

# Barriers to research productivity among gastroenterologists and hepatologists in Saudi Arabia

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## Abstract

**Background:** Clinical research is essential for the advancement of medical knowledge and evidence-based medical practice. In this study, we aimed to identify barriers that limit research productivity among gastroenterologists in Saudi Arabia.

**Methods:** We conducted a national online survey targeting gastroenterologists in Saudi Arabia. Participants were asked about the patterns of their practice, their prior research activities, and potential barriers to research productivity. Univariate and multivariate analyses were performed to examine the association between different factors and research productivity.

**Results:** A total of 85 gastroenterologists completed the survey. Respondents were predominantly male physicians (90.6%) and 40% of them belonged to the age group of 40-49 years. About 85.9% had at least one prior research participation of any type. Around 67.1% of the respondents had been a primary investigator at least once in the last 5 years, while only 23.5% had been a primary investigator at a minimum average rate of once a year. Multiple barriers to research productivity were identified: insufficient research time (78.8%), lack of funding and compensation (77.6%), lack of a statistician (68.2%), insufficient research training (64.7%), lack of connection (60%), lack of technical support (57.6%), and lack of interest (31%). On univariate analysis, insufficient research time and lack of funding and compensation were significantly associated with no research participation ( $P < 0.01$  and  $0.03$ , respectively). On multivariate analysis, lack of funding and compensation was independently associated with no research participation (adjusted OR 15.32; 95% C.I 2.66, 121.58,  $P < 0.01$ ).

**Conclusions:** Barriers to research productivity are highly prevalent among gastroenterologists in Saudi Arabia. Insufficient research time and lack of funding and compensation are the most common. Interventions are needed to promote research activities.

**Keywords:** Barriers, gastroenterologists, research

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## INTRODUCTION

Evidence-based medicine has been the established strategy for patients' care since 1992 when it replaced the

personalized unsystematic decisions in clinical practice.<sup>[1]</sup> Clinical research is the cornerstone of evidence-based medicine and a key to optimal patient care.<sup>[2,3]</sup> Studies are

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conducted to investigate unmet health needs, improve diagnostic tools, and optimize therapeutic interventions.<sup>[3]</sup> Furthermore, scientific publishing represents an imperative component of success for the physicians in both the academic and medical disciplines. It is an opportunity for career advancement, as well as intellectual and research skills enhancement.<sup>[4]</sup>

Research activities have been improving recently in Saudi Arabia. The number of publications in health science has significantly increased between 2008 and 2017, with an annual growth rate of 14.1%.<sup>[5]</sup> However, most publications were in local journals or journals with low impact factors.<sup>[5,6]</sup> Identifying barriers to research participation is needed to develop targeted interventions promoting research practice. Various factors might promote or impede research activities. Financial incentives, interest in research, and potential benefits to patients were shown to be among the most important factors motivating involvement in research.<sup>[7,8]</sup> On the other hand, the lack of allocated time for research activities in the institutes was the most important barrier in several countries.<sup>[3,9]</sup>

Barriers to increasing research productivity among gastroenterologists in Saudi Arabia have not been previously explored. The primary aim of this study is to identify various factors influencing research productivity among gastroenterologists in Saudi Arabia. We also aimed to describe the type of prior research activities and evaluate personal goals in research participation.

## MATERIAL AND METHODS

An invitation to complete an online questionnaire was sent to gastroenterologists in Saudi Arabia between April 17, 2020 and April 28, 2020. The survey was created using a Google Form document and completed anonymously by the respondents. The invitation to participate in the study with an embedded link to the survey was sent through professional gastroenterology groups in the “WhatsApp” social media platform. Reminder messages to fill in the survey were sent after 1 week from the initial invitation. The response to the survey was closed after 2 weeks from the invitation.

No validated questionnaire for the study was found in the literature. The questionnaires of previously published studies addressing similar objectives were reviewed.<sup>[4,7,10-13]</sup> We then developed the questionnaire used for the present study. No personal identifiers were collected. The questionnaire had three main sections. The first section was about demographic data including gender, age, gastroenterology subspecialties,

years in practice since passing their gastroenterology certification examinations, the main area of practice, and the average number of patients they consult per week. The second section was about research activities and included questions about allocated research time and their prior research participation including prior published study designs, type of journals (International Scientific Indexing journal or not), number of published studies as a primary investigator or a coauthor in the previous year and the past 5 years, and involvement in a peer review activity. The third section was about various barriers that may limit research participation and the respondent's personal goals on involvement in research activities. Multiple potential barriers to research were included in the survey including lack of research interest, insufficient research time, lack of funding and compensation, lack of information technology and technical support, lack of a statistician, insufficient research training, and lack of connection to other researchers. Multiple potential goals in research participation were included in the survey including personal interest in research, academic promotion, improvement of personal curriculum vitae (C.V), and enhancement of research skills. Since the advancement of scientific knowledge is an inherent goal in any research activity, this goal was not included in the survey. The respondents were able to choose one or multiple options to the questions about barriers and goals but they were subsequently asked to choose the single most relevant one. The study protocol and the survey were reviewed and approved by the Institutional Review Board at King Fahad Specialist Hospital, Dammam, Saudi Arabia.

## Statistical analysis

The percentage and count were used for categorical variables. Statistical analysis for categorical variables was performed using the Chi-square test or Fisher's exact test as appropriate. Univariate and multivariate analysis to examine the association between different factors and research participation. A two-tailed *P* value <0.05 was considered statistically significant. Statistical analysis was performed using the R statistical software, version 1.2.5042 – © 2009-2020 RStudio, Inc.

## RESULTS

### Characteristics of respondents

Among 214 physicians who were invited to participate, 85 (39.7%) completed the survey. The majority of the participants (90.6%) were men and 40% belonged to the age group of 40-49 years. About a third (35.2%) of the respondents had less than 5 years of practice since their board certification. Nearly 40% of the respondents were general gastroenterologists, 31.8% were advanced endoscopists,

12.9% were hepatologists, and the remaining 15.3% were from other subspecialties. About 37.6% of the participants were practicing in the Ministry of Health hospitals, 34.4% in governmental hospitals that do not belong to the Ministry of Health, 16.5% were working in university hospitals, and 11.8% were working in the private sector. The detailed characteristics of the respondents are shown in Table 1.

**Characteristics of research activities**

Table 2 summarizes the prior research activities of the respondents. The majority of respondents (85.9%) had at least one prior research activity as a primary investigator or as a coauthor. Half the respondents (50.6%) reported being a principal investigator (PI) in the past year. About 67.1% of the respondents reported being a primary investigator at least once in the last 5 years, while only 23.6% had been a primary investigator at least once a year on average. About 43.5% had never been coauthor in the past year and 29.4% in the past 5 years. About 34.1% of the respondents had no allocated research time and 35.2% had less than 10% of

their practice time allocated for research. The relationship between the allocated research time and the number of publications as a primary investigator in the past 5 years is shown in Figure 1.

Case reports and retrospective studies were the most common types of prior publications with 64.7% and 54.1% of respondents being involved in published case reports and retrospective studies, respectively. More than half (63.5%) of the respondents reported that their research is being published mainly in PubMed indexed journals. Almost half (48.2%) of the study respondents were involved in peer review with those who were PIs within the last 5 years being significantly more likely to get an invitation for peer review ( $P < 0.01$ ).

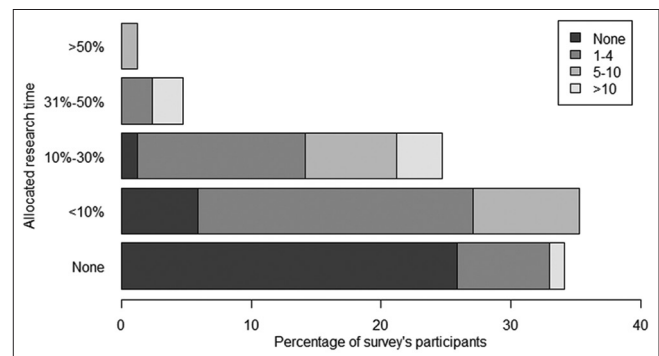
There was no significant association between any prior research activity and gender ( $P = 0.5$ ), age category ( $P = 0.52$ ), subspecialty ( $P = 0.73$ ), years in practice  $<10$  ( $P = 0.14$ ), main practice area ( $P = 0.45$ ), or number of patients per week  $>40$  ( $P = 0.99$ ). There was no significant association between being a primary investigator in the last 5 years with gender ( $P = 0.91$ ), age category ( $P = 0.18$ ), subspecialty ( $P = 0.13$ ), years in practice  $< 10$  ( $P = 0.88$ ), main practice area ( $P = 0.41$ ), or number of patients per week  $>40$  ( $P = 0.21$ ).

**Table 1: Characteristics of survey respondents**

Characteristic	n=85 (%)
Gender	
Male	77 (90.6)
Female	8 (9.4)
Age group	
30-39	30 (35.3)
40-49	34 (40.0)
50-59	14 (16.5)
60 or older	7 (8.2)
Subspecialty	
General Gastroenterology	34 (40.0)
Advanced Endoscopy	27 (31.8)
Hepatology/Transplant Hepatology	11 (12.9)
Inflammatory Bowel Diseases	6 (7.1)
Motility	5 (5.9)
Other	2 (2.4)
Main practice area	
Governmental hospital that belongs to the Ministry of Health	32 (37.6)
Governmental hospital that does not belong to the Ministry of Health	29 (34.1)
University hospital	14 (16.5)
Private hospital/clinic	10 (11.8)
Years in practice	
<5	30 (35.2)
5-10	21 (24.7)
11-20	22 (25.8)
>20	12 (14.1)
Number of patients per week	
1-20	8 (9.4)
21-40	38 (44.7)
41-60	27 (31.8)
>60	12 (14.1)
Allocated research time	
None	29 (34.11)
<10%	30 (35.29)
10-30%	21 (24.70)
31-50%	4 (4.70)
>51%	1 (1.17)

**Barriers to research participation**

Multiple barriers to research participation were identified. Figure 2 showed the prevalence of various barriers to research participation among the respondents. Insufficient research time was the most common (78.8%) followed by a lack of funding and compensation (77.6%) and a lack of a statistician (68.2%). When the respondents were asked about the single most limiting barrier, insufficient research time and lack of funding and compensation were the most commonly cited barriers 25.8% and 24.7%, respectively. The distribution of the single most limiting barrier is shown in Figure 3.



**Figure 1: Relationship between allocated research time and the number of studies as a primary investigator in the last 5 years**

**Table 2: Characteristics of the research activities of the respondents**

Research activity type	n=85 (%)
Any prior research	73 (85.9)
Primary investigator in the last year*	
None	43 (50.6)
1-4	37 (43.5)
5-10	4 (4.7)
>10	1 (1.2)
Primary investigator in the last 5 years*	
None	28 (32.9)
1-4	37 (43.5)
5-10	14 (16.5)
>10	6 (7.1)
Coauthor in the last year*	
None	37 (43.5)
1-4	34 (40.0)
5-10	11 (12.9)
>10	3 (3.5)
Coauthor in the last 5 years*	
None	25 (29.4)
1-4	32 (37.6)
5-10	18 (21.2)
>10	10 (11.8)
Type of prior research study participation	
Randomized controlled trial	16 (18.8)
Prospective cohort	33 (38.8)
Retrospective	46 (54.1)
Cross-sectional	40 (47.1)
Case report	55 (64.7)
Narrative review	32 (37.6)
Systematic review	17 (20.00)
Commentary	11 (12.9)

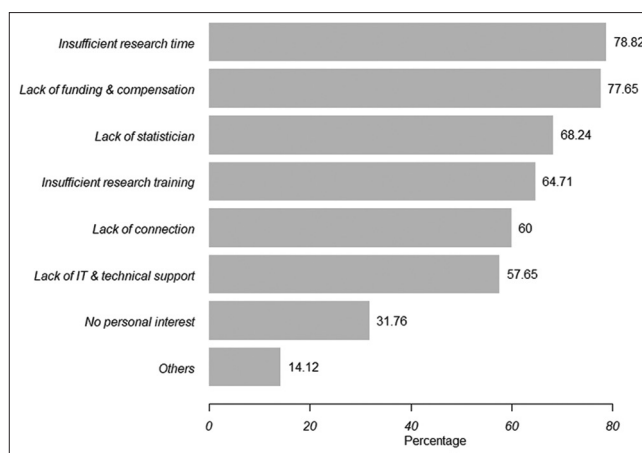
\*Number of research studies

On univariate analysis between any prior research activity and individual barriers, insufficient allocated research time and lack of funding and compensation showed a significant association ( $P < 0.01$  and  $< 0.03$ , respectively). On multivariate analysis including all barriers, only lack of funding and compensation was independently associated with no research participation (adjusted OR 15.32; 95% C.I 2.66, 121.58,  $P < 0.01$ ).

### Goals in research participation

The respondents' goals in research participation are summarized in Figure 4. Improvement of personal C.V and enhancement of research skills are the two most commonly reported goals, 81.1% and 80%, respectively. Personal interest in research was reported as a goal of 68.2% of respondents. When the respondents were asked about the single most important goal, personal interest in research activities and improvement of personal C.V were the most commonly cited goals, 27% and 24.7%, respectively. The distribution of the single most important goal is shown in Figure 5.

There was no significant association between prior research participation or with being PI within the last 5 years with individual goals, however, a trend existed toward

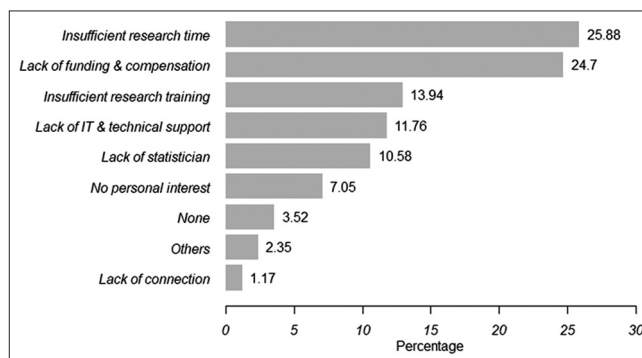


**Figure 2:** The prevalence of various barrier factors limiting research productivity among the survey's responders

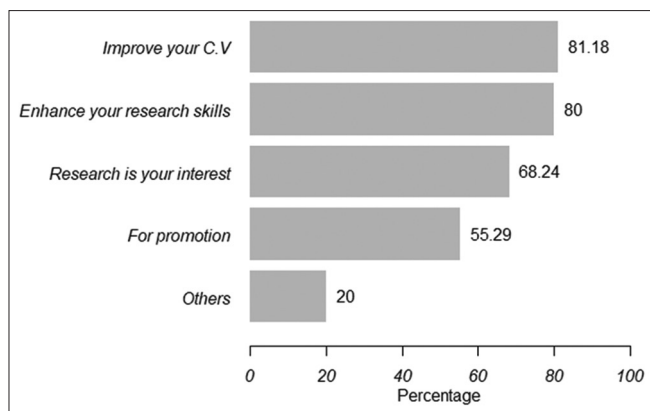
a significant association between promotion as a goal with being a primary investigator within the last 5 years (OR 2.61; 0.95 - 7.49,  $P = 0.06$ ).

### DISCUSSION

The primary aim of our study was to identify factors that influence research productivity among gastroenterologists in Saudi Arabia. Identifying barriers that limit research productivity is the first step on the way to improve research productivity in terms of not only quantity but most importantly quality. We have identified several barriers that hinder research productivity. The majority of the surveyed participants showed a personal interest in research activities but that interest is challenged by highly prevalent barriers. All the six potential barriers that we specifically inquired about, were cited by more than half of the participants. Among all barriers, insufficient allocated research time and lack of funding were the most common, reported by 78% and 77% of the respondents, respectively. Each one of these two barriers was reported as the single most limiting factor by about one-quarter of the respondents. About one-third of the survey participants reported having



**Figure 3:** Distribution of the single most limiting factor for research participation among all survey respondents

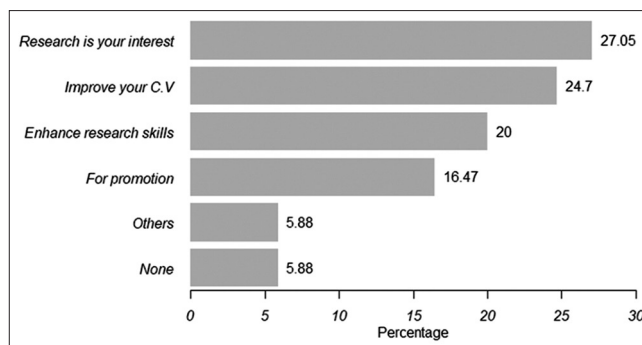


**Figure 4:** Distribution of research participation goals among survey's responders

no research time. Furthermore, another third have less than one-tenth of their time allocated for research. The unavailability of statisticians, lack of technical support, insufficient knowledge, and training in the field of research and statistics, as well as the inadequate connection between physicians practicing at different centers, are all barriers to high-quality research productivity.

To our knowledge, this is the first study that highlights factors influencing research productivity among gastroenterologists in Saudi Arabia. Lack of funding and compensation to time and efforts was independently associated with less research participation. Previously published international studies have shown similar findings. A study conducted by Messner *et al.* looking for the factors limiting the clinicians' participation in research activities found that funding is an important motivational element.<sup>[9]</sup> Another study performed in 27 African countries showed that inadequate resources including funding is the most significant limiting factor of research activities.<sup>[3]</sup> This is also similar to the factors reported by gastroenterologists in the U.S.A.<sup>[7]</sup> Moreover, a study looking at the American College of Gastroenterology grant program found that the size of the grant is associated significantly with not only the quality of research but also projects published in journals with a high impact factor.<sup>[14]</sup>

Our study showed no significant association between gender, age, load of work, years of experience, or the main area of practice of the physician and the number of his publications. This is discordant to the results of a study conducted by Alghanim *et al.*, looking at research output among faculty members at medical schools in Saudi Arabia, which showed that male gender, young members with fewer years in academic experience are more likely to participate in research.<sup>[4]</sup> The gender difference observed in their study might be due to the study being older with less



**Figure 5:** Distribution of the single most important goal for research participation

representation of female faculty. Besides, having a higher number of publications associated with younger age and fewer years can be explained by the academic physicians being motivated by promotions when compared with senior faculty members. In contrast, the proportion of university-based practice in our study was only 16% and promotion was ranked 4<sup>th</sup> among the single most important goals in research participation. In our study, subspecialty did not have any significant relation with research output. This is quite different from the study conducted among the members of the American Association for the Study of Liver Diseases (AASLD) which showed that hepatologists were more likely to have participated in clinical trials than gastroenterologists, and this was related to compensation and funding.<sup>[7]</sup>

Despite the prevalent barriers reported by the respondents in our study, there has been a noticeable increase in the interest in research activities among gastroenterologists in Saudi Arabia which has increased the number of publications. The present study demonstrated that the majority of respondents (85.9%) have had at least one research participation of any kind in their careers. Case reports, retrospective, and cross-sectional study designs were unsurprisingly the most popular type of publications. A review of publications that had been conducted in the gastroenterology field in Saudi Arabia from 2003 to 2012 revealed similar results.<sup>[15]</sup> Interestingly, this is similar to the quality of publications in the field of nephrology in Saudi Arabia. A study performed by Al-Khader *et al.* showed that 78% of the studies done by Saudi nephrologists were retrospective in design.<sup>[11]</sup>

Our results showed several personal goals driving gastroenterologists to conduct research. Interest in research activities was the most common one followed by career advancement through improving personal C.V, research skills enhancement as well as promotion, and academic ranking. This is quite similar to the study published by

Mitwalli *et al.* looking at perception and attitude toward research among medical residents in Saudi Arabia. Their aim of having scientific publications was mainly to improve their resume, enhance their research skills as well as their interest in research work.<sup>[13]</sup>

One can speculate on interventions that should be undertaken to overcome the barriers and thereby increase research productivity. As most participants have shown interest in research activities, the focus should be on increasing the time allocated for research, easing the access to research grants, and providing financial rewards. These interventions appear to be most needed. Introducing research courses in medical school curriculums and postgraduate programs, requiring postgraduate trainees to get involved in research projects would help to promote research awareness. Furthermore, establishing mentorship programs that connect junior physicians with expert researchers would help to bridge the gap of insufficient research training and lack of connection. Gastroenterology trainees and junior gastroenterologists should be encouraged to apply for research-oriented academic degree programs.

The strength of this study comes from the fact that it is the first study that aimed to evaluate the barriers to research productivity among gastroenterologists in Saudi Arabia. Identifying such barriers is critical in developing effective strategies aiming toward enhancing research activities. However, we acknowledge several limitations in our study. The response rate was relatively low (39.9%) and thus there is the risk of nonresponse bias. Those who have an interest in research are likely to be over-represented. We used a social media platform for the recruitment of study participants, which may have also affected the generalizability of the study results. However, the social media group we used has been created to facilitate scientific discussion among the Saudi gastroenterology community and we believe, although it appears convenient, it is a useful platform to recruit gastroenterologists for our study.

## CONCLUSIONS

In conclusion, there are several obstacles facing gastroenterologists in Saudi Arabia that limit their research productivity. Multiple barriers are highly prevalent with lack of funding and insufficiently allocated research time being the most common. Interventions should be made to limit

the burden of these barriers to improve research quality and participation among gastroenterologists in Saudi Arabia.

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## Conflicts of interest

There are no conflicts of interest.

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