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Predatory conferences: a systematic scoping review

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Title page

Predatory conferences: a systematic scoping review

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ABSTRACT

Objective To systematically map the scholarly literature on predatory conferences and describe the present state of research and the prevalent attitudes about these conferences.

Methods This scoping review follows PRISMA guidelines. Four databases were searched (PubMed/MEDLINE, Web of Science, Scopus, and ProQuest Social Sciences Premium Collection). In addition, the included studies' reference lists were scanned for additional papers not found in the searches. Peer-reviewed publications were included irrespective of study design. Letters and commentary were included if they were peer-reviewed. Editorials and literature reviews were excluded.

Results From 809 initial publications, 20 papers were included in the review, from 12 countries and covered a wide range of science disciplines, from nursing/medicine to energy/technology and computer science. More than half were empirical and published after 2017. In most papers, a definition of the term predatory conferences was put forward. Spam email invitations with flattering language were the most common characteristics, and the conferences were often hosted by unknown organizations that used copied pictures without permission. High fees, lack of peer review, and a multidisciplinary scope were signal features. All papers explicitly or implicitly suggested possible reasons for participating in predatory conferences. Some reasons were related to the overall context of academic work, the nature of predatory conferences (e.g., researchers falling prey to misleading information about a conference or choosing a conference based on an attractive location) and the personal characteristics of researchers. Only one paper reported empirically identified reasons for participating in predatory conferences. The three countermeasures proposed most frequently to deal with predatory conferences were increasing education, emphasizing responsibilities of universities and funders, and publishing lists of predatory publishers associated with conferences.

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Conclusions This review identified a scarcity of research concerning predatory conferences. Future empirical as well as fully analytical research should be encouraged by funders, journals and research institutions.

Strengths and limitations of this study

- This scoping review is the first to systematically synthesise the scholarly peer reviewed literature on predatory conferences in different settings.
- Limitations of this review include the scarcity of empirical research concerning predatory conferences, and the review therefore relied on theoretical papers, such as commentaries, which are less rigorous and make generalisations difficult.
- As scoping reviews do not intend to assess the quality of the literature included, the conclusions of this review have not considered the quality of the research but only the nature and existence of published scholarly articles.

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INTRODUCTION

Predatory journals have significantly infiltrated the academic publishing world, and many papers have raised awareness about the perils of publishing in such journals.¹⁻⁶ Predatory journals and conferences are often perceived as two sides of the same coin; nevertheless, literature on predatory conferences (PC) is noticeably lacking.⁷ Academic conferences are essential to researchers and an integral part of scientific communication, as they offer an opportunity for sharing research findings, building networks, and obtaining valuable new information.⁸ Conferences are also important for stakeholders, policymakers, and students.⁹ For graduate students, presenting at an international conference is often a required part of the curriculum.¹⁰ The number of PC has increased worldwide, and reportedly, they are becoming more sophisticated in concealing their nature as for-profit businesses with little or no regard for academic values.^{11 12} They often spam researchers with unsolicited email invitations, excessively praising the researcher's latest published paper.^{6 13}

These predatory enterprises are driven by a for-profit business model (while sometimes presenting themselves as not-for-profit), charging fees to the attendees, and disregarding proper peer review, instead allowing anyone who pays to become a speaker.^{14 15} Because PC appear to be legitimate scientific conferences, they deceive the attendees or their organizations into spending large sums for conference registration, travel, and accommodation. They also inflict a significant risk of damage to future researchers or policymakers who might unknowingly build their subsequent work or policies on the purported "scientific results" shared at such conferences.¹⁶

The InterAcademy Partnership (IAP), recently carried out a large global study, *Combatting Predatory Academic Journals and Conferences* (to be reported in 2022). The IAP (and author SE who was part of the working group carrying out the study) examined the available resources and found a striking focus on the publishing side of predatory practices and how little we know about PC in comparison, not only about why students and scholars attend them but also about what constitutes a PC and number of these conferences. Alarming, it has been claimed that PC might outnumber legitimate ones, which, if true, should call for a dedicated effort to counteract them.¹⁷ It thus

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became clear that there is a pronounced need for a targeted research approach mapping the existing literature and identifying gaps in it.

Reviews have previously focused on predatory journals and conferences. One review examined the main features of the open-access model, its potential consequences and its relevance for the whole scientific community.¹⁸ That review summarized the literature on predatory journals and conferences and described how this practice threatens the reputation of the open-access movement as it deviates from best editorial standards and ethics. The authors urge educational and ethical actions to enhance scholars' awareness of this serious threat to scientists' reputation and ultimately patients' safety. One narrative review aimed to create awareness of PC in biomedicine, the tactics they use to trap researchers, and suggestions for ways neophyte researchers can learn delineate PCs from legitimate ones.¹⁹ However, these reviews were not performed systematically and had limited scope and focus. To our knowledge, this scoping review is the first to systematically synthesize the literature solely on PC.

Objectives and research questions

The overall aim of this scoping review was to map systematically the scholarly literature on PC to describe the present state of research. We also posed the following research questions (RQ):

RQ1: How does the literature define predatory conferences?

RQ2: What are the reasons attendees have for participating in predatory conferences?

RQ3: What are the actual consequences for those attending predatory conferences, if any?

RQ4: What are the suggested countermeasures?

METHOD

Design

This study used the established scoping review methodology by Arksey and O'Malley,²⁰ later developed by Levac et al.²¹ This study used the Preferred Reporting Items for Systematic Reviews and Meta-Analyses for Scoping Reviews (PRISMA-Scr)²² (See Supplemental File, S1).

According to Arksey and O'Malley, there are usually six stages in undertaking a scoping review: (1) Identifying the research questions; (2) Identifying relevant studies; (3) Study selection; (4) Charting the data, (5) Collating, summarizing, and reporting the results, and (6) Consultation. According to the original framework step 6 is optional.

Stage 1: Identifying research questions

See earlier aim and RQs.

Stage 2: Identifying relevant studies

Two of the researchers (TG and SG) developed the initial search strategy, then further discussed it with SE and MO. TG created the actual searches in collaboration with two medical librarians. The librarians completed a preliminary test search in Scopus to identify whether studies appropriate for inclusion exists.

The databases searched were PubMed/MEDLINE, Web of Science, Scopus, and Social Sciences Premium Collection (ProQuest). In addition, the included papers (stage 3) were later scrutinized for any references to studies meeting the inclusion criteria but not found in the searches. The databases were searched from inception to September 23, 2021 (see Supplemental File, S2).

Stage 3: Study selection

The identified publications were exported and collated in EndNote (Clarivate™) to remove duplicates. The screening process utilized the Rayyan software platforms to facilitate the review.²³ This review process included a traditional screening approach of (1) titles and abstracts and (2) full text. Two reviewers (TG and SG) independently screened the papers based on predetermined inclusion and exclusion criteria for the title and abstract review (Table 1). TG and SG discussed all disagreements in the process of reaching a consensus. The resulting papers were then carefully read in full, and TG and SG again discussed any disagreement about inclusion or exclusion to reach consensus.

Table 1 Inclusion and exclusion criteria

	Inclusion criteria	Exclusion criteria
Exposure	Predatory conferences	Predatory publishers or journals
Setting	All research settings	N/A ^a

Study design	Publications irrespective of their study design. Letters to editor and commentary are included if they were peer-reviewed	Editorials and literature reviews were excluded
Language	English	All other languages
		N/A ^a : not applicable

Stage 4: Charting the data

We confirmed the publication's relevance to the aim of the review and extracted the data (Table 2).

The framework included bibliographical information (i.e., author(s), country, title, journal, and publication year), study type, and objectives. For each publication, we included in the table any definition of predatory conferences adopted, any empirical conference characteristics (e.g. country, setting, and research area of focus), reasons found for attendees to participate in PC, the experiences of attending such conferences, and any proposed countermeasures aiming to discourage their proliferation. All authors charted data from publications by using the data extraction framework. Two of the reviewers (TG and SG) discussed discrepancies until consensus was reached.

Table 2 Screening and extraction form

Level 1: Title and abstract review		
	1. Is this title/abstract written in English?	Yes/No
	2. Does it seemingly address PC?	Yes/No
Level 2: Full text review		
	1. Is there any reason this article should be excluded?	
	If yes: What is the reason for excluding?	a. Not in English b. Not about PC c. No full text available despite efforts to retrieve
	If no: What is the bibliographical information?	a. Author/s b. Title c. Country d. Publication year
	2. What type of publications?	a. Theoretical (Commentary/Viewpoint/Letter) b. Empirical (Qualitative or quantitative/Case report)
	3. Is there any definition of PC?	Yes/No
	If Yes: What is the definition?	
	If No: Are some characteristics of PC mentioned?	
	4. Does the publication say anything about why researchers participate in PC?	Yes/No
	If Yes: What are the reasons?	
	5. Does it say something about the actual consequences for those attending predatory conferences?	Yes/No

	If yes: What are the consequences?	
	5. Does it suggest any countermeasures to PC?	Yes/No
	If yes: What are the countermeasures?	

Stage 5: Summarising and reporting the results

Since a scoping review aims to map the concepts underpinning a research area and the primary sources available, the aggregated findings provided an overview of the research rather than an assessment of the individual studies’ quality. This study summarised data descriptively in line with the screening and extraction form. All authors discussed the results and agreed upon the final groupings of the results.

Stage 6: Consultation

Arksey and O'Malley ²⁰ suggest an (optional) consultation stage with stakeholders and experts to provide insights beyond what is reported in the literature. They recommend consultation exercises with stakeholders or experts throughout the process, from preparation to the dissemination of the findings. Since one of the authors (SE) is a member of an international working group formed by the InterAcademy Partnership (IAP) ¹⁴ as an expert working with combatting predatory academic journals and conferences, we opted to include step 6 in this review. SE was part of the whole process. Some IAP working group members (n=2) read a draft of this article and commented upon it.

Ethics statement

Ethical review was not required as no human subjects were the object of the study. Findings will be disseminated through professional networks, conference presentations and publication in a scientific journal.

Patient and public involvement

Patients and the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

RESULTS

Search results

The electronic searches yielded 809 records; after the removal of duplicates, screening of the remaining 419 records ensued. Assessment of titles and abstracts based on the inclusion criteria resulted in 38 papers remaining. The full texts of all these papers were obtained, and after applying the inclusion criteria, 18 records were excluded as 6 were editorials, 3 were not in English, 6 did not provide data relevant to predatory conferences, 2 were not peer-reviewed, and 1 was not available as a full-text document. As such, 20 peer-reviewed papers were included in the review (see PRISMA Fig. 1). Scanning these papers for further references to research on PC did not result in any additional records.

[INSERT FIGURE 1 ABOUT HERE]

Study context

Most (n=17) of the included papers were published between 2017 and 2021. The corresponding authors were from 12 different countries, where one fourth were affiliated to the USA,²⁴⁻²⁸ followed by India,²⁹⁻³¹ Denmark,^{32 33} Hungary,^{34 35} Saudi Arabia,³⁶ Iran,³⁷ UK,³⁸ Australia,³⁹ Switzerland,⁴⁰ Canada,⁴¹ Hong Kong,⁴² and the Czech Republic.⁴³ Predatory conferences attract multidisciplinary attention. Corresponding authors' disciplines included nursing/medicine,^{26 27 34-36 41} psychiatry,^{29 39} energy/technology,^{31-33 37} dentistry,³⁸ cancer,³⁰ pharmacy,²⁴ finance,⁴³ bibliometrics,²⁸ and computer science²⁵ (For characteristics of the included papers, see Table 3).

Study design

Eleven studies collected empirical data,^{25 26 28 34-36 38 40-43} where one half used a quantitative approach, one qualitative. Nine papers were theoretical,^{24 27 29-33 37 39} All papers were peer-reviewed.

Data synthesis

RQ1: How are predatory conferences defined?

Of 20 papers, 14 defined PC,^{24 26 29-31 33 34 36-41 43} two of these used definitions by others^{33 39} (Table 3).

Five papers did not define PC,^{27 28 32 35 42} and one paper suggested not to define them.²⁵ Most

definitions varied between addressing them as fraudulent or just of low quality, and between being “fictitious” and providing services wanted by the attendees, but they converge in pinpointing the exploitative profit motive as the driving force. Three attributes regarding PC were described: *means of invitation, organization, and low quality*. The common way of inviting to conferences were by email which used flattering language;^{26 27 30 33 36 38} had grammatical errors and/or non-scientific language;^{27 38} often two contact persons and no physical address, only email addresses;^{29 38 42} were lacking details of the meeting;^{26 27} and often targeting junior or novice researchers.^{29 34 36}

Another common attribute was related to the organization holding the conference. The organizers were often not well known and used names or copied pictures without permission.^{24 29 33} ^{36 38 40-42} Fast track (guarantee) acceptance was often described ^{28 29 37 42} with high fees, ^{26 27 36 39-42} or sometimes low fees that were not refunded if the conference was cancelled.^{24 29} The conferences were often situated at relatively small hotels, never in conference centres, colleges, or universities.^{24 29} Another attribute concerned the poor-quality standards. Peer review was often missing;^{25 27 29 32} ^{33 37 38 42} the academic subject matter of the PC had a wide and multidisciplinary scope;^{27 29 32 36-38 42} and the conference was organized for profit with little concern about scientific value.^{29 34 39 41 43}

Table 3 Definitions of PC

Definitions	
Agrawal et al.,2021 [29]	“Predatory conferences are like other conferences that provide platform to a scholar to present their research work, but these are organized mainly for profit and these are poorly organized”
Alnajjar et al., 2020 [36]	“They are low quality dubious events with a ‘blink of an eye’ abstract acceptance without peer review”
Asadi et al., 2018 [37]	“These fake/bogus conferences introduce themselves as international conferences, which are multidisciplinary and indexed in major scientific digital libraries”
Asadi, 2019 [32]	N/A ^b
Begum et al., 2021 [30]	“The fraudulent behaviour of predatory journals/conferences through E-mail solicitations and author’s perspective in unknowingly becoming victims of predatory publishing scheme, by being unaware of the fact that the journals in which they are involved are possibly predatory are highlighted here”
Bowman, 2014 [24]	“Fraudulent conferences take advantage of scholars for reasons similar to electronic publication: profitability for the hosting ‘organization’ and the desire for recognition by the party invited to make a presentation or chair a round table discussion”
Elmacioglu et al.,2009 [25]	“let us not define what questionable conferences are”
Heasman, 2019 [38]	PCs are “essentially small meetings, perhaps seminars would be a better term, based in hotel meeting rooms where elegates/speakers present their research and are presented with a certificate of recognition for their contribution”
Krasowski et al., 2019 [26]	“Conferences or meetings that are of potentially low quality and scientific value. Common themes include organization by companies or individuals as opposed to established scientific

	communities or organizations, high fees for presenters, and lack of transparency regarding the details of the meeting"
Lang et al., 2019 [34]	PC are "solely organized to make short term, commercial profit, taking advantage of the naïveté of many scholars and undermining the scientific community through misused time energy and resources"
Lang et al., 2020 [35]	N/A
Looi et al., 2020 [39]	From Cress, 2017," ... conferences that appear to be scholarly but are strictly exploitive money-making schemes that cost authors and funding sources time and money"
Makvandi et al., 2021 [40]	Organizers who "exploit the need for researchers to publish papers in proceedings or affiliated journals by asking for a significant conference attendance charge, using low quality conference business models"
Mercier et al., 2017 [41]	Organisers of these meetings "usually individuals or companies rather than an organisation or a scientific community, use names similar to reputable conferences and terms such as international or global but charge substantial fees to presenters and have little concern for scientific value"
Ozdemir et al., 2017 [31]	"Email invitations with flattering language. Some PCs are fictitious conferences, others are "congress tourism" in exotic places for a vacation. But others may promote narrow and certain scientific view of product without the alternatives mentioned"
Pecorari, 2021 [42]	N/A
Prorokowski, 2021 [43]	"conferences that are organised with the sole purpose of charging fees from unsuspecting researchers"
Sewell et al., 2019 [27]	N/A
Sonne et al., 2020 [33]	From McCrostie, 2018: "Low quality academic meetings, no supporting development of scholarship, no effective peer review, organizer uses deceit (most common is false claim of peer review, hides company headquarters' true location, and conceals it is for-profit"
Zhuang et al., 2007 [28]	N/A
	N/A ^b : Not available

RQ2: Reasons for participating in predatory conferences

All 20 papers^{29 30 32 36 37 24-28 31 33-35 38-43} explicitly or implicitly suggested possible reasons for participating in PC (Table 4). We identified reasons for this as relating to the overall context of the academic work, the nature of PC, and the personal characteristics of researchers. Academic related reasons involved a publish or perish climate focusing on the quantity rather than the quality of research dissemination,^{25 27 29 30 32 36 37 39-41} and the lack of support structures including guidance and control measures, encouraging and enabling researchers to make informed choices.^{24 26 28 31-35 40 42} Reasons related to the nature of predatory conferences involved researchers falling prey to deceptive and misleading information about conferences,^{24 27 29-33 35-39 41-43} choosing conferences due to attractive venues and exotic locations,^{31 32 36 37 42} opting for hassle free submission and review processes,^{25 42} and the opportunity to attend as a chair or invited speaker.^{24 31 40} Reasons relating to personal characteristics involved researchers overlooking the moral and scientific implications of attending predatory conferences due to inexperience,^{29 32 36-38 39-41 43} naivety,^{34 36 43} ignorance,^{32-34 37} vanity,^{27 33} or indifference.^{25 36 42}

Only one of the papers, Alnajjar et al.,³⁶ reported an empirical study on reasons for participating in predatory conferences. The qualitative study explored experiences of faculty members in nursing and medicine who had unknowingly fallen prey to PC. Study participants described how novice, naïve, and carrier-driven researchers are at higher risk of being conned into PC participation. Some peers overlook the conference value consciously and continue to travel on professional development grants, whereas others, who cover the costs with personal funds, are believed to be less likely to opt for predatory conferences.

Table 4 Reasons for participating in PC

	Academia related		Conference related				Researcher related				
	Publish or perish climate	Lack of support structures	Deceptive information	Attractive venue	Invitation as chair/speaker	Hassle free submission and review	Inexperience	Naiveté	Ignorance	Vanity	Indifference
Agrawal et al., 2021 [29]	X		X				X				
Alnajjar et al., 2020 [36]	X		X	X			X*	X*			X*
Asadi et al., 2018 [37]	X		X	X			X		X		
Asadi, 2019 [32]	X	X	X	X			X		X		
Begum et al., 2021 [30]	X		X								
Bowman, 2014 [24]		X	X		X						
Elmacioglu et al.,2009 [25]	X					X					X
Heasman, 2019 [38]			X				X				
Krasowski et al., 2019 [26]		X									
Lang et al., 2019 [34]		X						X	X		
Lang et al., 2020 [35]		X	X								
Looi et al., 2020 [39]	X		X				X				
Makvandi et al., 2021 [40]	X	X			X		X				
Mercier et al., 2017 [41]	X		X				X				
Ozdemir et al., 2017 [31]		X	X	X	X						
Pecorari, 2021 [42]		X	X	X		X		X			X
Prorokowski, 2021 [43]			X				X	X			
Sewell et al., 2019 [27]	X		X							X	
Sonne et al., 2020 [33]		X	X						X	X	
Zhuang et al., 2007 [28]		X									
	* Empirical findings										

RQ3: Consequences from having attended a predatory conference

Nineteen papers did not report or discuss the consequences of participating in PC.^{24-35 37-41 43} Just one empirical paper³⁶ reported a qualitative study in nursing and medicine. Seven faculty members with varying backgrounds that had fallen prey to PC in Australia, Spain, the USA, Switzerland, Singapore, and Italy were interviewed about their first-hand experiences. One consequence described was disappointment. They described how the conference organizers initially seemed interested in their research, but as soon as they arrived at the venue, they found overcrowded small rooms, no sessions and workshops in parallel, and a much disorganized venue. The conference did not follow the program or was reduced from three to two days, and the well-respected experts announced as keynote speakers were not there. Some attendees were asked to moderate sessions just before starting. The organizers never revealed their identities, and when contacting them, it appeared to be a remote-control operation. Many conference attendees were so disappointed that they left the conference.

Another disappointment involved cost; attendees were sometimes forced to book the accommodation through the organizers, in effect doubling the price. Another consequence concerned the risk of being subject to deceitful practices. Several of those who attended experienced that the organizer stole their identity and, without consent, used their pictures and personal information to portray them as part of their conference team. They also feared finding their conference abstract published on the conference webpage. Several interviewees expressed disappointment over a valuable academic opportunity being taken away from them, and they felt betrayed and angry because their reputation and credibility were at stake. Therefore, they did not want to attend any conferences at all in the future.³⁶

RQ4: What are the suggested countermeasures?

Six areas of countermeasures were suggested. The most important countermeasure described was education for all researchers and mentorship for beginning researchers and academics.^{26 29 31 32 34 36 38 39 41 43} A workshop with training exercises that could enable attendees to demarcate between legitimate and fake events was suggested.³⁶ The second and third most described countermeasures

were that steps must be taken by universities and funding institutions when evaluating qualifications of candidates for promotions or funding,^{24 33 36 36 41} and to publish lists of PC and organizers with red flags.^{27 30 33 43} Accreditations for conferences (e.g., through an impact factor or designation that the conference meets specific criteria) were also suggested,^{28 35 40} and by using diagnostic questions to assess PC to avoid submitting to them (self-help tools).^{33 38 42} The last suggested countermeasure described was that more empirical research is needed.³⁶

DISCUSSION

Our mapping of the research on predatory conferences shows a small, albeit growing body of literature on the subject. Compared to the issue of predatory publishing, PC, although a widespread and pervasive problem, receive surprisingly little attention.^{19 44} Even so, it seems to affect the global research community, regardless of discipline. Yet, the literature typically consists of editorials, letters, and the like, while the empirical scholarly literature on the subject consists of only 11 papers. Clearly, there is a need for more research to be funded, performed, and disseminated.

Definitions of what constitutes PC vary. They have been described as fraudulent, of low quality, as being “fictitious”, and providing services wanted by the attendees. There is agreement in the literature, however, that PC have a profit motive that is the driving force. In light of this, the scholarly community needs to develop a common understanding of what constitutes true PC that should *never* be supported by attendance, be given legitimacy, etc., and to delineate what constitutes a quality conference in which scholars should aspire to participate (going beyond avoidance of the unethical).⁴⁵ This might leave us with a grey zone of conferences that are of moderate quality but do not reflect the characteristics of PC. An important aspect is that many research organizations and funders pay for scholars to attend conferences to disseminate their research; these stakeholders should pay more attention to the quality of academic meetings paid for by them and could initiate quality control programmes. The literature is consistent in showing that

good measures of quality are the communication style of organizers and various characteristics of how the conference is organized.

Reasons for participating in predatory conferences are to a large extent the same as for participating in legitimate conferences, e.g., to present and discuss research with colleagues and to further one's career. The main reasons for participation in PC suggested in the literature are researchers being subject to deception by conference organizers and researchers being unaware of PC or indifferent to the moral and scientific implications of attending them. This involves researchers who are inexperienced and often lack the support structures for choosing appropriate conferences in a publish or perish culture. Remarkably, the empirical evidence is limited to one study supporting only a few of these suggestions. Further, we believe that research on reasons for participation in PC must consider the value of conference attendance and conference publications, which vary between disciplines. For example, we recognize that conference presentations and conference publications have little value when competing for research grants or academic positions for some disciplines. In contrast, conferences in e.g. computer science are considered as important as publication is in established journals.²⁸ Thus, it might be that lack of awareness of PC and naivety are more common reasons for participating in disciplines where conference publications hold little merit, while ambition and indifference might be more important driving forces in other disciplines. Understanding researchers' intentions when choosing to attend PC is important in designing effective counterstrategies. The lack of empirical research in this area calls for further research.

It is especially noteworthy that we found only one article addressing the consequences for people who have attended PC.³⁶ Thus, we have no knowledge about possible benefits of attending PC or whether scholars face negative consequences from presenting their research at these conferences. This knowledge would be of value in assessing the probability that people will continue to attend these types of conferences because of perceived gains or choose not to attend them because of the costs imposed upon individual researchers and their research organizations from attending. A better understanding of reasons why scholars present at these conferences would lead

to strategies for educating academics, universities, and funding institutions about PC. There is a need for much more research on this.⁴⁶

Our fourth research question relates to this last point, about what we should do to counteract or “combat” PC. While we have identified an argument for placing some of the responsibility on higher education institutions and funding agencies, the included surveyed literature calls mainly for educational efforts. Undoubtedly, these actions are complementary, and both are needed. We agree with Pecorari⁴² that disregarding ethics “can be countered by awareness-raising, and the deliberate choice can be countered by sanctions or at least the withholding of rewards.”⁴² However, while we found a lot of educational material in the scholarly literature pointing to the threat, several self-help tools are available to help individuals assess conferences, e.g., [Think.Check.Attend.](#)^{47 48}

CONCLUSIONS

This review identified a scarcity of empirical research concerning PC but revealed characteristics of these conferences and reasons why scholars submit abstracts to them. These conferences are low quality, with some researchers labelling them as fraudulent; invite potential attendees and presenters through spam emails (often with flattering language and grammatical errors); include limited, if any, peer review of abstracts; and are poorly organized. Reasons for participating in PC include the overall nature of academic work, with a climate in many settings that rewards quantity rather than quality of research dissemination, and lack of mentoring and support of beginner scholars to make informed decisions about conferences at which to present their research. Other reasons were not realizing the conference was low quality, deciding to attend because of location, or overlooking the implications of presenting at these conferences. While education of novice and experienced scholars about PC is critical, the review also suggested that universities and funding agencies should not be supporting presentations at PC. Consistent with calls for lists of predatory publishers is the need for a similar list of organizers of PC. In addition to costs of attending these

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3 conferences, the academic and career implications for researchers who present at PC have not been
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5 identified in the literature. This is an area needing further research and it should be encouraged by
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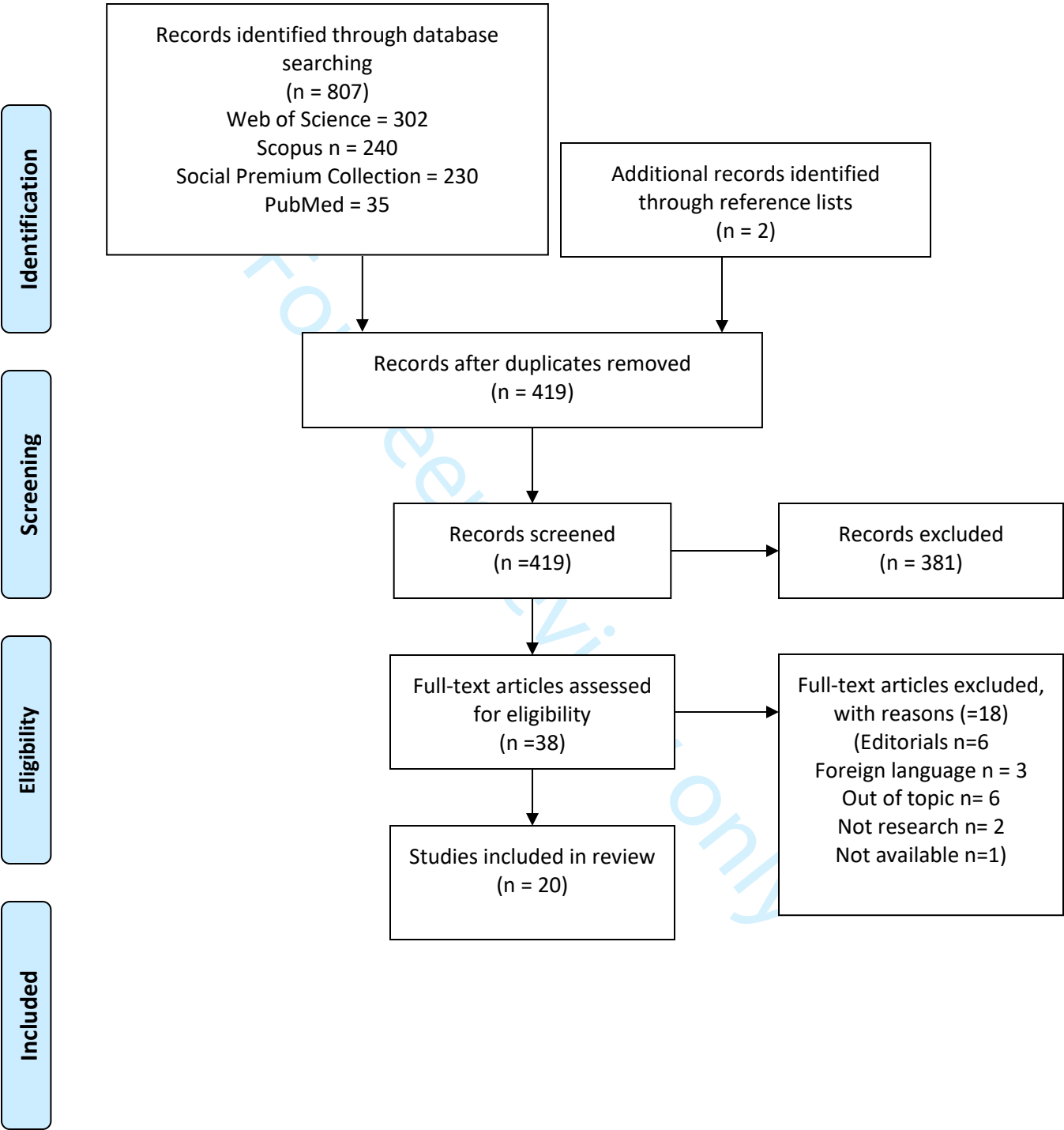
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Figure 1 Flow diagram of article selection for further review



From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097

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Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
TITLE			
Title	1	Identify the report as a scoping review.	1
ABSTRACT			
Structured summary	2	Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives.	2
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach.	5
Objectives	4	Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives.	5
METHODS			
Protocol and registration	5	Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number.	-
Eligibility criteria	6	Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale.	6-7
Information sources*	7	Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed.	6
Search	8	Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.	6
Selection of sources of evidence†	9	State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review.	6
Data charting process‡	10	Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done independently or in	7

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SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
		duplicate) and any processes for obtaining and confirming data from investigators.	
Data items	11	List and define all variables for which data were sought and any assumptions and simplifications made.	7
Critical appraisal of individual sources of evidence§	12	If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate).	N/A
Synthesis of results	13	Describe the methods of handling and summarizing the data that were charted.	8
RESULTS			
Selection of sources of evidence	14	Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram.	9
Characteristics of sources of evidence	15	For each source of evidence, present characteristics for which data were charted and provide the citations.	9
Critical appraisal within sources of evidence	16	If done, present data on critical appraisal of included sources of evidence (see item 12).	N/A
Results of individual sources of evidence	17	For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives.	9
Synthesis of results	18	Summarize and/or present the charting results as they relate to the review questions and objectives.	9-14
DISCUSSION			
Summary of evidence	19	Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups.	14
Limitations	20	Discuss the limitations of the scoping review process.	3
Conclusions	21	Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps.	16-17
FUNDING			
Funding	22	Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review.	18

JBI = Joanna Briggs Institute; PRISMA-ScR = Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews.

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Title page

Predatory conferences: a systematic scoping review

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ABSTRACT

Objective To systematically map the scholarly literature on predatory conferences and describe the present state of research and the prevalent attitudes about these conferences.

Methods This scoping review follows PRISMA guidelines. Four databases were searched (PubMed/MEDLINE, Web of Science, Scopus, and ProQuest Social Sciences Premium Collection). In addition, the included studies' reference lists were scanned for additional papers not found in the searches. Peer-reviewed publications were included irrespective of study design. Letters and commentary were included if they were peer-reviewed. Editorials and literature reviews were excluded.

Results From 809 initial publications, 20 papers were included in the review, from 12 countries and covered a wide range of science disciplines, from nursing/medicine to energy/technology and computer science. More than half were empirical and published after 2017. In most papers, a definition of the term predatory conferences was put forward. Spam email invitations with flattering language were the most common characteristics, and the conferences were often hosted by unknown organizations that used copied pictures without permission. High fees, lack of peer review, and a multidisciplinary scope were signal features. All papers explicitly or implicitly suggested possible reasons for participating in predatory conferences. Some reasons were related to the overall context of academic work, the nature of predatory conferences (e.g., researchers falling prey to misleading information about a conference or choosing a conference based on an attractive location) and the personal characteristics of researchers. Only one paper reported empirically identified reasons for participating in predatory conferences. The three countermeasures proposed most frequently to deal with predatory conferences were increasing education, emphasizing responsibilities of universities and funders, and publishing lists of predatory publishers associated with conferences.

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Conclusions This review identified a scarcity of research concerning predatory conferences. Future empirical as well as fully analytical research should be encouraged by funders, journals and research institutions.

STRENGTHS AND LIMITATIONS OF THIS STUDY

- This scoping review is the first to synthesise systematically the scholarly peer reviewed literature on predatory conferences in different settings.
- It identifies gaps in the existing literature and based on the literature suggests important countermeasures to prevent the further spread of predatory conference practices.
- Limitations of this review include the scarcity of empirical research concerning predatory conferences, and the review therefore relied on theoretical papers, such as commentaries, which are less rigorous and make generalisations difficult.

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INTRODUCTION

Predatory journals have significantly infiltrated the academic publishing world, and many papers have raised awareness about the perils of publishing in such journals.[1],[2],[3],[4],[5],[6] Predatory journals and conferences are often perceived as two sides of the same coin; nevertheless, literature on predatory conferences (PC) is noticeably lacking.[7] Academic conferences are essential to researchers and an integral part of scientific communication, as they offer an opportunity for sharing research findings, building networks, and obtaining valuable new information.[8] Conferences are also important for stakeholders, policymakers, and students.[9] For graduate students, presenting at an international conference is often a required part of the curriculum.[10] The number of PC has increased worldwide, and reportedly, they are becoming more sophisticated in concealing their nature as for-profit businesses with little or no regard for academic values.[11],[12] They often spam researchers with unsolicited email invitations, excessively praising the researcher's latest published paper.[6],[13]

These predatory enterprises are driven by a for-profit business model (while sometimes presenting themselves as not-for-profit), charging fees to the attendees, and disregarding proper peer review, instead allowing anyone who pays to become a speaker.[14],[15] Because PC appear to be legitimate scientific conferences, they deceive the attendees or their organizations into spending large sums for conference registration, travel, and accommodation. They also inflict a significant risk of damage to future researchers or policymakers who might unknowingly build their subsequent work or policies on the purported "scientific results" shared at such conferences.[16]

The InterAcademy Partnership (IAP) recently carried out a large global study, *Combatting Predatory Academic Journals and Conferences*. The IAP (and author SE who was part of the working group carrying out the study) examined the available resources and found a striking focus on the publishing side of predatory practices and very little knowledge about PC in comparison. Not only is there a lack of knowledge on why students and scholars attend PC, but also about criteria that determine if a conference is predatory and how many they are. Alarming, it has been claimed that

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PC might outnumber legitimate ones, which, if true, should call for a dedicated effort to counteract them.[17] It thus became clear that there is a pronounced need for a targeted research approach mapping the existing literature and identifying gaps in it.

Reviews have previously focused on predatory journals and conferences. One review examined the main features of the open-access model, its potential consequences, and its relevance to the scientific community.[18] That review summarized the literature on predatory journals and conferences and described how this practice threatens the reputation of the open-access movement as it deviates from best editorial standards and ethics. The authors urge educational and ethical actions to enhance scholars' awareness of this serious threat to scientists' reputation and ultimately patients' safety. One narrative review aimed to create awareness of PC in biomedicine, to describe the tactics they use to trap researchers, and to suggest how neophyte researchers can learn to delineate PCs from legitimate ones.[19] However, these reviews were not performed systematically and had limited scope and focus. To our knowledge, this scoping review is the first to systematically synthesize the literature solely on PC.

Objectives and research questions

The overall aim of this scoping review was to map systematically the scholarly literature on PC to describe the present state of research. We also posed the following research questions (RQ):

RQ1: How does the literature define predatory conferences?

RQ2: What are the reasons attendees have for participating in predatory conferences?

RQ3: What are the actual consequences for those attending predatory conferences, if any?

RQ4: What are the suggested countermeasures?

METHOD

Design

This study used the established scoping review methodology by Arksey and O'Malley,[20] later developed by Levac et al.[21] This study used the Preferred Reporting Items for Systematic Reviews and Meta-Analyses for Scoping Reviews (PRISMA-Scr)[22] (See Supplemental File, S1).

According to Arksey and O'Malley, there are usually six stages in undertaking a scoping review: (1) Identifying the research questions; (2) Identifying relevant studies; (3) Study selection; (4) Charting the data, (5) Collating, summarizing, and reporting the results, and (6) Consultation. According to the original framework step 6 is optional.

Stage 1: Identifying research questions

See earlier aim and RQs.

Stage 2: Identifying relevant studies

Two of the researchers (TG and SG) developed the initial search strategy, then further discussed it with SE and MO. TG created the actual searches in collaboration with two medical librarians. The librarians completed a preliminary test search in Scopus to identify whether studies appropriate for inclusion exists.

The databases searched were PubMed/MEDLINE, Web of Science, Scopus, and Social Sciences Premium Collection (ProQuest). In addition, the included papers (stage 3) were later scrutinized for any references to studies meeting the inclusion criteria but not found in the searches. The databases were searched from inception to September 23, 2021.

Stage 3: Study selection

The identified publications were exported and collated in EndNote (Clarivate™) to remove duplicates. The screening process utilized the Rayyan software platforms to facilitate the review.[23] This review process included a traditional screening approach of (1) titles and abstracts and (2) full text. Two reviewers (TG and SG) independently screened the papers based on predetermined inclusion and exclusion criteria for the title and abstract review (Table 1). TG and SG discussed all disagreements in the process of reaching a consensus. The resulting papers were then carefully read in full, and TG and SG again discussed any disagreement about inclusion or exclusion to reach consensus.

Table 1 Inclusion and exclusion criteria

	Inclusion criteria	Exclusion criteria
Exposure	Predatory conferences	Predatory publishers or journals
Setting	All research settings	N/A ^a
Study design	Publications irrespective of their study design. Letters to editor and commentary are included if they were peer-reviewed (letters and commentaries were examined for any declaration of having been subject to a peer review process, such as statements to that fact or dates being given for revision/acceptance).	Editorials and literature reviews were excluded
Language	English	All other languages
		N/A ^a : not applicable

Stage 4: Charting the data

We confirmed the publication's relevance to the aim of the review and extracted the data (Table 2).

The framework included bibliographical information (i.e., author(s), country, title, journal, and publication year), study type, and objectives. For each publication, we included in the table any definition of predatory conferences adopted, any empirical conference characteristics (e.g. country, setting, and research area of focus), reasons found for attendees to participate in PC, the experiences of attending such conferences, and any proposed countermeasures aiming to discourage their proliferation. All authors charted data from publications by using the data extraction framework. Two of the reviewers (TG and SG) discussed discrepancies until consensus was reached.

Table 2 Screening and extraction form

Level 1: Title and abstract review		
	1. Is this title/abstract written in English?	Yes/No
	2. Does it seemingly address PC?	Yes/No
Level 2: Full text review		
	1. Is there any reason this article should be excluded?	
	If yes: What is the reason for excluding?	a. Not in English b. Not about PC c. No full text available despite efforts to retrieve
	If no: What is the bibliographical information?	a. Author/s b. Title c. Country d. Publication year
	2. What type of publications?	a. Theoretical (Commentary/Viewpoint/Letter) b. Empirical (Qualitative or quantitative/Case report)
	3. Is there any definition of PC?	Yes/No
	If Yes: What is the definition?	

If No: Are some characteristics of PC mentioned?	
4. Does the publication say anything about why researchers participate in PC?	Yes/No
If Yes: What are the reasons?	
5. Does it say something about the actual consequences for those attending predatory conferences?	Yes/No
If yes: What are the consequences?	
5. Does it suggest any countermeasures to PC?	Yes/No
If yes: What are the countermeasures?	

Stage 5: Summarising and reporting the results

Since a scoping review aims to map the concepts underpinning a research area and the primary sources available, the aggregated findings provided an overview of the research rather than an assessment of the individual studies’ quality. This study summarised data descriptively in line with the screening and extraction form. All authors discussed the results and agreed upon the final groupings of the results.

Stage 6: Consultation

Arksey and O’Malley [20] suggest an (optional) consultation stage with stakeholders and experts to provide insights beyond what is reported in the literature. They recommend consultation exercises with stakeholders or experts throughout the process, from preparation to the dissemination of the findings. Since one of the authors (SE) is a member of an international working group formed by the InterAcademy Partnership (IAP) [14] as an expert working with combatting predatory academic journals and conferences, we opted to include step 6 in this review. SE was part of the whole process. Some IAP working group members (n=2) read a draft of this article and commented upon it.

Ethics statement

Ethical review was not required as no human subjects were the object of the study. Findings will be disseminated through professional networks, conference presentations and publication in a scientific journal.

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Patient and public involvement

Patients and the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

RESULTS

Search results

The electronic searches yielded 809 records; after the removal of duplicates, screening of the remaining 419 records ensued. Assessment of titles and abstracts based on the inclusion criteria resulted in 38 papers remaining. The full texts of all these papers were obtained, and after applying the inclusion criteria, 18 records were excluded as 6 were editorials, 3 were not in English, 6 did not provide data relevant to predatory conferences, 2 were not peer-reviewed, and 1 was not available as a full-text document. As such, 20 peer-reviewed papers were included in the review (see PRISMA Fig. 1). Scanning these papers for further references to research on PC did not result in any additional records.

[INSERT FIGURE 1 ABOUT HERE]

Study context

Most (n=17) of the included papers were published between 2017 and 2021. The corresponding authors were from 12 different countries, where one fourth were affiliated to the USA, ,[24],[25],[26],[27],[28] followed by India,[29],[30],[31] Denmark,[32],[33] Hungary,[34],[35] Saudi Arabia, [36] Iran,[37] UK,[38] Australia,[39] Switzerland,[40] Canada,[41] Hong Kong,[42] and the Czech Republic.[43] Predatory conferences attract multidisciplinary attention. Corresponding authors' disciplines included nursing/medicine,[26],[27],[34],[35],[36],[41] psychiatry,[29],[39] energy/technology,[31],[32],[33],[37] dentistry,[38] cancer,[30] pharmacy,[24] finance,[43] bibliometrics,[28] and computer science.[25]

Study design

Eleven studies collected empirical data,[25],[26],[28],[34],[35],[36],[38],[40],[41],[42],[43] where one half used a quantitative approach, one qualitative. Nine papers were theoretical,[24],[27],[29],[30],[31],[32],[33],[37],[39] All papers were peer-reviewed.

Data synthesis

RQ1: How are predatory conferences defined?

Of 20 papers, 14 defined PC,[24],[26],[29],[30],[31],[33],[34],[36],[37],[38],[39],[40],[41],[43] two of these used definitions by others[33],[39] (Table 3). Five papers did not define PC,[27],[28],[32],[35],[42] and one paper suggested not to define them.[25] Most definitions varied between addressing them as fraudulent or just of low quality, and between being “fictitious” and providing services wanted by the attendees, but they converge in pinpointing the exploitative profit motive as the driving force. Three attributes regarding PC were described: *means of invitation*, *organization*, and *low quality*. The common way of inviting to conferences were by email which used flattering language;[26],[27],[30],[33],[36],[38] had grammatical errors and/or non-scientific language;[27],[38] often two contact persons and no physical address, only email addresses;[29],[38],[42] were lacking details of the meeting;[26],[27] and often targeting junior or novice researchers.[29],[34],[36]

Another common attribute was related to the organization holding the conference. The organizers were often not well known and used names or copied pictures without permission.[24],[29],[33],[36],[38],[40],[41],[42] Fast track (guarantee) acceptance was often described [28],[29],[37],[42] with high fees,[26],[27],[36],[39],[40],[41],[42] or sometimes low fees that were not refunded if the conference was cancelled.[24],[29] The conferences were often situated at relatively small hotels, never in conference centres, colleges, or universities.[24],[29] Another attribute concerned the poor-quality standards. Peer review was often missing; [25],[27],[29],[32],[33],[37],[38],[42] the academic subject matter of the PC had a wide and multidisciplinary scope;[27],[29],[32],[36],[37],[38],[42] and the conference was organized for profit with little concern about scientific value.[29],[34],[39],[41],[43]

Table 3 Definitions of PC

	Definitions
Agrawal et al., 2021 [29]	"Predatory conferences are like other conferences that provide platform to a scholar to present their research work, but these are organized mainly for profit and these are poorly organized"
Alnajjar et al., 2020 [36]	"They are low quality dubious events with a 'blink of an eye' abstract acceptance without peer review"
Asadi et al., 2018 [37]	"These fake/bogus conferences introduce themselves as international conferences, which are multidisciplinary and indexed in major scientific digital libraries"
Asadi, 2019 [32]	N/A ^b
Begum et al., 2021 [30]	"The fraudulent behaviour of predatory journals/conferences through E-mail solicitations and author's perspective in unknowingly becoming victims of predatory publishing scheme, by being unaware of the fact that the journals in which they are involved are possibly predatory are highlighted here"
Bowman, 2014 [24]	"Fraudulent conferences take advantage of scholars for reasons similar to electronic publication: profitability for the hosting 'organization' and the desire for recognition by the party invited to make a presentation or chair a round table discussion"
Elmacioglu et al., 2009 [25]	"let us not define what questionable conferences are"
Heasman, 2019 [38]	PCs are "essentially small meetings, perhaps seminars would be a better term, based in hotel meeting rooms where delegates/speakers present their research and are presented with a certificate of recognition for their contribution"
Krasowski et al., 2019 [26]	"Conferences or meetings that are of potentially low quality and scientific value. Common themes include organization by companies or individuals as opposed to established scientific communities or organizations, high fees for presenters, and lack of transparency regarding the details of the meeting"
Lang et al., 2019 [34]	PC are "solely organized to make short term, commercial profit, taking advantage of the naïveté of many scholars and undermining the scientific community through misused time energy and resources"
Lang et al., 2020 [35]	N/A
Looi et al., 2020 [39]	From Cress, 2017, " ... conferences that appear to be scholarly but are strictly exploitive money-making schemes that cost authors and funding sources time and money"
Makvandi et al., 2021 [40]	Organizers who "exploit the need for researchers to publish papers in proceedings or affiliated journals by asking for a significant conference attendance charge, using low quality conference business models"
Mercier et al., 2017 [41]	Organisers of these meetings "usually individuals or companies rather than an organisation or a scientific community, use names similar to reputable conferences and terms such as international or global but charge substantial fees to presenters and have little concern for scientific value"
Ozdemir et al., 2017 [31]	"Email invitations with flattering language. Some PCs are fictitious conferences, others are "congress tourism" in exotic places for a vacation. But others may promote narrow and certain scientific view of product without the alternatives mentioned"
Pecorari, 2021 [42]	N/A
Prorokowski, 2021 [43]	"conferences that are organised with the sole purpose of charging fees from unsuspecting researchers"
Sewell et al., 2019 [27]	N/A
Sonne et al., 2020 [33]	From McCrostie, 2018: "Low quality academic meetings, no supporting development of scholarship, no effective peer review, organizer uses deceit (most common is false claim of peer review, hides company headquarters' true location, and conceals it is for-profit"
Zhuang et al., 2007 [28]	N/A
N/A ^b : Not available	

RQ2: Reasons for participating in predatory conferences

All 20 papers [24],[25],[26],[27],[28],[29],[30],[31],[32],[33],[34],[35],[36],[37],[38],[39],[40],[41],[42],[43], explicitly or implicitly suggested possible reasons for participating in PC (Table 4). We identified reasons for this as relating to the overall context of the academic work, the nature of PC,

and the personal characteristics of researchers. Academic related reasons involved a publish or perish climate focusing on the quantity rather than the quality of research dissemination,[25],[27],[29],[30],[32],[36],[37],[39],[40],[41] and the lack of support structures including guidance and control measures, encouraging and enabling researchers to make informed choices.[24],[26],[28],[31],[32],[33],[34],[35],[40],[42] Reasons related to the nature of predatory conferences involved researchers falling prey to deceptive and misleading information about conferences,[24],[27],[29],[30],[31],[32],[33],[35],[36],[37],[38],[39],[41],[42],[43] choosing conferences due to attractive venues and exotic locations,[31],[32],[36],[37],[42] opting for hassle free submission and review processes,[25],[42] and the opportunity to attend as a chair or invited speaker.[24],[31],[40] Reasons relating to personal characteristics involved researchers overlooking the moral and scientific implications of attending predatory conferences due to inexperience,[29],[32],[36],[37],[38],[39],[40],[41],[43] naivety,[34],[36],[43] ignorance, [32],[33],[34],[37] vanity,[27],[33] or indifference.[25],[36],[42]

Only one of the papers, Alnajjar et al.,[36] reported an empirical study on reasons for participating in predatory conferences. The qualitative study explored experiences of faculty members in nursing and medicine who had unknowingly fallen prey to PC. Study participants described how novice, naïve, and carrier-driven researchers are at higher risk of being conned into PC participation. Some peers overlook the conference value consciously and continue to travel on professional development grants, whereas others, who cover the costs with personal funds, are believed to be less likely to opt for predatory conferences.

Table 4 Reasons for participating in PC

	Academia related	Conference related	Researcher related
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	Publish or perish climate	Lack of support structures	Deceptive information	Attractive venue	Invitation as chair/speaker	Hassle free submission and review	Inexperience	Naiveté	Ignorance	Vanity	Indifference
Agrawal et al., 2021 [29]	X		X				X				
Alnajjar et al., 2020 [36]	X		X	X			X*	X*			X*
Asadi et al., 2018 [37]	X		X	X			X		X		
Asadi, 2019 [32]	X	X	X	X			X		X		
Begum et al., 2021 [30]	X		X								
Bowman, 2014 [24]		X	X		X						
Elmacioglu et al., 2009 [25]	X					X					X
Heasman, 2019 [38]			X				X				
Krasowski et al., 2019 [26]		X									
Lang et al., 2019 [34]		X						X	X		
Lang et al., 2020 [35]		X	X								
Looi et al., 2020 [39]	X		X				X				
Makvandi et al., 2021 [40]	X	X			X		X				
Mercier et al., 2017 [41]	X		X				X				
Ozdemir et al., 2017 [31]		X	X	X	X						
Pecorari, 2021 [42]		X	X	X		X		X			X
Prorokowski, 2021 [43]			X				X	X			
Sewell et al., 2019 [27]	X		X							X	
Sonne et al., 2020 [33]		X	X						X	X	
Zhuang et al., 2007 [28]		X									

* Empirical findings

RQ3: Consequences from having attended a predatory conference

Nineteen papers did not report or discuss the consequences of participating in PC.[24],[25],[26],[27],[28],[29],[30],[31],[32],[33],[34],[35],[37],[38],[39],[40],[41],[42],[43] Just one empirical paper[36] reported a qualitative study in nursing and medicine. Seven faculty members with varying backgrounds that had fallen prey to PC in Australia, Spain, the USA, Switzerland, Singapore, and Italy were interviewed about their first-hand experiences. One consequence described was disappointment. They described how the conference organizers initially seemed interested in their research, but as soon as they arrived at the venue, they found overcrowded small rooms, no sessions and workshops in parallel, and a much disorganized venue. The conference did not follow the program or was reduced from three to two days, and the well-respected experts announced as keynote speakers were not there. Some attendees were asked to moderate sessions

just before starting. The organizers never revealed their identities, and when contacting them, it appeared to be a remote-control operation. Many conference attendees were so disappointed that they left the conference.

Another disappointment involved cost; attendees were sometimes forced to book the accommodation through the organizers, in effect doubling the price. Another consequence concerned the risk of being subject to deceitful practices. Several of those who attended experienced that the organizer stole their identity and, without consent, used their pictures and personal information to portray them as part of their conference team. They also feared finding their conference abstract published on the conference webpage. Several interviewees expressed disappointment over a valuable academic opportunity being taken away from them, and they felt betrayed and angry because their reputation and credibility were at stake. Therefore, they did not want to attend any conferences at all in the future.[36]

RQ4: What are the suggested countermeasures?

Six areas of countermeasures were suggested. The most important countermeasure described was education for all researchers and mentorship for beginning researchers and academics.[26],[29],[31],[32],[34],[36],[38],[39],[41],[43] A workshop with training exercises that could enable attendees to demarcate between legitimate and fake events was suggested.[36] The second and third most described countermeasures were that steps must be taken by universities and funding institutions when evaluating qualifications of candidates for promotions or funding,[24],[33],[36],[41] and to publish lists of PC and organizers with red flags.[27],[30],[33],[43] Accreditations for conferences (e.g., through an impact factor or designation that the conference meets specific criteria) were also suggested,[28],[35],[40] and by using diagnostic questions to assess PC to avoid submitting to them (self-help tools).[33],[38],[42] The last suggested countermeasure described was that more empirical research is needed.[36]

DISCUSSION

Our mapping of the research on predatory conferences shows a small, albeit growing body of literature on the subject. Compared to the issue of predatory publishing, PC, although a widespread and pervasive problem, receive surprisingly little attention.[19],[44] The IAP suggested that COVID-19 caught most of the attention of stakeholders since 2020, neglecting the alarming threat of predatory practices.[14] This is unfortunate, as the problem seems to affect the global research community, regardless of discipline. There is now a worry that the pandemic is actually fuelling predatory on-line conferences.[29] Yet, the literature typically consists of editorials, letters, and the like, while the empirical scholarly literature on the subject consists of only 11 papers. Clearly, there is a need for more research to be funded, performed, and disseminated.

Definitions of what constitutes PC vary. They have been described as fraudulent, of low quality, as being “fictitious”, and providing services wanted by the attendees. There is agreement in the literature, however, that PC have a profit motive that is the driving force. In light of this, the scholarly community needs to develop a common understanding of what constitutes true PC that should *never* be supported by attendance, be given legitimacy, etc., and to delineate what constitutes a quality conference in which scholars should aspire to participate (going beyond avoidance of the unethical).[45] This might leave us with a grey zone of conferences that are of moderate quality but do not reflect the characteristics of PC. Established professional societies might also publish their materials from conferences without stringent quality checks.[46] An important aspect is that many research organizations and funders pay for scholars to attend conferences to disseminate their research; these stakeholders should pay more attention to the quality of academic meetings paid for by them and could initiate quality control programmes. The literature is consistent in showing that good measures of quality are the communication style of organizers and various characteristics of how the conference is organized.

Reasons for participating in predatory conferences are to a large extent the same as for participating in legitimate conferences, e.g., to present and discuss research with colleagues and to further one’s career. The main reasons for participation in PC suggested in the literature are

researchers being subject to deception by conference organizers and researchers being unaware of PC or indifferent to the moral and scientific implications of attending them. This involves researchers who are inexperienced and often lack the support structures for choosing appropriate conferences in a publish or perish culture. Remarkably, the empirical evidence is limited to one study supporting only a few of these suggestions. Further, we believe that research on reasons for participation in PC must consider the value of conference attendance and conference publications, which vary between disciplines. For example, we recognize that conference presentations and conference publications have little value when competing for research grants or academic positions for some disciplines. In contrast, conferences in e.g. computer science are considered as important as publication is in established journals.[28] Thus, it might be that lack of awareness of PC and naivety are more common reasons for participating in disciplines where conference publications hold little merit, while ambition and indifference might be more important driving forces in other disciplines. Understanding researchers' intentions when choosing to attend PC is important in designing effective counterstrategies. The lack of empirical research in this area calls for further research.

It is especially noteworthy that we found only one article addressing the consequences for people who have attended PC.[36] Thus, we have no knowledge about possible benefits of attending PC or whether scholars face negative consequences from presenting their research at these conferences. This knowledge would be of value in assessing the probability that people will continue to attend these types of conferences because of perceived gains or choose not to attend them because of the costs imposed upon individual researchers and their research organizations from attending. A better understanding of reasons why scholars present at these conferences would lead to strategies for educating academics, universities, and funding institutions about PC. There is a need for much more research on this.[47]

Our fourth research question relates to this last point, about what we should do to counteract or "combat" PC. While we have identified an argument for placing some of the responsibility on higher education institutions and funding agencies, the included surveyed literature

calls mainly for educational efforts. Undoubtedly, these actions are complementary, and both are needed. We agree with Pecorari[42] that disregarding ethics “can be countered by awareness-raising, and the deliberate choice can be countered by sanctions or at least the withholding of rewards.”[42] However, while we found a lot of educational material in the scholarly literature pointing to the threat, several self-help tools are available to help individuals assess conferences, e.g., [Think.Check.Attend.](#)[48],[49]

CONCLUSIONS

This review identified a scarcity of empirical research concerning PC but revealed characteristics of these conferences and reasons why scholars submit abstracts to them. These conferences are low quality, with some researchers labelling them as fraudulent; invite potential attendees and presenters through spam emails (often with flattering language and grammatical errors); include limited, if any, peer review of abstracts; and are poorly organized. Reasons for participating in PC include the overall nature of academic work, with a climate in many settings that rewards quantity rather than quality of research dissemination, and lack of mentoring and support of beginner scholars to make informed decisions about conferences at which to present their research. Other reasons were not realizing the conference was low quality, deciding to attend because of location, or overlooking the implications of presenting at these conferences. While education of novice and experienced scholars about PC is critical, the review also suggested that universities and funding agencies should not be supporting presentations at PC. Consistent with calls for lists of predatory publishers is the need for a similar list of organizers of PC. In addition to costs of attending these conferences, the academic and career implications for researchers who present at PC have not been identified in the literature. This is an area needing further research and it should be encouraged by funders and research institutions.

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Statements

Contributorship Design of the review: TG and SG. Data collection: TG. Data analysis and interpretation: TG, SG, SE and MO. Drafting the article: TG, SG, SE and MO. Critical revisions of the article: TG, SG, SE and MO. All authors approved the final version to be published.

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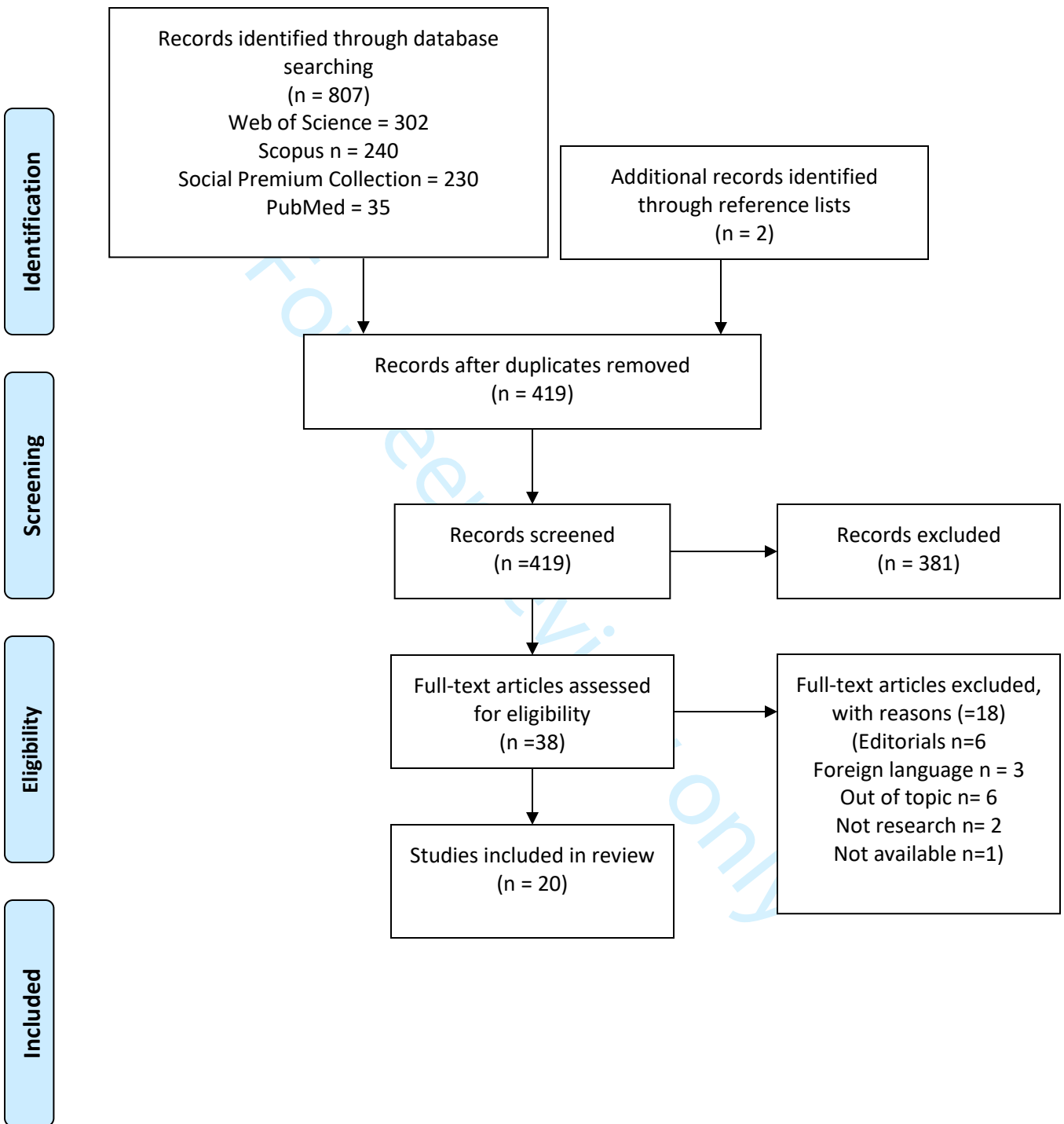
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Figure 1 Flow diagram of article selection for further review

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From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097

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Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
TITLE			
Title	1	Identify the report as a scoping review.	1
ABSTRACT			
Structured summary	2	Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives.	2
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach.	5
Objectives	4	Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives.	5
METHODS			
Protocol and registration	5	Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number.	-
Eligibility criteria	6	Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale.	6-7
Information sources*	7	Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed.	6
Search	8	Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.	6
Selection of sources of evidence†	9	State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review.	6
Data charting process‡	10	Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done independently or in	7

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
		duplicate) and any processes for obtaining and confirming data from investigators.	
Data items	11	List and define all variables for which data were sought and any assumptions and simplifications made.	7
Critical appraisal of individual sources of evidence§	12	If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate).	N/A
Synthesis of results	13	Describe the methods of handling and summarizing the data that were charted.	8
RESULTS			
Selection of sources of evidence	14	Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram.	9
Characteristics of sources of evidence	15	For each source of evidence, present characteristics for which data were charted and provide the citations.	9
Critical appraisal within sources of evidence	16	If done, present data on critical appraisal of included sources of evidence (see item 12).	N/A
Results of individual sources of evidence	17	For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives.	9
Synthesis of results	18	Summarize and/or present the charting results as they relate to the review questions and objectives.	9-14
DISCUSSION			
Summary of evidence	19	Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups.	14
Limitations	20	Discuss the limitations of the scoping review process.	3
Conclusions	21	Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps.	16-17
FUNDING			
Funding	22	Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review.	18

JBI = Joanna Briggs Institute; PRISMA-ScR = Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews.