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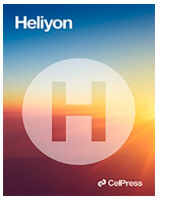

Research article

Do orthopaedics surgeons have any idea what predatory journals are?:(cross-sectional study)

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ABSTRACT

Objective: The legitimacy of published research confronts a real challenge posed by predatory journals. These journals not only distribute inadequately written articles but also undermine the prospects of acknowledgment and citation for high-quality content. It is essential, nevertheless, to differentiate between predatory journals and reputable open-access ones. A worldwide anti-predatory movement seeks to enhance awareness about such journals. Hence, our objective was to assess the awareness, attitudes, and practices of Sudanese orthopedic surgeons concerning both predatory and open-access publishing.

Methods: Conducted between January and April 2023, this cross-sectional electronic survey involved Sudanese orthopedic surgeons. The survey, comprising five domains to gauge knowledge, attitudes, and practices related to predatory and open-access publishing, was shared via the Sudanese Orthopedic Surgeons Association email distribution list among the 561 registered surgeons. The targeted sample size was 286. Categorical variables were reported using frequencies, while continuous variables were presented as medians and interquartile ranges. Nonparametric tests and ordinal regression were employed for inferential statistics.

Results: Of the 561 surgeons, 104 participants completed the questionnaire, resulting in a response rate of 18.5 %. Approximately 49% exhibited poor knowledge, with 56% unfamiliar with the term "predatory journals," and 74% unaware of Beall's list. Overall attitudes toward publication in open-access and predatory journals were neutral for 60% of participants, and only 26% demonstrated good overall publication practices. Higher knowledge scores positively correlated with attitude and practice scores. Ordinal regression analysis identified variables such as employment in university hospitals, higher academic rank, publication experience, and working in well-resourced countries as factors increasing the likelihood of higher knowledge, attitude, and practice scores.

Conclusion: The majority of the study participants reported very low knowledge of predatory journals and their possible detrimental consequences on the integrity and quality of scientific publications. Therefore, educational efforts on the negative impact of predatory publication practices in orthopedics are needed.

1. Introduction

As fraudulent manuscripts have been published in journals without appropriate peer review, predatory journals threaten the integrity of the medical science [1,2]. Predatory journals offer fast and easy publications, while the publishing companies that run

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predatory journals derive profits from the high article processing fees and costs associated with inadequate peer review of submitted articles [3]. After making a compilation of publications referred to as predatory, Beall focused on the term "predator journal". On the other hand, Beall's list included many open-access publications [4]. Open-access journals also make the writers pay an article processing fee in order to ensure that all the members of the scientific community have unlimited access to the information [2]. In the recent years, quite a few new open-access publications have appeared, and many famous journals currently offer open access respectively to enhance the distribution of findings [5]. However, the downside of the free access to scientific information through open-access journals is that it may encourage predatory publications which are a big threat to scholars. Open-access journals and also predatory journals are quite different in terms of their aims and operations in the scholarly publishing landscape.

1.1. The difference between predatory and open access journals

The goal of open-access journals is to make the research available free of charge, which necessitates the vigorous peer review and editorial processes. On the other hand, predatory journals take advantage of the author-pay model for profit by excluding real peer review and transparency [6]. Reputable open access journals are indexed, meet ethical standards, and may carry impact factors while predatory journals do not enjoy the recognition, indexing and credibility [7]. The difference is their engagement and the focus on quality, transparency, and academic research versus commercial publishing practices that undermine the integrity of academia [2,5].

Gray publishers should be considered, even if their content is indexed in the PubMed. Some of their published work is questioned a lot [8]. MDPI (Multidisciplinary Digital Publishing Institute) and Frontiers are publishers that have been the subjects of discussions, but it should be noted that opinions on whether they are predatory may differ. MDPI is an open access publishing house that manages many peer reviewed journals in the different fields. As some researchers value the open access model, there are many concerns about the peer review quality in some MDPI journals. Authors should also critically evaluate the reputation of the specific journals within the MDPI portfolio considering aspects such as peer-review quality, editorial procedures, and journal impact [8]. Another open access publisher is Frontiers that works on a platform of many scientific journals. Frontiers has participated in the conversations regarding its review and editorial policy, given the fact that some critics have highlighted some issues arising from the business model as well as possible conflicts of interests [9]. On the other hand, Frontiers has tried to address these concerns and many people's opinions may vary on its predatory nature. However, it should be remembered that the environment of scholarly publishing is ever-changing, and publishers may change their practices with time [9]. Additionally, there is a degree of subjectivity in the perceptions of predatory publishing such that what one researcher would consider as predatory may not be seen as such by another [9].

1.2. The harm inflicted by predatory journals on the medical literature

The effects of predatory journals on the medical literature are also very multidimensional and have far-reaching implications. To begin with, these journals participate in the spread of mediocre research by publishing works without any careful peer reviews. This undermines the validity and authority of the medical literature since most of the published materials fail to exhibit scientific precision and evidence-based conclusions. This degradation of quality does not only the scientific community but also endangers the wider healthcare system [10]. Moreover, the presence of the predatory journals undermines trust in the medicine. Healthcare professionals, researchers and also members of the public may doubt the quality of medical journal publications that undermine their trust in the healthcare system. This trust loss can limit the efficient sharing of the critical medical information and also hamper evidence-based practice development [11]. These consequences go beyond the skepticism, as the publication of low quality or fraudulent research in the predatory journals has real world implications. Poor clinical judgment, damaging treatments, and the spread of medical inaccuracies have become serious issues. This disinformation not only compromises the patient safety but also erodes the public health campaigns [12].

Resources are also usually wasted in this process, because the researchers who pay predatory journals for publication usually do not get any credit or impact factor. The amount spent on the publication charges could be reallocated to respectable journals that have a strong peer-review mechanisms, resulting in an improved resource allocation [13]. predatory journals form a distracting background din in the scientific arena that makes it very hard for the researchers and professionals to find reliable sources of information. This interference hinders the advancement of medical science and evidence-based practices, thereby impeding the academic growth [14].

The academic and vocational outcomes are evident, researchers who inadvertently publish with the predatory journals get a damaged reputation. Integration of these publications on CVs undermines the credibility and harms the career path choices, thus creating yet another cycle of professional failures [15]. There is an ethical consideration, especially among the researchers from the low- or middle-income settings who may be seen as targets of the predatory journals due to such factors as financial limitations and lack of awareness. This leads to an ethical dilemma for individuals who might not necessarily have access to superior publishing alternatives that raises many questions on the equitableness of the academia publication process [16].

1.3. Strategies for researchers to avoid predatory journals

It is first necessary to check a journal's reputation and also editorial policies before submitting an article to the journal [17]. It is critical to determine whether a journal is indexed in reliable databases such as PubMed, Scopus, and Web of Science. Researchers should be careful of publishers who flood their inboxes with offers to submit manuscripts or promise speedy publications without peer review [18]. The contact details on the journal's webpage should be verified as well as the editorial boards and submission rules [17]. It is also useful to seek knowledge from the expert colleagues on the reliable and unreliable sources [17]. While not all open-access

journals are predatory, such journals should be perceived with suspicion since many predatory ones use the open access as a decoy for the authors. Article-processing charges (APC) should be reasonable [19]. There are many tools to identify predatory journals, such as Beall's list (now offline), the Directory of Open Access Journals (DOAJ) [20], the "Think, Check and Submit" website [21], and the Committee on Publication Ethics (COPE) [22,23].

1.4. The battle against predatory publishers

The attempt to curtail the rise of predatory journals that abuse the open-access publishing paradigm for a profit by publishing poorly researched or fabricated articles has been going on for some time. A famous historical project was Jeffrey Beall's List, which included potential predatory publishers and journals that were popular until its removal in the year of 2017 [24]. Subsequently, Cabell's International created a blacklist of predatory journals that could become an aid for the researchers and institutions [25] and a practical use of the list was employed by Deora et al. [26] in their study to identify predatory journals in neuroscience which revealed 46 predatory journals out of 360 journals. The Directory of Open Access Journals)DOAJ(has enforced strict inclusion guidelines, thus creating a very credible list of open-access journals [20]. The Committee on Publication Ethics (COPE) offers ethical guidelines and support, and the "Think. Check. Submit." Initiative [23,27] provides researchers with a checklist to assess a journal's legitimacy. Additionally, the Declaration on Research Assessment (DORA) proposes better ways of research assessment where one is encouraged to assess the content rather than the reliance on journal-level metrics [28]. Collaborative work, industry initiatives, as well as educational efforts facilitate the increase of awareness and the formulation of measures aimed at reducing predatory publishing [11]. However, vigilance and informed decision making is still of paramount importance for the researchers to traverse the scholarly publication terrain successfully.

Institutions play a critical role in the fight against predatory publishing, as they implement multi-pronged approaches to minimize its influence [24]. Education serves as a cornerstone, teaching researchers, faculty and students about predatory publishing and equipping them to identify and avoid it [29]. Setting out policy on publication ensures that faculty are publishing in quality legitimate journals and that research is ethically conducted. Supporting the open access platform also conveys a strong institutional commitment to making research transparent [30]. The creation of publication ethics committees formalizes the process for addressing the issue by creating a standing committee within the administration to tackle concerns and intervene when predatory practices are identified [31]. Investing in maintaining existing journal subscriptions to good quality journals ensures that researchers do not feel forced to publish in predatory journals, particularly if open access publishing is not supported from research grants, due to a lack of access [32]. Investing in peer review training teaches researchers to identify good quality peer-reviewed journals opposed to poor quality predatory journals and seeks to remedy the problem [33]. Tying ethical publishing practices into promotion and tenure notifies researchers of the institutional expectation that reputable venues will enhance their career prospects. It thus incentivizes publishing in quality venues and drives academics to avoid predatory publishing [34]. Finally, working with legitimate publishers, organizations and academic societies and professional associations keeps institutions abreast of the latest best practices to promote the publication of good-quality research. Collectively, these integrated measures can conserve a college or university space that resists predatory publishing and avoids its spread through the academy.

Research has focused on predatory journal publisher consciousness among several medical specialties such as dermatology [35], oncology [2] and orthopedic surgery [5]. The results show that many participants in these studies were unaware of the predatory journals. The global anti-predator movement has been reflected in the growing literature focusing on the predatory publishing. But most of the published literature comes from the developed countries [36]. Scientific publishing in Sudan demonstrates a wide range of research areas, including agriculture, medicine and also social sciences. Sudan has recorded a noticeable increase in the scientific publications despite the economic challenges and occasional political instability in the country [37]. For a range of reasons, including career development, the approval in the scientific community, and competition for scholarships, young surgeons and academics are more likely to wish to have their research published. However, this can leave the inexperienced researchers at the mercy of predatory journals if they do not know that they exist. Moreover, the published research on the depth of knowledge of Sudanese health professionals about the open-access and predatory journals is very scarce. The main purpose of this research was to evaluate the Sudanese surgeons' understanding and attitudes towards publishing in the open-access (OA) and predatory journals, as well as the extent of their knowledge and opinions that determine their behavior when submitting their scientific work.

2. Materials & methods

2.1. Study design

This was a cross-sectional electronic survey-based study of orthopedic surgeons. It was conducted from the January 1, 2023 to the April 31, 2023.

2.2. Study population and sample size

At the time of the study, the Sudanese Orthopaedic Surgeons Association (SOSA) had a total of 561 registered surgeons. The electronic survey link was distributed to a total of 561 registered members through the email distribution system of the (SOSA) organization. In order to enhance the rate of response, a reminder was delivered on a biweekly basis. A total of 69 surgeons responded to the survey over the period from January to the end of February with an additional 35 responses collected in the subsequent months of

March and April. The estimation of nonresponse bias was conducted by the application of successive wave analysis, which is grounded on the theoretical framework of response continuum theory. Following the month of February, all further replies were categorized as second-wave responses [38,39].

It's noteworthy to mention that certain demographic groups were underrepresented in the study sample, particularly females. This disparity can be attributed to the limited number of Sudanese female orthopedic surgeons (numbering not more than 10), compared to their male counterparts. Additionally, there was a lower representation of surgeons aged over 60 years. This trend may be explained by the relatively recent emergence of orthopedic surgery as a specialty in Sudan compared to others, with its popularity increasing only over the last two decades.

2.3. The questionnaire designs

The survey was designed utilizing Google Forms and comprised five distinct sections. These segments were specifically structured to evaluate knowledge, attitudes, and practices. The design of these sections was influenced by the information gleaned from previously published works that focused on assessing the awareness of health professionals regarding predatory journals [2,5,15]. The first section was mainly concerned with demographics (age, gender, years of experience, work institution, professional rank, and academic rank) and publication experience (number of publications, how many as first author and how many as corresponding author). The second section included seven questions intended to assess the depth of knowledge about open-access and predatory journals. The third section included eleven questions designed primarily to assess surgeons' general attitudes toward the publication of their scientific work. The fourth section included questions to evaluate surgeons' attitudes toward the publication of their scientific work in open-access and predatory journals. The fifth and final section included five questions to evaluate surgeons' publication practices. Higher values were assigned to responses indicating a higher level of knowledge, positive attitude, or good practice. Bloom's cutoff points were used to determine the overall degree of knowledge, attitude and practice in line with several KAP studies [40–44] as follows.

1. *Knowledge:* A score equal to or more than 80% (5 points) was considered good knowledge, equal to or more than 60% (4 points) was considered moderate knowledge, and less than 60% (4 points) was considered poor knowledge.
2. *Attitudes toward the publication:* A score equal to or more than 80% (44 points) was considered a positive attitude, equal to or more than 60% (33 points) was considered a neutral attitude, and less than 60% (33 points) was considered a negative attitude.

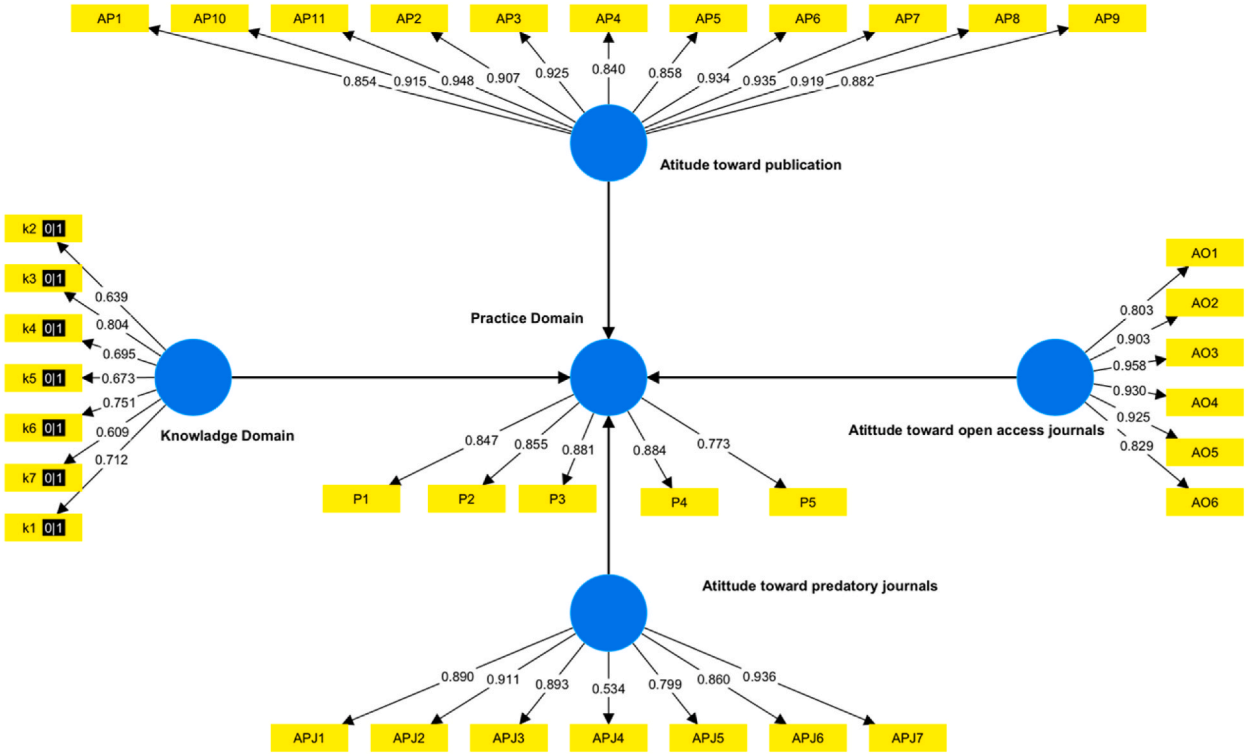

Figure (1). Shows the measurement model and factor loadings for each questionnaire construct. Yellow rectangular shapes represent questions (Factors, Items), while blue circular shapes represent constructs (Latent variables, Domains). Large arrows between circles represent the relationship between latent variables, while small arrows between rectangles and circles represent factor loadings in latent variables.

3. *Attitudes toward the publication in open-access journals:* A score of equal to or more than 80% (24 points) was considered a positive attitude, equal to or more than 60% (18 points) was considered a neutral attitude, and less than 60% (18 points) was considered a negative attitude.
4. *Attitudes toward the publication in predatory journals:* A score of equal to or more than 80% (28 points) was considered a positive attitude, equal to or more than 60% (21 points) was considered a neutral attitude, and less than 60% (21 points) was considered a negative attitude.
5. *Practice:* A score equal to or more than 80% (20 points) was considered good practice, equal to or more than 60% (15 points) was considered moderate practice, and less than 60% (15 points) was considered poor practice.

2.4. Validation of the questionnaire

English language experts reviewed the questionnaire's linguistic clarity, and four senior consultants proved content validity. The questionnaire was presented to a group of 30 surgeons in a pilot study to verify its construct validity and reliability. Factor analysis was performed using SmartPLS software (GmbH, Gewerbering 8, Germany) version 4. The PLS-SEM (partial least squares -structural equation modeling) algorithm depicted in (Fig. 1) was utilized to determine factor loadings for each domain to assess various questionnaire constructs' validity (convergent and discernment) and reliability (internal consistency), any question (item) with factor loading less than 0.4 was removed. All constructs demonstrated composite reliability, and Cronbach's alpha values were greater than 0.7, confirming the questionnaire's reliability. All constructs had AVE (Average variance extracted) value more than 0.5 which signifies convergent validity. Discriminant validity was confirmed using the Fornell and Larker criteria. Approximate model fit was tested by running consistent PLS-SEM bootstrapping, which showed a standardized root mean square residual (SRMR) value of 0.081 (95% CI 0.039–0.101), indicating good model fit (Supplementary File 1).

2.5. Statistical analysis

The data were analyzed using IBM SPSS version 25 (IBM Corp., Armonk, NY). Data exploration revealed that the data were not normally distributed; therefore, for descriptive statistics, frequencies were used to report categorical variables, while medians and

Table (1)
Shows the frequencies of respondents demographic variables and chi-square ($\chi 2$) test result between early (wave1) and late (wave2) respondents. (N = 104), * significant, **$\chi 2$ chi-square**.

Variable	Frequency of respondents Wave1(N69)	Frequency of respondents Wave2 (N35)	Total number of respondents N(104)	percentage	$\chi 2$ (df)	*P-value*
Age					0.9.771 (4)	0.06
<30	2	1	3	2.9		
30–40	19	8	27	26.0		
41–50	29	24	53	51.0		
51–60	17	1	18	17.3		
>60	2	1	3	2.9		
Gender					15.732 (1)	<0.001*
Male	68	26	94	90.4		
Female	1	9	10	9.6		
Professional Rank						
Resident	4	1	5	4.8		
specialist	10	9	19	18.3	2.334 (4)	0.675
senior specialist	18	9	27	26.0		
consultant	33	14	47	45.2		
senior consultant	4	2	6	5.8		
Academic Rank						
Teaching Assistant	8	6	14	13.5		
Assistant professor	40	15	55	52.9	1.835 (2)	.399
Associate professor	7	5	12	11.5		
Years of experience					7.369 (3)	0.061
<5	10	1	11	10.6		
6 to 10	26	13	39	37.5		
11 to 20	28	21	49	47.1		
>20	5	0	5	4.8		
Work institution					5.449 (2)	0.066
Community hospital	50	20	70	67.3		
Private practice	0	2	2	1.9		
University hospital	19	13	32	30.8		
Practice country					4.679 (1)	.096
Resourced countries	41	14	55	52.9		
Under resourced countries	28	21	49	47.1		

interquartile ranges (IQRs) were used for continuous variables. Univariate and multivariable ordinal logistic regression analysis was performed to explore the impact of explanatory variables like demographics and publication experience on the levels of knowledge, attitude and practice and results were reported as crude odd ratios (COR) and adjusted odd ratios (AOR). Successive wave analysis was performed using the chi-square test (2) and Mann–Whitney *U* test to estimate nonresponse bias. A P value of less than 0.05 for the 95% confidence interval was considered significant.

3. Results

3.1. Demographics & publication experience

A survey was conducted among 104 surgeons with a response rate of 18.5%. Successive wave analysis was conducted by comparing the initial and late respondents' characteristics. The $\chi 2$ test revealed a significant increase in female participants in the second wave, but apart from that, there were no significant differences among the rest of the demographic variables (Table 1). Using the Mann–Whitney *U* test and adopting response time as a grouping variable, there were no significant differences in the publication experience (frequency of publications, frequency of being the first author, and frequency of being the corresponding author) mean rank scores between early and late respondents (Table 2). Additionally, there was no significant difference in the level of knowledge, attitude, and practice between early and late respondents (Table 3). These findings suggest that individuals who needed more reminders shared comparable characteristics with early participants. Although the response rate was low, these findings suggest no evidence of nonresponse bias.

Most participants were males, 51% were between 41 and 50, 45.2% were consultants, 47.1% had 11–20 years of experience, 77% were in academic positions, 67.3% were practicing in community hospitals, and 52.9% worked in well-resourced countries (Table 1). The median number of publications was 3.5, with 1 as the first author and 1 as the corresponding author (Table 2).

3.2. Knowledge about open-access and predatory journals

Forty-three percent of respondents were not aware of the differences between open-access and subscription journals, 57.7% did not know the term "predatory journals", and 74% did not know Beall's list of predatory journals (Fig. 2). Forty-nine percent of the participants had poor overall knowledge, and 31.73% had good knowledge (Table 3).

Compared to associate professors, assistant professors (AOR 0.05; 95% CI 0.008–0.339), and teaching assistants (AOR 0.153, 95% CI 0.032 to 0.722) had significantly lower levels of knowledge. Individuals working in community hospitals were significantly less knowledgeable than university hospitals (AOR 0.153, 95% CI 0.032 to 0.722). An increase in years of experience increases the odds of scoring higher level of knowledge (AOR 2.12, 95% CI, 1.267 to 3.532). Additionally, a rise in both the number of publications (AOR 1.56, 95% CI, 1.186 to 2.814) and frequency of being the corresponding author (AOR 3.73, 95% CI, 1.404 to 9.956) increased the odds of scoring higher knowledge level (Table 4).

3.3. General attitude toward publication

Sixty-three percent of respondents agreed that good editorial support was the most important factor when considering a journal for publication, 41% believed that it was good indexing, and 43% believed that it was good peer review (Fig. 3). In addition, 56% had an overall neutral attitude toward publication, followed by 40% who had positive attitudes (Table 3).

Ordinal logistic regression analysis revealed that assistant professors (AOR 0.001, 95% CI 0.003–0.352) and teaching assistants (AOR 0.08, 95% CI 0.01 to 0.32) showed significantly lower attitude scores than associate professors. Individuals working in community hospitals showed significantly lower attitude scores than those working in university hospitals (AOR 0.222, 95% CI 0.041 to 0.596). Working in a well-resourced country was increased the odds of having higher attitude scores (AOR 3.57, 95% CI, 1.435 to 5.708). Furthermore, a rise in both the frequency of being the first author (AOR 6.38, 95% CI, 4.492 to 9.071) and the frequency of being the corresponding author (AOR 1.28, 95% CI, 1.003 to 1.623) increased the odds of having higher attitude levels (Table 5).

3.4. Attitude toward publication in open-access journals

Seventy percent of respondents had a neutral attitude toward publication in an open-access journal, with 50% believing that high visibility and more citations made them better options (Fig. 4). Sixty-eight percent had an overall neutral attitude, followed by 17% who had positive attitudes (Table 3).

Table (2)
Shows the median, range and, the results of Mann-Whitney *U* test to assess the publication experience differences between early (wave1) and late (wave2) respondents. (N = 104), * significant, IQR (interquartile rang).

	Median	Minimum	Maximum	IQR	U-Statistic	*P*-value
Number of publications	3.50	0	36	8.5	1125	0.560
How many as First author	1	0	12	5	970	0.308
How many as corresponding author	1	0	27	3	1054	0.261

Table (3)
Shows the frequencies of respondent's categories among the different study domains and the chi-square ($\chi 2$) test result between early (wave1) and late (wave2) respondants. (N = 104), * significant, **$\chi 2$ chi-square, OA open-Access, PJ Predatory Journals**.

Variable	Frequency of respondents Wave1(N69)	Frequency of respondents Wave2 (N35)	Total number of respondents	Percentage	$\chi 2$ (df)	*p-value*
Knowledge					0.529 (2)	0.768
Poor	34	17	51	49.04		
Moderate	12	8	20	19.23		
Good	23	10	33	31.73		
Attitude toward publication					2.008 (2)	0.366
Negative	3	0	3	2.88		
Neutral	37	22	59	56.73		
Positive	29	13	42	40.38		
Attitude toward OA					5.346 (2)	.069
Negative	12	3	15	14.42		
Neutral	49	22	71	68.27		
Positive	8	10	18	17.31		
Attitude toward PJ					3.273 (2)	.195
Negative	12	6	18	17.31		
Neutral	54	24	78	75.00		
Positive	3	5	8	7.69		
Practice					2.991 (2)	0.224
Poor	36	12	48	46.2		
Moderate	17	12	29	27.9		
Good	16	11	27	26		

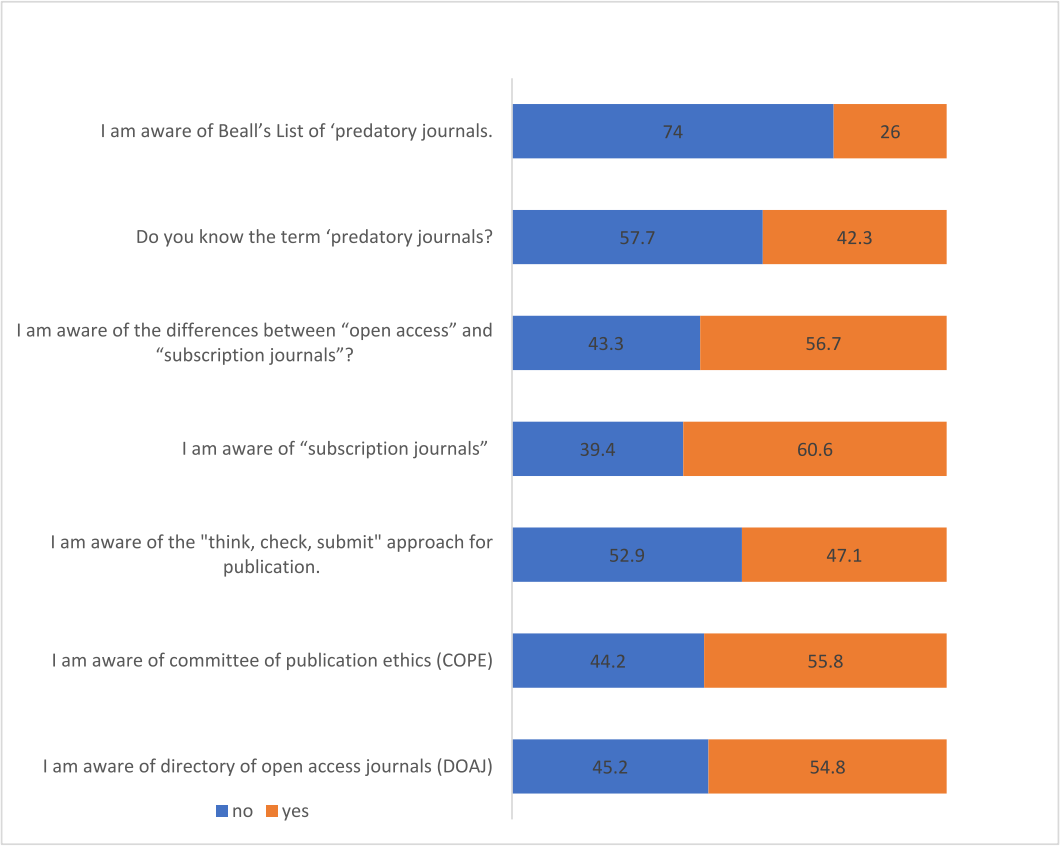

Figure (2). Bar chart showing the frequencies of respondents' answers to the knowledge questions (N = 104).

Table (4)
Shows predictors of knowledge score using multivariable ordinal logistic regression.* significant, AOR = Adjusted Odd Ratio. (N = 104).

Predictors	AOR	AOR 95% conifidance interval		*P-value*
		lower	Higher	
Age	0.924	0.782	1.094	0.36
Gender				
Male →Female	0.593	0.054	6.554	0.67
Professional Rank	0.67	0.175	2.567	0.559
Academic Rank				
Teaching Assistant→ Associate professor	**0.053**	**0.008**	**0.339**	**0.002***
Assistant professor →Associate professor	**0.152**	**0.032**	**0.722**	**0.018***
Years of experience	**2.116**	**1.267**	**3.532**	**0.004***
Work institution				
Community hospital→ University hospital	**0.157**	**0.035**	**0.711**	**0.016***
Private practice→ University hospital	0.597	0.026	13.755	0.747
Practice country				
Resourced→ Under resourced countries	0.018	1.866	0.151	0.182
Number of publications	**1.56**	**1.186**	**2.814**	**0.002***
How many as First author	0.859	0.445	1.656	0.651
How many as corresponding author	**3.738**	**1.404**	**9.956**	**0.008***

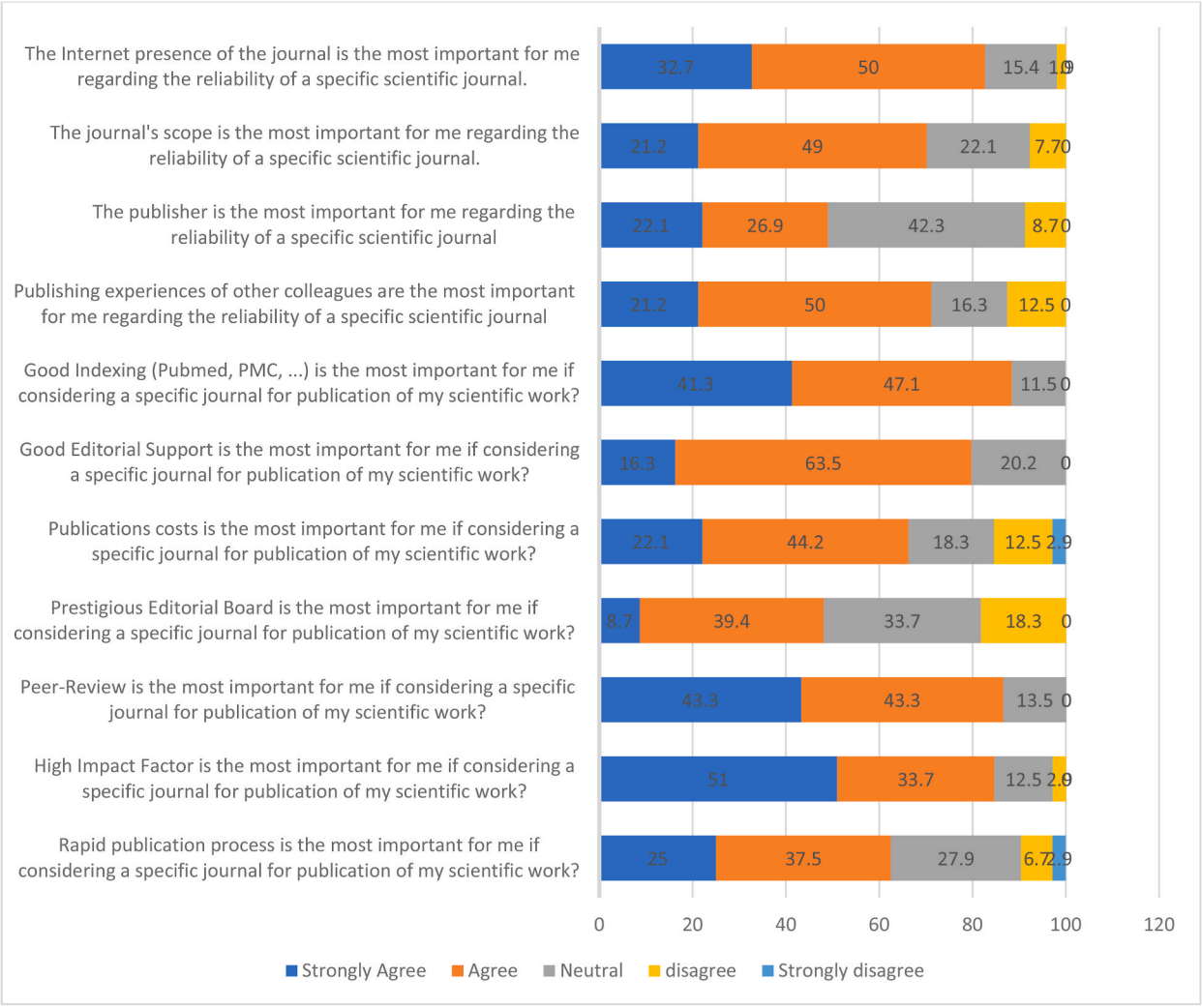

Figure (3). Bar chart showing the frequencies of respondents' answers to the general publication attitude questions (N = 104).

Table (5)
Shows predictors of general attitude score in publication using multivariable ordinal logistic regression,* significant, AOR = Adjusted Odd Ratio. (N = 104).

Predictors	AOR	AOR 95% confidence interval		*P-value*
		lower	Higher	
Age	1.006	0.894	1.131	0.927
Gender				
Male →Female	0.851	0.091	7.908	0.887
Professional Rank	1.335	0.528	3.374	0.542
Academic Rank				
Teaching Assistant→ Associate professor	**0.08**	**0.01**	**0.23**	**0.005***
Assistant professor →Associate professor	**0.001**	**0.0003**	**0.052**	**< 0.001***
Years of experience	0.912	0.756	1.099	0.332
Work institution				
Community hospital→ University hospital	**0.222**	**0.041**	**0.596**	**0.04***
Private practice→ University hospital	0.023	0.008	5.991	0.184
Practice country				
Resourced→ Under resourced countries	**3.572**	**1.435**	**5.708**	**0.001***
Number of publications	0.995	0.83	1.194	0.959
How many as First author	**6.381**	**4.492**	**9.071**	**0.012***
How many as corresponding author	**1.276**	**1.003**	**1.623**	**0.047***

Participants working in community hospitals had significantly lower attitude scores than university hospital participants (AOR 0.023, 95% CI 0.003 to 0.164) (Table 6).

3.5. Attitude toward publication in predatory journals

Sixty percent of the respondents were neutral about the statement that predatory journals have no or insufficient peer review, and 52% were also neutral about the statement that predatory journals have high publication fees and no editorial board (Fig. 5). Seventy-five percent had an overall neutral attitude toward publication in predatory journals, followed by 17% who had negative attitudes (Table 3).

Individuals working in community hospitals had significantly lower attitude scores than those working in university hospitals (AOR 0.33, 95% CI 0.11 to 0.94). Working in well-resourced countries was associated with increased odds of higher attitude scores (AOR 1.36, 95% CI, 1.14 to 1.95). Moreover, a rise in the frequency of being the first author (AOR 4.69, 95% CI, 1.449 to 15.175) increases

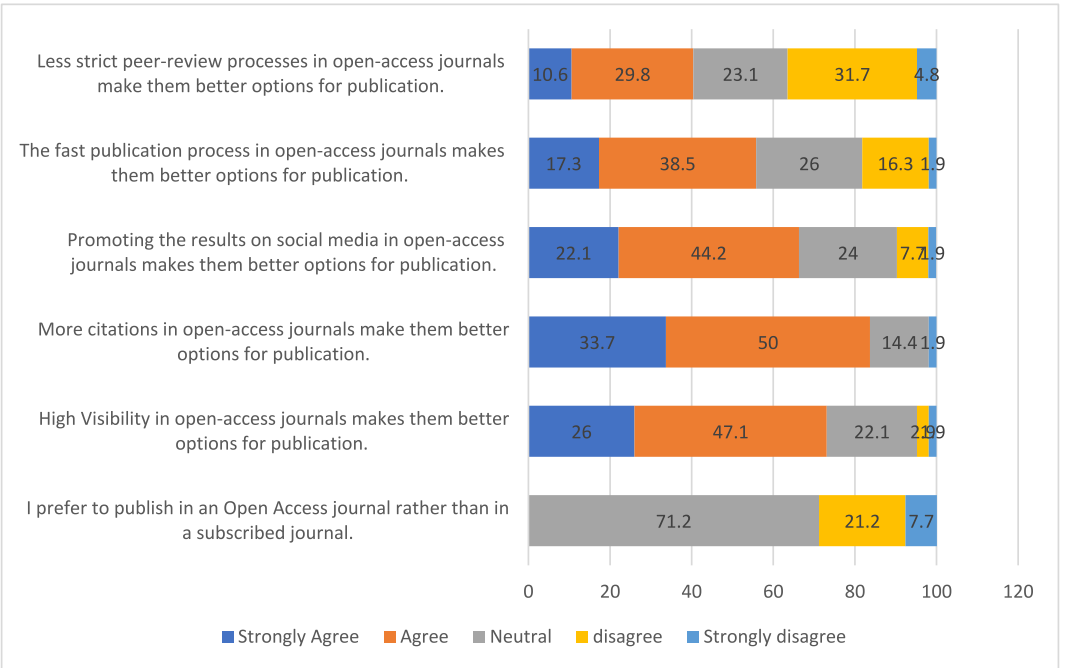

Figure (4). Bar chart showing the frequencies of respondents' answers to the attitude toward publication in open access journal questions (N = 104).

Table (6)
Shows predictors of attitude toward publication in open access journals scores using multivariable ordinal logistic regression * significant, AOR = Adjusted Odd Ratio. (N = 104).

Predictors	AOR	AOR 95% confidence interval		*P-value*
		lower	Higher	
Age	0.917	0.817	1.028	0.138
Gender				
Male →Female	1.316	0.136	12.749	0.813
Professional Rank	0.799	0.343	1.861	0.603
Academic Rank				
Teaching Assistant→ Associate professor	1.272	0.107	15.055	0.849
Assistant professor →Associate professor	0.235	0.024	2.282	0.212
Years of experience	1.026	0.856	1.23	0.784
Work institution				
Community hospital→ University hospital	**0.023**	**0.003**	**0.164**	**<0.001***
Private practice→ University hospital	0.049	0	8.451	0.251
Practice country				
Resourced→ Under resourced countries	2.149	0.538	8.584	0.279
Number of publications	1.013	0.845	1.215	0.889
How many as First author	1.315	0.966	1.789	0.081
How many as corresponding author	0.783	0.613	1.099	0.095

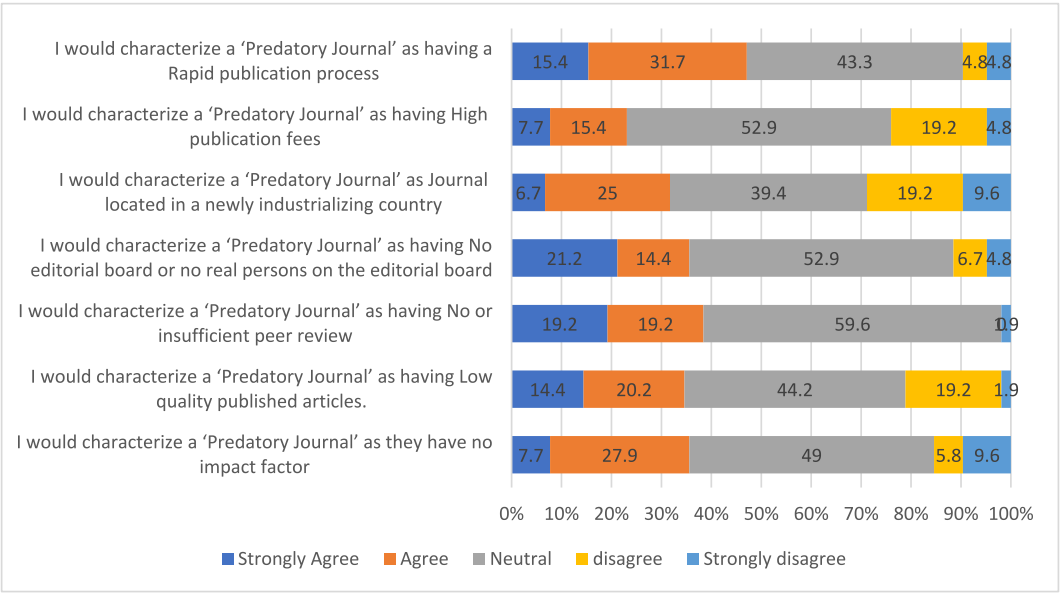

Figure (5). Bar chart showing the frequencies of respondents' answers to questions about the attitude toward publication in predatory journals (N = 104).

the odds of having higher attitude scores (Table 7).

3.6. Practice in scientific publication

Forty-five percent of the surgeons checked the title of a journal before publishing, 72% never used Beall's list to check predatory journals, 31% never used Scopus to check journals, and 22% never used Web of Science to check journals (Fig. 6). Forty-six percent had poor practice scores in the publication of their scientific work, followed by 29% with moderate scores and 26% with good practice scores (Table 3).

Compared to associate professors, assistant professors (AOR 0.02, 95% CI 0.004–0.6) and teaching assistants (AOR 0.121, 95% CI 0.017 to 0.837) had significantly lower practice scores. Working in community hospitals was associated with significantly lower practice scores than working in university hospitals (AOR 0.10, 95% CI 0.13 to 0.761). Working in well-resourced countries was increased the odds of having higher practice scores (AOR 3.60, 95% CI, 1.435 to 5.708). More years of experience (AOR 1.88, 95% CI, 1.29 to 2.734), a rise in the frequency of publications (AOR 1.66, 95% CI, 1.492 to 2.908) and the frequency of being the corresponding author (AOR 2.08, 95% CI, 1.052 to 4.113) increases the odds of having higher practice scores (Table 8).

Table (7)
Shows predictors of attitude toward characterization and publication in Predatory journals scores using multivariable ordinal logistic regression.* significant, AOR = Adjusted Odd Ratio. (N = 104).

Predictors	AOR	AOR 95% confidence interval		*P-value*
		lower	Higher	
Age	0.651	0.386	1.1	0.109
Gender				
Male →Female	0.19	0.003	13.112	0.442
Professional Rank	0.19	0.003	13.112	0.442
Academic Rank				
Teaching Assistant→ Associate professor	**0.089**	**0.06**	**0.5**	**0.014***
Assistant professor →Associate professor	2.869	0.136	60.477	0.498
Years of experience	**1.878**	**1.29**	**2.734**	**0.001***
Work institution				
Community hospital→ University hospital	**0.33**	**0.11**	**0.94**	**0.037***
Private practice→ University hospital	0.44	0.01	15.78	0.651
Practice country				
Resourced→ Under resourced countries	**1.36**	**1.14**	**1.95**	**0.039***
Number of publications	1.257	0.07	1.937	0.078
How many as First author	**4.69**	**1.449**	**15.175**	**0.01***
How many as corresponding author	4.369	0.856	22.289	0.076

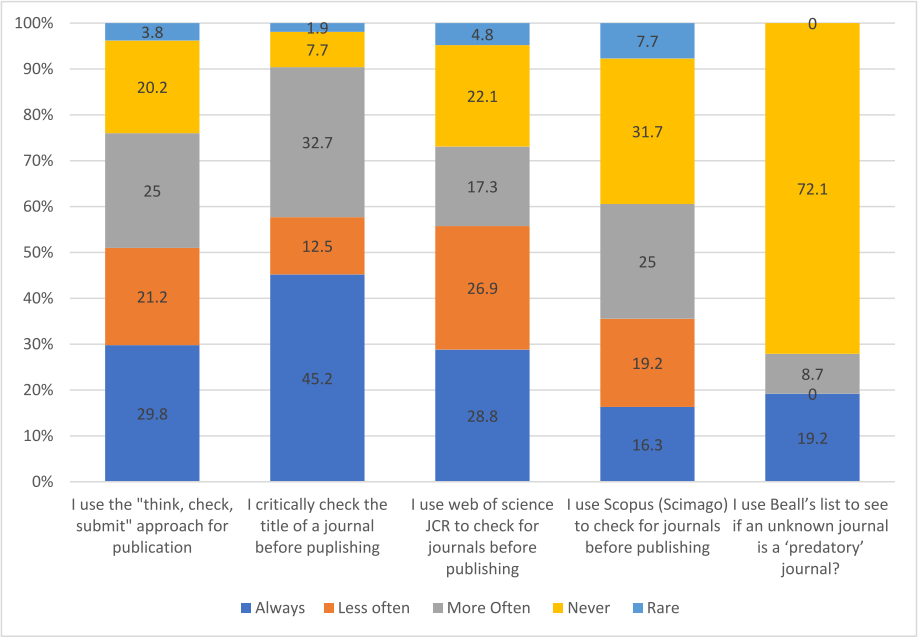

Figure (6). Bar chart showing the frequencies of respondents' answers to the practice in publication questions (N = 104).

3.7. The impact of the knowledge and attitude scores on practice

To assess the impact of the knowledge score and attitude scores on practice scores, univariate ordinal regression revealed that a higher knowledge score (OR 2.19, 95% CI, 1.78 to 2.74), general attitude scores (OR 1.15, 95% CI, 1.07 to 1.23), attitude toward open-access journals (OR 1.2, 95% CI, 1.11 to 1.31), and attitude toward predatory journal scores (OR 1.23, 95% CI, 1.13 to 1.35) significantly increases the odds of having higher practice scores. However, in multivariate analysis, all predictors significantly increase the odds of having higher practice scores except for attitudes toward predatory journals (Table 9).

4. Discussion

Predatory journals are a major threat to the quality of published research because they reduce the chances of recognition and citations of good articles [22]. It is important to note that predatory journals should not be confused with open-access journals [45]. To our knowledge, this study is the first to investigate the depth of knowledge and beliefs about predatory publishing among Sudanese orthopedic surgeons.

Table (8)
Shows predictors of practice scores in publication using multivariable ordinal logistic regression.* significant, AOR = Adjusted Odd Ratio. (N = 104).

Predictors	AOR	AOR 95% conifidance interval		*P-value*
		lower	Higher	
Age	0.845	0.726	1.983	0.069
Gender				
Male →Female	1.353	0.162	11.307	0.78
Professional Rank	0.185	0.052	2.663	0.112
Academic Rank				
Teaching Assistant→ Associate professor	**0.02**	**0.004**	**0.6**	**<0.001***
Assistant professor →Associate professor	**0.121**	**0.017**	**0.837**	**0.032***
Years of experience	**1.878**	**1.29**	**2.734**	**0.001***
Work institution				
Community hospital→ University hospital	**0.100**	**0.013**	**0.761**	**0.026***
Private practice→ University hospital	**0.10**	**0.03**	**0.36**	**<0.001***
Practice country				
Resourced→ Under resourced countries	**3.572**	**1.435**	**5.708**	**0.001***
Number of publications	**1.669**	**1.492**	**2.908**	**0.01***
How many as First author	1.04	0.613	1.763	0.885
How many as corresponding author	**2.08**	**1.052**	**4.113**	**0.035***

Table (9)
Shows the impact of knowledge and attitude scores on practice scores using univariate and multivariable ordinal logistic regression.* significant, OR= Crude Odd Ratio, AOR = Adjusted Odd Ratio. (N = 104).

	Univariate analysis				Multivariable analysis			
Predictors	OR	OR 95% confidence interval		*P-value*	AOR	AOR 95% confidence interval		*P-value*
		lower	**Higher**			**lower**	**Higher**	
Knowledge	**2.19**	**1.78**	**2.74**	**< .001***	**2.15**	**1.686**	**2.79**	**< .001***
General attitude	**1.23**	**1.13**	**1.35**	**< .001***	**1.1**	**1.013**	**1.19**	**0.025***
Attitude toward open access journals	**1.2**	**1.11**	**1.31**	**< .001***	**1.18**	**1.05**	**1.33**	**0.008***
Attitude toward predatory journals	**1.15**	**1.07**	**1.23**	**< .001***	1.07	0.961	1.21	0.223

The survey revealed that the majority of the respondents were not aware of "Beall's list of predatory journals," and more than 50% were not aware of the term "predatory journals"(Fig. 2), which is in line with studies among oncologists [2], dermatologists [35], and orthopedic surgeons in Germany [5]. Our study also revealed that more than 40% (Fig. 1) of the participants did not know the difference between subscription and open-access journals, and almost 50% had an overall poor knowledge score for predatory and open-access journals (Table 3). These results increase the risk of involvement in predatory publishing. Our findings revealed that working in well-resourced countries, having a higher academic rank, working in academic institutions, having an increased number of publications, and having a higher frequency of being a corresponding author were positive predictors of knowledge scores (Table 4). These results are consistent with those of many previous studies [2,5,35].

Although predatory publishing is a global problem, there is geographical impact on the depth of knowledge as well as number of publications in predatory journals. One study by Beshyah et al. [46] targeting doctors in the middle east and Africa had revealed that less than one third of the participants were knowledgeable about the characteristics of predatory publishers. Another investigation done by Moher et al. [47] revealed that the majority of authors publishing in predatory platforms were from middle and low income countries.

The lack of awareness of predatory journals can be rooted, among other things, in limited knowaldge, inadequate education regarding scholarly publishing practices, the ubiquitous pressure to publish, cunning methods utilized by predatory journals, resource scarcities in specific academic environments, language barriers, desire to publish, and the growing focus on open-access publishing [48,49]. The article processing charge (APC) is an important factor because although some predatory journals offers high APC comparable to open-access journals, most of them offers affordable APC which encourage researchers form developing countries to publish their work in their platforms especially those under the pressure of "publish or perish" concept [50]. This was also supported by a study by Bohannon, which revealed that the majority of authors in predatory journals are from developing nations, particularly Nigeria, India, and a few other African and Middle Eastern nations [1,50].

More than 50% of the participants strongly agreed that the journal impact factor is very important for them to consider a journal for publication, followed by 40%, who strongly agreed that good indexing is very important in selecting journals for publication (Fig. 3). These findings are in agreement with the results of oncologists [2]. However, more than 40% (Table 5) of the respondents were neutral toward the importance of the publisher's name. Unfortunately, many predatory journals falsify an impact factor [22] on their homepage, and some studies have reported that 14.9–24.7% of predatory journals are indexed in PubMed [51]. Therefore, many factors should be considered when selecting journals for publication. Our study revealed that more than 50% of the surgeons had an overall neutral general attitude toward publication (Table 3). Moreover, working in university hospitals, higher academic rank, working in well-resourced countries, and increased frequencies of publication as the first author and corresponding author had a

positive impact on total attitude scores (Table 5).

Fifty percent of the respondents felt that publishing in open-access journals enhanced the citation of their work, while 47% agreed that publishing in open-access journals promoted exposure to their work (Fig. 4). Despite this, 70% of the participants were indifferent (Table 3) about the choice of open-access vs. subscription journals, in contrast to the German study [5], where the majority of respondents were against. Working in university hospitals was the only predictor that improved the likelihood of positive attitudes toward open-access journals (Table 6).

In contrast to the results of other studies [2,5,35], the majority of participants in our survey gave neutral answers to all of the questions that measured their attitudes in the characterization of predatory journals (Figs. 5), and 75% had overall neutral attitude scores regarding predatory journals (Table 3). These findings might be explained by their overall lack of knowledge, as evidenced by their poor knowledge scores (50%). It was also noted that practicing in university hospitals, increased years of experience, higher academic rank, working in well-resourced countries, and increased frequency of publication as the first author were associated with higher attitude scores toward the characterization of predatory journals (Table 7).

Forty-five percent of the participants always critically checked the journal title before submission (Fig. 6), which is a good practice; this is in agreement with previous studies [2,5,35]. However, 72% never used Beall's list of predatory journals and 31% never used Scopus to check journals before submission. Only 26% of the participants had good overall practice scores (Table 3), which can be explained by a lack of knowledge. It was also noted that practicing in university hospitals, increased years of experience, higher academic rank, working in well-resourced countries, increased frequency of publications, and increased frequency of publications as corresponding authors were associated with higher practice scores (Table 8).

Our study revealed that higher knowledge was associated with more positive attitudes and good practice scores (Table 9), which signifies the importance of raising awareness about the dangers of predatory journals and improving researchers' approach to verifying journals before submission of their work. Therefore, Organizing educational webinars and workshops to assist researchers in discerning predatory journals is important [52,53]. It is advisable to consult reputable sources, such as the Committee on Publication Ethics (COPE), for authoritative guidance on ethical practices in the field of publishing, and they provide excellent lectures and webinars at their site [27].

To enhance the effectiveness of anti-predatory journal training, collaboration with academic institutions is important [54]. This collaboration involves partnering with institutions to integrate training into their academic programs. The Directory of Open Access Journals (DOAJ) offers a comprehensive compilation of esteemed open access journals. The Think, Check, and Submit initiative provides researchers with resources to aid in the process of identifying appropriate academic journals for publication. A good example is that some regional universities had already posted links for the aforementioned portals on their library web sites.

Engaging in collaborative efforts with academic publishers to establish comprehensive and unambiguous protocols for the dissemination of scholarly works is another strategy to guard against predatory publishing [55]. The World Association of Medical Editors (WAME) provides guidelines pertaining to ethical practices in the field of publishing [56]. The use of case studies as a research method has gained significant prominence in academic circles. Case studies involving the in-depth analysis of this inquiry pertain to the presentation of empirical instances that exemplify the ramifications associated with disseminating research in predatory journals, as well as strategies to circumvent such circumstances [54,57,58].

Ensuring that editors are well-informed about predatory journals is paramount in upholding the integrity of academic publishing, because one study revealed that 49% of editors were not familiar with Beall's list [59]. This awareness can be cultivated through educational initiatives, such as training sessions and workshops focused on distinguishing reputable journals from predatory ones [29,59]. Clear editorial guidelines and criteria should be established, emphasizing the importance of rigorous peer-review processes and ethical standards. Editors should be encouraged to rely on the established metrics and indexing databases.

According to the research results, it is recommended that SOSA play an active role in organizing training sessions and webinars to raise awareness about the risks associated with these journals and ways to avoid them. Additionally, establishing collaboration with academic institutions, both locally and internationally, is identified as a crucial element in implementing effective anti-predatory measures.

5. Limitations of the study

It should be noted, as a primary limitation of our study, that we surveyed only the surgeons listed on the SOSA mailing list. As a result, not all of the Sudanese orthopedic and trauma surgeons were represented in our research sample. However, it is very important to note that our results correspond well with the those previously published.

The other limitation that we need to mention is the relatively small sample used in this particular study. On the other hand, we performed a very detailed analysis of the successive waves and found no signs of nonresponse bias. Most of the survey respondents were academics, a pattern that may be attributed to the increased research interest noted among the people affiliated with academic institutions. This creates the risk of self-selection bias in the sample because individuals who are active in scholarly activities may be more prone to participate. It is also worth mentioning that the survey was aimed at people interested in scientific publishing, thus defining a certain group of the those engaged in research activities. The questionnaire used a self-completion method, which would again introduce the problem of the selection bias. To overcome this risk, the researchers adopted a plan of regular reminders every two weeks. Although these reminders were designed to promote a wider involvement and to minimize bias, it is essential to note that some extent of bias may remain. Moreover, all the survey questions were designed as closed-ended in order to eliminate the information bias. However, this method might not always capture the full range of the participants' views or allow for the expression of more subtle opinions. Closed questioning may limit the respondents to a selection of preset options, thereby overlooking many unique points of

view or lived experiences. Thus, while the efforts were directed at minimizing the bias in research, the findings should be interpreted considering the shortcomings of the survey and peculiarities of a particular sample.

6. Conclusion

A significant proportion of participants in the survey exhibited a lack of awareness regarding the concept of predatory journals and the potential negative impacts they could have on the credibility and caliber of the scientific literature. Moreover, the utilization and understanding of predatory publications, specifically standardized methodologies for identifying predatory journals, are infrequently employed and inadequately comprehended. Therefore, it is imperative to implement further educational initiatives regarding the risks associated with predatory publication practices within the field of orthopedics.

Ethical statement

The study protocol received ethical approval from the Research Ethics Committee at King Faisal University under the reference KFU-REC-2023-ETHICS797 and from the research and training office of SOSA. Participation in the survey was entirely voluntary, and completion of the survey implied the participant's consent to take part in the study. To ensure confidentiality, all participant information was anonymized.

Data availability statemen

Data will be made available on request.

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CRediT authorship contribution statement

Ahmed Hassan Kamal: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft.

Declaration of competing interest

The author declares he has no known financial interest or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.heliyon.2024.e26448.

References

[1] J. Bohannon, Who's afraid of peer review? Science 342 (6154) (2013) 60–65.
[2] G. Richtig, et al., Awareness of predatory journals and open access among medical oncologists: results of an online survey, ESMO Open 4 (6) (2019) e000580.
[3] S. Gandevia, Publication pressure and scientific misconduct: why we need more open governance, Spinal Cord 56 (9) (2018) 821–822.
[4] Silver, A. *Controversial website that lists 'predatory' publishers shuts down.* Nature 2017 2017/01/18; Available from: https://doi.org/10.1038/nature.2017.21328.
[5] E. Maurer, et al., Awareness of predatory journals and open access publishing among orthopaedic and trauma surgeons - results from an online survey in Germany, BMC Muscoskel. Disord. 22 (1) (2021) 365.
[6] B.-C. Björk, D. Solomon, Open access versus subscription journals: a comparison of scientific impact, BMC Med. 10 (1) (2012) 73.

[7] L. Shamseer, et al., Potential predatory and legitimate biomedical journals: can you tell the difference? A cross-sectional comparison, BMC Med. 15 (1) (2017) 28.
[8] D. Nicholas, et al., *Never mind predatory publishers… what about 'grey' publishers?* El Profesional de la información, 2023.
[9] J.E. Frantsvåg, Beware of predatory publishing – but also of low-quality blacklists, Nordic Perspectives on Open Science 8 (2023).
[10] C. Vakil, Predatory journals: authors and readers beware, Can. Fam. Physician 65 (2) (2019) 92–94.
[11] D.A. Forero, et al., Negative effects of "predatory" journals on global health research, Ann Glob Health 84 (4) (2018) 584–589.
[12] A. de La Blanchardière, et al., [Predatory journals: a real threat for medical research. 2 Assess their consequences and initiate a response], Rev. Med. Interne 42 (6) (2021) 427–433.
[13] Y. Yamada, How to protect the credibility of articles published in predatory journals, Publications 9 (1) (2021) 4.
[14] M.F. Abad-García, Plagiarism and predatory journals: a threat to scientific integrity, Anales de Pediatría (English Edition) 90 (1) (2019) 57.e1–57.e8.
[15] G. Richtig, et al., Problems and challenges of predatory journals, J. Eur. Acad. Dermatol. Venereol. 32 (9) (2018) 1441–1449.
[16] L.E. Ferris, M.A. Winker, Ethical issues in publishing in predatory journals, Biochem. Med. 27 (2) (2017) 279–284.
[17] M. Leonard, et al., Ten simple rules for avoiding predatory publishing scams, PLoS Comput. Biol. 17 (9) (2021) e1009377.
[18] T.A. Wilkinson, et al., A cross-sectional study of predatory publishing emails received by career development grant awardees, BMJ Open 9 (5) (2019) e027928.
[19] J. Bohannon, Who's afraid of peer review? Science 342 (6154) (2013) 60–65.
[20] Directory of open access journals(DOAJ). https://doaj.org/, 2023.
[21] *Think. Check. Submit.* [cited 2023; Available from: https://thinkchecksubmit.org/.
[22] S.A. Elmore, E.H. Weston, Predatory journals: what they are and how to avoid them, Toxicol. Pathol. 48 (4) (2020) 607–610.
[23] *The Committee on Publication Ethics (COPE)*. [cited 2023; Available from: https://publicationethics.org/.
[24] S.A. Elmore, E.H. Weston, Predatory journals: what they are and how to avoid them, Toxicol. Pathol. 48 (4) (2020) 607–610.
[25] S. Das, S.S. Chatterjee, Cabell's blacklist: a new way to tackle predatory journals, Indian J. Psychol. Med. 40 (2) (2018) 197–198.
[26] H. Deora, et al., Avoiding predatory publishing for early career neurosurgeons: what should you know before you submit? Acta Neurochir. 163 (1) (2021) 1–8.
[27] C.O.P.E. Presentations, Recordings of COPE Seminars and Webinars, 2018 [cited 2023; Available from: https://publicationethics.org/resources/seminars-and-webinars.
[28] A. Hatch, S. Curry, Changing How We Evaluate Research Is Difficult, but Not Impossible, vol. 9, Elife, 2020.
[29] A. Al-Ani, et al., Effect of an educational intervention on the knowledge, attitudes, and practices of healthcare workers at King Hussein Cancer Center towards predatory publishers, BMC Med. Educ. 23 (1) (2023) 355.
[30] S. Hadad, N. Aharony, Factors influencing researchers to publish in open-access: is it a self-decision or a self-reinforcing cycle? Online Inf. Rev. 47 (6) (2023) 1065–1082.
[31] S. Sengupta, S.G. Honavar, Publication ethics, Indian J. Ophthalmol. 65 (6) (2017) 429–432.
[32] E.D. Dalton, C. Tenopir, B.-C. Björk, Attitudes of North American academics toward open access scholarly journals, Portal Libr. Acad. 20 (1) (2020) 73–100.
[33] IAP, Executive Summary, in Combatting Predatory Academic Journals and Conferences, IAP, 2022, p. 11.
[34] A. Abrizah, N. Ahmad Kharman Shah, D. Nicholas, Malaysian early career researchers on the ethics of scholarly publishing, Malays. J. Libr. Inf. Sci. 24 (1) (2019) 75–96.
[35] G. Richtig, et al., Knowledge and influence of predatory journals in dermatology: a pan-Austrian survey, Acta Derm. Venereol. 99 (1) (2019) 58–62.
[36] A. Beshyah, M. Basher, S. Beshyah, A bibliometric analysis of the international medical literature on predatory publishing, Ibnosina J. Med. Biomed. Sci. 12 (2020) 23.
[37] M.M. Ali Elhassan, J. Monge-Nájera, Y.-S. Ho, Bibliometrics of Sudanese scientific publications: subjects, institutions, collaboration, citation and recommendations, Rev. Biol. Trop. 70 (1) (2022) 30–39.
[38] J.S. Armstrong, T.S. Overton, Estimating nonresponse bias in mail surveys, J. Market. Res. 14 (3) (1977) 396–402.
[39] T.J. Duszynski, et al., Successive wave analysis to assess nonresponse bias in a statewide random sample testing study for SARS-CoV-2, J. Publ. Health Manag. Pract. 28 (4) (2022) E685–e691.
[40] T. Dorji, T. Tshering, K. Wangdi, Assessment of knowledge, attitude and practice on tuberculosis among teacher trainees of Samtse College of Education, Bhutan, PLoS One 15 (11) (2020) e0241923.
[41] D.A. Doan, et al., Knowledge, attitudes, and practices of university students regarding COVID-19: a cross-sectional study in Vietnam, BMC Publ. Health 22 (1) (2022) 2016.
[42] K. Kaliyaperumal, Guideline for Conducting a Knowledge, Attitude and Practice (KAP) Study. AECS Illumination 4 (1) (2004) 7–9.
[43] P.A. Wahidiyat, et al., Cross-sectional study on knowledge, attitude and practice towards thalassaemia among Indonesian youth, BMJ Open 11 (12) (2021) e054736.
[44] R. Olum, et al., Coronavirus disease-2019: knowledge, attitude, and practices of health care workers at Makerere University Teaching Hospitals, Uganda, Front. Public Health 8 (2020) 181.
[45] M. Rupp, et al., Predatory journals: a major threat in orthopaedic research, Int. Orthop. 43 (3) (2019) 509–517.
[46] S. Beshyah, I. Hajjaji, A. Elbarsha, Awareness of predatory journals among physicians from Africa and the middle East: an exploratory survey, Ibnosina J. Med. Biomed. Sci. 10 (4) (2018) 136–140.
[47] D. Moher, et al., Stop this waste of people, animals and money, Nature 549 (7670) (2017) 23–25.
[48] S. Kurt, Why do authors publish in predatory journals? Learn. Publ. 31 (2) (2018) 141–147.
[49] H. Rawas, et al., Falling prey to predatory journals: experiences of nursing faculty, International Journal of Africa Nursing Sciences 13 (2020) 100222.
[50] J. Xia, et al., Who publishes in "predatory" journals? Journal of the Association for Information Science and Technology 66 (7) (2015) 1406–1417.
[51] A. Manca, et al., The surge of predatory open-access in neurosciences and neurology, Neuroscience 353 (2017) 166–173.
[52] A. Rijhwani, A. Parveen, Webinars/Online seminars – against, Journal of Medical Evidence 3 (2) (2022) 182.
[53] A. Adane Kinde, Avoiding predatory journals and publishers: a cross-sectional study, Eur. Sci. Ed. 47 (2021).
[54] R.M. Jingura, et al., Extent of publishing in predatory journals by academics in higher education institutions in Zimbabwe: a case study of a university, Account. Res. (2023) 1–15.
[55] H. Khan, et al., Disseminating biomedical research: predatory journals and practices, Indian J. Rheumatol. 17 (Suppl 2) (2022) S328–S333.
[56] Committee, W.P.E. *Recommendations on Publication Ethics Policies for Medical Journals*. [cited 2023; Available from: https://wame.org/recommendations-on-publication-ethics-policies-for-medical-journals..
[57] M. Dora, R.K. Kampa, Predatory publishing in Indian LIS research: a case study, Ser. Rev. 49 (1–2) (2023) 23–29.
[58] S. Gabrielsson, S. Eriksson, T. Godskesen, Predatory nursing journals: a case study of author prevalence and characteristics, Nurs. Ethics 28 (5) (2021) 823–833.
[59] A.J. Cohen, et al., Perspectives from authors and editors in the biomedical disciplines on predatory journals: survey study, J. Med. Internet Res. 21 (8) (2019) e13769.