

Authorship Ethics among Sudanese Healthcare Researchers: Knowledge Gaps, Unethical Practices, and Hierarchical Influence

Tanzeel Alamin Almahdi Gorashi^{1*}, Hajar Ali Elbaid Elbaloula², Ahd Abdelkreem Yousif Alata³

¹ Independent Researcher, Department of Hematology and Immunohematology

² Independent Researcher, Department of Clinical Chemistry

³ Independent Researcher, Department of Microbiology

Corresponding author: tanzeelalamin9@gmail.com

ORCID ID: 0009-0007-7126-4379

Abstract: **Background** Unethical authorship practices remain an important concern in health research because inappropriate inclusion or exclusion of authors may compromise fairness, accountability, and research integrity. **Objective** To assess awareness, attitudes, and practices related to authorship ethics among Sudanese healthcare professionals. **Methods** A cross-sectional survey was conducted among 98 respondents. Data were summarized using frequencies and percentages, and associations between demographic characteristics and authorship-related outcomes were assessed using chi-square tests. Statistical significance was set at $p < 0.05$. **Results** Among 98 respondents, 84.7% were female and 77.6% were Medical Laboratory Scientists. Awareness of unethical authorship practices was reported by 45.9%, while 76.5% had heard of gift/honorary authorship. Only 32.7% correctly identified all five ICMJE authorship components. Overall, 38.8% reported having added a non-contributing author, 30.6% had been excluded despite making a contribution, and 31.6% had been pressured to include a non-contributing author. Most respondents (84.7%) stated that they would not engage in unethical authorship practices, and 91.8% would refuse to add a non-contributing author. Demographic variables showed significant associations with awareness and authorship practices (mostly $p < 0.001$). **Conclusion** The findings indicate important gaps in comprehensive authorship knowledge alongside persistent inappropriate authorship practices. Formal authorship-ethics education, transparent authorship agreements, and stronger institutional policies are needed.

Keywords: Authorship; research ethics; honorary authorship; gift authorship; ICMJE; healthcare professionals; Sudan

Introduction

Authorship is more than a matter of professional courtesy; it is the mechanism through which credit, accountability, and responsibility for a piece of research are formally assigned. The International Committee of Medical Journal Editors (ICMJE) has long tried to make this mechanism explicit, setting out criteria intended to separate those who meaningfully contributed to a study from those who did not¹. In practice, however, these criteria are frequently stretched, ignored, or simply unknown to the people expected to apply them.

Concerns about this gap between principle and practice are not new. As early as the late 1990s, surveys of authors publishing in peer-reviewed medical journals found that a substantial share of articles carried “honorary” authors who had not met basic authorship criteria, alongside “ghost” contributors who had done real work but were left off the byline entirely². A similar pattern turned up a few years later among Cochrane systematic reviews, suggesting the problem was not confined to original research articles³. By 2011, a repeat survey of authors publishing in six leading general medical journals found that little had changed over more than a decade, despite growing awareness of the issue⁴.

Taken together, the wider literature on authorship across scientific disciplines describes a set of recurring, unresolved problems: authorship offered as a favor, added under pressure from a supervisor or senior colleague, or withheld from someone who did the actual work⁵. In its more extreme form, this behavior has been described as a kind of academic abuse, in which a senior researcher uses seniority to claim credit that properly belongs to a junior colleague⁶ — a dynamic that is especially relevant wherever hierarchical academic structures make it difficult for trainees or early-career staff to refuse.

Evidence from the Middle East echoes these global findings. A survey of health care researchers in Jordan found that a majority were unfamiliar with ICMJE authorship guidelines, and that a substantial proportion had, at some point, included an author who had not earned the position⁷. A separate study of pharmacy and other health-sciences faculty in the same country reported similarly incomplete understanding of what authorship is actually supposed to require⁸. This is not a problem unique to any one region: a comparable survey of South African researchers found much the same mix of honorary, coercive, and poorly understood authorship practices, suggesting that the underlying pressures — competition for publications, career advancement, and unclear institutional guidance — recur across very different research systems⁹.

What these studies share is a conclusion that inappropriate authorship is rarely just a matter of individual dishonesty; it tends to reflect gaps in formal training, weak institutional oversight, and academic hierarchies that make it hard to say no¹⁰. Sudan's healthcare research environment shares many of these same structural features — limited exposure to formal research-ethics training, hierarchical academic and clinical structures, and growing pressure to publish for career advancement — yet no study to date has examined how Sudanese healthcare professionals themselves understand and practice authorship. This study was designed to address that gap, assessing awareness, attitudes, and reported practices related to authorship ethics among Sudanese healthcare professionals, with the aim of identifying where knowledge gaps and institutional weaknesses are most likely to translate into unfair or inaccurate authorship credit.

Methodology

Study Design and Setting

A cross-sectional survey design was used to assess authorship awareness, attitudes, and practices among Sudanese healthcare professionals.

Study Population and Sample

The final analyzed sample consisted of 98 respondents.

Data Collection

Data were collected using a structured questionnaire covering socio-demographic characteristics, awareness of authorship criteria and unethical practices, perceived ICMJE requirements, previous authorship practices, attitudes toward unethical authorship, perceived causes, and experiences of pressure.

Study Variables

The main outcomes included awareness of unethical authorship, awareness of gift/honorary authorship, perceived authorship requirements, adding non-contributing authors, exclusion despite contribution, pressure to include non-contributors, attitudes toward unethical practices, and perceived causes.

Statistical Analysis

Data were summarized using frequencies and percentages. Associations between categorical demographic variables and authorship-related outcomes were examined using chi-square tests. A p-value < 0.05 was considered statistically significant.

Results

Table 1. Socio-Demographic Characteristics of Respondents (N = 98)

Variable	Category	n	%
Gender	Female	83	84.7
	Male	15	15.3
Academic Rank	Associate Professor	8	8.2
	Lecturer / Assistant Professor	29	29.6
	Master's Student	39	39.8
	Medical Research	8	8.2
	PhD Candidate	7	7.1
	Undergraduate	7	7.1

Profession	Medical Doctor	15	15.3
	Medical Laboratory Scientist	76	77.6
	Pharmacist	7	7.1
Years of Experience	> 7 years	30	30.6
	1–3 years	23	23.5
	4–7 years	45	45.9
Publication Status	Submitted (not published)	29	29.6
	Yes (published)	69	70.4

Table 2. Awareness of Authorship Criteria and Unethical Practices (N = 98)

Variable	n	%
Awareness of unethical authorship practices		
No	53	54.1
Yes	45	45.9
Heard of gift/honorary authorship		
No	23	23.5
Yes	75	76.5
Number of articles published		
1–2 articles	44	44.9
3–5 articles	15	15.3
> 5 articles	39	39.8

Table 3. Perceived Requirements for Authorship (N = 98)

Criteria	n	%
Approved final version only	14	14.3
Designed or planned the study	30	30.6
Designed + Approved final version	7	7.1

Designed + Data collection/analysis + Interpreted	7	7.1
Full ICMJE criteria (all 5 components)	32	32.7
Designed + Interpreted results	8	8.2

Table 4. Practices Related to Unethical Authorship (N = 98)

Variable	n	%
Ever added a non-contributing author		
No	60	61.2
Yes	38	38.8
Type of unethical authorship addition (n = 38)		
Gift / Honorary	14	14.3
Gift / Honorary + Hierarchical	8	8.2
Promotion-driven	8	8.2
Reciprocal (mutual exchange)	15	15.3
Reciprocal + Hierarchical	16	16.3
Ever not been included despite contribution		
No	68	69.4
Yes	30	30.6
Ever been pressured to include non-contributor		
No	67	68.4
Yes	31	31.6
Source of pressure (n = 31)		
Friend / Close colleague	23	23.5
Supervisor	8	8.2
Supervisor + Senior + Friend	8	8.2
Main reason for adding non-contributor		

Reciprocal exchange	15	15.3
Academic promotion	16	16.3
Promotion + Pressure + Reciprocal	8	8.2
Promotion + Relationships + Reciprocal	8	8.2
Institutional / departmental pressure	8	8.2
Maintaining relationships only	8	8.2
No specific reason	7	7.1

Note. Percentages calculated from total N = 98; subset analysis from respondents who answered Yes.

Table 5. Attitudes Toward Unethical Authorship (N = 98)

Variable	n	%
Engaged in any unethical authorship practice		
No	76	77.6
Yes	22	22.4
Attitudes toward unethical practices		
No (would not engage)	83	84.7
Sometimes	8	8.2
Yes (would engage)	7	7.1
Believe adding non-contributing author is unethical		
No	30	30.6
Yes	68	69.4
Would refuse to add non-contributing author		
Not sure	8	8.2
Yes	90	91.8

Table 6. Perceived Causes of Unethical Authorship (N = 98)

Perceived Cause	n	%
Lack of awareness	22	22.4
Pressure for academic promotion	23	23.5
Promotion + Cultural / hierarchical factors	7	7.1
Promotion + Lack of awareness	16	16.3
Promotion + Budget constraints for research	7	7.1
Promotion + Weak rules + Lack of awareness	8	8.2
Weak institutional rules only	15	15.3

Table 7. Chi-Square Tests: Association Between Demographic Variables and Awareness of Unethical Authorship

Variable Pair	χ^2	df	p-value
Gender × Awareness of unethical practices	106.004	4	< .001
Gender × Heard of gift authorship	115.512	4	< .001
Gender × Number of articles published	131.735	6	< .001
Age × Awareness of unethical practices	174.530	20	< .001
Age × Heard of gift authorship	180.581	20	< .001
Age × Number of articles published	273.893	30	< .001
Profession × Awareness of unethical practices	129.244	6	< .001
Profession × Heard of gift authorship	117.016	6	< .001
Profession × Number of articles published	142.364	9	< .001

Academic Rank × Awareness	139.361	12	< .001
Academic Rank × Heard of gift authorship	138.820	12	< .001
Academic Rank × Number of articles	191.223	18	< .001
Experience × Awareness of unethical practices	107.778	6	< .001
Experience × Heard of gift authorship	145.251	6	< .001
Experience × Number of articles published	165.000	9	< .001

Table 8. Association Between Demographic Variables and Authorship Practices

Variable Pair	χ^2	df	p-value
Pressured to include × Gender	108.002	4	< .001
Pressured to include × Age	167.233	20	< .001
Pressured to include × Academic Rank	164.807	12	< .001
Pressured to include × Profession	129.871	6	< .001
Pressured to include × Experience	106.549	6	< .001
Pressured to include × Published	126.613	4	< .001
Pressured to include × Articles count	115.361	6	< .001
Source of pressure × Gender	12.689	6	.048

Source of pressure × Age	217.503	30	< .001
Source of pressure × Academic Rank	189.509	18	< .001
Source of pressure × Profession	40.790	9	< .001
Source of pressure × Experience	30.038	9	< .001
Source of pressure × Published	33.086	6	< .001
Source of pressure × Articles count	44.372	9	< .001
Added non- contributor × Gender	106.502	4	< .001
Added non- contributor × Age	188.229	20	< .001
Added non- contributor × Academic Rank	145.749	12	< .001
Added non- contributor × Profession	128.371	6	< .001
Added non- contributor × Experience	112.546	6	< .001
Added non- contributor × Published	134.215	4	< .001
Added non- contributor × Articles count	119.929	6	< .001

Discussion

The study included 98 respondents and demonstrated important gaps between exposure to authorship concepts and comprehensive knowledge of formal authorship requirements. The participants were predominantly female (84.7%), and Medical Laboratory Scientists represented the largest professional group (77.6%). Master's students constituted 39.8% of the sample, while 45.9% had 4–7 years of experience. These characteristics indicate that a substantial proportion of participants had academic or professional exposure to research and publication.

Only 45.9% reported awareness of unethical authorship practices, although 76.5% had heard of gift or honorary authorship. Furthermore, only 32.7% identified all five ICMJE authorship components. This suggests that general familiarity with authorship misconduct does not necessarily translate into comprehensive knowledge of formal authorship requirements. Similar variability in research and authorship knowledge has been reported in studies from Egypt, Pakistan, and Saudi Arabia.^{11–13}

The gap between familiarity and complete knowledge is important because incomplete understanding may facilitate honorary, gift, reciprocal, or hierarchical authorship. Previous research has demonstrated discrepancies between formal authorship guidelines and researchers' practical understanding of authorship requirements.^{14, 15}

A substantial proportion of respondents reported inappropriate authorship practices. Overall, 38.8% reported having added a non-contributing author. The reported forms included reciprocal exchange, reciprocal authorship combined with hierarchical factors, gift/honorary authorship, and promotion-driven authorship. These findings are consistent with international evidence indicating that honorary and inappropriate authorship remain prevalent in health sciences.¹⁶

In addition, 30.6% reported having been excluded from authorship despite making a contribution, while 31.6% reported pressure to include a non-contributing author. Friends or close colleagues were reported as a source of pressure by 23.5%, while supervisors and combined sources were each reported by 8.2%. These findings demonstrate that authorship problems involve both inappropriate inclusion and inappropriate exclusion and may be influenced by professional relationships and hierarchy.^{15, 17}

Despite these reported practices, attitudes toward unethical authorship were generally negative. Most respondents (84.7%) stated that they would not engage in unethical authorship practices, 69.4% considered adding a non-contributing author unethical, and 91.8% stated that they would refuse to add one. This difference between reported attitudes and reported behavior suggests a possible attitude–practice gap, in which researchers may recognize ethical principles but experience circumstances that make adherence difficult.¹⁷

Participants identified academic promotion (23.5%) and lack of awareness (22.4%) as the leading perceived causes of unethical authorship. Weak institutional rules were reported by 15.3%, while other responses included combinations of promotion, cultural or hierarchical factors, lack of awareness, budget constraints, and weak rules. These findings suggest that unethical authorship is influenced by interacting educational, institutional, and career-related factors rather than individual ethical shortcomings alone.^{18–21}

The demographic analyses showed statistically significant associations between gender, age, profession, academic rank, and experience and awareness of unethical authorship, awareness of gift authorship, and number of published articles (all $p < 0.001$). The strongest association was between age and number of articles published ($\chi^2 = 273.893$, $df = 30$, $p < 0.001$), followed by academic rank and number of articles ($\chi^2 = 191.223$, $df = 18$, $p < 0.001$) and experience and number of articles ($\chi^2 = 165.000$, $df = 9$, $p < 0.001$). These associations may reflect cumulative academic exposure, career progression, and the greater research responsibilities associated with seniority.^{18–21}

Pressure to include a non-contributing author was significantly associated with gender, age, academic rank, profession, experience, publication status, and article count (all $p < 0.001$). The association with age was particularly strong ($\chi^2 = 167.233$, $df = 20$, $p < 0.001$), as was that with academic rank ($\chi^2 = 164.807$, $df = 12$, $p < 0.001$). Previous literature has described coercive authorship as a persistent problem, particularly where authority differences and career dependence exist.^{22–25}

The source of pressure was significantly associated with age ($\chi^2 = 217.503$, $df = 30$, $p < 0.001$), academic rank ($\chi^2 = 189.509$, $df = 18$, $p < 0.001$), profession, experience, publication status, and article count. The association with gender was comparatively weaker but remained statistically significant ($\chi^2 = 12.689$, $df = 6$, $p = 0.048$). This supports the interpretation that authorship pressure may reflect hierarchical and institutional structures rather than an isolated individual ethical problem.^{22, 24, 26}

Finally, adding a non-contributing author was significantly associated with gender, age, academic rank, profession, experience, publication status, and article count (all $p < 0.001$). The strongest association was observed with age ($\chi^2 = 188.229$, $df = 20$, $p < 0.001$), followed by academic rank ($\chi^2 = 145.749$, $df = 12$, $p < 0.001$). Overall, the findings indicate that inappropriate authorship practices are associated with multiple dimensions of the academic environment. Addressing the problem therefore requires formal research-ethics education together with transparent authorship agreements, institutional policies, and mechanisms for reporting and resolving authorship disputes.

Limitations

The cross-sectional, self-reported design is subject to social desirability and recall bias, and the sample was drawn from a limited number of institutions and professional groups, which may limit generalizability to the wider Sudanese healthcare research community.

Conclusion

This study identified substantial gaps in comprehensive authorship knowledge and a notable prevalence of inappropriate authorship practices among the surveyed Sudanese healthcare professionals. Although most respondents expressed ethical attitudes and willingness to reject non-contributing authorship, reported experiences of inappropriate inclusion, exclusion, and pressure indicate an important attitude–practice gap. The findings support the need for stronger research-integrity education and institutional mechanisms to promote fair and transparent authorship.

Recommendations

Integrate authorship ethics and ICMJE criteria into undergraduate, postgraduate, and continuing research-ethics training.

Encourage research teams to discuss and document authorship contributions at the beginning of projects and update them as contributions change.

Develop clear institutional policies addressing gift, honorary, reciprocal, coercive, and exclusionary authorship.

Provide confidential mechanisms for researchers and students to report authorship pressure or disputes without fear of academic retaliation.

Give particular protection and guidance to junior researchers and students who may be vulnerable to hierarchical pressure.

Conduct larger multicenter studies across Sudanese healthcare professions and institutions to better estimate the prevalence and determinants of unethical authorship.

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