy and reproduction. [3].

Benefits of Sexual Health and Problems Associated With Disruptions in Sexual Health

Sexual intimacy is meaningful to people and may function as a buffer against chronic stress, depression, and suicidal ideation [3-6]. Conversely, disruptions in sexual intimacy may be a further source of stress that exacerbate existing difficulties. Veterans, especially women and sexual and gender minority

veterans, experience a high rate of disruptions in healthy sexual intimacy. This is due to premilitary trauma, high rates of military-related injuries, multiple and often comorbid chronic illnesses (eg, vascular disease, obesity, depression, posttraumatic stress symptoms, substance use disorders, and tobacco use), and medication side effects that interfere with sexual desire and functioning [5,7-11]. While Veterans are often exposed to risk factors that disrupt sexual health during military service, many of these risk factors contribute to sexual dysfunction in the general population as well. Despite this, sexual health is often overlooked in clinical practice, both in the Veterans Health Administration (VHA) and other health care systems, unless the patient voices concerns [2,12].

Sexual Health Is Important to Whole Health

Sexual health has recently been acknowledged as an integral part of holistic conceptions of human health. An extensive report from the National Academies of Science, Engineering, and Medicine framed the importance of paradigmatic change in terms of sexually transmitted infection (STI) prevention [13]. They argued that the abstinence and disease-based models of STI prevention have largely failed to control STIs in the United States, and there is evidence that a sexual *health* framework is more likely to succeed. We extend their argument; shifting toward a sexual health model is important for more than STI prevention. As medical systems embrace whole health (defined as a focus on the multiple components of well-being based on their values, needs, and goals, and not simply the treatment of illnesses, injuries, and disabilities [14,15]) models of care, they will need to include sexual health or risk excluding an important aspect of their patients' overall health.

Benefits of Assessing Sexual Health

As health care systems transition toward whole health approaches to care, it will be essential that providers within these systems know what matters to their patients. This includes a basic understanding of a patient's values, goals, and overall identity, including their sexual orientation and gender identity (SOGI). This may be particularly important for people with lesbian, gay, bisexual, transgender, queer, and similar minority (LGBTQ+) identities whose values, goals, and sexuality may be overlooked. In addition to helping providers better understand their patients' values, sexual health assessment provides information that may not come out during a standard clinical assessment.

Correlation With Other Health Outcomes

Assessing sexual health can give providers important information about a patient's overall health and well-being; sexual concerns or dysfunction may signal unknown or undiagnosed health conditions. For example, a large meta-analysis demonstrated a correlation between erectile dysfunction in men and increased risk of negative cardiovascular outcomes and all-cause mortality [16]. In addition, sexual health assessment provides an opportunity to discuss treatment side effects such as drug-induced sexual dysfunction, which is common with the use of antihypertensives and antidepressants [17].

Conversely, providers can anticipate sexual health dysfunction when their patients have diagnoses known to impact sexual health or function. For example, sexual health concerns are associated with obesity, diabetes, obstructive sleep apnea in men, and metabolic syndrome in women [18-20]. Discussing this association with patients is one avenue providers can use to introduce the concept of sexual health and potentially motivate patients for behavioral change. In the absence of discussing sexual health, providers may miss the larger patient-centered picture and ignore the interrelationship between sexual health and overall health. For LGBTQ+ patients, this relationship between sexual health and overall health may be especially important.

Decreasing Disparities for LGBTQ+ Patients

There is substantial evidence that LGBTQ+ people experience worse physical and mental health outcomes relative to non-LGBTQ+ people [21-26], likely related to sexual and gender minority stress. Minority stress theory predicts that LGBTQ+ people will experience worse mental and physical health outcomes due to chronic stress caused by anti-LGBTQ+ victimization and stigma in society as well as internalization of these biases [25,26]. For LGBTQ+ veterans, this pattern holds [27], especially in relation to sexual health [28], and may be exacerbated by having served in the military under "Don't Ask, Don't Tell" [29] and increased exposure to sexual assault and harassment while in service [30-32]. Health care systems implementing policies to normalize the collection of SOGI data in routine clinical practice would help clinicians identify patients at increased risk for poor general and mental health outcomes due to chronic exposure to sexual and gender minority stress.

Enhancing Whole Health and Patient-Centered Approaches

The VHA has committed to a whole health approach to care where providers partner with veterans to help them achieve their health goals [15]. Although the VHA's whole health approach covers most aspects of well-being, it stops short of explicitly discussing sexual health. This approach underemphasizes the importance of good sexual functioning and healthy sexual intimacy on patient values or goals. Incorporating sexual health in whole health materials designed to prompt patient-provider communication would signal to providers and patients that these topics can be openly discussed.

Addressing Barriers to Sexual Health Assessment

The Gap Between Providers' and Patients' Beliefs About Sexual Health Assessment

Sexual Orientation and Gender Identity

Understanding core features of patients' identities is essential in building trust between patient and provider, and identifying their values. Yet assessment of SOGI—critical first steps for providers conducting sexual health assessments and developing a holistic understanding of their patients' identities—is not routine despite recommendations from the National Academy of Medicine and Joint Commission [33,34].

Providers often cite lack of time and training, uncertainty around how SOGI affect health, and a belief that patients will bring up their SOGI as reasons for not proactively asking for this information [35-38]. In one qualitative study of primary care providers (n=25), participants stated that, given the limited time allotted for appointments, asking about SOGI would take time away from asking, or bias their assumptions, about their patients' sexual behaviors and current primary and secondary reproductive anatomy (ie, anatomical inventory; for more information see Grasso et al [39]) [40]. Providers also believed that asking about SOGI might lead to patient discomfort.

In contrast, studies find that most patients are comfortable discussing their SOGI with their health provider. In the recent EQUALITY study that included a sample of 429 emergency department providers, roughly 80% of providers worried that asking patients about SOGI would offend them; however, only 9% to 11% of patients (n=1516) thought they might be offended. By contrast, about half of patients and 74% to 80% of providers believed that knowing a patient's SOGI would give them a better understanding of the whole person [41,42]. In a study of 304 primary care patients drawn from 4 community health settings, investigators found that about 90% of patients think their SOGI information is important for the provider to know and only around 10% think they would refuse to answer SOGI questions on hospital registration forms [43].

There is also evidence that people overwhelmingly answer SOGI questions. An analysis of the 2014 Behavioral Risk Factor Surveillance System data for the 20 states that included a SOGI module found that both veterans (n=22,587) and nonveterans (n=146,475) had very low rates of refusal in answering SOGI

questions (1.5% and 1.9%, respectively). These data also indicated that veterans were more likely to respond to SOGI questions than nonveterans [44]. These behavioral data reinforce that routine SOGI assessments are an important aspect of patient-centered care.

An important nuance to this discussion is that due to discrimination in society and the military, some LGBTQ+ veteran patients worry about disclosing their sexual orientation or gender identity to VHA health care providers [45]. Many lesbian and bisexual women veterans have experienced discrimination, rejection, or poor care after disclosing their sexuality to providers and may avoid conversations regarding sexual identity [46]. These experiences may reinforce discrimination and traumas encountered during military deployments due to their perceived sexual orientation [31]. Worries stemming from discrimination may lead to delays in seeking health care, compounding poor health outcomes for lesbian and bisexual women veterans. The VHA and providers must demonstrate that they are welcoming and affirming of LGBTQ+ veterans [47], and they can do this, in part, by normalizing SOGI and sexual health assessment for all patients.

Taking a Sexual Health History

The same patterns hold for assessing sexual health more broadly. Namely, providers feel uncomfortable about assessing sexual health without the patient bringing up the issue first for a variety of reasons including lack of time, lack of knowledge about sexual health, worry about causing offense, and personal discomfort [48-51]. Yet patients largely report that they would not be offended by sexual health questions and would like their providers to ask [52] or are okay with providers initiating sexual health conversations, even when they have a preference for starting the discussion themselves [53]. In a recent qualitative study, a general practitioner in a French outpatient clinic asked 93 patients about their sexual health, tying the question to a presenting concern or asking at the end of the appointment [54]. A majority (92%) of patients expressed positive (31%) or neutral (61%) feelings about the sexual health question when the provider followed up with a question about the patient's reaction to the question.

Studies continue to find that patients have unvoiced sexual health concerns that go unassessed [55,56]. A study using nationally representative samples of heterosexual and lesbian, gay, and bisexual Americans underscores that, while collecting SOGI data is vitally important, it is not enough [12]. Across sexual orientation groups, the percentage of respondents who reported talking with their provider about sexual health over the past year was 8% to 15% (no significant between-group differences). This contrasts with the 22% to 42% of respondents who reported experiencing a persistent sexual health concern in the past year. This demonstrates a gap between the prevalence of sexual health concerns and the extent to which they are addressed.

Technological Barriers

A major barrier for VHA in assessing SOGI and sexual health has been the lack of structured data fields for this information within the current electronic health record (EHR) [57]. The

VHA's current EHR has no national sexual health assessment template or note title. This means that, even when providers collect SOGI or sexual health information, these data cannot be readily accessed by other providers. Health care systems' use of standardized templates or easily identifiable sexual health notes will facilitate providers' assessment and documentation of patients' sexual health. When one VHA postdeployment clinic included sexual health in their standard intake, this information was collected and more readily accessible. Researchers examining these intakes found that between 17% to 24% of men assessed in this clinic expressed concerns about their sexual health [58-60].

Whether a barrier to sexual health assessment is poor patient-provider communication or a lack of technological capacity in an EHR system, these barriers will need to be overcome. Fortunately, VHA is moving ahead on several initiatives to reduce these barriers. These initiatives could inform similar implementation efforts in other health care systems.

Overcoming Barriers to Sexual Health Assessment

VHA's Health Record Modernization

Several opportunities exist for VHA to improve the sexual health assessment of veterans. Notably, VHA will soon have SOGI data fields within its current EHR. Plans to permit veterans to enter and edit SOGI data themselves through a web portal prior to an initial visit to establish care are currently underway. VHA has also developed a national sexual health note template for providers to facilitate assessment and tracking. In addition, VHA is replacing its current system with a commercial EHR product (Cerner Millennium, Sweden). Cerner Millennium has SOGI fields and three sexual health screening modules that will improve collecting and tracking this information.

The three standardized sexual health assessment forms in VHA's Cerner Millennium include a brief history screen designed for intake or hospital admission (eg, sexual concerns to discuss with the provider). The second module is a brief sexual health risk screen that focuses on history of and efforts to prevent STIs. The third module is a more detailed sexual health risk assessment that asks about changes in sexual frequency, desire, satisfaction, and function, and evidence of pain or coercion to engage in unwanted sexual activity. Together, these assessments provide structure to make it easier for VHA providers to use best practices when assessing sexual health and, crucially, give room for patient-centered care that goes beyond a focus on risk and dysfunction [47,61,62]. The national sexual health template for the current VHA EHR combines all three assessments from Cerner Millennium. The template will also pull in basic patient data, including gender identity and sexual orientation when these data are available. If not available, the provider is prompted to ask about these identities.

Provider Education

Education programs will follow implementation of the new SOGI fields in the current EHR and the expansion of Cerner Millennium to additional facilities. Two trainings on gender identity—one for current EHR users and one for Cerner

Millennium users—have already been released. Separate trainings on sexual orientation and on sexual health (for current EHR users and for Cerner Millennium users) are nearing completion. Training will support all members of primary care teams and patients in recognizing the link between sexual health, general health, and well-being [63-65]. These trainings will also help providers learn how to incorporate and document SOGI and sexual health assessment into their workflows. Educational interventions will include resources for primary care teams to help them conduct sexual health assessments.

Table 1 is an example of a brief sexual health assessment that could be adapted to a “pocket card” format. Providers following this guide would first collect SOGI information, including a 2-step sex assigned at birth (confirming information in the record system) and gender identity assessment. They would then conduct a brief sexual health assessment using the “Five ‘P’” model developed by the Centers for Disease Control and Prevention (CDC) with additional questions incorporating a sixth “P” for pleasure [3,61]. The questions in Table 1 were adapted from a CDC guide, the Cerner Millennium modules

being implemented in VHA, and other articles discussing sexual health assessment [62]. Table 2 lists all the questions and responses contained in the Cerner Millennium modules being implemented within VHA. While Table 2 is too large for a “pocket card,” the modules could be broken into separate cards and given to primary care team members assigned to complete those modules. Brief role-plays during preclinic stand-ups could help provider teams become comfortable using these tools.

Teams will be encouraged to assign roles and responsibilities for completing the sexual health intakes and following up on identified concerns. While general recommendations focus on increasing the use of nursing staff [13,66], the VHA’s transition to using Patient Aligned Care Teams in primary care makes it well situated to implement sexual health assessments conducted by several team members, each responsible for completing different components. In addition, as the VHA has also committed to increasing access to whole health coaching, whole health coaches could also play an important role in completing aspects of the sexual health assessment.

Table 1. Sexual orientation and gender identity, and 6 P’s pocket card.

	Questions
Sexual orientation and gender identity	
Sexual orientation	<ul style="list-style-type: none"> • What is your sexual orientation?
Sex at birth	<ul style="list-style-type: none"> • What was your sex assigned at birth?
Gender identity	<ul style="list-style-type: none"> • What is your gender identity?
Global	<ul style="list-style-type: none"> • Do you have any sexual health questions or concerns?
6 P’s	
Partners	<ul style="list-style-type: none"> • Have you been sexually active in the last 12 months? • In the past 12 months, how many people have you had sex with? • In the past 12 months, how many of your sexual partners have been new partners for you? • What genders do your partners identify with?
Practices	<ul style="list-style-type: none"> • What parts of your body are involved when you have sex? • Have you exchanged sex for your needs (money, housing, drugs, etc)?
Protection from STIs ^a	<ul style="list-style-type: none"> • What do you do to prevent STIs? • Have you been vaccinated for human papillomavirus, hepatitis A, or hepatitis B?
Past history of STIs	<ul style="list-style-type: none"> • Have you been tested for STIs in the past? • Would you like to be tested? • Have you been diagnosed with an STI in the past? • Have any of your partners been diagnosed with an STI?
Prevention of pregnancy	<ul style="list-style-type: none"> • How important is it to you to prevent pregnancy? • Are you or your partner using contraception or practicing any form of birth control?
Pleasure	<ul style="list-style-type: none"> • How satisfied are you with your or your partners’ sexual functioning? • Has there been any change in your or your partners’ sexual desire or the frequency of sexual activity? • Do you or your partners use any particular devices or substances to enhance your sexual pleasure?

^aSTI: sexually transmitted infection.

Table 2. Veterans Health Administration Cerner pocket cards.

	Response options
Sexual orientation and gender identity	
Confirm sex assigned at birth as listed in the health record.	Male, female, nonbinary, transgender male, transgender female, does not wish to disclose, other
What is your current gender identity (check all that apply)?	
Preferred pronouns	He/him/his, she/her/hers, they/them/theirs, ze/zin/zirs, patient name, other
Do you think of your sexual orientation as...	Straight or heterosexual; lesbian, gay, or homosexual; bisexual; something else, please specify (select other); do not know; choose not to disclose; other
Sexual health history screen	
Do you have any sexual health “questions or concerns” that you would like to discuss with your provider?	Yes, no
Have you been sexually active in the last 12 months?	Yes, no
If no, have you ever been sexually active?	Yes, no
If yes, in the past 12 months, how many people have you had sex with?	[Numeric]
In the past 12 months, how many of your sexual partners have been new partners for you?	[Numeric]
In the last 12 months, have your sexual partners been...	Male, female, both
Sexual health risk screening	
Have any of your partners in the past 12 months ever been diagnosed with a sexually transmitted infection?	Yes, no
Have any of your sexual partners in the last 12 months had HIV?	Yes, no
Have any of your sexual partners in the last 12 months injected drugs?	Yes, no
Have you exchanged sex for money, drugs, or other nonmonetary items in the last 12 months (transactional sex)?	Yes, no
What are you doing to prevent sexually transmitted infections?	Abstinent (choosing not to have sex), reduce number of sexual partners, maintains monogamous relationship (only one partner), uses condoms or other barrier methods, other
Do you have any sexual health questions or concerns that you would like to discuss?	[Open response]
Detailed sexual health history assessment	
How satisfied are you with you (or your partner’s) sexual functioning?	[Open response]
Has there been any change in your (or your partner’s) sexual desire or the frequency of sexual activity?	[Open response]
Do you (or your partners) use any particular devices or substances to enhance your sexual pleasure?	Yes, no
What kinds of devices or substances?	Other
Do you ever have pain with intercourse?	Yes, no
Do you have any difficulty with lubrication?	Yes, no
Do you have any difficulty achieving orgasm?	Yes, no
Do you have any difficulty obtaining and maintaining an erection?	Yes, no
Do you have difficulty with ejaculation?	Yes, no
Is there anything about your (or your partner’s) sexual activity (as individuals or together) that you would like to change?	Yes, no
What other concerns or questions regarding your sexual health or practices would you like to discuss (eg, pain, low/high sex drive, or safe practices)?	[Open response]

Patient Education

In the VHA, a veteran education campaign with brief public service announcements and on-site information will also be needed to inform patients that they will be asked about their SOGI and sexual health and why. When self-report mechanisms are available, veterans will need to be informed about how to use them and how their information will be used and protected. Fact sheets for veterans on why gender identity is asked are already available. Fact sheets for veterans on why sexual orientation and sexual health are assessed are nearing completion. These fact sheets will be available at VHA facilities and on VHA websites. In addition, VHA could leverage its expertise in developing phone apps to create a sexual health education tool targeted toward adult patients. Currently, there is a dearth of apps providing comprehensive information about sexual health [67]; a well-designed app would likely benefit veterans both inside and outside the VHA.

The evidence we reviewed points to the gap in patient-provider communication about sexual health largely due to provider perception. This appears to be driven by providers' beliefs that patients are not willing to discuss their sexual health when, in fact, they are. While veteran educational interventions are important, provider education is critical for promoting sexual health assessment.

Conclusion

While sexual health is an important part of overall health, health care providers do not routinely assess patients' sexual health. The primary barriers seem to be providers' beliefs that patients will be offended if asked about sexual health and logistical barriers to assessing sexual health. We believe that adding sexual health assessments directly to EHRs and pairing these changes with provider education about using these tools will help. Focusing provider education on addressing the belief gap between providers and patients (ie, sharing evidence that patients are largely comfortable with sexual health assessment) and interventions to increase providers' comfort with discussing sexual health will likely increase the impact of logistical changes. In addition, focusing on patients' priorities and sexual well-being could potentially increase patient engagement in care and enhance the whole health of our patients.

Finally, most research on sexual health has focused on risk, dysfunction, and treatment. Research is needed to identify commonly held sexual health goals and promote healthy sexual functioning. Implementing routine sexual health assessment and providing structural support for providers to do so and to ensure the information is accessible to the entire care team would make such research more feasible. This approach could move health care from reacting to problems to preventing them and to promoting healthy sexual functioning for optimal health.

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Conflicts of Interest

None declared.

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Abbreviations

CDC: Centers for Disease Control and Prevention

EHR: electronic health record

LGBTQ+: lesbian, gay, bisexual, transgender, queer, and similar minority

SOGI: sexual orientation and gender identity

STI: sexually transmitted infection

VHA: Veterans Health Administration

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Peer Review of “Representing Physician Suicide Claims as Nanopublications: Proof-of-Concept Study Creating Claim Networks”

Anonymous

Related Articles:

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KEYWORDS

physician suicide; suicide; suicide prevention; physician well-being; physician mental health; nanopublication; physician; doctor; mental health; semantic publishing; bibliometrics; claim network; information distortion; misinformation

This is a peer-review report submitted for the paper “Representing Physician Suicide Claims as Nanopublications: Proof-of-Concept Study Creating Claim Networks.”

Round 1 Review

General Comments

This paper [1] proposes a citation network of scientific publications about physician suicide. Such a citation network is a pioneering work for examining accurate claims of physician suicide. The network idea and entity schema design present unique values toward understanding the challenge.

Specific Comments

Major Comments

1. Information completeness concerns: the authors claim that “A subset of articles from the literature search were identified that made an assertion (claim) about the annual rate of US physicians who die of suicide. Additional articles published between August 2019 and March 2020 have been identified and manually added to the article set used for this study.” However, such a data-searching procedure is not comprehensive and may

lead to biased research. For example, the same source [2] of the Accreditation Council for Graduate Medical Education cited a paper back in 2003 with the same number, 300. If I did a google search or a professional database, I can find many more beyond the selected time periods. I would argue such an approach has a strong time bias and source bias. Do the authors conduct the investigation on a reliable database?

2. Nanopublication schema design: the schema is not well designed. For example, Figure 1 shows the number of fields is fixed and nonextensible. Therefore, that will lead each nanopublication to a limited citation size and a biased network. The authors may consider collaborations with scientists in a database or in computer science to redesign the toolkit. In addition, nanopublications can be revised or removed, and this design may lead to many false submissions. The authors may need to think about how to approach this because one contribution of this work is the toolkit.

Minor Comments

3. Some links are not accessible in the manuscript, such as [3].
4. The figures (eg, Figure 1) in the documents are quite blurry. The authors should consider using pictures with high resolutions.

Conflicts of Interest

None declared.

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1. Leung TI, Kuhn T, Dumontier M. Representing Physician Suicide Claims as Nanopublications: Proof-of-Concept Study Creating Claim Networks. *JMIRx Med* 2022;3(3):e34979 [FREE Full text] [doi: [10.2196/34979](https://doi.org/10.2196/34979)]

2. 10 Facts about physician suicide. Accreditation Council for Graduate Medical Education. URL: <https://www.acgme.org/globalassets/PDFs/ten-facts-about-physician-suicide.pdf> [accessed 2022-06-22]
 3. US physician suicide rate claim network (nanopub index). Nanopub. URL: <http://purl.org/np/RAzPytdERsBd378zHGvwgRbat1MCiS7QrxNrPxe9yDu6E> [accessed 2022-04-03]
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Peer Review of “Representing Physician Suicide Claims as Nanopublications: Proof-of-Concept Study Creating Claim Networks”

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KEYWORDS

physician suicide; suicide; suicide prevention; physician well-being; physician mental health; nanopublication; physician; doctor; mental health; semantic publishing; bibliometrics; claim network; information distortion; misinformation

This is a peer-review report submitted for the paper “Representing Physician Suicide Claims as Nanopublications: Proof-of-Concept Study Creating Claim Networks.”

Round 1 Review

General Comments

This paper [1] tries to address a myth that has been and continues to be perpetuated around the number of US physician suicides. It tries to put forward an approach to addressing myths in a way to better inform specific populations (ie, in this case, physicians) of the reality of suicide in the profession.

Specific Comments

Major Comments

1. This is an important effort and should be applauded.
 2. This confirms that the myth remains in existence, despite minor changes to it, and should be either verified or dispelled.
 3. The approach presented to address situations as described is one that has merit and can be useful to many where there is interest and desire. The paper was well written, clear, data driven, and of a good length. I would have liked a bit more in the discussion section (eg, implications could be stronger) and a simple conclusion statement at the end.
-

Conflicts of Interest

None declared.

Reference

1. Leung TI, Kuhn T, Dumontier M. Representing Physician Suicide Claims as Nanopublications: Proof-of-Concept Study Creating Claim Networks. *JMIRx Med* 2022;3(3):e34979 [FREE Full text] [doi: [10.2196/34979](https://doi.org/10.2196/34979)]
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Peer-Review Report

Peer Review of “Representing Physician Suicide Claims as Nanopublications: Proof-of-Concept Study Creating Claim Networks”

Eric C Chan¹, MD, MSc, FRCPC

Department of Psychiatry, University of Calgary, Calgary, AB, Canada

Related Articles:

Companion article: <https://www.medrxiv.org/content/10.1101/2020.05.16.20101881v1>

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KEYWORDS

physician suicide; suicide; suicide prevention; physician well-being; physician mental health; nanopublication; physician; doctor; mental health; semantic publishing; bibliometrics; claim network; information distortion; misinformation

This is a peer-review report submitted for the paper “Representing Physician Suicide Claims as Nanopublications: Proof-of-Concept Study Creating Claim Networks.”

Round 1 Review

General Comments

This study [1] describes the use of nanopublications as a means to create a citation network of claims. The authors suggest that this approach allows for verification of claims in scientific literature. In the case of this particular article, the authors describe a process in which nanopublications are created from assertions of physician suicide incidence and describe their findings. Notably, the authors report that “the network is not fully connected,” “no single primary source of the claim could be identified,” and “all end-point citations either had a claim with no further citation, had no apparent claim, or could not be accessed to verify the claim.”

I believe this work is important for the methods used and the purpose of the study more than it is for the actual finding itself (which is also important). Properly implemented, the approach used could be very important in improving the validity of claims cited in scientific literature. As demonstrated in this study, it is important that assertions be verifiable in order to prevent the propagation of misinformation or distorted information. The propagation of misinformation can impact future work, as the assertions may influence the way future researchers pursue investigation. Furthermore, misinformation or inaccurate information in peer-reviewed literature can negatively impact

the perceived integrity of the scientific process. As such, I believe the methods used by the authors deserve attention but should also be examined carefully to ensure the way in which this approach is implemented is thorough and can accurately identify the primary source of claims if possible.

The authors do an excellent job of describing the purpose of their work and provide the spreadsheet used to create the nanopublication index. This is helpful in evaluating the work and ensuring accuracy. Given the importance of this work, one aspect of the methodology is unclear and, in my opinion, should be made clear before the article could be considered suitable for publication.

Specific Comments**Major Comments**

The process to determine how an assertion was cited (if at all) is unclear. Optimally, any statement providing quantitative information, such as the one investigated in this study, should be directly followed by the relevant citation. This is not always the case, however, especially when multiple statements are made based on the same source and especially if they build on each other. If the authors only consider citations immediately following the assertion, they may have missed the reference provided shortly prior, or at the end of the paragraph. It would be helpful if the authors provided additional detail on this process, so that this process can be applied more consistently by other research teams using this approach.

While I commented on the process in which they determine which citations to evaluate, I have also examined the articles

in Figure 2 for which no reference was provided. The only potentially missed reference was a 1977 JAMA article by Sargent et al [2]. Regarding that paper, the relevant statistic (300-400 physicians per year) is not mentioned anywhere. Overall, I am not concerned about the thoroughness of the process used but advise that the exact details be included in the methods.

Minor Comments

Figure 2 appears to have some errors (there may be others I have not noticed; I suggest the authors review the entire figure for accuracy):

- The nanopublication links for Withy et al [3] and Anzia et al [4] are identical; it appears the link for Anzia (2016) in the figure is incorrect when compared to the excel file.
- The year of publication for what appears to be Andrew & Brenner (2018) in the excel file is listed as 2015.

Round 2 Review

General Comments

The authors appear to have addressed many of the concerns raised by me and by other reviewers, but some comments still have not been addressed satisfactorily. I do feel this work is important, but the below comments should be addressed before publication.

Specific Comments

Major Comments

1. Other reviewers brought up the statement “Additional articles published between August 2019 and March 2020 have been identified and manually added to the article set used for this study.” While I believe the authors clarified a separate concern raised by one of the authors, this statement requires additional clarification. It is unclear how those articles were identified, and this should be explained.
2. The authors appear to have misunderstood my following comment: “The process to determine how an assertion was cited

(if at all) is unclear. Optimally, any statement providing quantitative information, such as the one investigated in this study, should be directly followed by the relevant citation. This is not always the case, however, especially when multiple statements are made based on the same source and especially if they build on each other. If the authors only consider citations immediately following the assertion, they may have missed the reference provided shortly prior, or at the end of the paragraph. It would be helpful if the authors provided additional detail on this process, so that this process can be applied more consistently by other research teams using this approach”.

To clarify, I would like more details on how it was determined which sources were cited to support a claim. For example, if a paper contained a paragraph with the assertion in question, it may not always have the relevant citation at the end of the statement. Take the following hypothetical statement (not from any actual paper, but for illustrative purposes):

“Physician suicide remains an important topic related to the health status of the workforce, but previous studies indicate that there are little data on the subject in the scientific literature [1-4]. 300 to 400 US physicians die by suicide annually, and a recent economic analysis estimates that physician suicide results in the loss of US \$XXXXXX per year from the American health care system [5]. Consequently, physician suicide is the Yth cause of death among physicians [6].”

The “300 to 400” physician number should be found in reference 5, but that is not always the case, especially if later edits were made and the change was not noticed. Sometimes, there is no citation “5,” and the statistic is derived from references 1-4 or 6. While this is obviously not good practice, it does occur in scientific papers occasionally and not infrequently in other types of publications (while I cannot remember for sure, I believe one of the studies cited is missing a citation similar to 5). I would like to clarify if the authors attempted to account for other proximal references, which is different from snowballing, but arguably may catch sources that otherwise could be missed.

Conflicts of Interest

None declared.

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1. Leung TI, Kuhn T, Dumontier M. Representing Physician Suicide Claims as Nanopublications: Proof-of-Concept Study Creating Claim Networks. *JMIRx Med* 2022;3(3):e34979 [FREE Full text] [doi: [10.2196/34979](https://doi.org/10.2196/34979)]
2. Sargent DA, Jensen VW, Petty TA, Raskin H. Preventing Physician Suicide. *JAMA* 1977 Jan 10;237(2):143. [doi: [10.1001/jama.1977.03270290043024](https://doi.org/10.1001/jama.1977.03270290043024)]
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Chan EC

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Peer-Review Report

Peer Review of “Representing Physician Suicide Claims as Nanopublications: Proof-of-Concept Study Creating Claim Networks”

Ariel Soares Teles¹, PhD

Federal Institute of Maranhão, Araióses, Brazil

Related Articles:

Companion article: <https://www.medrxiv.org/content/10.1101/2020.05.16.20101881v1>

Companion article: <https://preprints.jmir.org/preprint/34979>

Companion article: <https://med.jmirx.org/2022/3/e40158/>

Companion article: <https://med.jmirx.org/2022/3/e34979/>

(*JMIRx Med* 2022;3(3):e39889) doi:[10.2196/39889](https://doi.org/10.2196/39889)

KEYWORDS

physician suicide; suicide; suicide prevention; physician well-being; physician mental health; nanopublication; physician; doctor; mental health; semantic publishing; bibliometrics; claim network; information distortion; misinformation

This is a peer-review report submitted for the paper “Representing Physician Suicide Claims as Nanopublications: Proof-of-Concept Study Creating Claim Networks.”

Round 1 Review

This paper [1] presents a study focused on “the use of nanopublications as a scientific publishing approach to establish a citation network of claims drawn from a variety of media concerning the rate of suicide of US physicians.” The study finds interesting results, and I have the following comments and concerns.

Specific Comments**Major Comments**

1. Consider the sentence “To our knowledge, no such application to this field has previously been done.” Authors should provide related work to argue this. Comparison with previous works is missing in the paper. Are there others related to nanopublications?
2. The paper would improve if examples (at least one) of nanopublications used in the data source were added. This would be illustrative.
3. Reference Leung et al [2] 2019 has been published and is apparently peer-reviewed. Check if there are other references to be added in the data source.
4. Consider these two sentences: “A subset of articles from the literature search were identified that made an assertion (claim

about the annual rate of US physicians who die of suicide. Additional articles published between August 2019 and March 2020 have been identified and manually added to the article set used for this study.” I think these sentences should be unpacked. How were these two steps performed?

5. The main results of this paper are in Table 1, which “revealed that (1) the network is not fully connected, (2) no single primary source of the claim could be identified, and (3) all end-point citations either had a claim with no further citation, had no apparent claim, or could not be accessed to verify the claim.” This is interesting, but what was the rationale for using nanopublications as a tool in the methodology? Could these results be found using snowballing as a review method?

6. What are the contributions of the paper? They could be explicitly declared. Moreover, the objective of the paper should be better declared—“In this paper, we aim to create nanopublications from assertions relating to physician suicide incidence.” I think this is not the same from the abstract, which is much better.

Minor Comments

7. eg to eg, (add comma)
8. et al to et al. (add dot)
9. Figure 1 is in low quality.
10. Remove “-” from URLs:

<http://purl.org/np/RAqWNPJt3Eb4HkmPCpjaiR“-”HGczKIZag6cBNMkG8nxu6I>

Round 2 Review

I congratulate the authors for their work. All my questions were answered, and concerns addressed. Thank you!

Conflicts of Interest

None declared.

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1. Leung TI, Kuhn T, Dumontier M. Representing Physician Suicide Claims as Nanopublications: Proof-of-Concept Study Creating Claim Networks. *JMIRx Med* 2022;3(3):e34979 [FREE Full text] [doi: [10.2196/34979](https://doi.org/10.2196/34979)]
 2. Leung TI, Snyder R, Pendharkar S, Chen CA. Physician suicide: a scoping literature review to highlight opportunities for prevention. *GPA* 2020 Nov 03;3(2):141-168. [doi: [10.52095/gpa.2020.1374](https://doi.org/10.52095/gpa.2020.1374)]
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Peer Review of “Representing Physician Suicide Claims as Nanopublications: Proof-of-Concept Study Creating Claim Networks”

Anonymous

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KEYWORDS

physician suicide; suicide; suicide prevention; physician well-being; physician mental health; nanopublication; physician; doctor; mental health; semantic publishing; bibliometrics; claim network; information distortion; misinformation

This is a peer-review report submitted for the paper “Representing Physician Suicide Claims as Nanopublications: Proof-of-Concept Study Creating Claim Networks.”

Round 1 Review

General Comments

This paper [1] integrates these various claims, enables the verification of nonauthoritative assertions, and makes informed statements in the advocacy of physician suicide prevention, thereby better equipping researchers and advancing evidence-based knowledge.

Conflicts of Interest

None declared.

Reference

1. Leung TI, Kuhn T, Dumontier M. Representing Physician Suicide Claims as Nanopublications: Proof-of-Concept Study Creating Claim Networks. *JMIRx Med* 2022;3(3):e34979. [doi: [10.2196/34979](https://doi.org/10.2196/34979)]
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Peer-Review Report

Peer Review of "Are We Sure We Fully Understand What an Infodemic Is? A Global Perspective on Infodemiological Problems"

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(*JMIRx Med* 2022;3(3):e39928) doi:[10.2196/39928](https://doi.org/10.2196/39928)

KEYWORDS

communication; conspiracy; COVID-19; education; fake news; infodemic; infodemiology; mass media; public health; risk perception; science

This is a peer-review report submitted for the paper "Are We Sure We Fully Understand What an Infodemic Is? A Global Perspective on Infodemiological Problems."

Round 1 Review

Dear Authors,

This paper [1] presents a scientific and futuristic discourse on the context of infodemiology. However, I suggest arranging the

content in order of importance. For example, I think the problem of predatory journals is overexplained. Moreover, the suggestion given regarding the mentioned problem is not practical, and the statements about the relationship between the editor and the referee do not seem fair. Additionally, the authors' statements about the duration of the submission review process are incomplete without an innovative result or proposal. In addition, the suggestions in the last part of the article need further explanation. Lastly, some of the items mentioned in the Abstract of the article have received little attention in the main text.

Conflicts of Interest

None declared.

Reference

1. Rovetta A, Castaldo L. Are We Sure We Fully Understand What an Infodemic Is? A Global Perspective on Infodemiological Problems. *JMIRx Med* 2022;3(3):e36510 [[FREE Full text](#)] [doi: [10.2196/36510](https://doi.org/10.2196/36510)]
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Peer Review of "Are We Sure We Fully Understand What an Infodemic Is? A Global Perspective on Infodemiological Problems"

Anonymous

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(*JMIRx Med* 2022;3(3):e40303) doi:[10.2196/40303](https://doi.org/10.2196/40303)

KEYWORDS

communication; conspiracy; COVID-19; education; fake news; infodemic; infodemiology; mass media; public health; risk perception; science

This is a peer-review report submitted for the paper "Are We Sure We Fully Understand What an Infodemic Is? A Global Perspective on Infodemiological Problems."

Round 1 Review

General Comments

This paper [1] aims to highlight principal problems related to the understanding of the infodemic phenomenon. Although it debates interesting aspects of this field, the paper seems incomplete and evasive. Moreover, the authors used problematic definitions for distinct types of information disorder.

Specific Comments

Major Comments

1. The neologism "dismisinformation" is problematic; we commonly use "misinformation" as an umbrella term when we cannot distinguish the type of information disorder.

2. The definition of fake news is advancing toward a specific information disorder, that is, it is not a mere simplification of phenomena (see, for instance, Molina et al [2]).
3. The authors affirm that infodemics cannot exist without disinformation. This sentence is imprecise because information disorder also includes malinformation, fake news, and conspiracy theory. The background adopted by the authors to reflect on the presented problems can be compromised by such misconceptions.
4. I recommend that the authors concentrate their efforts on a specific problem, presenting a deep argumentation about the mechanisms that contribute to the success of information disorder during the pandemic.

Conflicts of Interest

None declared.

References

1. Rovetta A, Castaldo L. Are We Sure We Fully Understand What an Infodemic Is? A Global Perspective on Infodemiological Problems. *JMIRx Med* 2022;3(3):e36510 [FREE Full text] [doi: [10.2196/36510](https://doi.org/10.2196/36510)]
 2. Molina MD, Sundar SS, Le T, Lee D. "Fake News" Is Not Simply False Information: A Concept Explication and Taxonomy of Online Content. *American Behavioral Scientist* 2019 Oct 14;65(2):180-212. [doi: [10.1177/0002764219878224](https://doi.org/10.1177/0002764219878224)]
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KEYWORDS

communication; conspiracy; COVID-19; education; fake news; infodemic; infodemiology; mass media; public health; risk perception; science

This is a peer-review report submitted for the paper “Are We Sure We Fully Understand What an Infodemic Is? A Global Perspective on Infodemiological Problems.”

Round 1 Review

This paper [1] is a well-written, informative study. However, it has some grammatical errors.

Conflicts of Interest

None declared.

Reference

1. Rovetta A, Castaldo L. Are We Sure We Fully Understand What an Infodemic Is? A Global Perspective on Infodemiological Problems. *JMIRx Med* 2022;3(3):e36510 [[FREE Full text](#)] [doi: [10.2196/36510](https://doi.org/10.2196/36510)]
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Peer-Review Report

Peer Review of “Are We Sure We Fully Understand What an Infodemic Is? A Global Perspective on Infodemiological Problems”

Gunther Eysenbach, MD, MPH

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KEYWORDS

communication; conspiracy; COVID-19; education; fake news; infodemic; infodemiology; mass media; public health; risk perception; science

This is a peer-review report submitted for the paper “Are We Sure We Fully Understand What an Infodemic Is? A Global Perspective on Infodemiological Problems.”

Round 1 Review

General Comments

This is a reasonable viewpoint/opinion paper [1]. I do not agree with everything that is being said but that is also not the goal—it is the authors' opinion.

I do think the paper should be transferred to JMIR Infodemiology. As to the authors' statement that “the obsessive pursuit of prestige must be drastically limited as they undermine the credibility of science,” I agree, and that also extends to obsession with the impact factor, so I hope the author follows his own advice and agrees to a transfer.

Specific Comments**Major Comments**

1. It may be worth citing [2] in addition to ref 1.
2. Preprint servers do screen submissions, and there are different levels of screening, varying by preprint server. For example, MedRxiv implemented more strict criteria on COVID-19 compared with Zenodo, etc.
3. “Level of evidence” is a well-known phrase and is typically thought of in terms of study type rather than dissemination modality (ie, “systematic review” is better than “RCT,” which is better than “observational studies,” etc). If you come up with a new hierarchy—that is not directly speaking to the study type—I would suggest you come up with a new phrase or label for the type of hierarchy you are suggesting.

Conflicts of Interest

None declared.

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1. Rovetta A, Castaldo L. Are We Sure We Fully Understand What an Infodemic Is? A Global Perspective on Infodemiological Problems. *JMIRx Med* 2022;3(3):e36510 [FREE Full text] [doi: [10.2196/36510](https://doi.org/10.2196/36510)]
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Peer-Review Report

Peer Review of “Sexual Health Assessment Is Vital to Whole Health Models of Care”

Cynthia Darling-Fisher¹, PhD, FAANP, FNP-BC

School of Nursing, University of Michigan, Ann Arbor, MI, United States

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(*JMIRx Med* 2022;3(3):e39927) doi:[10.2196/39927](https://doi.org/10.2196/39927)

KEYWORDS

sexual health; sexual health assessment; veteran; health equity; health assessment; whole health model; communication; communication barrier; technological barrier; health care; sexuality; sexual orientation; gender identity; sex; gender; model; care; barrier; well-being; comfort; assessment; EHR; electronic health record; quality; equity

This is a peer-review report submitted for the paper “Sexual Health Assessment Is Vital to Whole Health Models of Care.”

Round 1 Review

General Comments

This is an excellent paper [1] that should be published. It's well-written, informative, and important to disseminate to the health care community. This paper addresses an initiative by the Veterans Affairs (VA) health care system to address an issue important for providing high-quality comprehensive patient care. It is great that addressing sexual health assessment in their electronic health record (EHR) is being implemented by the VA since federal programs often influence national implementation. The additions presented in this paper need to be incorporated into other EHR programs, like Epic. Integration of detailed sexual health information in patient documentation is important to address preventive care, promote healthy sexual functioning, and optimize overall health and well-being. Having done research on the use of surveys to address sensitive topics such as sexual health and sexually transmitted infection risk, I found that patients of all ages are very willing to answer honestly (and in detail) about their sexual health on surveys, which then provides a time-efficient and useful way to open this discussion. This approach also allows health care providers to introduce these sensitive topics and, when patients are willing, provide health education, health promotion, and appropriate treatment when needed. I have also used this approach in my own clinical practice. This use of surveys to obtain and open the discussion on sensitive health issues has been documented in numerous research projects. It has also been shown to promote patient

satisfaction with their care since it increases their sense of “being heard” by their providers. It also allows providers to provide more accurate care.

This paper is important to disseminate information about how a major health system has recognized the importance of sexual health assessment and found a way to implement this and incorporate it into their EHR. It also highlights the need to educate providers to orient them to the new system and provides ways to do this to assist them in better approaching sensitive health issues.

Specific Comments

Great information about the VA's approach. A particular strength of this paper is the presentation of prompts at different levels of assessment for patients who are hospitalized and more comprehensive visits.

Major Comments

1. Excellent background information
2. The pocket card format is excellent and serves several purposes: makes it easy for providers to follow a template and validates the importance of this information in providing patient care, and the repetition of obtaining this data in practice with all patients reinforces the importance of obtaining this data and can reduce provider resistance to asking these questions.
3. Following the pocket card questions (comprehensive form) nicely addresses and includes the patient's partner information in the history. This reinforces for the provider the benefit of obtaining this information. The fact that the provider/EHR asks for partner information also highlights for the patient the

importance to consider their partner(s) when addressing their own sexual health. This can also be a great trigger for patient education, which moves beyond the basic “plumbing” aspect of sexual health information (eg, how things work).

Minor Comments

4. A minor suggestion would be to provide a little more detail about provider education in the implementation of this new format. This could include role-playing with debriefing to help providers address their own concerns/reluctance to talk about sexual issues with their patients.

Conflicts of Interest

None declared.

Reference

1. Uzdevins A, Helmer DA, Spelman JF, Mattocks KM, Johnson AM, Chardos JF, et al. Sexual health assessment is vital to whole health models of care. *JMIRx Med* 2022;3(3):e36266 [[FREE Full text](#)] [doi: [10.2196/36266](https://doi.org/10.2196/36266)]

Abbreviations

EHR: electronic health record

VA: Veterans Affairs

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Peer Review of “Sexual Health Assessment Is Vital to Whole Health Models of Care”

Anonymous

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KEYWORDS

sexual health; sexual health assessment; veteran; health equity; health assessment; whole health model; communication; communication barrier; technological barrier; health care; sexuality; sexual orientation; gender identity; sex; gender; model; care; barrier; well-being; comfort; assessment; EHR; electronic health record; quality; equity

This is a peer-review report submitted for the paper “Sexual Health Assessment Is Vital to Whole Health Models of Care.”

Round 1 Review

General Comments

This paper's [1] idea is new, but unfortunately, there is no structured format for the abstract or paper. The study methods are not specified, and the conclusion is so short and insufficient.

Specific Comments

Major Comments

1. The study needs a structured format.
 2. Please specify different parts of the study such as the methods and results.
 3. Are technological barriers just related to the lack of structured data fields for this information within its current electronic health record or note titles?
-

Conflicts of Interest

None declared.

Reference

1. Uzdavines A, Helmer DA, Spelman JF, Mattocks KM, Johnson AM, Chardos JF, et al. Sexual health assessment is vital to whole health models of care. *JMIRx Med* 2022;3(3):e36266 [FREE Full text] [doi: [10.2196/36266](https://doi.org/10.2196/36266)]
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Peer Review of “Sexual Health Assessment Is Vital to Whole Health Models of Care”

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sexual health; sexual health assessment; veteran; health equity; health assessment; whole health model; communication; communication barrier; technological barrier; health care; sexuality; sexual orientation; gender identity; sex; gender; model; care; barrier; well-being; comfort; assessment; EHR; electronic health record; quality; equity

This is a peer-review report submitted for the paper “Sexual Health Assessment Is Vital to Whole Health Models of Care.”

Round 1 Review

General Comments

Thank you for the opportunity to review this manuscript [1] entitled: Sexual Health Assessment as Part of a Whole Health Model to Care: Improving Communication and Technological Barriers. This review paper aims to summarize barriers to assessing sexual health and to suggest some ways to overcome them. The paper summarizes sexual health issues from a new perspective (whole health model), trying to draw some practical new methods. However, several significant questions should be explained before publication.

Specific Comments**1. Abstract**

This seems to be a review article in my understanding.

I suggest reorganizing the abstract.

For review articles, the abstract specifies the topic of the review and the main conclusions drawn.

Additionally, why is there a holistic health model in the title and no mention of it in the abstract?

Also, why the Veterans Health Administration (VHA) is specifically mentioned needs to be answered in the abstract.

Finally, the purpose of the review needs to be reclarified in the abstract. As of the current version, the purpose of this paper seems to be reported too vaguely. Is the authors' main intent to

provide recommendations for development and implementation for the VHA through this review or is the target population just veterans?

2. Introduction

It is recommended to reorganize in a logical order.

Similar to the summary, readers are confused by the sudden mention of veterans.

Since the first paragraph throws out the concept of sexual health. I propose to consolidate the second and third paragraphs while reducing the content. First, mention the fact that sexual health is now an integral part of overall health, then introduce the benefits of achieving sexual health (the original two or three paragraphs), and finally the current obstacles to achieving sexual health (original fourth paragraph).

3. Barriers to Assessing Sexual Health

I personally recommend independent secondary headings.

Of the three obstacles mentioned in the paper, the first is too long to describe. I suggest points 2 and 3 need to be longer to make the structure of the paper smoother.

4. Benefits of Assessing Sexual Health

I personally recommend independent secondary headings here also.

Assessing the benefits of sexual health highlights the importance of sexual health, which is the point of the entire review. I think this paragraph should be moved to the front.

5. Overcoming Barriers to Sexual Health Assessment

I think patient education is a key point in achieving sexual health assessment and needs to be covered in detail.

6. Conclusion

I think the conclusion of the current version needs to be reorganized.

In short, if it is too long it leads to a loss of readability. The conclusion needs to be concise and outline what the paper does exactly, such as what problems were found and what solutions were proposed.

Conflicts of Interest

None declared.

Reference

1. Uzdevins A, Helmer DA, Spelman JF, Mattocks KM, Johnson AM, Chardos JF, et al. Sexual health assessment is vital to whole health models of care. JMIRx Med 2022;3(3):e36266 [[FREE Full text](#)] [doi: [10.2196/36266](https://doi.org/10.2196/36266)]

Abbreviations

VHA: Veterans Health Administration

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Peer-Review Report

Peer Review of “Waiting Time and Patient Satisfaction in a Subspecialty Eye Hospital Using a Mobile Data Collection Kit: Pre-Post Quality Improvement Intervention”

Alexandros Argyriadis¹

School of Health Sciences, Frederick University, Nicosia, Cyprus

Related Articles:Companion article: <https://preprints.jmir.org/preprint/34263>Companion article: <https://med.jmirx.org/2022/3/e40453/>Companion article: <https://med.jmirx.org/2022/3/e34263/>*(JMIRx Med 2022;3(3):e40444)* doi:[10.2196/40444](https://doi.org/10.2196/40444)**KEYWORDS**

Waiting time; waiting list; patient satisfaction; quality improvement; clinical audit; ophthalmology; patient-centered care;

This is a peer-review report submitted for the paper “Waiting Time and Patient Satisfaction in a Subspecialty Eye Hospital Using a Mobile Data Collection Kit: Pre-Post Quality Improvement Intervention.”

Round 1 Review

General Comments

This article [1] studies the waiting time and patient satisfaction in a subspecialty eye hospital in Cameroon. It is a matter of fact that hospital-waiting time is a major concern in many other countries, but it is important that this paper concentrates on Cameroon. Moreover, the article mentions the use of a mobile data collection kit conducting pre-post quality improvement intervention.

The article can be characterized as quite innovative and offers a significant connection of theory with practice.

It would be quite interesting if the authors mention the reasons why they chose Cameroon and refer to some similar recent research. Although, it is clear why this project is necessary to be studied. The objectives of the study are clear and combine waiting time and satisfaction, 2 important factors for the increase of quality-of-life indicators. The methods that were used are suitable and adequate for this project and the authors follow a correct pathway for the implementation of their work.

The research leads to the result that the use of plan-do-study-act (PDSA) led to a borderline significant reduction of 65.4 minutes

in waiting time over 6 weeks and an insignificant improvement in satisfaction, suggesting that quality improvement efforts have to be maintained over a considerable period to be able to produce significant changes. The study provides a good basis for quality improvement in limited-resource settings making use of block appointment systems, with comprehensive subspecialty eye care services. We recommend shortening the patient pathway and other measures including a phasic appointment system, automated patient time monitor, robust ticketing, patient pathway supervision, standard triaging, task shifting, doctor consultation planning, patient education, and additional registration staff.

Specific Comments**Minor Comments**

1. It would be quite interesting if the authors mention the reasons why they chose Cameroon and refer to some similar recent research.
2. The description of the problem can be enriched with some more information.
3. A justification of why this research method was chosen can be an extra asset for this interesting work.
4. I also believe that the authors have used too many references than normal in a paper. They might decrease the number of references and stay in the most appropriate range. Too many citations are used in this paper. Most journals recommend no more than 40 references.

Conflicts of Interest

None declared.

Reference

1. Mbwogge M, Astbury N, Nkumbe HE, Bunce C, Bascaran C. Waiting time and patient satisfaction in a subspecialty eye hospital using a mobile data collection kit: pre-post quality improvement intervention. *JMIRx Med* 2022;3(3):e34263 [[FREE Full text](#)] [doi: [10.2196/34263](https://doi.org/10.2196/34263)]

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Peer-Review Report

Peer Review of “Waiting Time and Patient Satisfaction in a Subspecialty Eye Hospital Using a Mobile Data Collection Kit: Pre-Post Quality Improvement Intervention”

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KEYWORDS

Waiting time; waiting list; patient satisfaction; quality improvement; clinical audit; ophthalmology; patient-centered care;

This is a peer-review report submitted for the paper “Waiting Time and Patient Satisfaction in a Subspecialty Eye Hospital Using a Mobile Data Collection Kit: Pre-Post Quality Improvement Intervention.”

Round 1 Review

Reviewer BK

General Comments

In this paper [1], the authors aimed at improving patient waiting times and satisfaction through the use of PDSA quality improvement cycles. It is an interesting practical study. However, there are some major issues that need to be addressed by the authors. The following comments can help the authors improve the manuscript.

Specific Comments

Major Comments

1. In the Abstract and Methods sections, what does “ODK” stand for?
2. I suggest moving the problem description to the study rationale as the first paragraph of this section.
3. In the methods section, the contents related to the data collection need to be expanded to include the type of data that were collected by data collectors.
4. The methods of data collection should be explained clearly.
5. In the Results section (page 11), the authors said, “The first 7 changes were implemented, which includes...” and “Five of the originally proposed changes could not be implemented due to...” I think it is better if the authors

either change the wording of the sentences or provide a complete explanation of the all changes. Then, the authors can explain which strategy was implemented and which one was not implemented.

6. In the Results section (*Unintended Outcomes* subsection), the authors noted the following: “...the intervention appeared to have affected women adversely...” This section needs further explanations about the possible reasons for such an unintended outcome.
7. I am wondering whether all changes were implemented at the same time or they were implemented one by one. In case of the second approach, the impact of each strategy on changing waiting times and improving patient satisfaction could be investigated separately and compared with other strategies.
8. What were the possible reasons for non-significant increase in patient satisfaction while the waiting time was improved?
9. As the authors noted in the *Strengths and Limitations* section, the sample size was relatively small. However, they need to explain more why they did not reach a larger sample size. What were the main limitations?

Minor Comments

1. Multimedia appendices were not available to me.
2. Any survey instruments or questionnaires used for measuring patient satisfaction need to be added to the manuscript.

Round 2 Review

Reviewer BK

General Comments

I appreciate the authors for their time and efforts to implement our suggestions. However, some issues need further attention.

1. The Introduction section started with the problem description. This section usually comes later and after

describing the background. Hence, the coherence of the paragraphs should be revised. Moreover, the current subheadings in the Introduction section seem unnecessary and the authors can remove or reduce them.

2. As the authors said, they implemented all the changes together. However, each strategy or change might have a different impact on changing waiting times and improving patient satisfaction, which was worth investigating. If the authors did not do so, it is better to add this point to the *Strengths and Limitations* section.

Conflicts of Interest

None declared.

Reference

1. Mbwogge M, Astbury N, Nkumbe HE, Bunce C, Bascaran C. Waiting time and patient satisfaction in a subspecialty eye hospital using a mobile data collection kit: pre-post quality improvement intervention. *JMIRx Med* 2022;3(3):e34263 [[FREE Full text](#)] [doi: [10.2196/34263](https://doi.org/10.2196/34263)]
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Anonymous

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KEYWORDS

Waiting time; waiting list; patient satisfaction; quality improvement; clinical audit; ophthalmology; patient-centered care;

This is a peer-review report submitted for the paper “Waiting Time and Patient Satisfaction in a Subspecialty Eye Hospital Using a Mobile Data Collection Kit: Pre-Post Quality Improvement Intervention.”

Round 1 Review

I have completed the statistical review of this manuscript [1], which is well-organized and presented. However, the following suggestions will help improve the quality of this manuscript.

1. Is it a proof-of-concept-type study? Kindly add the time period of this study.
2. Kindly do not use word “subjects” for study participants. You can simply use either “participants” or “patients.”
3. No power calculation rationale was provided in this report, so these results cannot be generalized.
4. Authors must include statements regarding the statistical software to perform data analysis and what level of statistical significance was used for hypothesis testing.
5. Authors must add more clarity to the “Logistic regression with reported...” statement as odds ratios with 95% confidence intervals are calculated from the logistic regression. What is the point of margins plot in this case? What other covariate were adjusted in the logistic
6. Table 1, the cohabiting group can be merged with the married group. Add “years” in brackets next to “Age.” Arrival time can also be sensibly presented with fewer meaningful categories.

Conflicts of Interest

None declared.

Reference

1. Mbwogge M, Astbury N, Nkumbe HE, Bunce C, Bascaran C. Waiting time and patient satisfaction in a subspecialty eye hospital using a mobile data collection kit: pre-post quality improvement intervention. *JMIRx Med* 2022;3(3):e34263 [[FREE Full text](#)] [doi: [10.2196/34263](https://doi.org/10.2196/34263)]
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Authors' Response to Peer Reviews

Authors' Response to Peer Reviews of "Representing Physician Suicide Claims as Nanopublications: Proof-of-Concept Study Creating Claim Networks"

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KEYWORDS

physician suicide; suicide; suicide prevention; physician well-being; physician mental health; nanopublication; physician; doctor; mental health; semantic publishing; bibliometrics; claim network; information distortion; misinformation

This is the authors' response to peer-review reports for "Representing Physician Suicide Claims as Nanopublications: Proof-of-Concept Study Creating Claim Networks."

Review Round 1

Anonymous [1]

Comment: This paper [2] proposes a citation network of scientific publications about physician suicide. Such a citation

network is a pioneering work for examining accurate claims of physician suicide. The network idea and entity schema design present unique values toward understanding the challenge.

1. Information completeness concerns: the authors claim that "A subset of articles from the literature search were identified that made an assertion (claim) about the annual rate of US physicians who die of suicide. Additional articles published between August 2019 and March 2020 have been identified and

manually added to the article set used for this study.” However, such a data-searching procedure is not comprehensive and may lead to biased research. For example, the same source [3] of the Accreditation Council for Graduate Medical Education cited a paper back in 2003 with the same number, 300. If I did a google search or a professional database, I can find many more beyond the selected time periods. I would argue such an approach has a strong time bias and source bias. Do the authors conduct the investigation on a reliable database?

Response: Thank you for this observation. As noted in the manuscript, the data source for articles that asserted the claim of interest was a previously published scoping review of the literature about physician suicide. Regarding the web search, this manuscript used only articles published in peer-reviewed literature as an original data source for a claim about the annual suicide rate. Web search was out of scope for the retrieval step of this proof-of-concept study. These points have also been clarified in the Methods, and a statement was also added to the Limitations to indicate that a web search of the claim could provide additional insights regarding misinformation propagation of the physician suicide claim on the internet.

A revision in the Methods has detailed this approach for clarity and so that the reader has greater detail of the search strategy used: “Briefly, in that literature review, a medical librarian assisted in refining the research question, developing the search strategy, and conducting a search of relevant electronic databases, including Ovid Medline, PsycINFO, and Scopus. These databases were searched from inception through March 2020 and using the predefined literature review methodology, 347 articles were identified for analysis, with the earliest dating back to 1903 [7]. From these 347 articles, articles were further screened for this proof-of-concept study to focus on articles that made an assertion, or claim, about the annual rate of US physicians who die of suicide. Additional articles from peer-reviewed journals were published through March 2020 were identified and added to the article set used for this study. Websites, news articles, blogs, white papers, organizational or institutional reports, and other gray literature were not the focus of this study and therefore not retrieved for inclusion as original sources of the annual suicide rate claim.”

A revision in the Limitations notes is as follows: “Finally, there may be a limitation based upon the search strategy that contributed to the data source used for this study. As web search may also offer a valuable source of nonpeer-reviewed literature and gray literature that also make a claim similar to ‘300 to 400 US physicians die by suicide annually’; these may offer an unstudied area of misinformation in public-facing publications about physician suicide. As this study was not designed as an infodemiology study, however, incorporating such a search to enrich the data source and further analysis could add to the current literature about physician suicide.”

Comment: 2. Nanopublication schema design: the schema is not well designed. For example, Figure 1 shows the number of fields is fixed and nonextensible. Therefore, that will lead each nanopublication to a limited citation size and a biased network. The authors may consider collaborations with scientists in a database or in computer science to redesign the toolkit. In

addition, nanopublications can be revised or removed, and this design may lead to many false submissions. The authors may need to think about how to approach this because one contribution of this work is the toolkit.

Response: We appreciate the comment of the reviewer, although respectfully note that the template used is not a complete reflection of our abstract schema. The template, itself being represented as a nanopublication, can easily be extended and improved. It is therefore not “fixed and nonextensible.” If instead the intent of the reviewer was to note that “publishing nanopublications cannot be undone” (instead of “... can be undone”), then we note that nanopublications can be retracted, such that they are no longer shown in a regular setting but can still be accessed as an archived version.

Comment: 3. Some links are not accessible in the manuscript, such as [4].

Response: Thank you for noticing this. We apologize for this error. There was a “-“ that should not have been present in the link, which caused it to be inaccessible for the reviewer. This has been corrected.

Comment: 4. The figures (eg, Figure 1) in the documents are quite blurry. The authors should consider using pictures with high resolutions.

Response: Thank you for noting this issue from the preprint version of the manuscript. We have uploaded higher-resolution versions of all figures in accordance with JMIR Publications’ author instructions.

Anonymous [5]

Comment: This paper tries to address a myth that has been and continues to be perpetuated around the number of US physician suicides. It tries to put forward an approach to addressing myths in a way to better inform specific populations (ie, in this case, physicians) of the reality of suicide in the profession.

1. This is an important effort and should be applauded.
2. This confirms that the myth remains in existence, despite minor changes to it, and should be either verified or dispelled.
3. The approach presented to address situations as described is one that has merit and can be useful to many where there is interest and desire. The paper was well written, clear, data driven, and of a good length. I would have liked a bit more in the discussion section (eg, implications could be stronger) and a simple conclusion statement at the end.

Response: Thank you to Anonymous [5] for the positive and supportive comments. We also agree that it is important to be able to readily identify misinformation, especially regarding a topic such as physician suicide. We believe that this study offers a new perspective on an important topic and an opportunity to potentially apply a similar schema to understanding misinformation propagation in claim networks about other topics. We have revised and reorganized the Discussion section for content and to match JMIR Publications style.

Anonymous [6]

Comment: This paper integrates these various claims, enables the verification of nonauthoritative assertions, and makes informed statements in the advocacy of physician suicide prevention, thereby better equipping researchers and advancing evidence-based knowledge.

Response: Thank you to Anonymous [6] for the kind and encouraging comments. We agree this is an important area of study and an opportunity to apply new technologies toward understanding the field of physician suicide.

Reviewer AF [7]

Comment: This study describes the use of nanopublications as a means to create a citation network of claims. The authors suggest that this approach allows for verification of claims in scientific literature. In the case of this particular article, the authors describe a process in which nanopublications are created from assertions of physician suicide incidence and describe their findings. Notably, the authors report that “the network is not fully connected,” “no single primary source of the claim could be identified,” and “all end-point citations either had a claim with no further citation, had no apparent claim, or could not be accessed to verify the claim.”

I believe this work is important for the methods used and the purpose of the study more than it is for the actual finding itself (which is also important). Properly implemented, the approach used could be very important in improving the validity of claims cited in scientific literature. As demonstrated in this study, it is important that assertions be verifiable in order to prevent the propagation of misinformation or distorted information. The propagation of misinformation can impact future work, as the assertions may influence the way future researchers pursue investigation. Furthermore, misinformation or inaccurate information in peer-reviewed literature can negatively impact the perceived integrity of the scientific process. As such, I believe the methods used by the authors deserve attention but should also be examined carefully to ensure the way in which this approach is implemented is thorough and can accurately identify the primary source of claims if possible.

The authors do an excellent job of describing the purpose of their work and provide the spreadsheet used to create the nanopublication index. This is helpful in evaluating the work and ensuring accuracy. Given the importance of this work, one aspect of the methodology is unclear and, in my opinion, should be made clear before the article could be considered suitable for publication.

1. The process to determine how an assertion was cited (if at all) is unclear. Optimally, any statement providing quantitative information, such as the one investigated in this study, should be directly followed by the relevant citation. This is not always the case, however, especially when multiple statements are made based on the same source and especially if they build on each other. If the authors only consider citations immediately following the assertion, they may have missed the reference provided shortly prior, or at the end of the paragraph. It would be helpful if the authors provided additional detail on this

process, so that this process can be applied more consistently by other research teams using this approach.

Response: We appreciate the positive comments of Reviewer AF [7], as well as the request for clarification regarding the procedures used for collecting each of the claims from the manuscripts. These clarifications have been added to the Methods. All sources of the claim were read in full by the first author to ensure that no additional related information was missed from each of the sources of the claim. Additionally, another reviewer inquired about whether snowballing reference lists was used; this was addressed in the revision of the Methods section and is acknowledged as a potential limitation of the current proof-of-concept study in the Discussion section.

Comment: While I commented on the process in which they determine which citations to evaluate, I have also examined the articles in Figure 2 for which no reference was provided. The only potentially missed reference was a 1977 JAMA article by Sargent et al [8]. Regarding that paper, the relevant statistic (300-400 physicians per year) is not mentioned anywhere. Overall, I am not concerned about the thoroughness of the process used but advise that the exact details be included in the methods.

Response: Thank you for this comment. The Methods have been significantly revised and reorganized both to address the reviewer’s request for additional details as well as to match JMIR Publications style. The 1977 article by Sargent et al [8] is familiar to the first author and indeed does not mention the specific claim of interest. This points precisely to the original research question examining where this claim may have originated from. The Discussion, particularly the Limitations, has been elaborated to note areas for further work regarding different ways to represent data about the physician suicide incidence, which could be beneficial and foundational for further suicide research network and platform development.

Comment: Figure 2 appears to have some errors (there may be others I have not noticed; I suggest the authors review the entire figure for accuracy):

- The nanopublication links for Withy et al [9] and Anzia et al [10] are identical; it appears the link for Anzia (2016) in the figure is incorrect when compared to the excel file.
- The year of publication for what appears to be Andrew and Brenner (2018) in the excel file is listed as 2015.

Response: We thank the reviewer for their detailed review and corrections for the figure. Figure 2 is now Figure 3 in the resubmission. The nanopublication for Anzia has been corrected in the figure. Additionally, the nanopublication link for the Andrew and Brenner 2015 version of the website has been corrected in the figure.

Reviewer AL [11]

Comment: This paper presents a study focused on “the use of nanopublications as a scientific publishing approach to establish a citation network of claims drawn from a variety of media concerning the rate of suicide of US physicians.” The study finds interesting results, and I have the following comments and concerns.

1. Consider the sentence “To our knowledge, no such application to this field has previously been done.” Authors should provide related work to argue this. Comparison with previous works is missing in the paper. Are there others related to nanopublications?

Response: Thank you for this request for clarification. There is no prior work applying nanopublications in this way to asserted claims in published peer-reviewed literature. The work by Clark [12,13] has been added and cited with regards to work on micropublications, which is not the same as the present schema applied in this study. A sentence has been added to the Introduction to acknowledge Clark’s work on micropublications: “...previous work on micropublications, which are a semantic model for scientific claims and evidence that enables knowledge discovery and inference across networks of information. A similar approach to identify and trace citation distortion had previously been done regarding a specific scientific claim about Alzheimer’s disease. The current study extends this work by applying the nanopublication schema to the same physician suicide claim.”

Comment: 2. The paper would improve if examples (at least one) of nanopublications used in the data source were added. This would be illustrative.

Response: We appreciate this comment and feedback from the reviewer. The entire first paragraph of the Results section has been added to the revised manuscript, and it now details one set of nanopublications. They are illustrated in Figure 2.

Comment: 3. Reference Leung et al [14] (2019) has been published and is apparently peer-reviewed. Check if there are other references to be added in the data source.

Response: We greatly appreciate the comment from the reviewer and note that we have clarified the data source used in this proof-of-concept study in a Data Source subsection of the Methods. The authors had already used the final reference list from the published article, not the MedRxiv preprint [15], for this study. The reference has been updated in the reference list of this manuscript.

The Data Source subsection of the Methods section is more detailed, briefly summarizing the search strategy: “Briefly, in that literature review, a medical librarian assisted in refining the research question, developing the search strategy, and conducting a search of relevant electronic databases, including Ovid Medline, PsycINFO, and Scopus. These databases were searched from inception through March 2020 and using the predefined literature review methodology, 347 articles were identified for analysis, with the earliest dating back to 1903. From these 347 articles, articles were further screened for this proof-of-concept study to focus on articles that made an assertion, or claim, about the annual rate of US physicians who die of suicide. Additional articles from peer-reviewed journals were published through March 2020 were identified and added to the article set used for this study. Websites, news articles, blogs, white papers, organizational or institutional reports, and other grey literature were not the focus of this study and therefore not retrieved for inclusion as original sources of the annual suicide rate claim.”

Comment: 4. Consider these two sentences: “A subset of articles from the literature search were identified that made an assertion (claim) about the annual rate of US physicians who die of suicide. Additional articles published between August 2019 and March 2020 have been identified and manually added to the article set used for this study.” I think these sentences should be unpacked. How were these two steps performed?

Response: Thank you for this question, which we have addressed, based on your previous comment, as well as that of another peer reviewer requesting this clarification.

Comment: 5. The main results of this paper are in Table 1, which “revealed that (1) the network is not fully connected, (2) no single primary source of the claim could be identified, and (3) all end-point citations either had a claim with no further citation, had no apparent claim, or could not be accessed to verify the claim.” This is interesting, but what was the rationale for using nanopublications as a tool in the methodology? Could these results be found using snowballing as a review method?

Response: As a proof-of-concept study, this study sought to explore the claim network for a single claim about physician suicide rates. This was the rationale and aim for applying nanopublications as the tool, and the focus was to retrieve specifically the citation noted in a published article in relation to the claim made. As this approach did not involve snowballing to manually search the full reference list of each of the included articles, we have added this to the limitations. The limitation is as follows: “Second, regarding the data source approach, snowballing to examine full reference lists of the included articles was not performed. The focus for this proof-of-concept study was to specifically focus on the citation that the author of an article provides at the end of the sentence that makes the annual suicide rate claim. Snowballing may reveal additional publications that make the same claim, but we also anticipate that this approach would add further evidence that the claim network about annual suicide rate would reveal additional fragmented and disconnected parts of the network. Additional investigation would be needed to explore this hypothesis.”

Comment: 6. What are the contributions of the paper? They could be explicitly declared. Moreover, the objective of the paper should be better declared—“In this paper, we aim to create nanopublications from assertions relating to physician suicide incidence.” I think this is not the same from the abstract, which is much better.

Response: Thank you for this excellent suggestion. The aim statement in the abstract (Objectives) and in the manuscript (at the end of the Introduction), now consistently states, “The aim of this study is to use nanopublications as a scientific publishing approach to create a citation network of claims in peer-reviewed publications about the rate of suicide of US physicians.” A similar comment made by another reviewer regarding clear statements about the paper’s contributions has led to revisions of the Discussion and Conclusion. We have revised and reorganized the Discussion section for content and to match JMIR Publications style.

Comment: 7. and 8. [a] eg to eg, (add comma); [b] et al to et al. (add dot)

Response: These have been corrected. We look forward also to JMIR Publications' copyeditors assisting further with any additional stylistic changes needed to conform to the journal's publication standards.

Comment: 9. Figure 1 is in low quality.

Response: Thank you for noting this issue from the preprint version of the manuscript. We have uploaded higher-resolution versions of these figures in accordance with JMIR Publications' author instructions.

Comment: Remove "-" from URLs:

<http://purl.org/np/RAqW1NPJt3Eb4HkmPCjaiR> "-"
HGCzKIZag6cBNMkG8nxu6l

Response: Thank you for noting this issue, as did another reviewer. This was unfortunately an artifact that arose from the different formatting used in the preprint version of this manuscript. This has been corrected in the revised submission.

Review Round 2

Reviewer AF [7]

General Comments

The authors appear to have addressed many of the concerns raised by me and by other reviewers, but some comments still have not been addressed satisfactorily. I do feel this work is important, but the below comments should be addressed before publication.

Specific Comments

Major Comments

Comment: Other reviewers brought up the statement "Additional articles published between August 2019 and March 2020 have been identified and manually added to the article set used for this study." While I believe the authors clarified a separate concern raised by one of the authors, this statement requires additional clarification. It is unclear how those articles were identified, and this should be explained.

Response: Thank you for repeating this comment to ensure we have provided sufficient methodologic detail to address the previous comment more thoroughly. This has been addressed in two ways in the revised manuscript. First, the Methods section has been revised with the requested detail during revision (the revised text is also included below). Second, the spreadsheet containing the data set that is openly accessible on FigShare [16] has been updated with an additional column to note where each reference originated from.

"One author (TIL) established a Google Scholar alert using the keyword, 'physician suicide,' and screened additional articles from peer-reviewed journals to include based on earlier established inclusion criteria from the published scoping literature review [7]. ...The spreadsheet also notes the original source of the reference for the set: scoping literature review, Google Scholar alert, or not applicable as the citation is included because it is referenced by another claim."

Comment: The authors appear to have misunderstood my following comment: "The process to determine how an assertion was cited (if at all) is unclear. Optimally, any statement providing quantitative information, such as the one investigated in this study, should be directly followed by the relevant citation. This is not always the case, however, especially when multiple statements are made based on the same source and especially if they build on each other. If the authors only consider citations immediately following the assertion, they may have missed the reference provided shortly prior, or at the end of the paragraph. It would be helpful if the authors provided additional detail on this process, so that this process can be applied more consistently by other research teams using this approach".

To clarify, I would like more details on how it was determined which sources were cited to support a claim. For example, if a paper contained a paragraph with the assertion in question, it may not always have the relevant citation at the end of the statement. Take the following hypothetical statement (not from any actual paper, but for illustrative purposes):

"Physician suicide remains an important topic related to the health status of the workforce, but previous studies indicate that there are little data on the subject in the scientific literature (references 1 to 4). 300 to 400 US physicians die by suicide annually, and a recent economic analysis estimates that physician suicide results in the loss of US \$XXXXX per year from the American health care system (reference 5). Consequently, physician suicide is the Yth cause of death among physicians (reference 6)."

The "300 to 400" physician number should be found in reference 5, but that is not always the case, especially if later edits were made and the change was not noticed. Sometimes, there is no citation "5," and the statistic is derived from references 1-4 or 6. While this is obviously not good practice, it does occur in scientific papers occasionally and not infrequently in other types of publications (while I cannot remember for sure, I believe one of the studies cited is missing a citation similar to 5). I would like to clarify if the authors attempted to account for other proximal references, which is different from snowballing, but arguably may catch sources that otherwise could be missed.

Response: Thank you to the peer reviewer for the specificity in clarifying this particular comment. We have revised the Methods section to include a Data Extraction subsection to address the reviewer's comment more completely. The revised subsection includes the following text in the revised manuscript:

"To ensure that citations provided to support a claim were sufficiently identified, the sentence preceding and following the claim of interest were checked for a citation. Textbox 1 illustrates an example of the extraction procedure on the level of the manuscript and claim.

Textbox 1. Claim identification and attribution during data extraction." Please see the revised manuscript for the full textbox.

With regards to the peer reviewer's comment that "Sometimes, there is no citation 5, and the statistic is derived from references 1-4 or 6. While this is obviously not good practice, it does occur in scientific papers occasionally and not infrequently in other

types of publications...” we also hypothesize that this may be a commonly occurring issue in the area of physician suicide; however, this is beyond the scope of this paper. We acknowledged this already in the Limitations section of the manuscript, noting that this proof-of-concept study focuses only on a verbatim claim, and that “Further work is needed to represent all available data on physician suicide, beyond focusing on the single claim studied here. Representing additional data as nanopublications, including incidence data,

risk factors, demographics, and other contextual information, may offer an even richer graph of existing knowledge about physician suicide to enable more rapid learning about the field.”

Reviewer AL [11]

Comment: I congratulate the authors for their work. All my questions were answered, and concerns addressed. Thank you!

Response: Thank you to the peer reviewer kindly for the thoughtful and detailed peer review.

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Authors' Response to Peer Reviews

Authors' Response to Peer Reviews of “Are We Sure We Fully Understand What an Infodemic Is? A Global Perspective on Infodemiological Problems”

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KEYWORDS

communication; conspiracy; COVID-19; education; fake news; infodemic; infodemiology; mass media; public health; risk perception; science

This is the authors' response to peer-review reports for “Are We Sure We Fully Understand What an Infodemic Is? A Global Perspective on Infodemiological Problems.”

Round 1 Review

Dear Editor,

We appreciate the opportunity to review our manuscript for re-evaluation. We sincerely thank the reviewers for suggesting substantial improvements to our work. If further changes are deemed necessary, we will be more than willing to make them.

Anonymous [1]

Comment 1: “The neologism “dismisinformation” is problematic; we commonly use “misinformation” as an umbrella term when we cannot distinguish the type of information disorder.”

Answer: Dear reviewer, we agree that the exact definition of disinformation and misinformation lacks uniformity, which can create ambiguity. For example, some authors prefer to totally separate misinformation (understood as involuntary) from disinformation (understood as voluntary) [2]. For instance, Wang et al [3] argue that “Misinformation involves information that is inadvertently false and is shared without intent to cause harm, while disinformation involves false information knowingly being created and shared to cause harm.” Moreover, O’Hair et al [4] propose the following definition: “A formal definition of disinformation is any message or a set of messages that represent a meaning complex discrepant from or incompatible with a sender’s intent and/or a relatively informed or expert consensual evidentiary state.” We have proceeded to specify this important detail in the manuscript (please see the “Infodemiology” subsection). The added text is as follows: “Specifically, O’Hair et al formally define disinformation

as ‘any message or a set of messages that represent a meaning complex discrepant from or incompatible with a sender’s intent and/or a relatively informed or expert consensual evidentiary state.’”

Comment 2: The definition of fake news is advancing toward a specific information disorder, that is, it is not a mere simplification of phenomena (see, for instance, Molina et al).

Answer: Dear reviewer, we agree with this point. Indeed, our sentence specifies that the expression “fake news” is sometimes used as a synonym of “dismisinformation” in its broadest sense. In this regard, Wang et al [3] argue that “Although ‘fake news’ is the term that received most popular attention, it is arguably the most problematic one in terms of definitional rigour.” We have modified the paper specifying this aspect and citing the proposed reference (please see the “Infodemiology” subsection).

The added text is as follows: “To date, there is no univocal cataloging of the various types of infodemic information. For instance, Wardle et al define ‘disinformation’ as the intersection between misinformation (eg, false connection and misleading content) and malinformation (eg, leaks, harassment, and hate speech). On the contrary, Wang et al argue that when the dissemination is voluntary and takes place for malicious purposes, we speak of disinformation; otherwise (ie, when it is unintentional and accidental) we speak of misinformation. Some authors enclose both meanings in the unique term ‘dismisinformation,’ while others adopt the sometimes-criticized expression ‘fake news’... In this regard, it is essential to point out that these denominations can include false news, polarized content, satire, misreporting, commentary, persuasive information, and citizen journalism.”

Comment 3: The authors affirm that infodemics cannot exist without disinformation. This sentence is imprecise because information disorder also includes malinformation, fake news, and conspiracy theory. The background adopted by the authors to reflect on the presented problems can be compromised by such misconceptions.

Answer: Dear reviewer, thank you for pointing out this shortcoming. We clarified this point in the introductory section on infodemiology. It was specified to the reader that the definition proposed by O’Hair [4] includes these phenomena.

The added text is as follows: “In this paper, we will adopt the O’Hair convention. Phenomena such as malinformation and conspiracy hypotheses will therefore be included in the concept of dis-misinformation.”

Comment 4: I recommend that the authors concentrate their efforts on a specific problem, presenting a deep argumentation about the mechanisms that contribute to the success of information disorder during the pandemic.

Answer: Dear reviewer, we agree that focusing on a specific topic would increase the impact of the discussion on the individual topic. However, the purpose of this perspective is to provide a brief summary of all possible problems to consider when devising an infodemiological strategy. On the other hand, future papers may be developed to address the individual issues appropriately, starting from this general background.

Reviewer BM [5]

Comment: Dear Authors

This paper presents a scientific and futuristic discourse on the context of infodemiology. However, I suggest arranging the content in order of importance. For example, I think the problem of predatory journals is overexplained. Moreover, the suggestion given regarding the mentioned problem is not practical, and the statements about the relationship between the editor and the referee do not seem fair. Additionally, the authors’ statements about the duration of the submission review process are incomplete without an innovative result or proposal. In addition, the suggestions in the last part of the article need further explanation. Lastly, some of the items mentioned in the Abstract of the article have received little attention in the main text.

Answer: Dear reviewer, thank you for your evaluation of our paper. We have improved the abstract as suggested to make it clearer and more consistent with the content of the manuscript. In this regard, we have tried to clarify that this paper does not want to propose easy solutions but provide an overview of the problems to be faced in order to solve the infodemic issue. Indeed, we have specified that our suggestions (eg, degrees of reliability) are highly indicative and can be used as a mere starting point to then be delineated by more targeted research. The aim is that this manuscript can be read by both a specialized and lay public. Precisely for this reason, we have tried to explain scenarios (such as those of predatory publication) that are not known by those who are not in the sector but are fundamental from a communicative point of view (indeed, the public can be confused about the difference between a journal and another). Finally, we respectively disagree that the proposed solutions are not innovative: for example, at present, the communication format adopted in television shows and even newspapers does not include the presentation of evidence reliability through a specifically dedicated scale. This has given way to public figures comparing their mere personal opinions with peer-reviewed literature, generating extreme confusion in an inexperienced audience. Therefore, we strongly believe that our proposal may be a very straightforward way of limiting the disclosure of conflicting information based solely on the principle of individualistic authority. In fact, the color presentation of information is a method already widely used to determine the severity of epidemiological situations (eg, COVID-19) as it is very easy to interpret.

Anonymous [6]

Comment: This paper is a well-written, informative study. However, it has some grammatical errors.

Answer: Dear reviewer, thank you very much for your review. We are pleased about your comment. Following your indications, we have done a grammar revision of the whole paper through the professional version of the “Grammarly” software.

Reviewer CE [7]

Comment: This is a reasonable viewpoint/opinion paper [2]. I do not agree with everything that is being said but that is also not the goal—it is the authors’ opinion.

I do think the paper should be transferred to JMIR Infodemiology. As to the authors' statement that "the obsessive pursuit of prestige must be drastically limited as they undermine the credibility of science," I agree, and that also extends to obsession with the impact factor, so I hope the author follows his own advice and agrees to a transfer.

Answer: Dear reviewer, thank you very much for your review and intellectual openness. We want to stress that there is no problem in publishing our paper in a journal without an impact factor. In this regard, we specify that JMIRx Med (our first option) currently does not have impact factor.

Comment 1: It may be worth citing Mackey et al in addition to ref 1.

Answer: Dear reviewer, thank you very much for this relevant suggestion. The paper has been added as a reference.

Comment 2: Preprint servers do screen submissions, and there are different levels of screening, varying by preprint server. For example, MedRxiv implemented more strict criteria on COVID-19 compared with Zenodo, etc.

Answer: Dear reviewer, thank you for pointing out this important aspect. We have briefly discussed this information in the manuscript to provide a more complete and clear background on preprints.

The added text is as follows: "Besides, it is essential to consider that screening criteria are not uniform between the various

preprints platforms: for instance, medRxiv and bioRxiv repositories operate stricter selection criteria about COVID-19 than other databases. Hence, it is also necessary to consider this aspect when evaluating the classification level."

Comment 3: "Level of evidence" is a well-known phrase and is typically thought of in terms of study type rather than dissemination modality (ie, "systematic review" is better than "RCT," which is better than "observational studies," etc). If you come up with a new hierarchy—that is not directly speaking to the study type—I would suggest you come up with a new phrase or label for the type of hierarchy you are suggesting.

Answer: Dear reviewer, thank you very much for this essential clarification. We fully agree that using the term "degrees of evidence" is inappropriate as it is already adopted for a different purpose. Therefore, we have proposed the "degree of reliability," a scale that considers both the levels of evidence and the credibility of a paper.

The added text is as follows: "Further critical issues arise when presenting sensitive information to the public: indeed, it is not just a matter of communicating the degree of evidence (eg, original article vs meta-analysis) but also its credibility (eg, publication in a predatory journal vs publication in a legitimate journal). Therefore, the public should be educated on what we have termed 'degree of reliability' (ie, a scale that considers both the level of evidence and the credibility of scientific works)."

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Authors' Response to Peer Reviews

Authors' Response to Peer Reviews of "Sexual Health Assessment Is Vital to Whole Health Models of Care"

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KEYWORDS

sexual health; sexual health assessment; veteran; health equity; health assessment; whole health model; communication; communication barrier; technological barrier; health care; sexuality; sexual orientation; gender identity; sex; gender; model; care; barrier; well-being; comfort; assessment; EHR; electronic health record; quality; equity

This is the authors' response to peer-review reports for "Sexual Health Assessment Is Vital to Whole Health Models of Care."

Round 1 Review

Reviewer BM [1]

Comment: This is an excellent paper [2] that should be published. It's well-written, informative, and important to disseminate to the health care community. This paper addresses an initiative by the Veterans Affairs (VA) health care system to address an issue important for providing high-quality comprehensive patient care. It is great that addressing sexual health assessment in their electronic health record (EHR) is being implemented by the VA since federal programs often influence national implementation. The additions presented in this paper need to be incorporated into other EHR programs, like Epic. Integration of detailed sexual health information in patient documentation is important to address preventive care, promote healthy sexual functioning, and optimize overall health and well-being. Having done research on the use of surveys to address sensitive topics such as sexual health and sexually transmitted infection risk, I found that patients of all ages are very willing to answer honestly (and in detail) about their sexual health on surveys, which then provides a time-efficient and useful way to open this discussion. This approach also allows health care providers to introduce these sensitive topics and, when patients are willing, provide health education, health promotion, and appropriate treatment when needed. I have also used this approach in my own clinical practice. This use of surveys to obtain and open the discussion on sensitive health issues has been documented in numerous research projects. It has also been shown to promote patient satisfaction with their care since it increases their sense of "being heard" by their providers. It also allows providers to provide more accurate care.

This paper is important to disseminate information about how a major health system has recognized the importance of sexual health assessment and found a way to implement this and incorporate it into their EHR. It also highlights the need to educate providers to orient them to the new system and provides ways to do this to assist them in better approaching sensitive health issues.

Response: Thank you for the compliments on the paper! We agree that the US federal government plays an important role in driving changes in health care delivery and that systems outside the Veterans Health Administration (VHA) will integrate sexual health into their EHRs. We also appreciate and agree with your perspective on using survey approaches to collect screening information about sensitive topics.

Specific Comments

Comment: Great information about the VA's approach. A particular strength of this paper is the presentation of prompts at different levels of assessment for patients who are hospitalized and more comprehensive visits.

Major Comments

Comment 1: Excellent background information

Comment 2: The pocket card format is excellent and serves several purposes: makes it easy for providers to follow a

template and validates the importance of this information in providing patient care, and the repetition of obtaining this data in practice with all patients reinforces the importance of obtaining this data and can reduce provider resistance to asking these questions.

Comment 3: Following the pocket card questions (comprehensive form) nicely addresses and includes the patient's partner information in the history. This reinforces for the provider the benefit of obtaining this information. The fact that the provider/EHR asks for partner information also highlights for the patient the importance to consider their partner(s) when addressing their own sexual health. This can also be a great trigger for patient education, which moves beyond the basic "plumbing" aspect of sexual health information (eg, how things work).

Response: Thank you! Yes, we're hopeful these kinds of educational materials will help providers navigate sexual health assessments more easily.

Minor Comments

Comment 4: A minor suggestion would be to provide a little more detail about provider education in the implementation of this new format. This could include role-playing with debriefing to help providers address their own concerns/reluctance to talk about sexual issues with their patients.

Response: Thanks for the suggestion! We added more detail about provider education, including the use of role-plays and practice assessments:

- Page 13, paragraph 2: "Two trainings on gender identity—one for current EHR users and one for Cerner Millennium users—have already been released. Separate trainings on sexual orientation and on sexual health (for current EHR users and for Cerner Millennium users) are nearing completion."
- Page 14, paragraph 1: "Brief role-plays during pre-clinic stand-ups could help provider teams become comfortable using these tools."

Anonymous [3]

General Comments

Comment: Thank you for the opportunity to review this manuscript entitled: Sexual Health Assessment as Part of a Whole Health Model to Care: Improving Communication and Technological Barriers. This review paper aims to summarize barriers to assessing sexual health and to suggest some ways to overcome them. The paper summarizes sexual health issues from a new perspective (whole health model), trying to draw some practical new methods. However, several significant questions should be explained before publication.

Response: Thank you for reviewing the manuscript and the feedback!

Specific Comments

1. Abstract

Comment: This seems to be a review article in my understanding.

Response: This is a commentary paper; we reviewed pertinent literature, but the intent is to make an argument for assessing sexual health rather than aggregate and report information and themes from prior work. We revised the title to make this clear for readers: “Commentary: Sexual health assessment is vital to whole health models of care”

Comment: I suggest reorganizing the abstract. For review articles, the abstract specifies the topic of the review and the main conclusions drawn.

Response: We revised the abstract to highlight our central argument: “If health systems, including the U.S. Department of Veterans Affairs Veterans Health Administration (VHA), incorporate sexual health into whole health models of care they could enhance preventive care, promote healthy sexual functioning, and optimize overall health and well-being.”

Comment: Additionally, why is there a holistic health model in the title and no mention of it in the abstract?

Response: We revised the abstract to clarify the link with whole health models of care: “Healthcare systems adopting whole health models of care will need to incorporate holistic assessment of sexual health...into whole health models of care they...”

Comment: Also, why the VHA is specifically mentioned needs to be answered in the abstract.

Response: We named the VHA earlier in the abstract to make readers aware the VHA would be discussed in more depth later in the abstract: “If health systems, including but not limited to the Veterans Health Administration (VHA), incorporate...”

Later in the abstract, we discuss the VHA’s changes to its EHR; we clarified that this example could be helpful for providers and administrators outside the VHA: “These examples may be helpful for other healthcare systems interested in moving to a whole health model of care.”

Comment: Finally, the purpose of the review needs to be reclarified in the abstract. As of the current version, the purpose of this paper seems to be reported too vaguely. Is the authors’ main intent to provide recommendations for development and implementation for the VHA through this review or is the target population just veterans?

Response: In addition to the specific revisions specified above, throughout the abstract we clarified that these issues are pertinent beyond the VHA:

“These examples may be helpful for other healthcare systems interested in moving to a whole health model of care”

“These interventions will need to be targeted to both providers and patients in all healthcare systems wanting to transition into whole health models of care, not just the VHA”

“Healthcare systems (i.e., both the VHA and other systems)...”

2. Introduction

Comment: It is recommended to reorganize in a logical order. Similar to the summary, readers are confused by the sudden mention of veterans.

Response: We added a discussion of veterans and, for clarity, specified that we are not just discussing veterans throughout the Introduction:

“Most people, not just Veterans (Veterans are individuals who have served in the Armed Forces, regardless of combat exposure, and who are no longer on active duty after receiving an honorable discharge from military service), are sexually active and value sexuality”

“Veterans, especially women and sexual and gender minority veterans, experience a high rate of disruptions in healthy sexual intimacy. This is due to premilitary trauma, high rates of military-related injuries, multiple and often comorbid chronic illnesses (e.g., vascular disease, obesity, depression, posttraumatic stress symptoms, substance use disorders, and tobacco use), and medication side-effects that interfere with sexual desire and functioning (5,7–11). While Veterans may be exposed to risk factors that disrupt sexual health more frequently, many of these risk factors contribute to sexual dysfunction in the general population as well”

“...overlooked in clinical practice, both in the Veterans Health Administration and other healthcare systems...”

Comment: Since the first paragraph throws out the concept of sexual health. I propose to consolidate the second and third paragraphs while reducing the content. First, mention the fact that sexual health is now an integral part of overall health, then introduce the benefits of achieving sexual health (the original two or three paragraphs), and finally the current obstacles to achieving sexual health (original fourth paragraph).

Response: Thank you for feedback about the flow of the introduction. We chose to use subheadings to highlight changes in discussion from benefits of and risks to sexual health to incorporating sexual health (and its assessment) in whole health models.

3. Barriers to Assessing Sexual Health

Comment: I personally recommend independent secondary headings.

Response: While we did use subheadings to highlight changes in direction in the original draft, we changed the formatting of the subheadings to better showcase them for readers and to conform to JMIR’s formatting requirements.

Comment: Of the three obstacles mentioned in the paper, the first is too long to describe. I suggest points 2 and 3 need to be longer to make the structure of the paper smoother.

Response: We acknowledge that we spend more time discussing the communication gap caused by providers’ incorrect beliefs about patients’ willingness to discuss sexual health. This is largely because this topic is more novel and less discussed than technological barriers encountered in EHRs. In addition, these technological barriers are already well on the way to being overcome whereas the patient-provider communication gap is more nuanced.

4. Benefits of Assessing Sexual Health

Comment: I personally recommend independent secondary headings here also.

Response: Thank you for this suggestion! We added additional headings throughout the paper.

Comment: Assessing the benefits of sexual health highlights the importance of sexual health, which is the point of the entire review. I think this paragraph should be moved to the front.

Response: We agreed about the structural issue and moved this section to immediately follow the Introduction.

5. Overcoming Barriers to Sexual Health Assessment

Comment: I think patient education is a key point in achieving sexual health assessment and needs to be covered in detail.

Response: We discuss patient education in the subsection "Patient Education." We reformatted the subheading to highlight this subsection and conform with JMIR's formatting requirements. In addition, we added the following update about VHA's plans for patient education:

- Page 19, paragraph 2: "To assist with this, the VHA is developing a patient-facing factsheet about SOGI that will be posted to the VA's public website during Pride Month (June) 2022."

Additionally, the core of our argument from the Barriers section is that providers need to be the ones to take charge in assessing patients' sexual health. Based on the evidence we review in that section, providers' unwillingness to query about sexual health, because they believe patients would be offended, is a far larger barrier than patient-side communication barriers. That's not to say patient education isn't important. We believe (and argue that) provider education is more important for this topic.

To clarify this issue, we added this paragraph to the end of the Patient Education section:

- Page 14, paragraph 2: "The evidence we reviewed above points to the gap in patient-provider communication about sexual health largely due to provider perception. This appears to be driven by providers' beliefs that patients are not willing to discuss their sexual health when, in fact, they are. While veteran educational interventions are important, provider education is critical for promoting sexual health assessment."

6. Conclusion

Comment: I think the conclusion of the current version needs to be reorganized. In short, if it is too long it leads to a loss of readability. The conclusion needs to be concise and outline what the paper does exactly, such as what problems were found and what solutions were proposed.

Response: Thank you for the feedback about readability. We condensed the summary paragraphs and information about

pre-exposure prophylaxis that may have contributed to the lack of clarity. The first paragraph of the Conclusion now reads:

- Page 14, paragraph 2: "While sexual health is an important part of overall health, health care providers do not routinely assess patients' sexual health. The primary barriers seem to be providers' beliefs that patients will be offended if asked about sexual health and logistical barriers to assessing sexual health. We believe that adding sexual health assessments directly to EHRs and pairing these changes with provider education about using these tools will help. Focusing provider education on addressing the belief gap between providers and patients (i.e., sharing evidence that patients are largely comfortable with sexual health assessment) and interventions to increase providers' comfort with discussing sexual health will likely increase the impact of logistical changes. In addition, focusing on patients' priorities and sexual well-being could potentially increase patient engagement in care, and enhance the whole health of our patients."

Anonymous [4]

General Comments

Comment: This paper's [1] idea is new, but unfortunately, there is no structured format for the abstract or paper. The study methods are not specified, and the conclusion is so short and insufficient.

Specific Comments

Major Comments

Comment 1: The study needs a structured format.

Comment 2: Please specify different parts of the study such as the methods and results.

Response: We believe there was a misunderstanding about this paper. It is a commentary not an original research study. There are no structured methods or results sections because there were no empirical methods or results. We hope that clarifying this in the title and providing additional structure in the abstract will prevent a similar misunderstanding for future readers.

Comment 3: Are technological barriers just related to the lack of structured data fields for this information within its current EHR or note titles?

Response: These are the primary technological barriers discussed in the literature and that we experience as health care providers and researchers, yes. "Lack of structured data fields" is also shorthand for a great deal of informatics and data architecture decision-making that is beyond the scope of this manuscript.

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Abbreviations

EHR: electronic health record
VA: Veteran Affairs
VHA: Veterans Health Administration

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Authors' Response to Peer Reviews

Authors' Response to Peer Reviews of "Waiting Time and Patient Satisfaction in a Subspecialty Eye Hospital Using a Mobile Data Collection Kit: Pre-Post Quality Improvement Intervention"

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KEYWORDS

Waiting time; waiting list; patient satisfaction; quality improvement; clinical audit; ophthalmology; patient-centered care

This is the authors' response to peer-review reports for "Waiting Time and Patient Satisfaction in a Subspecialty Eye Hospital Using a Mobile Data Collection Kit: Pre-Post Quality Improvement Intervention."

Round 1 Review

Dear Reviewer,

We start by thanking the editorial team for their expression of interest in the topic and the reviewers in helping to move the paper forward. We would also like to thank you and the reviewers for the input in improving our work. The reviewer comments were quite constructive, and we ensured that the best possible clarifications and responses are provided. Kindly find our responses embedded in the point-based comments. We hope

that our responses/clarifications will be satisfactory and that the reviewed manuscript will be of acceptable standard.

Reviewer T [1]**General Comments**

This article [2] studies the waiting time and patient satisfaction in a subspecialty eye hospital in Cameroon. It is a matter of fact that hospital-waiting time is a major concern in many other countries, but it is important that this paper concentrates on Cameroon. Moreover, the article mentions the use of a mobile data collection kit conducting pre-post quality improvement intervention. The article can be characterized quite innovative and offers a significant connection of theory with practice.

It would be quite interesting if the authors mention the reasons why they chose Cameroon and refer to some similar recent

research. Although, it is clear why this project is necessary to be studied. The objectives of the study are clear and combine waiting time and satisfaction, 2 important factors for the increase of quality-of-life indicators. The methods that were used are suitable and adequate for this project and the authors follow a correct pathway for the implementation of their work.

The research leads to the result that the use of plan-do-study-act (PDSA) led to a borderline significant reduction of 65.4 minutes in waiting time over 6 weeks and an insignificant improvement in satisfaction, suggesting that quality improvement efforts have to be maintained over a considerable period to be able to produce significant changes. The study provides a good basis for quality improvement in limited-resource settings making use of block appointment systems, with comprehensive subspecialty eye care services. We recommend shortening the patient pathway and other measures including a phasic appointment system, automated patient time monitor, robust ticketing, patient pathway supervision, standard triaging, task shifting, doctor consultation planning, patient education, and additional registration staff.

Specific Comments

Minor Comments

1. It would be quite interesting if the authors mention the reasons why they chose Cameroon and refer to some similar recent research.

RESPONSE: This is the first study targeting the improvement of waiting time and satisfaction in ophthalmology in Cameroon. Other quality improvement studies were found [3-5], including those that aimed at investigating patients' satisfaction with the quality of health care services [6] and the undertaking of antiretroviral treatment [7]. Our choice of setting has been explained and similar studies are alluded to. Kindly refer to the first paragraph of the study rationale (highlighted in yellow).

2. The description of the problem can be enriched with some more information.

RESPONSE: We have now phrased the problem as suggested.

3. A justification of why this research method was chosen can be an extra asset for this interesting work.

RESPONSE: Thanks for this suggestion. The before and after study designs making use of the model for improvement have been widely reported [8]. We prioritized the simple pre-post study design because we wanted to make the study as close to reality as possible; second, it was a single-center study, which ruled out the possibility of making use of a control group. We have also shown that the PDSA is a widely used model in quality improvement studies [9-11]. This has been explained (highlighted in yellow) in the *Approach to Impact Assessment* subsection per the SQUIRE reporting guidelines for quality improvement studies [12,13].

4. I also believe that the authors have used too many references than normal in a paper. They might decrease the number of references and stay in the most appropriate range. Too many citations are used in this paper. Most journals recommend no more than 40 references.

RESPONSE: We thank you for raising this point. Although more explanations and justifications from reviewers simply meant more references to substantiate our clarifications, we have reduced the total number of citations. We believe we adhere to the journal guidelines and are not aware of any restrictions on the number of citations in JMIR journals. Should this be the case, we will be happy to review. Moreover, this suggestion seems to conflict with the editorial suggestion for more citations.

Reviewer BK [14]

General Comments

In this paper, the authors aimed at improving patient waiting times and satisfaction through the use of PDSA quality improvement cycles. It is an interesting practical study. However, there are some major issues that need to be addressed by the authors. The following comments can help the authors improve the manuscript.

Specific Comments

Major Comments

1. In the Abstract and Methods sections, what does "ODK" stand for?

RESPONSE: Open Data Kit (ODK) is a mobile data collection app [15]. This has now been clarified (highlighted in green).

2. I suggest moving the problem description to the study rationale as the first paragraph of this section.

RESPONSE: While we thank the reviewer for their comment, we wish to remind them that we followed specific reporting guidelines [12,13] when reporting the results. We decided to maintain this text as it is.

3. In the methods section, the contents related to the data collection need to be expanded to include the type of data that were collected by data collectors.

RESPONSE: We provided details of data collection under the subsection titled "Attributing Results to the Intervention" in the methods section (highlighted in green) based on the reporting guidelines mentioned earlier [12,13].

4. The methods of data collection should be explained clearly.

RESPONSE: We thank the reviewer for emphasizing on this. We wish to remind that we strictly followed the SQUIRE reporting guidelines because evidence suggests that quality improvement interventions are often poorly reported [16]. Two data collectors were purposely recruited for the study (see the "Data Collectors" subsection). They randomly approached participants at the point of entry and enrolled those who consented. Kindly refer to the "Attributing Results to the Intervention" subsection for more details (highlighted in green).

5. In the Results section (page 11), the authors said, "The first 7 changes were implemented, which includes..." and "Five of the originally proposed changes could not be implemented due to..." I think it is better if the authors either change the wording of the sentences or provide a complete explanation of the all

changes. Then, the authors can explain which strategy was implemented and which one was not implemented.

RESPONSE: We remain grateful for this comment. Our explanation of implemented changes on page 12 under “Intervention Time Line,” which have now been modified, follows a complete list of all proposed changes found on page 6 under the “Changes Proposed” subsection, modified as well (text highlighted in green) as suggested.

6. In the Results section (*Unintended Outcomes* subsection), the authors noted the following: “...the intervention appeared to have affected women adversely...” This section needs further explanations about the possible reasons for such an unintended outcome.

RESPONSE: We appreciate the reviewer’s suggestion for more details. We further investigated why that was and found that the increase in waiting time was specific to the 15-24-year age group among women who were recruited after the intervention. We have now provided an explanation to that effect (highlighted in green) in the *Unintended Outcomes* subsection.

7. I am wondering whether all changes were implemented at the same time or they were implemented one by one. In case of the second approach, the impact of each strategy on changing waiting times and improving patient satisfaction could be investigated separately and compared with other strategies.

RESPONSE: Given the time constraint, we implemented all the changes together. We have added a phrase under the “Intervention Time Line” subsection on page 12, to make this clear (highlighted in green).

8. What were the possible reasons for non-significant increase in patient satisfaction while the waiting time was improved?

RESPONSE: We provided an explanation for this in the last paragraph of the “Association between patient satisfaction and waiting time” subsection of the Discussion. Kindly see text highlighted in green on page 21.

9. As the authors noted in the *Strengths and Limitations* section, the sample size was relatively small. However, they need to explain more why they did not reach a larger sample size. What were the main limitations?

RESPONSE: We worked with a limited sample size given the limited timeframe and data collectors. By its very nature, the time motion study required that data collectors record the time spent at each service point (kindly see flow chart on page 11) while shadowing, from entry through exit. This led to a maximum enrollment of 2 participants per day per data collector, provided they still had arrivals after finishing with the first participant. This has now been clarified in the text highlighted in green in the *Strengths and Limitations* subsection.

Minor Comments

1. Multimedia appendices were not available to me.

RESPONSE: Dear Reviewer, we know not why that was but our online manuscript management profile indicates that there were 2 supplementary files attached as Multimedia Appendices.

2. Any survey instruments or questionnaires used for measuring patient satisfaction need to be added to the manuscript.

RESPONSE: The data collection form downloaded from the ODK data form validation app [17] has now been uploaded as a Multimedia Appendix.

Anonymous [18]

I have completed the statistical review of this manuscript, which is well-organized and presented. However, the following suggestions will help improve the quality of this manuscript.

1. Is it a proof-of-concept-type study? Kindly add the time period of this study.

RESPONSE: This was not a proof-of-concept study. We have now included a statement to clarify the period in the first sentence of the “Study Setting” subsection in the Methods section (highlighted in pale blue).

2. Kindly do not use word “subjects” for study participants. You can simply use either “participants” or “patients.”

RESPONSE: This has been amended accordingly.

3. No power calculation rationale was provided in this report, so these results cannot be generalized.

RESPONSE: We thank the reviewer for this comment. We have amended the text (highlighted in pale blue) in the first paragraph of the study conclusion as well as in the Abstract’s conclusion statement to reflect this.

4. Authors must include statements regarding the statistical software to perform data analysis and what level of statistical significance was used for hypothesis testing.

RESPONSE: We thank the reviewer for pointing this out. We have now included some text and made amendments (highlighted in pale blue) in the Abstract’s methods statement and the “Data Analysis” subsection on page 8, to this effect.

5. Authors must add more clarity to the “Logistic regression with reported...” statement as odds ratios with 95% confidence intervals are calculated from the logistic regression. What is the point of margins plot in this case? What other covariate were adjusted in the logistic regression? Kindly provide proper details with more clarity.

RESPONSE: We have added some text (highlighted in pale blue) under the “Association of Waiting Time and Satisfaction” subsection under “Data Analysis,” as suggested.

6. Table 1, the cohabiting group can be merged with the married group. Add “years” in brackets next to “Age.” Arrival time can also be sensibly presented with fewer meaningful categories.

RESPONSE: Thanks for the suggestion. The table has been amended accordingly.

Round 2 Review

Dear Reviewer,

We thank you for your additional comments and commitment to improving the paper. While we note that the editorial

comments were already addressed in the previous round, as seen below, kindly refer to the “external peer-review report” section for our responses to additional reviewer comments.

External Peer-Review Reports

Reviewer BK [14]

General Comments

I appreciate the authors for their time and efforts to implement our suggestions. However, some issues need further attention.

1. The Introduction section started with the problem description. This section usually comes later and after describing the background. Hence, the coherence of the paragraphs should be revised. Moreover, the current subheadings in the Introduction section seem unnecessary and the authors can remove or reduce them.

RESPONSE: This has been amended accordingly.

2. As the authors said, they implemented all the changes together. However, each strategy or change might have a different impact on changing waiting times and improving patient satisfaction, which was worth investigating. If the authors did not do so, it is better to add this point to the *Strengths and Limitations* section.

RESPONSE: We have added this in the *Strengths and Limitations* section to highlight this point.

Round 3 Review

Reviewer BK [14]

Dear Reviewer,

We thank you for your comments. We note with regret that our responses to your comments were already submitted on April 11, 2022, but for some reasons unknown, we got another email notifying us of the same comments. Kindly see below the responses to your comments that were already submitted.

General Comments

I appreciate the authors for their time and efforts to implement our suggestions. However, some issues need further attention.

1. The Introduction section started with the problem description. This section usually comes later and after describing the background. Hence, the coherence of the paragraphs should be revised. Moreover, the current subheadings in the Introduction section seem unnecessary and the authors can remove or reduce them.

RESPONSE: This has been amended accordingly.

2. As the authors said, they implemented all the changes together. However, each strategy or change might have a different impact on changing waiting times and improving patient satisfaction, which was worth investigating. If the authors did not do so, it is better to add this point to the *Strengths and Limitations* section.

RESPONSE: We have added this in the *Strengths and Limitations* section to highlight this point.

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Original Paper

Representing Physician Suicide Claims as Nanopublications: Proof-of-Concept Study Creating Claim Networks

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Abstract

Background: In the poorly studied field of physician suicide, various factors can contribute to misinformation or information distortion, which in turn can influence evidence-based policies and prevention of suicide in this unique population.

Objective: The aim of this paper is to use nanopublications as a scientific publishing approach to establish a citation network of claims in peer-reviewed publications about the rate of suicide among US physicians.

Methods: A list of articles from a previously published scoping literature review on physician suicide was used to identify those articles that commented on or investigated suicidal behaviors of physician populations, including students, postgraduate trainees, and practicing physicians. The included articles were from peer-reviewed publications and asserted a claim about the annual rate of physician suicide. Manual data extraction was performed to collect article (or resource) type, title, authors, digital object identifier or URI, publication year, claim (about annual physician suicide rate), data of last access of the article (eg, for a webpage), and citations supporting the claim. Additional articles, websites, or other links were only added to the set of claims if they were cited by a peer-reviewed article already included in the data set. A nanopublication was created for each article or resource using Nanobench with an investigator-developed literature-based claim nanopublication template.

Results: A set of 49 claims concerning the rate of US physician suicide was represented as nanopublications. Analysis of the claim network revealed that (1) the network is not fully connected, (2) no single primary source of the claim could be identified, and (3) all end-point citations had a claim with no further citation, had no apparent claim, or could not be accessed to verify the claim. The nanopublication strategy also enabled the capture of variant claims published on a website.

Conclusions: Nanopublications remain to be adopted in broader scientific publishing in medicine, especially in publishing about physician mental health and suicide. This proof-of-concept study highlights an opportunity for more coordinated research efforts in the subject of physician suicide. Our work integrates these various claims and enables the verification of nonauthoritative assertions, thereby better equipping researchers to advance evidence-based knowledge and to make informed statements in the advocacy of physician suicide prevention. Representing physician suicide rate claims as nanopublications can be extended and improved in future work.

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KEYWORDS

physician suicide; suicide; suicide prevention; physician well-being; physician mental health; nanopublication; physician; doctor; mental health; semantic publishing; bibliometrics; claim network; information distortion; misinformation

Introduction

Nanopublications are “core scientific statements with associated context” [1]. That is, scientific findings can be published as minimal pieces for computer interpretation, enabling nanopublications to cite other nanopublications unambiguously and reliably [2]. Furthermore, they are self-contained in that they contain scientific assertions as well as their provenance information and metadata; nanopublications can then be given reliable URIs for verification of the digital artifact and its entire reference tree [2]. The infrastructure allows the creation of citation, claim, and argumentation networks in which scientific statements are identified, connected, and verified [1].

In application, the use of nanopublications to represent scientific assertions in biomedical literature is not new. For example, the genetic basis for disease pathophysiology from DisGeNET has been mapped as nanopublication [3,4]. An Alzheimer disease research network built a web research community that organized research findings in an annotated knowledge base [5]. Applications largely involve data sets from the life science domains, including data on diseases, genes, proteins, drugs, and biological pathways [6].

In the field of physician suicide, disparate research, opinion, and position statements have been published in scholarly literature, with more than 60% of such literature published in the last 20 years alone [7]. Physician suicide has been reported in at least 37 countries, and many risk factors for suicidal behavior that affect the general population, such as inadequately diagnosed or treated mental health disorders or substance use disorders, also apply to physicians. More controversially, various unique risk factors have been suggested, including specialized knowledge of human physiology, easier access to lethal means of self-harm, personality traits selected in the physician training pathway, specialty of practice, and legal or licensing issues unique to the medical field [7].

Physician suicide is a serious issue for the medical workforce, globally and maximally leveraging available evidence toward prevention. Yet, even foundational information about the incidence of physician suicide remains poorly understood. In previous work, a claim network was manually constructed to

trace the provenance of an often-cited claim that 300 to 400 US physicians die by suicide annually, which suggested that claim distortion and propagation of such misinformation about physician suicide incidence occurs in published literature [8]. This work drew from previous work on micropublications, which are a semantic model for scientific claims and evidence, which enables knowledge discovery and inference across networks of information [9,10]. A similar approach to identify and trace citation distortion had previously been carried out regarding a specific scientific claim about Alzheimer disease [11]. This paper extends this work by applying the nanopublication schema to the same physician suicide claim.

As literature about physician suicide is growing in parallel with the growth of scientific literature overall, which offers a unique opportunity to begin building core infrastructure to facilitate community learning, in a verifiable manner, about physician suicide. Such learning, founded on verifiability and reliability of available data, could support the needed vigilance of researchers, advocates, policy makers, and medical community in overcoming misinformation and information distortion about physician suicide.

The aim of this study is to use nanopublications as a scientific publishing approach to create a citation network of claims in peer-reviewed publications about the rate of suicide among US physicians. This is a proof-of-concept study for applying semantic web infrastructure to physician suicide research. To our knowledge, no such application to this field has previously been carried out. Facilitating the integration, interoperability, and findability of high-quality research on physician suicide would benefit evidence-based policies and interventions in suicide prevention among physicians.

Methods

Data Sources

A previous scoping review of the literature about physician suicide identified articles that commented on or investigated suicidal behaviors of physician populations, including students, postgraduate trainees, and practicing physicians [7]. Briefly, in that literature review, a medical librarian assisted in refining the research question, developing the search strategy, and

conducting a search of relevant electronic databases, including Ovid Medline, PsycINFO, and Scopus. These databases were searched from inception through April 2018. Using the predefined literature review methodology, 347 articles were identified for analysis, with the earliest dating back to 1903 [7]. From these 347 articles, articles were further screened for this proof-of-concept study to focus on articles that made an assertion, or claim, about the annual rate of US physicians who die of suicide. Then, 1 author (TIL) established a Google Scholar alert using the keyword “physician suicide” and screened additional articles from peer-reviewed journals to include based on earlier established inclusion criteria from the published scoping literature review [7]. These articles, published through March 2020, were identified and added to the article set used for this study.

Websites, news articles, blogs, white papers, organizational or institutional reports, and other gray literature were not the primary focus of this study and therefore not retrieved for inclusion as original sources of the annual suicide rate claim. However, additional articles, websites, or other links were only

added to the set of claims if they were cited by a peer-reviewed article already included in the data set.

Data Extraction

Manual data extraction was performed by 1 author (TIL) to collect article (or resource) type, title, authors, digital object identifier or HTTP URI, publication year, claim (about annual physician suicide rate), data of last access of the article (eg, for a webpage), and the citations that the authors indicated supported the claim. Data were extracted into a spreadsheet that was then used to create nanopublications. The spreadsheet also notes the original sources of the reference for the set, which are as follows: scoping literature review [7], Google Scholar alert, or not applicable as the citation is included because it is referenced by another claim.

To ensure that the citations provided to support a claim were sufficiently identified, the sentence preceding and following the claim of interest was checked for a citation. [Table 1](#) illustrates an example of the extraction procedure on the level of the manuscript and claim.

Table 1. Claim identification and attribution during data extraction.

Claim of interest, including preceding and following sentences	Claim extracted	Citations to which the claim is attributed
“There is an urgent need for development and dissemination of these best practices. An estimated 300 physicians die by suicide per year, and rates may be rising. ^{43,44} Each time, the headlines are saddening—even shocking” [12].	“An estimated 300 physicians die by suicide per year, and rates may be rising” [12].	<ul style="list-style-type: none"> • Apropos claim citation No. 43: Facts about physician depression and suicide [13] • Apropos claim citation No. 44: Physician Burnout and Well-Being: A Systematic Review and Framework for Action [14]
“And the mortality is high. In male doctors the suicide risk is 1.4 times that of the general population and for female doctors it is an astounding 2.27. We know that 300–400 physicians commit suicide every year. And there likely are more, since some death certificates may not reflect the actual cause of death” [15].	“We know that 300–400 physicians commit suicide every year” [15].	<ul style="list-style-type: none"> • No citation provided

For websites, a version of the website with a last access date was retrieved for data extraction using Internet Archive’s Wayback Machine [16]. If a claim was available, then this text was extracted as the claim; if none, then the nanopublication included the comment “No apparent claim of annual physician suicide rate”; if no archived version of the website was available, then the nanopublication included the comment “Unverified claim of annual physician suicide rate present.” A separate nanopublication was created for each different cited version of a website if it was cited at 2 different time points by different articles.

Data Structure

Each nanopublication consists of 3 components: assertion, provenance, and publication information [17]. Following the nanopublication model of Groth et al [1], the steps taken to create a nanopublication for each claim about physician suicide incidence involved the following:

1. Assertion: represented as a set of triples—the subject is the local article or resource identifier, which is linked via creator, date, identifier, title, type, citation, and comment.

2. Provenance: each assertion is linked to the creator (annotator), who is identifiable by an Open Researcher and Contributor Identifier account.
3. Publication information: each nanopublication contains a time stamp, the creator, link to the template, and public key plus signature.

We created a literature-based claim template to specify these fields and values and provide mappings to semantic types and relations using Resource Description Framework Schema, Nanopublication ontology, the Fabio ontology for document types, the Provenance, Authoring and Versioning ontology for provenance, and the SemanticScience Integration Ontology for citations.

Creating Nanopublications

A nanopublication was created for each article or resource using *Nanobench* with the literature-based claim nanopublication template ([Figure 1](#)) [18]. *Nanobench* is a Java based end-user tool that allows for browsing and publishing of nanopublications. By connecting to the decentralized nanopublication network [19], users can see other people’s nanopublications and publish their own via forms generated from specific templates, which

are themselves defined and published as nanopublications. All published nanopublications are digitally signed and linked to the user's Open Researcher and Contributor Identifier account

[20]. A nanopublication index was then created containing all created nanopublications.

Figure 1. Nanobench template for literature-based claims. DOI: Digital Object Identifier; ORCID: Open Researcher and Contributor Identifier.

nanobench | [my channel](#) | [others](#) | [search](#) | [publish](#) |

Publish a new Nanopublication

Publish a new nanopublication below with the chosen template ([source](#)) or [choose a different template](#).

Template: Template for literature-based claims

This document is a

This document has title "

This document has authors "

This document has document identifier

This document was published in "

This document was last accessed on " (optional)

This document claims " (optional)

This document cites (optional)

This document cites (optional)

This document has the following observation " (optional)

I understand that publishing cannot be undone and that the provided information will be publicly visible and openly connected to my ORCID identifier.

Ethical Considerations

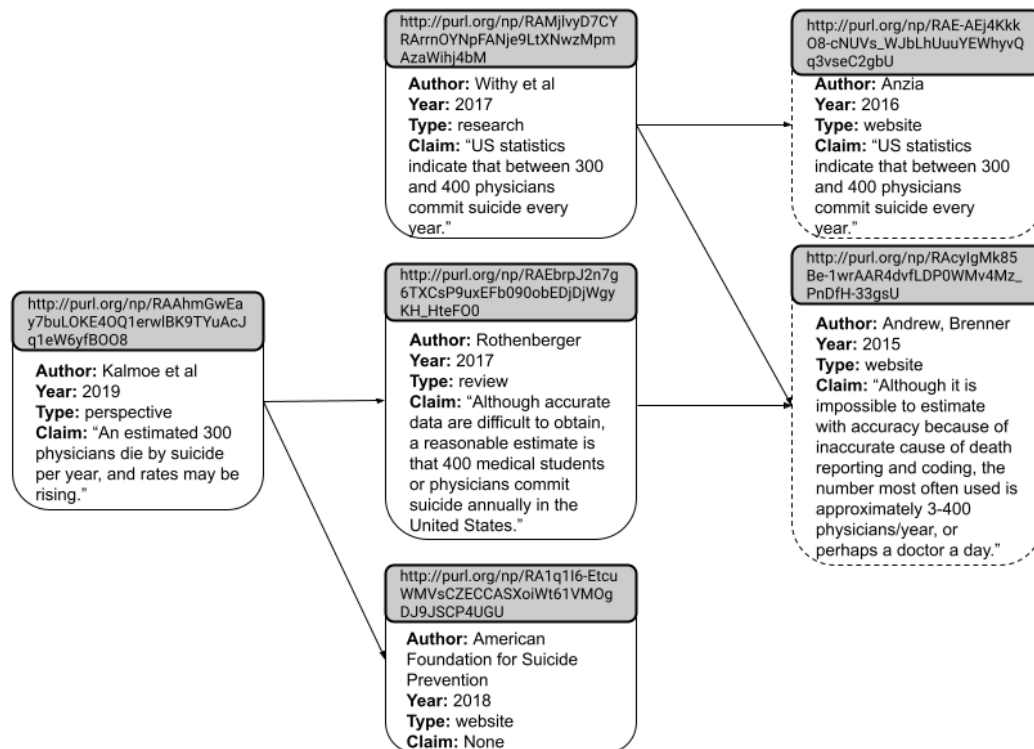
The study involved data derived from resources published and available in the public domain. No institutional review board approval was required.

Results

A set of 49 claims concerning the rate of US physician suicide was represented as nanopublications. Figure 2 [12-14,21,22] illustrates 1 published peer-reviewed article [12] represented as a nanopublication, which was then linked to its citation for the claim, which was also represented as a nanopublication along with the associated chain of nanopublished claims. For example, Kalmoe et al [12] claimed in a 2019 perspective article, "An estimated 300 physicians die by suicide per year, and rates may be rising." This claim was accompanied by citations of 2 resources, a 2018 version of a website from the American Foundation for Suicide Prevention (AFSP) [13] and a literature review published in peer-reviewed literature [14]. Each of these resources was reviewed to extract information to create

nanopublications. The AFSP website did not make this claim. Rothenberger et al claimed in 2017 that "Although accurate data are difficult to obtain, a reasonable estimate is that 400 medical students or physicians commit suicide annually in the United States." This claim was accompanied by the citation of a 2015 version of a website from Medscape, a medical news platform, which claimed "Although it is impossible to estimate with accuracy because of inaccurate cause of death reporting and coding, the number most often used is approximately 3-400 physicians/year, or perhaps a doctor a day" [23]. This website stated a claim about annual physician suicide rate but provided no further references. Withy et al claimed in 2017 that "US statistics indicate that between 300 and 400 physicians commit suicide every year" [21] and also cited the same Medscape website [23], as well as a website from StatNews, another medical news platform, which claimed "US statistics indicate that between 300 and 400 physicians commit suicide every year" [22]. This website also stated a claim about annual physician suicide rate but provided no further references. As a result, this claim network ends, as demonstrated in Figure 2.

Figure 2. Nanopublications linked by their claims, if made, and nanopublications cited as source of the claim, if available. Nanopublications appearing in light gray with dashed lines represent an article or resource that states a claim about annual physician suicide rate but provides no further references.



Nanopublications and claim networks were created for all included articles in the data set, similar to how Figure 2 was created (Figure 3). Figure 3 shows multiple claim networks created, without a single primary source or end point for linked nanopublications. This resulted in 12 stand-alone nanopublications unlinked to any others because of the absence of a citation to support the asserted claim. An additional 8 types of graphs were created, where all nanopublications resulted in one of two possible end points: (1) no apparent claim of annual physician suicide rate was identified, or it was unverified if claim of annual physician suicide rate is present; (2) a claim about annual physician suicide rate was asserted, but no further citations are provided to support the claim.

Although not an a priori objective of this study, applying the nanopublication schema to annual physician suicide claims enabled the capture of variant claims published on a website. Specifically, the website for the AFSP was cited 6 times between 2011 and 2018. Surprisingly, while only the 2018 version of

the AFSP website could be retrieved, it contained no apparent claim of annual physician suicide rate. It could not be determined whether a previous version of the website may have stated the claim but then was subsequently removed.

In another instance, the physician suicide claim appeared to have changed over time; the Medscape website was cited by articles as a 2015 and 2018 version, each represented by different nanopublications. The 2015 version of the Medscape website retrieved from Internet Archive's Wayback Machine stated the following: "It has been reliably estimated that on average the United States loses as many as 400 physicians to suicide each year (the equivalent of at least one entire medical school)." However, the 2018 version of the website, which used the same link, stated the claim differently, which is as follows: "Although it is impossible to estimate with accuracy because of inaccurate cause of death reporting and coding, the number most often used is approximately 3-400 physicians/year, or perhaps a doctor a day."

Figure 3. Multiple graphs linking nanopublications representing US physician suicide rate claims. Closed circles: the nanopublication represents an article that states a claim about annual physician suicide rate. Open circles: the nanopublication represents an article or resource that has “No apparent claim of annual physician suicide rate” or it is “Unverified if claim of annual physician suicide rate present.” Gray circles: the nanopublication represents an article or resource that states a claim about annual physician suicide rate but provides no further references.

Graph Relation	Frequency
●	12
● → ○	5
● → ● → ○	1
● → ○	2
● → ○	1
● → ● → ○	1
● → ○	1
● → ● → ○	1
● → ● → ○	1
● → ○	1
● → ○	1
● → ○	1

Discussion

Principal Results

The findings of this study emphasize the importance of integrating scientific literature, especially individual scientific claims, in a reliable and verifiable manner. Creating nanopublications to represent articles’ claims that “300 to 400 U.S. physicians die by suicide annually” empirically demonstrates that this is a poorly supported yet frequently stated claim. No single source of the US physician suicide rate claim studied could be identified.

This study is the first known application of nanopublication infrastructure to scientific claims regarding physician suicide. Applying the nanopublications schema to physician suicide claims revealed that (1) the claim network is not fully connected, (2) no single primary source of the claim is available, and (3) all end-point citations had a claim with no further citation, had no apparent claim, or could not be accessed to verify the claim. This is in line with previous findings [8] and expands on existing work by representing physician suicide rate claims as nanopublications. Representing these claims as nanopublications can be extended and improved. This study has important implications.

Because the use of nanopublications has not been applied to suicidology research, in particular physician suicide, this proof-of-concept study may highlight the need for more coordinated research efforts in these fields. Some biomedical research communities have already benefited from such an approach to their research efforts. It is important to note that to achieve this goal, a minimum set of community agreed-upon annotations would be needed to optimize nanopublication quality [1]. In the study of physician suicide, no such community standards exist yet, but this could also be an opportunity to develop such standards, driving the application of nanopublication in this field from the ground up. Such further work could address an imperative that has previously been identified in the study of physician suicide incidence [7].

Nanopublications can allow for continued claim tracing and verification, including, for example, accounting for versioning. Different website versions may even differ in their assertions of the claim, which was identified in this study even though it was not a stated aim of the study. This study builds on previous work by applying nanopublication infrastructure to the articles and claims they make. As earlier noted, the use of nanopublications to represent scientific assertions has been conducted for the genetic basis for disease pathophysiology [3]; Alzheimer disease research [5]; and additional life sciences

data, including data on diseases, genes, proteins, drugs, biological pathways [6].

Limitations

One limitation is that the claim network contains only verbatim claims about the annual physician suicide rate. The first study estimating incidence from 2 years of obituary data from a medical professional organization was published in 1968, reporting a crude annual suicide rate of 38.4 per 100,000 physicians [24]. Since then, systematic reviews or meta-analyses have sought to aggregate data from other observational studies estimating incidence [25-28]. Most studies about suicide incidence should report a suicide mortality rate, which is the number of deaths by suicide per 100,000 person-years, and physician suicide mortality rates have yet to be nanopublished. Further work is needed to represent all available data on physician suicide, beyond focusing on the single claim studied here. Representing additional data as nanopublications, including incidence data, risk factors, demographics, and other contextual information, may offer an even richer graph of existing knowledge about physician suicide to enable more rapid learning about the field.

Second, regarding the data source approach, snowballing to examine full reference lists of included articles was not performed. The focus for this proof-of-concept study was to specifically focus on the citation that the author of an article provides at the end of the sentence that makes the annual suicide rate claim. Snowballing may reveal additional publications that make the same claim, but we also anticipate that this approach would add further evidence that the claim network about annual suicide rate would reveal addition fragmented and disconnected

parts of the network. Additional investigation would be needed to explore this hypothesis.

Moreover, the geographical focus of the claims in this study is in the United States, although physician suicide is a global issue. Dutheil et al [28] conducted a meta-analysis that included peer-reviewed literature from North America, Europe, Africa, Australia, and Asia. The literature review that served as a data source for this study also identified 37 countries where physician suicide was reported [7]. Incorporating country of origin and death by suicide, when available, into nanopublications about physician suicide could further enrich understanding physician suicide in a global context.

Finally, there may be a limitation based upon the search strategy that contributed to the data source used for this study. As web search may also offer a valuable source of nonpeer-reviewed literature and gray literature that also make a claim similar to “300 to 400 U.S. physicians die by suicide annually,” these may offer an unstudied area of misinformation in public-facing publications about physician suicide. As this study was not designed as an infodemiology study, however, incorporating such a search to enrich the data source and further analysis could add to the current literature about physician suicide.

Conclusions

Nanopublications remain to be adopted in broader scientific publishing in medicine, and especially in publishing about physician mental health and suicide. Our work integrates these various claims and enables the verification of nonauthoritative assertions, thereby better equipping researchers to advance evidence-based knowledge and make informed statements in the advocacy of physician suicide prevention.

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Data Availability

All data are openly available. Manually extracted data from each of the claims were stored in a spreadsheet [29], then subsequently published as individual nanopublications, and aggregated into a nanopublication index [30]. *Nanobench* is available for use without licensing fees [20].

Authors' Contributions

TIL collected and structured the data, performed the data analysis, and drafted the manuscript and revisions. TK and MD provided the software used for the study and revised the manuscript. All authors conceived the study design, interpreted the data, and approved the final manuscript. The authors thank Chwen-Yuen Angie Chen and Sima Pendharkar for the thoughtful and critical conversations about physician suicide that in part contributed to the conception of the research question in this study.

Conflicts of Interest

TIL is a scientific editor at JMIR Publications.

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Abbreviations

AFSP: American Foundation for Suicide Prevention

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Original Paper

Waiting Time and Patient Satisfaction in a Subspecialty Eye Hospital Using a Mobile Data Collection Kit: Pre-Post Quality Improvement Intervention

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Abstract

Background: Waiting time can considerably increase the cost to both the clinic and the patient and be a major predictor of the satisfaction of eye care users. Efficient management of waiting time remains as a challenge in hospitals. Waiting time management will become even more crucial in the postpandemic era. A key consideration when improving waiting time is the involvement of eye care users. This study aimed at improving patient waiting time and satisfaction through the use of Plan-Do-Study-Act (PDSA) quality improvement cycles.

Objective: The objectives of this study were to determine the waiting time and patient satisfaction, measure the association between waiting time and patient satisfaction, and determine the effectiveness of the PDSA model in improving waiting time and satisfaction.

Methods: This was a pre-post quality improvement study among patients aged 19 to 80 years, who are consulting with the Magrabi International Council of Ophthalmology Cameroon Eye Institute. We used PDSA cycles to conduct improvement audits of waiting time and satisfaction over 6 weeks. A data collection app known as Open Data Kit (Get ODK Inc) was used for real-time tracking of waiting, service, and idling times at each service point. Participants were also asked whether they were satisfied with the waiting time at the point of exit. Data from 51% (25/49) preintervention participants and 49% (24/49) postintervention participants were analyzed using Stata 14 at .05 significance level. An unpaired 2-tailed *t* test was used to assess the statistical significance of the observed differences in times before and after the intervention. Logistic regression was used to examine the association between satisfaction and waiting time.

Results: In total, 49 participants were recruited with mean age of 49 (SD 15.7) years. The preintervention mean waiting, service, and idling times were 450 (SD 96.6), 112 (SD 47), and 338 (SD 98.1) minutes, respectively. There was no significant association between patient waiting time and satisfaction (odds ratio 1, 95% CI 0.99-1; $P=.37$; $\chi^2_3=0.4$). The use of PDSA led to 15% (66 minutes/450 minutes) improvement in waiting time ($t_{47}=-2$; $P=.05$) and nonsignificant increase in patient satisfaction from 32% (8/25) to 33% (8/24; $z=0.1$; $P=.92$).

Conclusions: Use of PDSA led to a borderline statistically significant reduction of 66 minutes in waiting time over 6 weeks and an insignificant improvement in satisfaction, suggesting that quality improvement efforts at the clinic have to be made over a considerable period to be able to produce significant changes. The study provides a good basis for standardizing the cycle (consultation) time at the clinic. We recommend shortening the patient pathway and implementing other measures including a phasic appointment system, automated patient time monitoring, robust ticketing, patient pathway supervision, standard triaging, task shifting, physician consultation planning, patient education, and additional registration staff.

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KEYWORDS

waiting time; waiting list; patient satisfaction; quality improvement; clinical audit; ophthalmology; patient-centered care

Introduction

Background

Long waiting time can significantly increase costs and be a major determinant of the satisfaction of those seeking health care services [1]. Patient experience and satisfaction are closely linked to the quality of care that users attribute to health care [2,3]. Although quality of care does not necessarily translate into patient satisfaction, it can be a major predictor [4]. Patient experience and satisfaction can also be dependent on the time patients spend in clinics during their consultation [5]. The reduction of waiting time has been a key concern, especially for ambulatory hospitals, owing to increasing outpatient demands [6]. Efficient management of patient flow in hospitals ensures high quality of care [7]. It has been reported that patient flow management as part of a hospital quality improvement strategy warrants continuous attention and should involve all staff [7]. Evidence suggests that there is a strong negative correlation between waiting time and patient satisfaction [8,9]. User dissatisfaction has been strongly linked to waiting times, with users spending more time in waiting than being attended to [10]. It is believed that the routine task of health care staff is to perform their work and improve it [11]. However, the ability to reduce waiting time and improve services may be limited by service capacity [12].

In ophthalmology, long waiting time and the dissatisfaction of those seeking eye care have been worsened by the COVID-19 pandemic [13]. Apart from affecting patient satisfaction, system delays also affect health care program delivery [14]. Waiting time has been identified as one of the major challenges in managing workflow in eye hospitals because of the growing number of those in need of eye care [15].

Between 2010 and 2019, the number of people with blindness increased by 10.8% (95% unit interval 8.9%-12.4%) and moderate to severe visual impairment increased by 31.5% (95% unit interval 30%-33.1%) [16]. Sub-Saharan Africa faces severe limitations for well-trained eye care personnel [17]. In Cameroon, it is estimated that 250,000 people are blind and 600,000 are visually impaired. The prevalence of blindness in

Cameroon is one of the highest in the world, and there is no government health budget allocation specific to eye health [18].

The concept of waiting time presents different meanings in different contexts. In countries with a regularized appointment system such as the United Kingdom, it is the time spent from booking an appointment to when the person attends the appointment [19]. In low-income economies such as Cameroon, waiting time is the time a patient spends at the clinic to obtain a complete health check [20].

Hospital waiting time is a major concern in Cameroon as in many other countries [21]. The current evidence regarding quality improvement specific to waiting time in hospitals in Cameroon is lacking [22]. The problem of long waiting times in clinics in Cameroon can primarily be attributed to poor management [23], and there is strong evidence that waiting time in Cameroonian hospitals is the main cause of dissatisfaction when accessing health care [24]. Its understanding will help in defining the measures of change needed for its improvement. The problem of long waiting times at the Magrabi International Council of Ophthalmology Cameroon Eye Institute (MICEI) escalated owing to the increase in patient volume. Conscious of the need to deliver high-quality eye care services, the eye institute capped its daily patient visits, in part, to deal with the overwhelming number of patient complaints about waiting time. Following this, MICEI management sought to investigate the time that patients spend at the clinic and propose measures of improvement.

Study Rationale

Our choice of Cameroon stems from the fact that apart from the lack of any previous study that primarily sought to improve waiting time and satisfaction in Cameroon, waiting time was found to be the main reason for patient complaints at the newly established eye hospital (MICEI) in Cameroon. The study was the first of its kind that was specific to ophthalmology in Cameroon. However, we found quality improvement interventions undertaken in other health areas [22,25,26]. One sought to improve waiting time by means of hospital-wide quality improvement, using the Strengthening Laboratory Management Toward Accreditation model [22]; another sought to improve early infant diagnoses coverage, timely return of

HIV test results, and initiation of antiretroviral treatment using the Quality Improvement Collaborative approach [25]; and another sought to improve the adherence and cure of patients with tuberculosis, by using SMS text message reminders [26]. We also found 2 studies [23,24] that aimed at investigating patients' satisfaction with the quality of health services [23] and the undertaking of antiretroviral treatment [24].

This study was based on the model of Plan-Do-Study-Act (PDSA) [27]. This 4-stage model was proposed by Deming as a simple way to undertake quality improvement interventions in health care. It involves making continuous cyclical improvements geared toward achieving what works best for care users.

The use of pre-post quasi-experimental designs [28,29] and the PDSA model in health care [30] in general and in ophthalmology [31] in particular, has been widely reported. A similar study was conducted in Ethiopia using an appointment system [20]. In addition, there is evidence of use of the Open Data Kit (ODK) developed by Get ODK Inc, in health care projects in Cameroon [32].

Specific Objectives

This study had three objectives: (1) determine the waiting time and satisfaction, (2) measure the association between waiting time and satisfaction, and (3) measure the effectiveness of the PDSA model in improving waiting times and satisfaction.

Methods

Study Setting

This study was conducted at the MICEI from June 15, 2018, to July 28, 2018. MICEI is a subspecialty eye hospital and training center, with an average of 300 daily outpatient visits [33]. The center is the only tertiary eye institute in Cameroon, with 72-bed

capacity, 8 ophthalmologists, 8 ophthalmic nurses, and approximately 70 full-time staff.

Contextual Factors

Study feasibility was carefully examined by assessing some contextual factors that are likely to affect success [34]. The study was made context-specific by using the Model for Understanding Success in Quality [35]. We calculated the Model for Understanding Success in Quality score using an Excel template developed by the East London National Health Service Foundation Trust [36], as shown in Table S1 in [Multimedia Appendix 1](#).

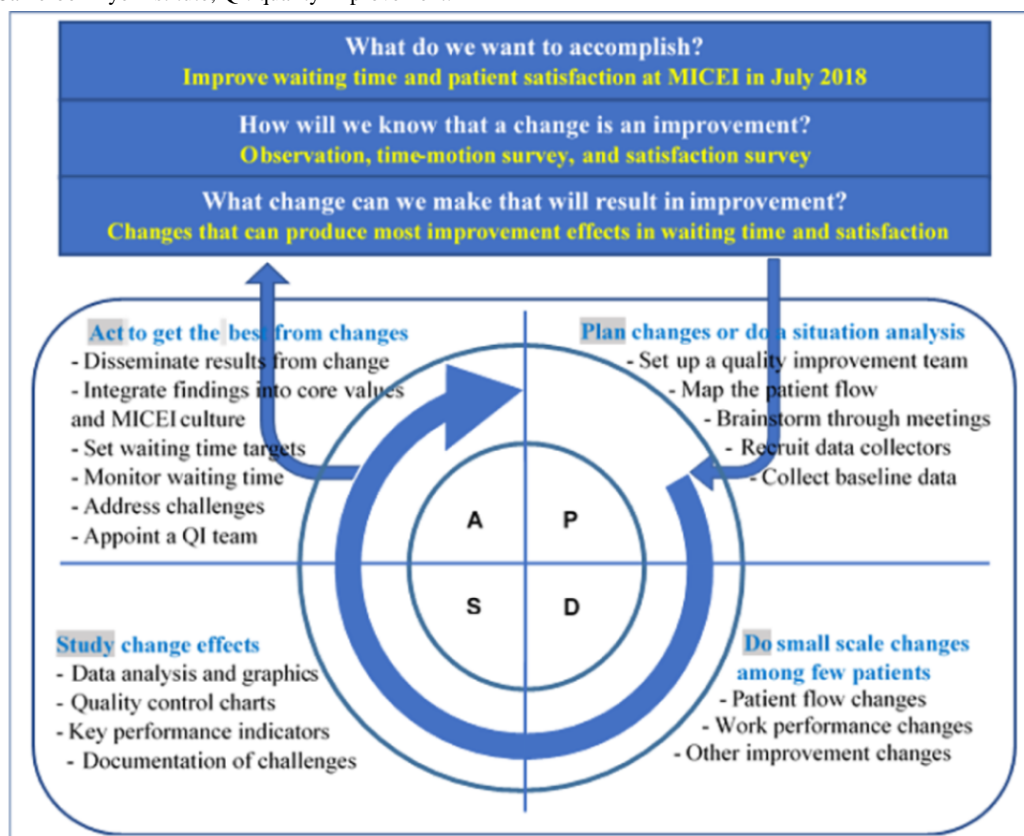
The eye care center is suburban, 25 km away from the city center of the country's capital. The Center Region is host to 8 other eye clinics delivering general ophthalmology services in public and private hospitals. Enabling factors include motivated executive toward quality improvement, well-structured microsystem with state-of-the-art equipment, the institute's aim to become a center of excellence, and high donor expectations. In addition, MICEI runs a patient-based and tiered pricing model similar to that of the Aravind Eye Care System in India, which is different from the disintegrated hospital-based eye care delivery within Cameroon. Other positive factors were the availability of stationery and printing of study materials at the hospital and the hospitality of the staff.

PDSA—Plan and Do Phase: Intervention

Overview

This was a 2-step person-centered quality improvement intervention using the PDSA model. The first step involved situation analysis of the waiting time and mapping of the patient flow. On the basis of this analysis, best-fit measures were introduced to offset delays in the waiting time. [Figure 1](#) shows an adapted PDSA conceptual framework of the intervention [37].

Figure 1. Plan-Do-Study-Act conceptual framework. Licensed under the Open Government License. MICEI: Magrabi International Council of Ophthalmology Cameroon Eye Institute; QI: quality improvement.



Recruitment of Participants

Study participants were recruited from patients consulting with the MICEI between June 2018 and July 2018, using nonprobabilistic sampling [38]. Participants were randomly approached at the point of entry by 2 trained data collectors and introduced to the study if they met the inclusion criteria, and only those who voluntarily consented were enrolled. The inclusion criteria were the following: aged between 18 to 80 years, seeking ophthalmic consultation, and able to understand and speak either English or French. The exclusion criteria were the following: incapacity to provide consent; surgical and postoperative appointments; and patients not following the normal flow, such as those in the *fast track* and *very important person* categories.

Data Management

Data collection was performed using ODK [39]. A data form was built using Microsoft Excel 2010 and validated using the web-based Microsoft Excel Spreadsheet Form (XLSForm Online version 1.2.0). Then, the Excel data form was converted to a version (XML) compatible with the server (ODK back end) using the downloadable Microsoft Excel Spreadsheet Form (ODK-XLSForm Offline version 1.6.0; [Multimedia Appendix 2](#)) and uploaded to ODK Aggregate server (open-source Java server) with a personalized user ID and password. As this study was conducted in a predominantly French-speaking region, all data forms and patient information materials were translated into French to suit participants.

Huawei MediaPad T2 10.0 Pro and Samsung Galaxy Note 10.1 android tablets with installed ODK Collect application (open source) for requesting data forms from the server were used to collect real-time data on waiting time and patient satisfaction.

To check for completeness, 2 dry runs were performed and the data form was modified before the start of the intervention. Data collection was automated, thereby reducing errors. The data form was built such that each question must be answered before proceeding to the next. All the filled data forms were verified by the principal investigator for completeness before submitting to the server.

The latest version of ODK Briefcase downloaded and installed on Windows 10 was used to extract the data set from the Aggregate server. Then, this was exported as a CSV file and loaded into Stata 14 for analysis.

Quality Improvement Team

A quality improvement team was set up, including the principal investigator, pediatric ophthalmologist, medical records officer, senior outpatient nurse, head of investigations, nurse assistant, optical technician, and facility manager. The team met once every week on less busy days from 7 to 8 AM, to provide feedback on daily challenges and propose solutions. The team aimed to reduce waiting time by 25%.

Data Collectors

A total of two data collectors (an advanced-level holder and a university student) purposely recruited for the study were trained using a standard operating procedures manual developed for the study.

Dry Run and Testing

After 2-day training, a dry run was performed on 2 consenting patient volunteers. On the basis of the challenges, the data form was modified to account for interunit counterreferrals (owing to back-and-forth movements) and include the option, *other*, to some of the questions to make answers more flexible. The questionnaire was finalized after a second dry run, converted, and resubmitted to the server.

Changes Proposed

The patient flow was mapped, and all consultation rooms were identified according to room numbers. Patient flow bottlenecks were identified through brainstorming and direct observations. On the basis of an interim analysis of data collected from 51% (25/49) of the participants, the following measures were proposed to potentially reduce waiting time:

1. A time monitor sheet to record the start and finish times at each service point.
2. Introduce a second receptionist for the separate handling of reviews.
3. Introduce a numbering system for all patients (reviews and new patients alike).
4. Regularly supervise the patient flow for on-the-spot handling of bottlenecks.
5. Appoint an experienced ophthalmic nurse for effective triaging of patient files.
6. Educate patients on patient flow, for orientation and reduction of turnaround time.
7. Standardize waiting time by defining the duration for a full consultation.
8. A phasic appointment system that includes associating a nurse assistant to each ophthalmologist, to take notes and book appointments, and the proactive sorting of patient files a day before the booked appointments. Each day is divided into slots corresponding to the maximum number of patients a physician is able to handle.
9. Grant ophthalmic nurses' permission to discharge less complicated cases.
10. Color zoning of the general ophthalmology department to know who is waiting for whom.

PDSA: Study of the Intervention Phase

Approach to Impact Assessment

A PDSA-led pre-post quasi-experimental design was used to measure the effectiveness of the intervention, from June 15, 2018, to July 28, 2018. This method was particularly important because we wanted to address two key aspects of quality: clinical effectiveness through waiting time and patient experience through patient satisfaction [40]. We used the before-after design [29] to keep the intervention as close to reality as possible. Moreover, it was not ethical to conduct a pre-post study with a control group as this was a single-center study [29]. In addition, evidence on the use of PDSA in quality improvement interventions has been well documented [41-43]

Attributing Results to the Intervention

A total of 49 participants from randomly arriving patients at the eye institute were invited to participate in a time-motion and

satisfaction survey at 2 time points (n=25, 51% participants before the intervention and n=24, 49% participants after the intervention). Data collectors randomly approached participants at the point of entry, explained the study to them, and enrolled only those who provided voluntary consent. Through a process of shadowing, data collectors recorded the time spent at each service point, from entry to exit. At the exit, patients were asked whether they were satisfied and the reasons for their dissatisfaction, if relevant. We determined that the results were owing to the intervention by assessing and comparing the waiting time and patient satisfaction of the 2 samples.

Measures

Processes and Outcomes

The duration of a full consultation day was investigated using waiting time as the primary outcome variable. Waiting time was defined as the time spent in the microsystem, from entry to exit [20]. It was a continuous variable made up of (1) service time, which is the time the patient is being served and in contact with staff, and (2) idling time, which is the time the patient spends between service points, waiting to be served. The secondary outcome variable was patient satisfaction, defined as the patient-reported satisfaction with waiting time and service. This was used to determine whether waiting time was a good determinant of patients' satisfaction. Other variables included participants' sociodemographic variables.

Assessment of Contextual Factors

Direct observations, quality improvement meeting sessions, and interim analysis, including the use of data visualization techniques (scatter and box plots), were used to determine any unusual data points that can be attributed to contextual factors. Abnormal data points were identified by calculating the lower ($Q1-1.5[Q3-Q1]$) and upper ($Q3+1.5[Q3-Q1]$) fences. Data points that fell outside these limits were investigated further.

Data Analysis

Waiting Time and Satisfaction

All statistical analyses were performed using Stata 14 at .05 significance level. On the basis of our sample size, the Shapiro-Wilk test for the pretest sample ($z=1$; $P=.10$) and the posttest sample ($z=-0.98$; $P=.80$) showed that both samples were assumed to be drawn from a normal distribution [44]. In addition, the skewness and kurtosis tests for the first sample (skewness: $P=.30$; kurtosis: $P=.90$) and the second sample (skewness: $P=.50$; kurtosis: $P=.80$) fulfilled the normality hypothesis. On the basis of these tests, we used the parametric approach for our data analysis. The mean waiting, service, and idling times were calculated. Patients' satisfaction was analyzed using frequencies. Box plots were used to compare waiting times between men and women according to type of patient. A difference in means plot was also used to visually inspect and compare the means between categorical variables including gender, age group, arrivals, diagnosis, and residence.

Association of Waiting Time and Satisfaction

Logistic regression [45] with reported odds ratios (ORs) was performed to establish the existence of any association between

waiting time and patient satisfaction. Participants' satisfaction was modeled with waiting time, age, and gender using the logistic regression, and ORs with 95% CIs were calculated.

Effectiveness of PDSA

Independent sample 2-tailed *t* test [46] was used to compare the waiting time and satisfaction of the preintervention and postintervention groups. Box plots and pie charts were used to visually examine the pre-post intervention effects on waiting time and patient satisfaction, respectively, according to gender and type of patient.

Ethics Approval

Consistent with the Helsinki Declaration of 1975, the protocol for this study was developed and approved by the ethics committee of the London School of Hygiene and Tropical Medicine (15444). Ethics approval was also obtained from the institutional review board of MICEI (0003/L/DG/DM/PA/KBG). All the participants provided written informed consent. All the data forms submitted to the server were encrypted using a pair of public keys. Participants received reimbursement for their consultation fees.

Results

The study findings are reported in accordance with the revised Standards for Quality Improvement Reporting Excellence (version 2.0) guidelines [47].

Participant Demographics

A total of 49 participants, 15 (31%) of whom were reviews, participated in the study. Their mean age was 49 (SD 15.7) years, ranging from 19 to 80 years (25/49, 51% were women). Participants were recruited into two consecutive samples (preintervention sample and postintervention sample) and matched for age and self-reported sex. The mean age for the preintervention arm (25/49, 51% of the participants; 13/25, 52% were women) was 49.3 (SD 14.6) years and that for the postintervention arm (24/49, 49% of the participants; 12/24, 50% were women) was 49.6 (SD 17) years. Most patients (38/49, 78%) arrived between 6 and 9 AM for their consultation. [Table 1](#) presents the sociodemographic characteristics of the study participants.

Table 1. Sociodemographic characteristics (N=49).

Characteristics	Preintervention participants (n=25), n (%)	Postintervention participants (n=24), n (%)
Age (years)		
15-24	1 (4)	3 (13)
25-54	14 (56)	10 (42)
55-64	5 (20)	7 (29)
65-80	5 (20)	4 (17)
Gender^a		
Men	12 (48)	12 (50)
Women	13 (52)	12 (50)
Patient type		
New	18 (72)	16 (67)
Review	7 (28)	8 (33)
Marital status		
Married and cohabiting	17 (68)	14 (58)
Single	6 (24)	7 (29)
Divorced and widow	2 (8)	3 (13)
Residence		
Littoral	0 (0)	2 (8)
Far North	1 (4)	1 (4)
Center	20 (80)	20 (83)
West	2 (8)	0 (0)
Northwest	0 (0)	1 (4)
South	1 (4)	0 (0)
Origin		
Littoral	0 (0)	1 (4)
Center	14 (56)	8 (33)
West	9 (36)	14 (58)
Northwest	1 (4)	0 (0)
North	0 (0)	1 (4)
South	1 (4)	0 (0)
Work status		
Formal	9 (36)	6 (25)
Informal	8 (32)	13 (54)
Others	8 (32)	5 (21)
Education		
None	1 (4)	1 (4)
Elementary	3 (12)	1 (4)
GCE ^b —ordinary level	6 (24)	11 (46)
GCE—advance level	3 (12)	2 (8)
University	4 (16)	7 (29)
Doctorate	8 (32)	2 (8)
Travel time		

Characteristics	Preintervention participants (n=25), n (%)	Postintervention participants (n=24), n (%)
<1 hour	18 (72)	19 (79)
A few hours	5 (20)	4 (17)
Half a day	1 (4)	0 (0)
1-2 days	1 (4)	1 (4)
Transport means		
Private	6 (24)	6 (25)
Public	18 (72)	18 (75)
Motorbike	1 (4)	0 (0)
Arrival time		
5-7 AM	14 (56)	5 (21)
7-9 AM	7 (28)	14 (58)
9-11 AM	4 (16)	5 (21)

^aSelf-reported.

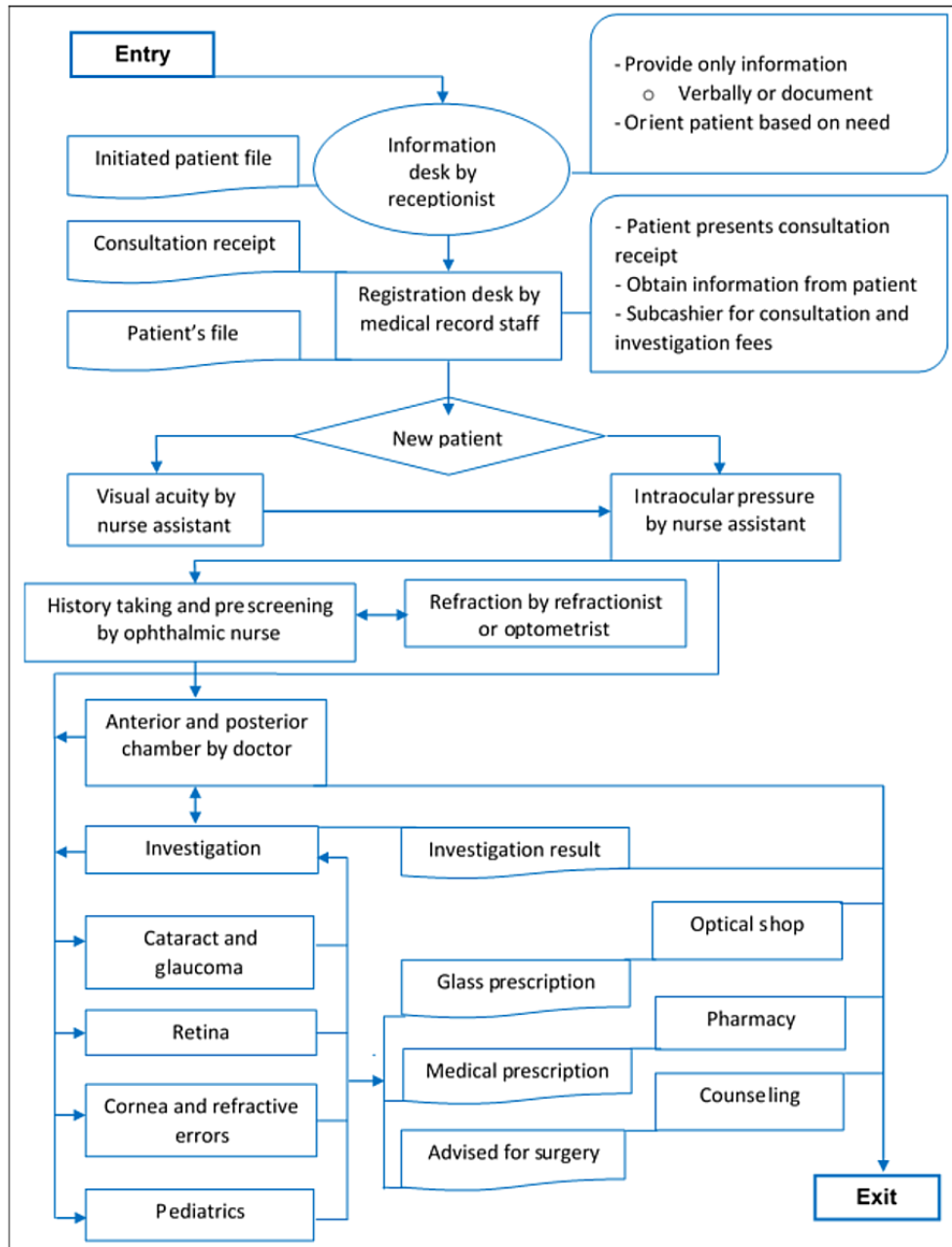
^bGCE: General Certificate of Education.

Patient Pathway (Patient Flow)

The patient flow chart starts at the gate where patients are handed a number upon arrival. Medical record files are initiated at the reception by calling the patients based on numbers. Patients are also advised on the consultation fee based on the consultation option chosen (very important person, fast track, or standard). Patients are registered in the medical records upon presentation of a cash receipt of the consultation fee. If patients are on a repeat visit, their medical record file will have to be retrieved by the medical records officer to proceed to the next service point. In the general ophthalmology unit, visual acuity, blood pressure, and intraocular pressure are measured by assistant ophthalmic nurses. The visual acuity determines whether patients should be refracted. Patients are prescreened

by an ophthalmic nurse with the help of a slit lamp before seeing the general ophthalmologist. The general (outpatient) ophthalmologist may request for mydriatic eye drops to be instilled if necessary. Then, he refers patients to subspecialty units based on the anterior and posterior chamber assessments (using a slit lamp). The flow is such that there may be back-and-forth movements owing to counterreferrals. At the end of the intervention, 96% (47/49) of the participants had visited the general ophthalmology department. Altogether, 49% (24/49) of the participants had visited the cataract and glaucoma unit and 31% (15/49) had visited the cornea and refractive errors unit. There was no marked difference in service point visits according to gender and sample. [Figure 2](#) shows the patient flow at the clinic.

Figure 2. Authors' conception—patient pathway protocol.



Intervention Time Line

In the preintervention phase, 51% (25/49) of the participants participated in a time-motion and satisfaction survey. On the basis of the interim analysis, changes were implemented. The second group of 49% (24/49) participants was recruited for the time-motion survey after the changes, and the 2 groups were compared.

The first 7 changes were implemented, which includes the following: (1) a time monitor sheet to record the start and finish times at each service point, (2) introduction of a second receptionist for the separate handling of review patients, (3) expansion of the numbering system to include all patients, (4) patient flow supervision for on-the-spot handling of bottlenecks, (5) triaging of patient files led by assistant nurses at the general ophthalmology department, (6) proactive sorting of patient files

in the medical records, and (7) regular patient education by a medical record staff. These changes were implemented simultaneously as a package.

Of the 10 originally proposed changes, three changes (ie, standardization of waiting time by defining the duration for a full consultation, granting ophthalmic nurses the permission to discharge less complicated cases, and color zoning of the general ophthalmology department) could not be implemented owing to cost and time constraints. For instance, color zoning of the outpatient waiting area required a formal contract award procedure. Other three measures, including the phasic appointment system, effective triaging, and patient education, could not be fully implemented owing to staff shortage, lack of qualified nurses, and lack of audiovisual materials, respectively.

Figure 3 displays the waiting time series with the intervention effect.

Figure 3. Time line of time-motion and satisfaction survey.



Waiting Time and Patient Satisfaction

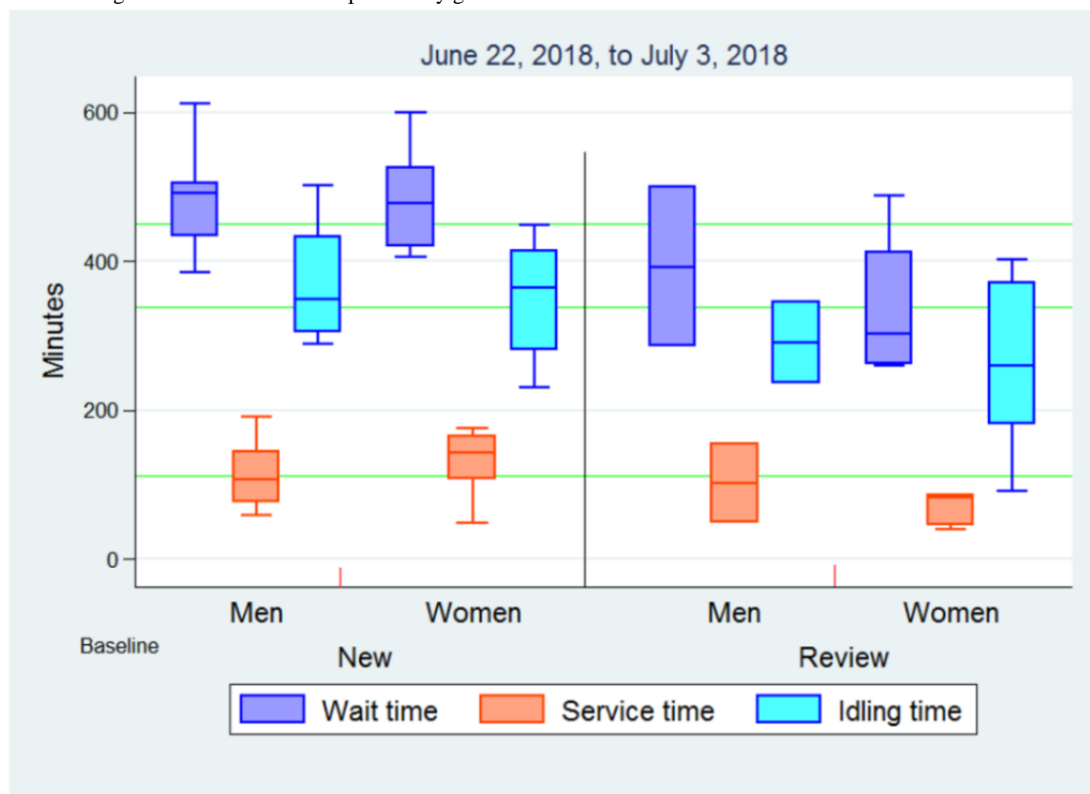
At baseline, the mean waiting time (service time and idle time) for a comprehensive eye examination at the MICEI was found to be 450 (SD 96.6) minutes. The mean service time was 112 (SD 47) minutes and the mean idling time was 338 (SD 98.1) minutes. The idle time (338 minutes) spent by patients was 3 times more than that being served. The service points with high mean waiting times at baseline included room 15 with 204 (SD 86.1) minutes, room 20 with 203 (SD 141.4) minutes, room 13 with 185 (SD 46.1) minutes, room 18 with 161 (SD 63.5) minutes, and room 16 with 99 (SD 97.4) minutes. At baseline, the highest proportion of idling time was among patients going through room 15 (196 minutes/204 minutes, 96%), room 20 (192 minutes/203 minutes, 95%), room 13 (167 minutes/185

minutes, 90%), room 18 (140 minutes/161 minutes, 87%), and room 16 (84 minutes/99 minutes, 85%).

The mean waiting time for men was 472 (SD 86.5) minutes and that for women was 429 (SD 104.1) minutes. Men spent 77% (362 minutes/472 minutes) of the time in idling, whereas women spent 73% (315 minutes/429 minutes) of the time. Table S1 in [Multimedia Appendix 3](#) shows the detailed waiting, service, and idling times by service point and gender.

The mean waiting time for new patients was 485 (SD 67) minutes and that for reviews was 359 (SD 105.8) minutes. Both new patients and reviews spent 75% of the waiting time in idling (364 minutes/485 minutes and 269 minutes/359 minutes, respectively). [Figure 4](#) shows the baseline waiting, service, and idling times of new and review patients by gender.

Figure 4. Baseline waiting time of new and review patients by gender.



Of the 51% (25/49) of the participants who participated in the baseline survey, 32% (8/25) reported that they were satisfied with the waiting time, 63% (5/8) of whom were women and 75% (6/8) were new patients. Among the participants who reported to be dissatisfied (17/25, 68%), 76% (13/17) complained of long waiting time as the main reason for dissatisfaction, whereas 24% (4/17) complained of queue jumping.

At baseline, 28% (7/25) of the participants in the preintervention sample were reviews. All 7 participants reported that they were dissatisfied with their first visit to the clinic. Of these participants, 43% (3/7) agreed that they were satisfied with the current visit.

Association of Waiting Time and Satisfaction

We performed binary outcome logistic regression because satisfaction was a binary outcome. Waiting time was not a good predictor of satisfaction, as the negative association ($z=-0.9$) was not statistically significant (OR 1, 95% CI 0.99-1; $P=.37$; $\chi^2_3=0.4$). Further investigation by gender and age group did not show any significant difference.

Effectiveness of PDSA

An independent sample t test showed that the mean waiting time reduction from 450 (95% CI 409.7-489.5) minutes at baseline to 384 (95% CI 327.8-440.6) minutes after intervention was not statistically significant, with 15% (66 minutes/450 minutes) reduction in mean waiting time ($t_{47}=2$; $P=.05$). The mean service time significantly reduced from 112 (95% CI 92.5-131.3) minutes to 85 (95% CI 71.9-98) minutes ($t_{47}=2.4$; $P=.02$), whereas the mean idling time reduced from 338 (95% CI 297.2-378.2) minutes to 299 (95% CI 248.3-350.3) minutes. The reduction in waiting time was mainly driven by high service

rate, as the difference of 38 (95% CI -24.7 to 101.5) minutes in idling time was not statistically significant ($t_{47}=1.2$; $P=.20$). Tables S1 and S2 in [Multimedia Appendix 3](#) show the effects of the intervention on waiting and service times. The mean waiting time for women increased by 2% (10 minutes/429 minutes), whereas that for men reduced by 30% (142 minutes/472 minutes). Service time for men was 1.6 times (33 minutes/20 minutes) more likely to reduce than that for women. In addition, the idling time for men was similar before (362 minutes/472 minutes, 77%) and after the intervention (253 minutes/330 minutes, 77%), whereas that for women increased from 73% (315 minutes/429 minutes) to 79% (345 minutes/438 minutes). A detailed distribution of waiting time is provided in Table S1 in [Multimedia Appendix 3](#).

The mean waiting time for new patients reduced by 11% (53 minutes/485 minutes) and that for reviews reduced by 20% (71 minutes/359 minutes). The intervention was approximately twice as likely to have a positive impact on the waiting time of reviews. [Figure 5](#) shows the intervention's effect on waiting time.

[Figure 6](#) shows an overview of the intervention's effect on the distribution of waiting time and satisfaction.

The satisfaction with waiting time increased slightly from 32% (8/25) at baseline to 33% (8/24) after the intervention. This difference (0.01, 95% CI -0.2 to 0.3) was not statistically significant ($z=0.1$; $P=.9$). The percentage of new patients who reported to be satisfied increased from 33% (6/18) to 38% (6/16), whereas that for reviews decreased from 29% (2/7) to 25% (2/8). In addition, those who said that they were satisfied tended to be older than those who did not. [Figure 7](#) shows the satisfaction with waiting time by gender.

Figure 5. Intervention effect on waiting time.

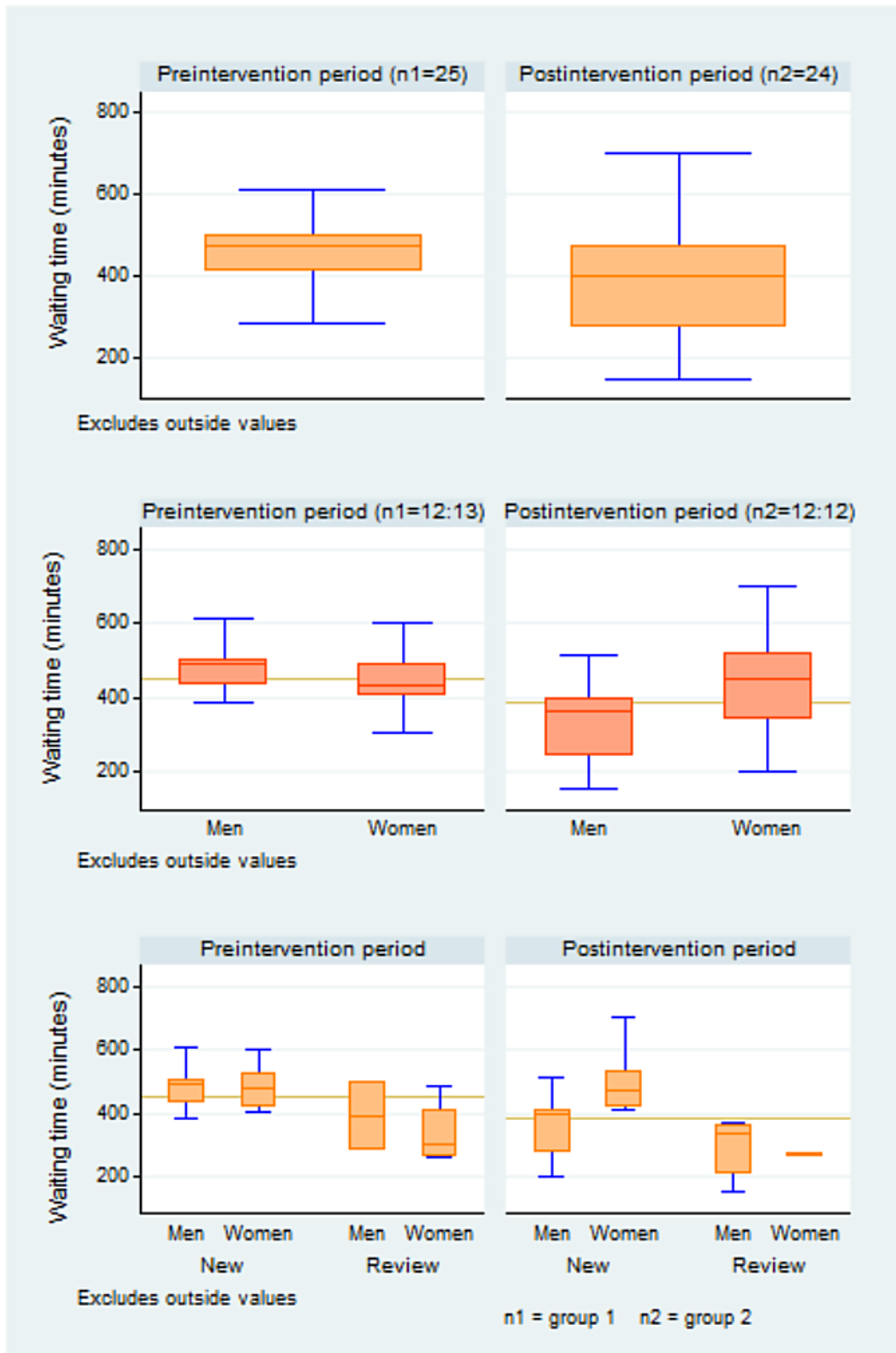


Figure 6. Comparison of preintervention and postintervention waiting time.

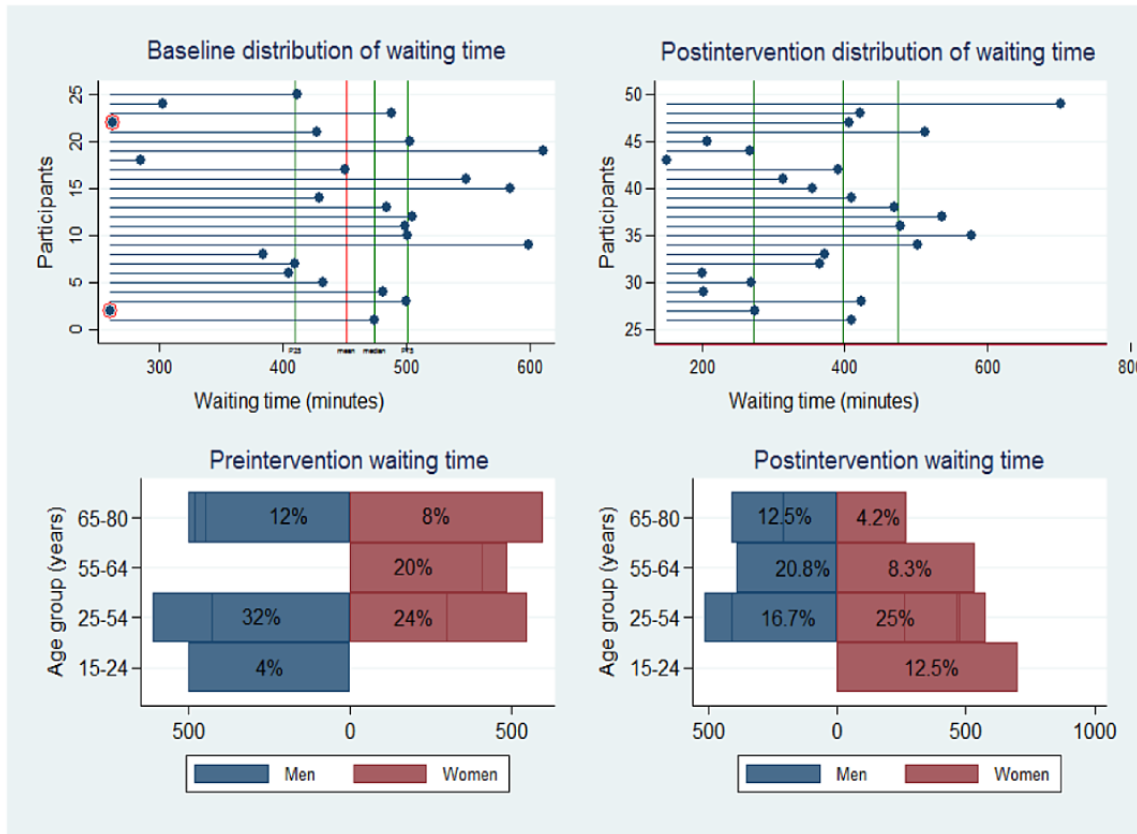
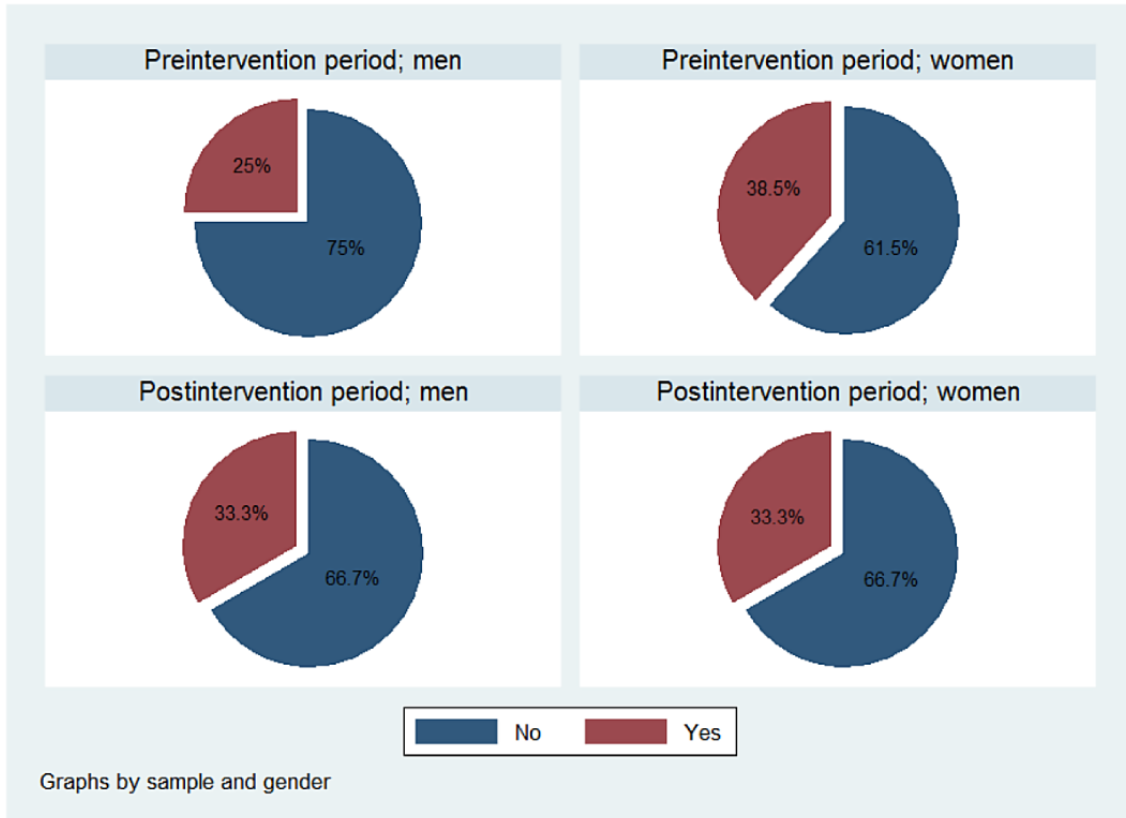


Figure 7. Pre-post comparison of patient satisfaction.



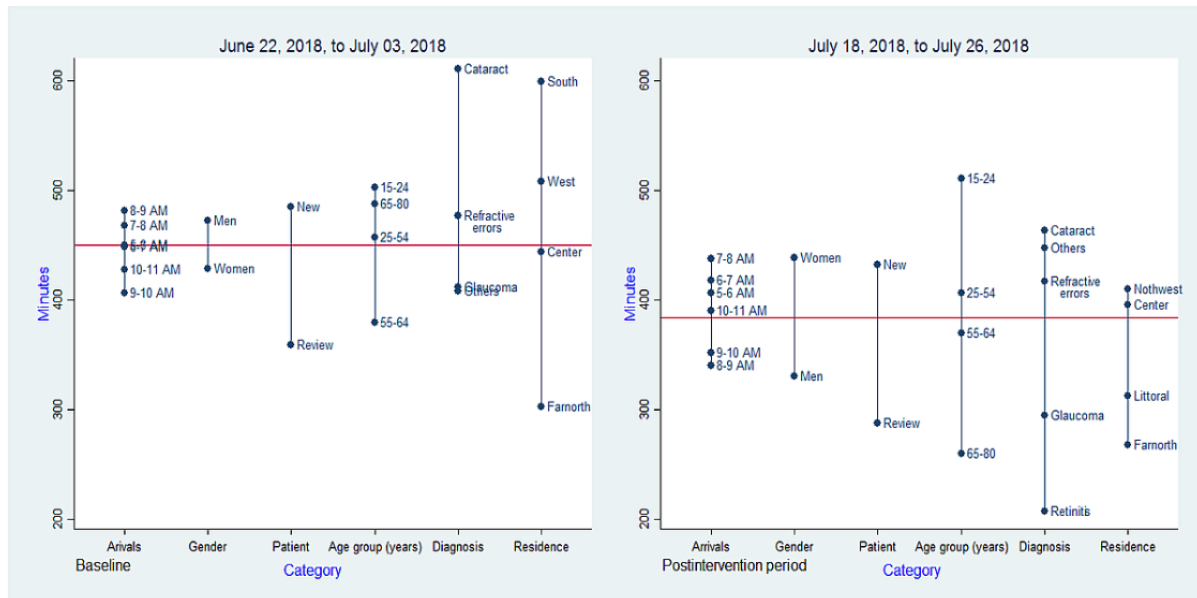
Unintended Outcomes

The intervention led to unexpected increase in the waiting time for the general ophthalmologist examination. In addition, the intervention appeared to have affected women adversely, as evidenced by the slight increase reported in the waiting time. A mean comparison across variables showed that this effect

was more marked for women in the age group of 15 to 24 years (Figure 8).

Further investigation showed that the 6% (3/49) of women who belonged to the age group of 15 to 24 years were enrolled after the intervention, thus giving a wrong indication of an adverse effect.

Figure 8. Difference in means by category.



Discussion

Principal Findings

We found mean waiting time of 450 (SD 96.6) minutes, mean service time of 112 (SD 47) minutes, and mean idling time of 338 (SD 98.1) minutes. The PDSA intervention led to 15% (66 minutes/450 minutes) improvement in mean waiting time ($t_{47}=2$; $P=.05$), from 450 (95% CI 409.7-489.5) minutes at baseline to 384 (95% CI 327.8-440.6) minutes after the intervention. Only one-third of the participants reported being satisfied with the waiting time (8/25, 32%) at baseline. Waiting time was not found to be associated with satisfaction (OR 1, 95% CI 0.99-1; $P=.37$; $\chi^2_3=0.4$).

Comparison With Previous Studies

Baseline Waiting Time

Other studies have reported high mean clinic waiting times; however, we have not found any reports as high as our finding. Mean waiting time of 274 (SD 103.4) minutes was reported among adults visiting the University of Port Harcourt Teaching Hospital in Nigeria, which was lower than the 450 (SD 96.6) minutes we found in this study [48]. The sample size ($n=401$) was much larger than ours, and the medical services and patient flow involved significantly few steps for the patient to navigate. The short patient pathway may explain the short time spent at the clinic. The mean waiting time of 104.1 (SD 96.4) minutes found in a study conducted at the Thong Nhat Hospital in Vietnam was also lower than our finding [49]. In that study, patients saw the consultant immediately after registering, and the consultant either recommends a blood or imaging test. The

patient revisits the physician and, then, is sent to the pharmacy. This pathway with 5 service points and rapid access to the senior physician can explain the lower waiting time compared with our study, where patients had to visit 12 service points on average. Another study conducted in a teaching hospital in Nigeria reported 160.2 (SD 62.4) minutes of waiting time [50]. In that study, waiting time was defined as the time from registration to seeing the physician, rather than the total visit time that we used in our study. Similarly, a study at the Kintampo Municipal Hospital in Ghana reported a mean total visit time of 303.6 (SD 94.8) minutes (5.06 hours) [51]. Their patient pathway comprised only 6 service points. A pilot quality improvement using PDSA cycles in an operating theater unit of a tertiary hospital in India found the average waiting time at baseline to be 221 minutes [42]. Differences in waiting time measurement can explain the low waiting time, which was limited to time at the operating theater. Similarly, at the Medunsa Oral Clinic in South Africa, the mean total time spent at the clinic among 149 patients was reported to be 235.79 (SD 78.79) minutes, which is approximately 2 times lower than the 450 (SD 96.6) minutes reported in our study [52]. The patient pathway for the dental clinic was simple with only five service points (check-in, reception, diagnostic room, treatment, and checkout). Another study at the Jos University Teaching Hospital in Nigeria showed that the total mean outpatient time was 248 minutes [53]. Again, patients in this study followed a simple patient pathway, being sent to see the physician after registration, after which they were sent to the pharmacy. A waiting time audit among 316 women attending an antenatal clinic in Ghana showed that the mean time spent at the clinic was 6.5 hours, which is close to the 7.5 hours reported in our

study [54]. Although the definition of waiting time in their study was similar to that used in ours, the 6.5 hours waiting time in their study was based on the reported time spent at the clinic rather than a time audit, as was the case in our study. As such, no details about the patient pathway were given, but 73% of the participants (n=204) noted that most of the time was spent in waiting to see the physician.

From these findings, it appears that streamlining the patient pathway by reducing the number of service points that the patients have to navigate and giving the patient access to the physician faster may be a good strategy to reduce overall waiting times.

Service and Idling Times

In our study, the proportion of idling time increased from 75% (338 minutes/450 minutes) to 78% (299 minutes/384 minutes) after the intervention, even though there was a general reduction in mean waiting time.

Similar studies in other settings also reported high idling times, such as a study in China, among 49 outpatients in an endocrinology center, that reported the idling time to be 89% (150.5 minutes/168.3 minutes) [10]. A multicenter study across 9 clinics in KwaZulu-Natal (South Africa) with a sample size of 1763 (baseline: n=860 and follow-up: n=903) used a health service strengthening framework over 12 months and reported the proportion of idling time after the intervention to be 94% (115 minutes/122 minutes) [55]. Akinyinka et al [56] found the eye clinic service time at a primary care center in Lagos to be 8.2 (SD 2) minutes, similar to our findings of 8.5 (SD 8.8) minutes for the general ophthalmologist in our study. In Southwestern Ethiopia, a study including 853 patients showed that patients spent a total time of 553.4 minutes in going through all service points, of which 50% (274.9 minutes/553.4 minutes) was spent in waiting for services [57]. At the University of Benin Teaching Hospital in Nigeria, the proportion of time spent before seeing the physician was reported to be 85% (22 minutes/146 minutes) [58].

In New York, patients spent 58% (53 minutes/91.9 minutes) of the mean total visit time in waiting to be called into a room (20.1 minutes), for the provider (18.6 minutes), and for the preceptor (14.3 minutes) [59]. Visit time was based on appointment visits, with a much simple patient pathway including only registration and examination room. A study including 555 patients attending a teaching clinic in Sacramento (the United States) reported the time spent at the clinic to be 80.5 (SD 30) minutes, of which 19 (SD 16) minutes were spent idling [60]. Their waiting time was based on an individual appointment system and involved a 2-stage consultation (registration and examination room). Our study was based on a block appointment system with multiple provider service points. A study in a pediatric clinic in the United States reported the idling time to be 20.9 to 23.9 minutes for consultations and 15.8 to 20.32 minutes for the filling of prescriptions, using a Lean Six Sigma model [61]. Their idling times were not computed for the entire patient pathway, as these were the times patients waited before being attended to after registration and the time between paying the prescription bill and being called at the pharmacy, respectively.

This evidence suggests that patients attending clinics in low-income and middle-income settings, in particular, may be spending most of their time in waiting to receive a service, referred to as idling waiting time in our study. It would be pertinent to consider interventions that focus specifically on decreasing the time patients spend between service points and possibly reducing the number of service points in the patients' pathway. Our intervention decreased the overall waiting time, but likely through a proportionally large reduction in service time rather than idling time. The length of consultation may affect patient safety and clinical effectiveness, and caution should be exercised when introducing measures that reduce the time of consultations, which are already brief [62-66].

Reduction in Waiting Time

Our study reports a reduction of 15% in waiting time through the intervention, which is less than the original target of 25% reduction. This can be a result of not being able to implement all the originally planned components of the intervention and the short time between intervention implementation and analysis. In addition, the involvement of physicians in training on the last day of our study led to an unusually high waiting time of 702 minutes for the last participant, thereby affecting our mean results.

Several studies of interventions to reduce waiting times report reductions in the same range as that reported in our study. Racine et al [59] conducted a before-after study, including 844 patients (group 1=426; group 2=418) at a pediatric clinic in the East Bronx in New York and reported a reduction of 15% (13.6 minutes/91.9 minutes) in mean total visit time. The reduction in mean waiting time achieved in our study was also comparable with the 13% (28 minutes/208 minutes) reported in a before-after study using the Lean Six Sigma model, with the National Heart Institute in Cairo, Egypt, over 16 months [67]. In the United States, Ciulla et al [68] achieved 18% reduction through their intervention, using the Lean Six Sigma model. Another study conducted in an emergency department in Singapore over 6 months showed 12% reduction using a similar model [69]. Improvements at the Fujiang Provincial Hospital in China [8] reduced the mean waiting time per month for consultations by 34% (8.1 minutes/23.9 minutes). In addition, 2 public primary care centers in South Africa reported reductions of 21% (27 minutes/129 minutes) and 29% (79 minutes/275 minutes), respectively, in waiting time [70]. This study was also implemented in 3 phases over 8 months, which can explain the higher reduction compared with our study.

In general, we found that our reduction rate falls within the range reported in other published studies using similar methodologies. A long implementation time and the opportunity to incorporate all the components of the intervention could have improved our results.

Association Between Patient Satisfaction and Waiting Time

In this study, we found little evidence of association between waiting time and patient satisfaction (OR 1, 95% CI 0.99-1.00; $P=.37$). Another study from China, with a similarly small sample size (49 patients), also reported nonsignificant negative

association between time spent at the clinic and satisfaction ($r=-0.07$) [10].

A study at the Hamilton Regional Eye Institute in Canada reported significant association between waiting time and patient satisfaction (OR 0.92, 95% CI 0.86-0.98; $P=.01$) [71]. The study was based on an appointment system and implemented over 8 months, which is more likely to be a sufficient period to explore this relationship. A comparative study between primary care centers in Gauteng and Free State in South Africa found a negative association between patients' impression about time spent at the clinic and satisfaction [72]. Strong negative association between patient satisfaction and waiting time was also reported among 1403 antenatal care visits in Kenya and 859 in Namibia, across 564 and 303 health facilities, respectively [73]. Negative association was also observed among 1617 patients with HIV, undergoing antiretroviral therapy in Nigeria [74]. In Malawi, negative association between waiting time and patient satisfaction was reported among 120 women undergoing cervical cancer screening, as was the case among 406 participants seeking laboratory services at antiretroviral therapy clinics in Addis Ababa in Ethiopia [75,76].

We report that patients who were dissatisfied commonly complained of long waiting times (13/17, 76%). Other studies from Canada, India, and Cameroon reported similar findings (79%, 73.3%, and 73%, respectively) [77-79].

The decrease in waiting time achieved through our intervention was not reflected in a significant improvement in patient satisfaction after the intervention. We believe that the effect size was not sufficiently large to affect patient satisfaction over a short time at the clinic, and it is possible that a large significant impact on waiting time reduction and a large sample size are needed for it to be a good predictor of patient satisfaction.

Strengths and Limitations

This is the first quality improvement study in Cameroon with the primary end point of improving waiting time, using a mobile data collection kit for real-time patient monitoring. In addition to providing some evidence in circumstances under which randomized controlled trials may not be possible [80], this study prioritizes and places users at the forefront of quality improvement [81]. The data collection method was automated, thereby reducing data entry errors.

Being the first quality improvement intervention, the change process was slower than expected. The limited influence over contextual factors could have affected the intervention's degree of success. In addition, not all changes that were proposed were implemented, which also limited the impact of the intervention. The sample size was limited by the data collection method. Each data collector could follow up only a single patient at a time from start to finish. This limited the daily enrollment to a maximum of 2 patients per data collector and sometimes just a single participant, depending on the consultation cycle. A large sample size would have led to a more normally distributed outcome variable and better inference. Finally, we did not perform subgroup analysis of the changes implemented, to

measure the impact of each change on waiting time and satisfaction.

The unexpected increase in the waiting time for the general ophthalmologist examination may have been caused by a fast service rate of the preceding units, indicating the importance of considering the patient pathway in its entirety when designing interventions. It was also found that women experienced slight increase in their waiting time. Investigating the reasons for this finding is beyond the scope of this study and would require further exploration in a study with a large sample size.

Public Health Implications

This study sets the pace for further considerations regarding the delivery of evidence-based patient-centered eye care [82]. There is an urgent need to rethink the eye care delivery strategy in Cameroon [18,83]. The postpandemic era will need even more efficient health systems. This will require patients to be considered as partners in quality improvement. Our intervention is a demonstration of how relatively small investments can lead to service improvements. Further studies are needed to improve waiting time and reduce the opportunity cost of consultation for patients.

Conclusions

We sought to improve waiting time and patients' satisfaction using PDSA-led quality improvement. We found 15% borderline significant improvement in waiting time over 6 weeks, suggesting that PDSA-led quality improvement at MICEI is promising over a long period. Our results suggest that improving the waiting time in the short run will not produce significant improvements in patient satisfaction in the setting under study. This study highlights the importance of patient-centered quality improvement, which helps to improve the provider-user relationship. Given the lack of evidence on the acceptable waiting time for a comprehensive eye examination at MICEI, our results provide a benchmark for standardizing the cycle time for a comprehensive eye examination.

We recommend that strategies aimed to reduce waiting time focus on reducing the idling time rather than affecting the consultation time. These may include reducing the number of service points that the patient has to navigate in the clinic and considering placing the consultation with the physician earlier in the patient flow. In addition, introduce a phasic appointment system, starting with reviews and progressively introducing them to new patients. Specific measures introduced with this intervention should be incorporated routinely in the clinic, such as the following: (1) automated patient flow monitoring system that tracks the start and finish times at each service point, (2) introduction of a second receptionist for the separate handling of reviews, (3) implementation of robust ticketing at the gate and reception for all patients, (4) queue length checks along the patient pathway and waiting time threshold alert system for on-the-spot handling of bottlenecks, (5) triaging of patient files led by assistant nurses at the general ophthalmology department, (6) proactive sorting of patient files in the medical records, and (7) use of audiovisual materials for patient education on the patient pathway and waiting time.

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Data Availability

The data set for this study will be made available upon reasonable request. Kindly contact the corresponding author with detailed study protocol and justification of funding to conduct the study.

Authors' Contributions

MM designed the study and intervention and led the participant recruitment, data analysis, and development of the manuscript. C Bascaran contributed to developing the intervention and manuscript preparation. NA provided guidance for study development. HEN contributed to the institutional review board approval and quality improvement team setup. C Bunce advised on the analysis and reviewed the statistics in the manuscript. All authors read and approved the manuscript.

Conflicts of Interest

None declared.

Multimedia Appendix 1

Evaluation of contextual factors.

[[DOCX File , 14 KB - xmed_v3i3e34263_app1.docx](#)]

Multimedia Appendix 2

Survey questionnaire.

[[PDF File \(Adobe PDF File\), 713 KB - xmed_v3i3e34263_app2.pdf](#)]

Multimedia Appendix 3

Distribution of waiting time.

[[DOCX File , 25 KB - xmed_v3i3e34263_app3.docx](#)]

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Abbreviations

MICEI: Magrabi International Council of Ophthalmology Cameroon Eye Institute

ODK: Open Data Kit

OR: odds ratio

PDSA: Plan-Do-Study-Act

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