

Original Research Article

Barriers to Research and Publications among Family Medicine Residents in Saudi Arabia

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Abstract

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Research activities carried by postgraduate medical residents are very important in promoting better clinical care, critical reasoning and writing, keeping updated with local, regional and international guidelines as well as lifelong education. However, some barriers were identified to prevent residents from conducting of high-quality research during residency. The research objective was to determine the barriers that can prevent family medicine residents to conduct high-quality research during residency and to make publication by the residents during residency. A cross-sectional survey was conducted among family medicine residents enrolled in the residency program the of seven largest hospitals in Riyadh City, Kingdom of Saudi Arabia. A self-reported survey instrument was used for data collection. It included questions regarding personal and academic-related characteristics of physicians, history of taking research during residency, confidence and motivation in seeking publication of research and barriers and existing resources conducting research. A total of 254 family medicine residents responded out of targeted 286, giving a response rate of 88.8%. The majority of them (85%) aged between 26 and 29 years. Males represented 53.9% of them. Regarding their future choice after completion of the residency program, 33.1% chose practice as family medicine specialists whereas 24% chose to pursue a graduate degree. Majority of the respondents (91.3%) reported taking a research course during residency training and 85% reported presence of a mandatory research course during residency training. The commonest reported barriers mentioned by family medicine residents to complete their research were lack of overall interest in research project (40.2), lack of interest in completing research (38.6%), limited knowledge of the processes associated with research (36.2%) and lack of time available to complete research activities (24.4%). Regarding the resources currently available to assist the family medicine residents in the pursuit of research, the most frequently reported were mentorship from a preceptor or colleague with extensive research experience (59.1%) and mentorship from preceptors with extensive family medicine practice experience (49.6%). Barriers are existing regarding the conduction of research projects among family medicine resident physicians. Thus, people in charge should implement measures in order to create effective solutions to these barriers.

Keywords: Research, Barriers, Resident physicians, Resources, Saudi Arabia

INTRODUCTION

Background

According to the Kingdom of Saudi Arabia (KSA) Vision 2030 program, Research has been prioritized with an ultimate goal to occupy an international standard in

higher education, with at least 5 Saudi universities be among the top two hundred universities in the world by 2030 (Saudi Arabia's Vision (2030).

In this context, the 2020 Times Higher Education World University Ranking included 7 Saudi universities

among the top first 1400 universities of the globe. Among criteria for ranking is research productivity (Times Higher Education. World University Rankings, 2019). The number and quality of published researches is one of the main indicators for advancement in the field of medical education and evaluate the research productivity (Tadmouri and Bissar-Tadmouri, 1999; Latif, 2015). Therefore, the Saudi Arabia government in the last decade is trying to find ways to allocate sufficient budget for research activities (Ul-Haq et al., 2020).

Conduction research activities by postgraduate medical residents is very important in promoting better clinical care, critical reasoning, keeping updated with international guidelines as well as lifelong education (Hebert et al., 2003). Therefore, training in conduction of all steps of research should be an important element of medical education (Laporte et al., 2002; Senf et al., 2005).

The main barriers to perform a research by resident physicians were summarized in the literature as insufficient time, limited efficient supervision, limited research skills and training as well as job-related stress (Mitwalli et al., 2014; Al Omari and Al Asmary, 2006; Pawar et al., 2012; Al Taha et al., 2017; Al Abdullateef, 2012; Barghouti et al., 2009).

Study rationale

Active participation in research with its all types by family medicine residents is essential in order to enable them to practice, according to evidence-based medicine and to appraise conducted studies. Therefore, barriers to conduct a research among them should be identified and suitable solutions for these barriers should be settled. our Research question: What are the obstacles that prevent family medicine residents to conduct high quality research during residency?

Aim of the study

To determine the barriers that can prevents family medicine residents in Riyadh, Saudi Arabia to conduct high quality research during residency and to make pub the residents during residency.

Specific objectives

- To assess family medicine residents' perception of the barriers that prevents them from conducting high quality research.
- To evaluate the residents' desire to conduct future high-quality research.
- To make needs assessment for possible plan that supports family medicine residents to conduct high

quality research in the future.

LITERATURE REVIEW

Reviewing of literature for similar studies to the present one, revealed some studies; most of them were carried out overseas.

Soubhanneyaz *et al.* performed a questionnaire-based study in Medina, Saudi Arabia on 100 family medicine residents in 2019 and concluded that difficulty in publishing and lack of statistical support were the main obstacles to not do research among their sample, in addition, about half of their respondents indicated they are unwilling to do research (Soubhanneyaz et al., 2019).

Habineza et al. performed a cross-sectional questionnaire-based study in Rawanda among 60 interns and pediatrics trainees in 2019 to evaluate the attitude, benefits and the barriers surrounding research activity among the trainees, faculty lacking time to mentor, lack of funding, lack of statistical support, and lack of faculty experienced in conducting research what are the main barriers to not conduct research among their respondents (Habineza et al., 2019).

Hames, et al. in 2018 conducted a cross-sectional questionnaire-based research to identify the barriers to research and toalso suggest potential plans to support research achievement among 88 Canadian radiology residents. Lack of time, lack of personal interest and lack of mentorship were the main obstacles to not conduct research among their sample, in addition to on call demand and clinical duties (Hames et al., 2018).

Olaussen, et al. conducted a survey in 2017 to identify research obstacles among 61 emergency medicine residents in Australia. Their respondents showed low confidence in leading a research project and a limited prior research activity, most common research barriers among their respondents were time, skills and cultural factors (Olaussen et al., 2017).

Al-Taha, et al. conducted Survey based study on 13 plastic surgery programs in Canada in 2017 to evaluate the attitude and perceived obstacles to conduct research during residency and revealed that the dominant barriers were lack of time, insufficient mentors and research ethics process. In addition, more than 70% of residents in their study were interested to conduct research during residency (Al-Taha et al., 2017).

Bookstaver, et al. conducted a survey-based study in south-eastern region of the United States on 209 pharmacy residents to examine barriers to conduct research in 2015. The results showed that the majority of residents indicated that research was beyond their residency project in addition to lack of time and lack of knowledge (Bookstaver et al., 2015).

Bammeke et al. in 2015 conducted an online survey study in Canada to evaluate 54 family medicine residents' barriers to conduct research and determine possible

plans to encourage research among the residents. They reported that's the main reason to not do research were lack of time, like of interests and lack of skills. In addition, majority of residents were uninterested to do research. They suggested allowing full research days and journal clubs for the residents to learn from (Bammeke et al., 2015).

Irwin, et al. in 2013 conducted a cross-sectional survey-based research to identify the barriers to publish research among residents from the perspective of program directors and former residents. With a total of 32 program directors and 98 residents they revealed obtaining institutional review board (IRB) approval and publication process as the main barriers to conduct research in addition to collecting and analyzing data (Irwin et al., 2013).

Silcox, et al conducted a cross-sectional survey-based research in 2006 on anaesthesiology residents and program directors in Canada to evaluate the attitude and perception about the obstacles to conduct research. They demonstrated that the major barrier to do research was lack of time. Most residents indicated that they preferred to do clinical relevant activities rather than do a research project (Silcox et al., 2006).

Rivera, et al in 2002 conducted a questionnaire-based research in the United States among 138 internal medicine residents at the American College of physicians to understand the resources needed and the barriers to perform research work during residency program among them. Among 73 residents, majority indicated that insufficient time, lack of research skills and insufficient research curriculum were the main reasons to not do a research during residency. However, almost two-thirds of respondents indicated that research should be mandatory during residency (Rivera et al., 2005).

METHODS AND METHODOLOGY

Study design: Cross-sectional survey-based study

Study population

All family medicine residents enrolled in residency program in seven largest hospitals in Riyadh city, Kingdom of Saudi Arabia were eligible for study inclusion. These hospitals are King Khalid University hospital, Prince Sultan Medical City, King Faisal Specialized hospital and Research Center, King Fahd Medical City, King Salman Medical city, National Guard hospital and Prince Mohammed Bin Abdulaziz hospital.

Population eligibility and sampling

All family medicine resident physicians working in main

hospitals in Riyadh (n=286) were invited to participate in the study by filling in the study questionnaire. The exclusion criteria are general practitioners and residents of other specialties.

Questionnaire/data collection form

Previously published self-administered survey from the literature by Bookstaver et al. (2015) was used after obtaining approval from the corresponding author to assess family medicine residents' perception of the barriers that prevents them from conducting high quality research. The survey instrument consisted of four sections making 22 questions:

Section (1)—Four personal characteristics and academic-related questions including gender, age, current residency level, and career plans after current residency completion; Section (2)—Five questions related to history of taking a research during residency and level of interest; Section (3)—Four questions related to confidence and motivation in seeking publication of research; and Section (4)—Two questions on identifying barriers and existing resources.

Data collection technique

SurveyMonkey (www.surveymonkey.com) was used to collect participants' response. Repeated submissions from the same participants were prohibited through linking each response with their IP address in the Survey Monkey web page. Participants were approached through a large WhatsApp group containing all family medicine residents in the main hospitals in Riyadh, Saudi Arabia.

Data management and statistical analysis

Once the respondents have completed filling in the survey questionnaires, questionnaires were collected and imported into the SPSS software version 28 for further analysis. Percentages and frequencies were used to describe the categorical data whereas median, inter-quartile range (IQR) and mean ranks were used to describe numerical discrete data (ranks of the importance of barriers and resources of research). Mann-Whiney and Kruskal-Wallis non-parametric statistical tests were utilized for the comparison between two or more than two groups, respectively and p-value less than 0.05 was considered for statistical significance.

Ethical considerations

Participants were not asked for their names or any

Table 1. Personal and academic-related characteristics of the participants (n=254)

	Frequency	Percentage
Age (years)		
22-25	19	7.5
26-29	216	85.0
30-34	19	7.5
Gender		
Male	137	53.9
Female	117	46.1
Residency level		
R-1	74	29.1
R-2	81	31.9
R-3	99	39.0
Future choice after completion of the residency program		
Academic position	36	14.2
Administrative job	16	6.3
Complete fellowship training	57	22.4
Pursue a graduate degree	61	24.0
Practice as a family medicine specialist	84	33.1

identifying information, therefore, their confidentiality was protected. Participants were not paid for their participation and were entirely voluntary and their privacy was maintained. Digital data were stored in secure computer files after it is entered. Any report of this research that is made available to the public was not included participants name or any other individual information by which they could be identified. Research proposal was approved by the local Research and Ethics committee at Prince Sultan Military Medical City, Riyadh

RESULTS

Response rate

A total of 254 family medicine residents responded by filling in the study questionnaire completely, out of targeted 286, giving a response rate of 88.8%.

Personal and academic-related characteristics

Table 1 summarizes the personal and academic characteristics of the respondents. Majority of them (85%) aged between 26 and 29 years whereas 7.5% aged between 30 and 34 years. Males represented 53.9% of them. More than one-third (39%) of them were R-3 level residents. Regarding their future choice after completion of the residency program, 33.1% chose practice as family medicine specialists whereas 24% chose pursue a graduate degree.

History of taking a research during residency and level of interest

Majority of the respondents (91.3%) reported taking a research course during residency training as shown in Figure 1 and 85% reported presence of a mandatory research course during residency training. Figure 2

Less than half of the respondents (47.6%) reported having no benefits from their relationship with mentors whereas 46.5% reported having benefits. Figure 3

Almost two-thirds (62.2%) of family medicine residents expected a research to be a component of their professional career while 60.6% were interested in further pursuing research related to their family medicine residency project. Table 2

Confidence and motivation in seeking publication of research

It is shown in Table 3 that 43.3% of the family medicine residents either agreed or strongly agreed that they feel confident in current level of knowledge in pursuing and completing a research and 18.9% were strongly interested in pursuing and completing research, such as giving professional presentations or publishing manuscripts in peer reviewed medical journal. The most frequently observed personal motivation for research activity was the fact that the research is a requirement of their career (53.5%), followed by being a source of personal recognition/reputation (46.1%). More than half of the respondents (54.7%) anticipated that completing research activity would result in improving their curriculum vitae and making them more competitive for a career (44.1%).

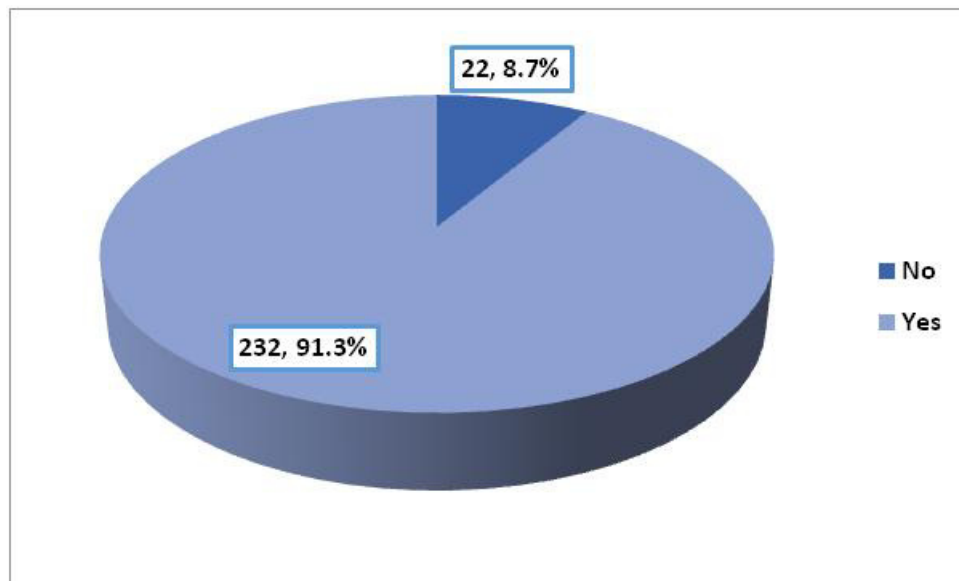


Figure 1. Participants` history of taking a research course during residency training

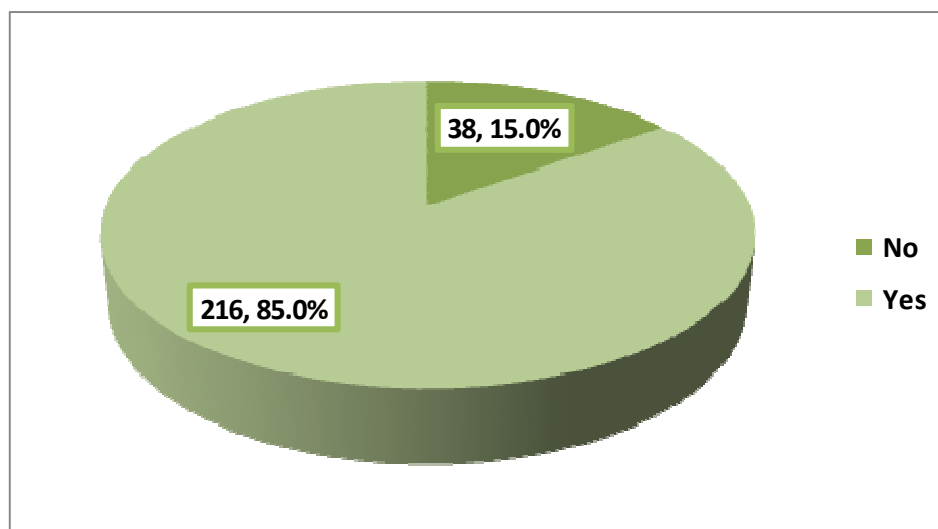


Figure 2. Presence of a mandatory research course during residency training

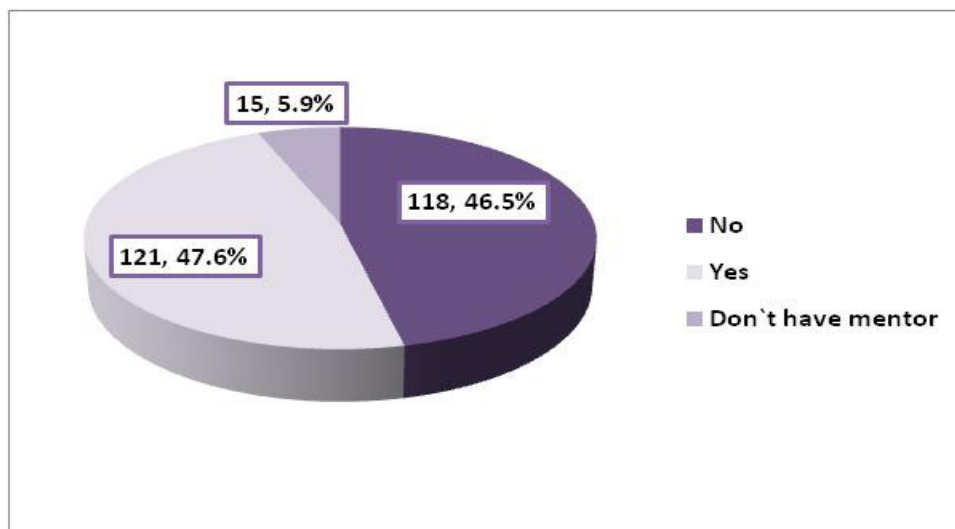


Figure 3. Participants benefits from their relationship with mentors

Table 2. Family medicine residents' interest in research

	Frequency	Percentage
Expecting a research to be a component of residents' professional career		
True	158	62.2
False	96	37.8
Residents' interest in further pursuing research related to their family medicine residency project		
True	154	60.6
False	100	39.4

Table 3. Confidence and motivation of family medicine residents in seeking publication of research

Statements	Frequency	Percentage
Feeling confident in current level of knowledge in pursuing and completing a research		
Strongly disagree	14	5.5
Disagree	46	18.1
Neutral	84	33.1
Agree	76	29.9
Strongly agree	34	13.4
My current level of personal interest in pursuing and completing research, such as giving professional presentations or publishing manuscripts in peer reviewed medical journal		
Strongly not interested	20	7.9
Not interested	31	12.2
Neither interested nor not interested	82	32.3
Somewhat interested	73	28.7
Strongly interested	48	18.9
My personal motivation for research activity is:		
For professional advancement	53	20.9
As a requirement of my career	136	53.5
For personal recognition/reputation	117	46.1
For personal satisfaction	85	33.5
I anticipated that completing research activity would result in the following benefits:		
Result in professional advancement	64	25.2
Improve my curriculum vitae	139	54.7
Make me more competitive for a career	112	44.1
Add to the medical literature	70	27.6

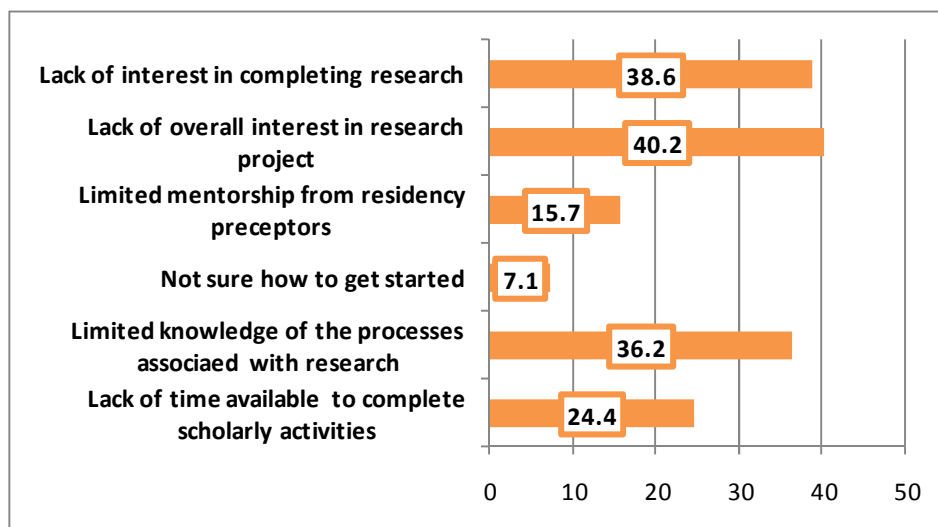


Figure 4. Barriers facing family medicine residents to personal completion of research

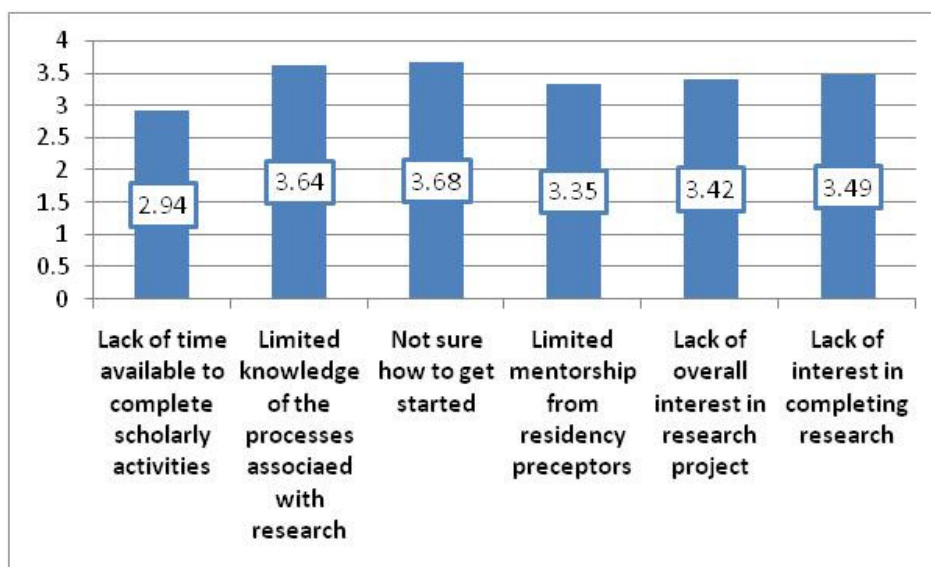


Figure 5. Personal barriers identified by family medicine residents ranked by level of importance

1: very important

6: not important at all

Barriers to personal completion of research

From Figure 4, it is evident that the commonest reported barriers mentioned by family medicine residents to complete their research were lack of overall interest in research project (40.2), lack of interest in completing research (38.6%), limited knowledge of the processes associated with research (36.2%) and lack of time available to complete research activities (24.4%).

According to family medicine residents, the most important barrier was lack of time available to complete research activities (average mean =2.94), followed by

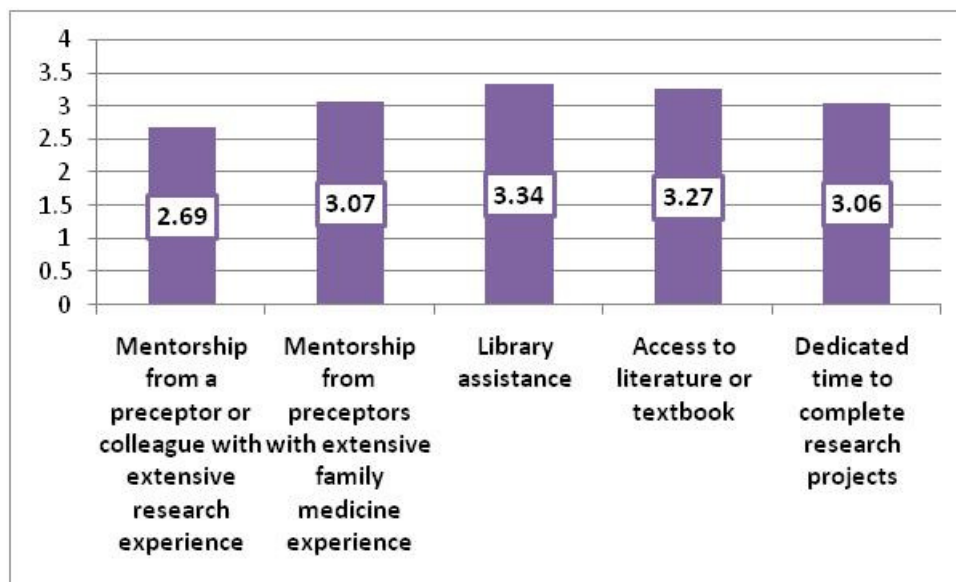
limited mentorship from residency preceptors (average mean =3.35) whereas the least important barrier was being not sure how to get started (average mean=3.68). Figure 5

Resources to conduct a research

Regarding the resources currently available to assist the family medicine residents in the pursuit of research, the most frequently reported were mentorship from a preceptor or colleague with extensive research

Table 4. Resources currently available to assist the family medicine residents in the pursuit of research

Resources	Frequency	Percentage
Literature retrieval resources (pubmd, Google scholar, etc)	55	21.7
Library assistance	50	19.7
Mentorship from a preceptor or colleague with extensive research experience	150	59.1
Mentorship from preceptors with extensive family medicine practice experience	126	49.6
I am not sure of the resources available	12	4.7

**Figure 6.** Resources to complete the research identified by family medicine residents ranked by level of importance

1 very important

5 not important at all

experience (59.1%) and mentorship from preceptors with extensive family medicine practice experience (49.6%). Table 4

According to family medicine residents, the most important resources needed to complete research activities were mentorship from a preceptor or colleague with extensive research experience (average mean =2.69) and dedicated time to complete research project (average mean=3.06) whereas the least important resource was library assistance (average mean = 3.34). Figure 6

Factors associated with perceiving of barriers to conduct research

-Student's gender

Lack of interest in completing a research was perceived

as a more important barrier for doing a research by male residents than females (mean ranks were 117.11 and 139.66, respectively), $p=0.012$. Table 5

-Student's age

There were no significant differences as regards perceiving the importance of barriers to conduct a research by family medicine residents according to their age. Table 6

-Residency level

Table 7 shows no significant differences as regards perceiving the importance of barriers to conduct a research by family medicine residents according to their residency level.

Table 5. Comparison between male and female resident physicians regarding perceiving of barriers to conduct a research

Barriers	Males N=137		Females N=117		p-value*
	Median (IQR)	Mean rank	Median (IQR)	Mean rank	
Lack of time available to complete scholarly activities	3 (2-4)	131.75	3 (2-4)	122.52	0.305
Lack of overall interest in research project	3 (3-4)	126.76	3 (3-4)	128.37	0.856
Lack of interest in completing research	3 (3-4)	117.11	4 (3-5)	139.66	0.012
Limited knowledge of the processes associated with research	4 (3-5)	124.0	4 (3-5)	131.60	0.400
Limited mentorship from residency preceptors	3 (2-4)	120.52	3 (3-5)	135.67	0.093
Not sure how to get started	4 (2.5-5)	122.67	4 (3-5)	133.16	0.245

IQR: Inter-quartile range

*Mann-Whitney test

Table 6. Perceived barriers to conduct a research by family medicine residents according to their age

Barriers	22-25 years N=19		26-29 years N=216		30-34 years N=19		p-value*
	Median (IQR)	Mean rank	Median (IQR)	Mean rank	Median (IQR)	Mean rank	
Lack of time available to complete scholarly activities	3 (2-4)	131.50	3 (2-4)	125.37	3 (2-5)	147.68	0.414
Lack of overall interest in research project	3 (2-5)	105.61	3 (3-4)	130.39	3 (2-4)	116.55	0.270
Lack of interest in completing research	4 (2-5)	127.82	4 (3-4)	130.33	3 (2-4)	94.97	0.117
Limited knowledge of the processes associated with research	3 (2-5)	118.76	4 (3-5)	129.07	4 (2-5)	118.37	0.706
Limited mentorship from residency preceptors	2 (2-5)	99.26	3 (2-4.75)	130.43	3 (2-4)	122.45	0.183
Not sure how to get started	4 (2-5)	117.55	4 (3-5)	130.80	3 (2-4)	99.95	0.163

IQR: Inter-quartile range

*Kruskal-Wallis test

Table 7. Perceived barriers to conduct a research by family medicine residents according to their residency level

Barriers	R1 N=74		R2 N=81		R3 N=99		p-value*
	Median (IQR)	Mean rank	Median (IQR)	Mean rank	Median (IQR)	Mean rank	
Lack of time available to complete scholarly activities	3 (2-4)	135.86	3 (2-3)	125.70	3 (2-4)	122.72	0.471
Lack of overall interest in research project	3 (2-5)	130.34	3 (3-4)	127.81	3 (3-4)	125.12	0.891
Lack of interest in completing research	4 (3-5)	137.39	3 (3-4)	124.65	3 (3-4)	122.43	0.358
Limited knowledge of the processes associated with research	4 (3-5)	130.84	4 (2.5-5)	124.09	4 (3-5)	127.79	0.841
Limited mentorship from residency preceptors	3 (2-5)	128.22	3 (2-4)	124.76	3 (2-4)	129.20	0.913
Not sure how to get started	4 (2-5)	117.80	4 (3-5)	131.81	4 (3-5)	131.22	0.384

IQR: Inter-quartile range

*Kruskal-Wallis test

Table 8. Comparison between male and female resident physicians regarding perceiving of resources to complete a research

Barriers	Males N=137		Females N=117		p-value*
	Median (IQR)	Mean rank	Median (IQR)	Mean rank	
Mentorship from preceptors with extensive family medicine experience	3 (2-4)	120.47	3 (2-4)	135.73	0.089
Mentorship from preceptor or colleague with extensive research experience	3 (2-3)	124.34	3 (2-4)	131.20	0.441
Library assistance	3 (3-4)	124.85	4 (3-4)	130.61	0.519
Access to literature or textbook	3 (2-4)	122.55	4 (3-4)	133.30	0.230
Dedicated time to complete research project	3 (2-4)	117.78	3 (2-4)	138.88	0.019

IQR: Inter-quartile range

*Mann-Whitney test

Table 9. Perceived resources to complete a research by family medicine residents according to their age

Barriers	22-25 years N=19		26-29 years N=216		30-34 years N=19		p-value*
	Median (IQR)	Mean rank	Median (IQR)	Mean rank	Median (IQR)	Mean rank	
Mentorship from preceptors with extensive family medicine experience	3 (2-4)	118.50	3 (2-4)	129.78	3 (2-3)	110.63	0.452
Mentorship from preceptor or colleague with extensive research experience	3 (2-4)	129.29	3 (2-3)	127.09	3 (2-3)	130.37	0.975
Library assistance	3 (2-4)	105.37	4 (3-4)	130.57	3 (2-4)	114.63	0.237
Access to literature or textbook	3 (2-4)	115.76	3 (2-4)	128.12	3 (2-4)	132.16	0.735
Dedicated time to complete research project	2 (2-4)	116.45	3 (2-4)	129.98	3 (2-3)	110.37	0.405

IQR: Inter-quartile range *Kruskal-Wallis test

Table 10. Perceived resources to complete research by family medicine residents according to their residency level

Barriers	R1 N=74		R2 N=81		R3 N=99		p-value*
	Median (IQR)	Mean rank	Median (IQR)	Mean rank	Median (IQR)	Mean rank	
Mentorship from preceptors with extensive family medicine experience	3 (2-4)	139.89	3 (2-4)	134.55	3 (2-4)	112.47	0.024
Mentorship from preceptor or colleague with extensive research experience	3 (2-4)	137.50	3 (2-3)	125.23	3 (2-3)	121.88	0.336
Library assistance	3 (3-4)	133.86	4 (3-4)	138.25	3 (2-4)	113.95	0.048
Access to literature or textbook	4 (3-4)	139.97	3 (2-4)	125.76	3 (2-4)	119.61	0.170
Dedicated time to complete research project	4 (2-4)	142.28	3 (2-4)	121.77	3 (2-4)	121.15	0.107

IQR: Inter-quartile rang *Kruskal-Wallis test

Factors associated with resources to complete the research

-Student's gender

Male residents perceived dedicated time to complete research project as an important resource to complete

the research more than female residents (mean ranks were 117.78 and 138.88, respectively), $p=0.019$. Table 8

-Student's age

There were no significant differences as regards perceiving

ving the importance of resources to complete a research by family medicine residents according to their age. Table 9

-Residency level

Residence of level 3 (R-3) perceived the importance of mentorship from preceptors with extensive family medicine experience as a resource to complete a research more than residents of lower levels, $p=0.024$. Also, R-3 residents perceived the importance of library assistance as a resource to complete a research more than residents of lower levels, $p=0.048$. Table 10

DISCUSSION

The quality of health care provided to patients is a basic element of medicine (Pastor et al., 2015). Resident physicians are very important element in the healthcare system and their training aims to prepare them to offer optimal quality of health care (Sonnenberg et al., 2018).

Most postgraduate residency programs, including family medicine program in Saudi Arabia require residents to conduct a research as a prerequisite of graduation. Engaging of residents in various processes of research activities can result in increasing their participation in research after completion of their residency and increase the proportion of those who choose to complete their career in training (Smith, 2005; Abramson et al., 2014; Cull et al., 2003). In the present study only 14.2% of the family medicine residents chose to complete their career in academic position. This low proportion could be a reflection of defect in their training in research.

In the present study as well as in other studies, barriers were existing regarding conduction of research projects among resident physicians (Habineza et al., 2019; Olaussen et al., 2017; Amin et al., 2012; Stockfelt et al., 2016; Alghamdi et al., 2014).

In the present study, the commonest reported barriers mentioned by family medicine residents to complete their research were lack of overall interest in research project (40.2), lack of interest in completing research (38.6%), limited knowledge of the processes associated with research (36.2%) and lack of time available to complete research activities (24.4%). Variable findings were observed in several studies conducted on both local and international levels. In an older study carried out among paediatric residents in United States, the commonest reported barriers to conduct a research were time availability, advanced academic degrees, personal interest in research, future career plans, and availability of mentors.³³In Rwanda, the most frequently observed barrier was lack of experienced staff in conducting research as most of them lack time for supervision and

give their candidates needed research skills (Habineza et al., 2019). In Canada, the most commonly reported barriers to be involved in research were availability of time, availability of research mentors, and lack of formal teaching of research methods (Siemens et al., 2010). In Jordan, lack of time was the commonest reported barrier among family physicians (Barghouti et al., 2009). In Uganda, lack of knowledge, funds, collaborations, facilities and proper supervision were the observed barriers to conduct research (Munabi et al., 2006). In Iran, lack of funds was the main barrier to conduction of research amongst medical students (Memarpour et al., 2015). In Canada, most plastic surgery residents were interested in conducting research throughout residency; however, some barriers were reported included lack of time, limited access to research supervisors, the process of obtaining research ethics and limited access to biostatistical advice (The Canadian Plastic Surgery Research Collaborative (CPSRC), 2017).

On local level, in Medina, the difficulty in publishing research during residency period and the lack of statistical support were the main barriers mentioned by family medicine residents to conduct a research during residency period.¹⁵Recently, a study conducted among Ophthalmology residents all over Saudi Arabia reported that the main barriers to conduct research were lack of dedicated time, complex obtaining research approval, and lack of financial support (Al Saeed et al., 2022).

Concerning importance of barriers, the present study revealed that the most important was lack of time available to complete research activities, followed by limited mentorship from residency preceptors whereas the least important barrier was being not sure how to get started. Therefore, proving sufficient time for conducting a research and availability of qualified mentors are essentially needed to conduct a high-quality research by residents than can be published in a peer-reviewed journal.

In the present study 46.1% and 33.5% of residents claimed that their personal motivation for research activity was for personal recognition/reputation and personal satisfaction, respectively. In Rwanda, 98% of residents reported being interested in undertaking future research (Habineza et al., 2019). Others also reported positive perception of research among resident physicians, if barriers were overcome (Ejaz et al., 2011), while Siddaiah-Subramanya et al (2017) observed lower level of positive attitudes toward research in developing countries (Siddaiah-Subramanya et al., 2017).

Regarding the resources currently available to assist the family medicine residents in the pursuit of research, the most frequently reported in this study were mentorship from a preceptor or colleague with extensive research experience (59.1%) and mentorship from preceptors with extensive family medicine practice experience (49.6%) and according to family medicine residents, the most important resources needed to

complete research activities were mentorship from a preceptor or colleague with extensive research experience and dedicated time to complete research project. The importance of having mentorship from a preceptor with extensive research experience as well as having enough time were reported by many others (Habineza et al., 2019; Olaussen et al., 2017; Alghamdi et al., 2014; The Canadian Plastic Surgery Research Collaborative (CPSRC), 2017).

In the present study, male residents perceived dedicated time to complete research project as an important resource to complete the research more than female residents. Unfortunately, we didn't find results of others to compare. However, the difference between males and female in this regards could be attributed to biologic difference between them in feeling the importance of time.

In this study, resident physicians of higher level (R-3) perceived the importance of mentorship from preceptors with extensive family medicine experience and library assistance as resources to complete a research more than residents of lower levels. This is quite accepted as they are more involved in doing their mandatory research and thus feel more about the needed resources.

Limitations of the present study include its conduction in residents of one program in one city of the Kingdom of Saudi Arabia, which could limit the generalizability of its results over other programs of residency and other places of the Kingdom of Saudi Arabia. The cross-sectional design of the study is another limitation of the study as it proves only association between the cause and effect and not causality. Finally, the used tool was self-administered, thus could be subjected to bias. Despite of this, the study is unique in its nature in our region and explored the obstacles faced family medicine residents while conducting their residency research.

CONCLUSION

Barriers were existing regarding conduction of research projects among family medicine resident physicians in Riyadh, Saudi Arabia. The commonest reported barriers were lack of overall interest in research project, lack of interest in completing research, limited knowledge of the processes associated with research and lack of time available to complete research activities. Concerning importance of barriers, the most important was lack of time available to complete research activities, followed by limited mentorship from residency preceptors whereas the least important barrier was being not sure how to get started. A considerable proportion of resident physicians claimed that their personal motivation for research activity was for personal recognition/reputation and personal satisfaction. Regarding the resources currently available to assist the family medicine residents in the pursuit of research, the most frequently reported were mentorship

from a preceptor or colleague with extensive research experience and mentorship from preceptors with extensive family medicine practice experience and according to family medicine residents, the most important resources needed to complete research activities were mentorship from a preceptor or colleague with extensive research experience and dedicated time to complete research project.

RECOMMENDATIONS

Based on the study results, the following are recommended:

1. Offering sufficient time for resident physicians to conduct their residency research.
2. Giving incentives to mentors to help them to have time to mentor their candidates.
3. Encouraging of resident physicians to submit their work at conferences or in peer-reviewed journals with very close and effective supervision.
4. Results of this study should be raised to decision-makers to help them to strengthen research activities and improve the existing education system offered to researchers to create healthier research culture for residents.
5. Hiring high professional research personnel and providing intensive research training courses; including formal teaching of research methodology, essentials of biostatistics, and proposal/manuscript writing.
6. Further study is recommended in other residency programs and other places of the Kingdom to have a comprehensive conclusion of the situation

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