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# Comparing the participation of men and women in academic medicine in medical colleges in Sudan: A cross-sectional survey

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## Abstract:

**INTRODUCTION:** In different countries around the world, the involvement of women in academic medicine was less in comparison with men. This study aimed to assess whether there were significant gender differences in research perception, practice, and publication in Sudan.

**METHODS:** This was an analytical cross-sectional study was carried out using questionnaire among 153 teaching staff of five Sudanese medical faculties from both genders, including teaching assistants, lecturers, assistant professors, associate professors, and full professors.

**RESULTS:** There were no significant differences among participants' gender regarding their universities, qualifications, research training received after graduation, and participation in research currently or in the past or current position, but female participants seem to be younger as their mean of age was 38.8 ( $\pm 9.2$ ) compared with 42.6 ( $\pm 10.1$ ) for males. Importantly, the males' researcher has not only published significantly more than females but also appeared to have significantly more years of research experience. The mean score of research perception was higher among male participants who indicated that they had a more favorable perception of research.

**CONCLUSION:** The study showed that in Sudanese medical colleges significantly higher percentage of men published scientific papers more than women. In addition, the male also had a significantly higher mean score of research perception which indicated that they had a more favorable perception of research.

## Keywords:

Academic medicine, female, male, Sudan

## Introduction

Besides the fact that research is regarded as a tool of scientific progress for any nation,<sup>[1]</sup> it also plays a major role in the field of medicine and development of both medical practice and academic work.<sup>[2]</sup> Therefore, research is part of the activities of medical staff in most of the Sudanese medical school. Several studies showed less perception and involvement of women in comparison with men in the practice of research among faculty members in

medical colleges.<sup>[3-5]</sup> One of the factors that found to be significantly affecting research perception and practice among faculty members is gender.<sup>[6,7]</sup>

For instance, Alghanim and Alhamali in Saudi Arabia found that 42.2% of males faculty members had published their research comparing with only 28.4% of females ( $P = 0.020$ ).<sup>[3]</sup> In Pakistan significantly, a higher proportion of men were involved in research compared to women (men: 50.0% and women: 30.8%;  $P = 0.01$ ).<sup>[5]</sup> This observation of less female involvement

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in academic medicine was also reported in the USA and Nigeria.<sup>[8,9]</sup> Importantly, many studies showed the presence of high negative perception of academic medicine among female in comparison with men.<sup>[10,11]</sup> For instance, it was shown that women in the Arab countries were often confined to lower-ranking faculty positions having more to do with teaching than with research.<sup>[12]</sup> Different factors can influence the contribution of women in academic medicine. For example, in Lebanon, socioeconomic factors; demographic factors; family networks and interpersonal connections; government, legal frameworks, and legislation; religious were shown to influence women contribution in Academic medicine.<sup>[13]</sup> Other factors that decrease women contribution in academic medicine in the Middle East and North Africa (MENA) regions were attributed to the patriarchic atmosphere of educational institutions, the gender climate, lack of mentoring and training in research and in leadership and the difficulties to achieve work and family life balance. In Sudan and MENA regions, the number of women joining the faculty of medicine is almost similar or exceeded the number of men. In certain specialties such as pediatric and obstetrics and gynecology, the number of women exceeded the number of men.<sup>[14-16]</sup>

In the presence of adequate support, the number of women who joined academic medicine was shown to be almost similar or exceeded the number of men. For example, in Saudi Arabia, women contribution in academic medicine was assessed for 21 years in one university. Women joined academic medicine were found to be 4.4% in comparison with 4% of males of the total graduates. Importantly, women specialized in various fields and progressed equitably with the men in their postgraduate studies. It worth mentioning that women in this study progressed slowly in academic medicine rank and this delay was attributed to family, and social responsibilities and lack of clear policies about the adequate support the medical school can provide. This study showed that women in MENA are capable in the presence of adequate support to progress well with their academic career.<sup>[17]</sup> Little information is known about the gender differences in Sudanese medical colleges concerning perception and practice of research. Therefore, this study aimed to assess whether there were significant gender differences in research perception, practice, and publication in Sudan.

## Methods

This was a quantitative analytical cross-sectional study, conducted in the period from July 2016 to July 2017. The study recruited teaching staff of Sudanese medical faculties from both genders, including teaching assistants, lecturers, assistant professors, associate professors, and

full professors. Five medical faculties were included in this study; three of them were governmental (Bahri, Gadarif, and Kordofan Universities) and the other two are private (The National Ribat University and Sudan International University). Two out of these chosen five medical faculties are established outside the Capital, Khartoum. Regarding sampling, we have obtained lists of teaching staff from the authorities to make the sample frame. Then, sample size was calculated by the following equation:

$$n = \frac{N}{1 + N(d)^2}$$

o Where:

n: is the sample size

N: is the population size

d: is the degree of accuracy desired (0.05).

The total number of teaching staff in the five medical schools previously mentioned is about 390.

$$n = \frac{390}{1 + 390(0.05)^2} = 197.5$$

Then because the population size is small, the adjusted sample was used according to the following equation:

$$n = \frac{n_0}{1 + (n_0 - 1)/N}$$

$$\frac{197.5}{1 + (197.5 - 1)/390} = 131.7$$

According to the equation, the sample size for this study is 132. It is increased to 180 to compensate for non respondents and inadequately filled questionnaires.

## Data collection and analysis

The self-administered questionnaires were distributed across staff in these five medical colleges. The questionnaire consisted of four parts as follows: (i) sociodemographic data (besides age, gender, and marital status, we also added qualification, university, years of experience, current position at university, medical specialty, and years since graduation). (ii) research practice (questions about whether received research training, whether participated in research apart from necessary research for MBBS, MSc, MD, or Ph. D, Other questions about types of research, number of publications, oral and poster presentations, and whether published as the first or co-authors). (iii) research difficulties and barriers,

and (iv) perception of research: this was assessed using Likert response scale from 1 to 5 (1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; and 5 = strongly agree). The perception section included 14 statements representing many aspects concerning medical research. This part was a predesigned validated structured questionnaire used to assess research perception in previous studies.<sup>[18,19]</sup> We have previously published details about sampling and data collection, and in this occasion, we have done further analysis to assess the participation of men and women in academic medicine in medical colleges in Sudan.<sup>[19]</sup> The collected data were analyzed using version 24 of the IBM statistical package for social science (SPSS) program (Chicago, IL, USA). A Chi-square test was carried out on the relationships between demographics and other variables. ANOVA was used to compare means of perception scores among different subgroups. A value of  $P < 0.05$  was considered statistically significant.

### Ethical consideration

The research ethics committee ethically approved the research at The National Ribat University, Khartoum,

Sudan. Permission and approval were obtained from the authorities of the medical faculties. Informed consent was attached with the questionnaire, including the purpose of the study, voluntary participation, and confidentiality.

## Results

### Distribution of the study sample according to universities, qualifications, and demographic features

A total of 153 respondents, submitted adequately filled questionnaires, were included in the study. The response rate was 85%. Sixty-five percent of respondents were male ( $n = 100$ ), and the mean age of them all was 41.25 (standard deviation  $\pm 9.92$ ) years. 90 (59%) were from public universities, and 63 (41%) were from private ones. The majority have the MD (36.8%), and MSc (30.9%) as qualification and almost half of them are assistant professors (49%) [Table 1]. There were no significant differences among participants' gender regarding their universities, qualifications, or current position, but female participants seem to be younger as their mean of

**Table 1: Distribution of the study sample according to universities, qualifications, current position and marital status, with mean and standard deviation of participants' age, years since graduation and years of experience (compared among gender)**

Variance	All, n (%)	Comparison among gender		P
		Male, n (% among sex)	Female, n (% among sex)	
<b>University</b>				
Bahri	26 (17)	15 (15)	11 (20.8)	0.147
Kordofan	35 (22.9)	20 (20)	15 (28.3)	
Gadarif	29 (19)	23 (23)	6 (11.3)	
SIU	30 (19)	17 (17)	13 (24.5)	
Ribat	33 (21.6)	25 (25)	8 (15.1)	
Total	153 (100)	100 (100)	53 (100)	
<b>Qualification</b>				
MBBS	8 (5.3)	3 (3)	5 (9.4)	0.499
MSc	47 (30.9)	30 (30.3)	17 (32.1)	
MD	56 (36.8)	39 (39.4)	17 (32.1)	
PhD	16 (10.5)	10 (10.15)	6 (11.3)	
Membership/fellowship	25 (16.4)	17 (17.2)	8 (15.1)	
<b>Current position</b>				
TA	8 (5.2)	3 (3)	5 (9.4)	0.435
Lecturer	43 (28.1)	29 (29)	14 (26.4)	
Assistant Professor	75 (49)	48 (48)	27 (50.9)	
Associate Professor	23 (15)	17 (17)	6 (11.3)	
Professor	4 (2.6)	3 (3)	1 (1.9)	
<b>Marital status</b>				
Single	29 (19.1)	13 (13.1)	16 (30.2)	0.004*
Married	120 (78.9)	86 (86.9)	34 (64.2)	
Divorced	2 (1.3)	0	2 (3.8)	
Widowed	1 (0.7)	0	1 (1.9)	
Age, mean $\pm$ SD	41.3 $\pm$ 9.9	42.6 $\pm$ 10.1	38.8 $\pm$ 9.2	0.045*
Years of experience, mean $\pm$ SD	8.1 $\pm$ 6.5	9.1 $\pm$ 6.9	6.2 $\pm$ 5.3	0.016*
Years since graduation, mean $\pm$ SD	15.8 $\pm$ 9.3	16.5 $\pm$ 9.6	14.6 $\pm$ 8.8	0.238

\*P value <0.05 significant, TA=Teaching assistants, SD=Standard deviation, SIU=Sudan International University

age was 38.8 (±9.2) compared with 42.6 (±10.1) for males. Furthermore, there is a significant difference in years of experience [Table 1].

### Comparison of gender regarding research experience and output

There were no significant differences between male and female participants regarding research training received after graduation, and participation in research currently or in the past. However, the percentage of those who published their research was more among male participants. The mean score of research perception was higher among male participants who indicated that they had a more favorable perception of research. More male participants have published their work, but the difference is statistically significant in the case of publication as co-authors [Table 2]. The detailed questions on research perception with responses compared among gender are shown in Table 3. A significant difference in perception of the male was noted in research during medical school, recruitment and for promotion and also understanding for research methodology [Table 3].

### Research barriers among female and male academic staff

Less female participants have chosen “lack of financial incentives” as one of the most important research barriers (45.3%) compared to male participants (77.8%) with  $P = 0.000$ . The same significant differences appeared in the other two barriers; “work-related stress” and “lack of motivation” which were indicated more by male participants [Table 4].

## Discussion

In this cross-sectional study, the male proportion is almost double compared to the female gender in selected universities. This higher representation of males in academia and holding of academic and research positions is not uncommon.<sup>[20]</sup> Even though male: female is almost 2:1, the findings reflect that there is no difference between male and female in practicing research training or being involved in research projects. Importantly, this study showed that male have higher publication output than female. This can be attributed in part to the fact that women are also having their own challenges of looking after families and children.<sup>[21]</sup> Another reason, this study showed that the perception toward research and its importance and role in the medical field is generally higher among male doctors. Khan *et al.*, mentioned that good perception is usually associated with the better production of research.<sup>[5,22,23]</sup>

It is reasonable to suggest that men and women have the same enthusiasm for research as both agreed that teaching research methodology should be part of the curriculum

**Table 2: Comparison of gender regarding research training, participation in research, current involvement in research, publication, and research perception**

Variance	Sex		P
	Male, n (% among sex)	Female, n (% among sex)	
Received research training after graduation			
Yes	81 (82.7)	42 (79.2)	0.607
No	17 (17.3)	11 (20.8)	
Ever participated in research			
Yes	71 (72.4)	39 (73.6)	0.881
No	27 (27.6)	14 (26.4)	
Currently involved in research			
Yes	60 (61.9)	25 (51)	0.210
No	37 (38.1)	24 (49)	
Research publication			
Yes	47 (47.5)	16 (30.2)	0.039*
No	52 (52.5)	37 (69.8)	
Published as the first author	38 (38.8)	14 (26.4)	0.127
Published as co-author	41 (41.8)	11 (20.8)	0.009*
Research perception, mean±SD	4.16±0.39	3.99±0.51	0.031*

\*P value <0.05 Significant, SD=Standard deviation

and it is important to be conducted in medical schools.<sup>[4,5]</sup> Despite this positive approach, women scored significantly less in these two areas; “research record should be an important criterion for recruitment and promotion of teaching staff.” In addition, female doctors think that their understanding of research methodology is not good. This lack of understanding of research methodology may affect the attitude and practice of research. A similar finding was reported by the study of Alghanim and Alhamali in Saudi Arabia, participants who did not publish research articles, reported lack of knowledge in research methodology.<sup>[3]</sup> This finding requires attention not only because it will decrease research productivity by female faculty members but also it may affect their students’ perception and practice of research indirectly. Although lack of research funding is a common problem across the world even in rich countries, large proportions in both male and female doctors believe that “lack of funding” is the main barriers (83% among males and 74% among females) and this was not statistically significant ( $P = 0.18$ ).<sup>[3,24]</sup> Therefore, it is plausible to suggest this may decrease motivation in particular among women in a low resource setting country like Sudan.

Despite the fact that the following factors were not found to be statistically significant (lack of statistical support, supervisors, allocated research time an research skills), we believe that more investment and research capacity building are needed. Other areas for improvement are,

**Table 3: Perception of research among male and female academic staff**

Statement	Perception		
	Male, mean±SD	Female, mean±SD	P
Role of research in the medical field is important	4.89±0.31	4.75±0.68	0.079
Conducting research during medical school is important	4.47±0.67	4.31±0.78	0.210
Research participating should be made compulsory to all medical students	4.37±0.72	4.10±0.83	0.038*
Teaching research methodology should be part of the curriculum	4.72±0.56	4.60±0.87	0.312
Research conduction during medical school has a positive impact on medical students	4.47±0.67	4.13±0.95	0.013*
Research record should be an important criterion for recruitment and promotion of teaching staff	4.39±0.77	4.10±1.00	0.048*
Research conduction reinforces teamwork spirit	4.33±0.78	4.12±0.92	0.143
Research is a part of my long-term career goals	4.39±0.75	4.13±0.86	0.064
I think that I have a good understanding of research methodology	3.95±0.89	3.58±0.96	0.020*
Patient outcome improves with continued medical research	4.43±0.69	4.40±0.87	0.833
Undertaken research increases the burden in already over-curriculum (heavy load - educational or clinical) medical student	2.81±1.13	2.88±0.94	0.689
A medical student can plan and conduct good and publishable research projects	3.92±0.85	3.87±0.84	0.730
I have been encouraged by my seniors to get involved in any research activity	3.65±1.03	3.46±1.15	0.303
I think I have received adequate undergraduate education in research?	2.95±1.06	2.67±1.17	0.149
I am interested in doing research	4.45±0.78	4.42±0.85	0.832
Being a medical teacher is encouraging me to participate in research activities	4.33±0.75	4.37±0.82	0.770

\*P value <0.05 Significant, Data are presented as the mean±SD, compared among genders. SD=Standard deviation

**Table 4: Comparison between male and female participants regarding research barriers**

Barriers	Male, n (% among sex)	Female, n (% among sex)	P
Lack of financial incentives	77 (77.8)	24 (45.3)	0.000*
Lack of funding	82 (82.8)	39 (73.6)	0.178
Lack of statistical support	30 (30.3)	16 (30.2)	0.988
Lack of supervisors	27 (27.3)	12 (22.6)	0.533
Work-related stress	64 (64.6)	23 (43.4)	0.012*
Lack of allocated research time	43 (43.4)	16 (30.2)	0.110
Lack of research skills	20 (20.2)	17 (32.1)	0.104
Lack of motivation	32 (32.3)	9 (17)	0.042*
Restricted literature access	14 (14.1)	6 (11.3)	0.624
Research is difficult	4 (4)	5 (9.4)	0.179
Restricted internet access	14 (14.1)	7 (13.2)	0.874
Restricted computer access	1 (1)	2 (3.8)	0.243
Difficulty of getting papers accepted in peer-reviewed journals	23 (23.2)	10 (18.9)	0.534

\*P value <0.05 Significant

but less effect on this study outcome was: “restricted literature access,” “perception that research is difficult,” “restricted internet accesses”, “restricted computer access,” and “difficulty in getting papers accepted in journals.” It is possible to suggest that large studies are needed to elicit factors that may decrease research practice in Sudan. Unfortunately, factors such as “lack of financial incentives,” work-related stresses, and lack of motivation are main barriers for practicing research

with statistically significant difference ( $P = 0.00, 0.01,$  and  $0.04,$  respectively). However, work-related stress as a research barrier was reported in many studies.<sup>[3]</sup> Furthermore, male doctors usually have a dual practice of teaching and being clinicians at the public and private sectors at the same time. Appropriate rewards/ incentives and time allocation are considered essential in promoting research cultures.<sup>[25,26]</sup>

In spite of these findings which showed that male doctors mentioned more barriers than female doctors, but still, their productivity in terms of publications as first and co-authors are higher than female doctors. This may be attributed to positive male perception about research as mentioned above. Laurel Edmund *et al.*, reported that women are generally interested in teaching more than research and they lose commitment to research as their academic education progress.<sup>[27]</sup> Furthermore, less production in academic and research areas is also among women was also reported in other similar studies.<sup>[28]</sup>

This study is not without limitations. The cross-sectional design may not allow for generalization of the results to the whole universities in Sudan. A similar study that includes the majority of the medical schools in Sudan will lead to better understanding. Despite these limitations, this study is novel, essential, and pioneer in drawing the attention of health authorities to improve research practice in Sudanese medical schools.

## Conclusion

In Sudanese medical colleges significantly, a higher percentage of men published scientific papers more than

women. In addition, the male also had a significantly higher mean score of research perception which indicated that they had a more favorable perception of research.

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### Conflicts of interest

There are no conflicts of interest.

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