Cureus
Part of SPRINGER NATURE

Open Access Original Article

An Assessment of Research Needs and Awareness Among First-Year Postgraduate Trainees at Qassim Health Cluster, Saudi Arabia

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Review began 10/04/2026
Review ended 10/25/2026
Published 10/28/2026

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DOI: 10.7759/cureus.118701

Abstract

Background and objective

Research is vital for enhancing critical thinking in clinical and everyday decision-making. Periodic assessments of research awareness among first-year (R1) trainees enrolled in postgraduate programs offered by the Saudi Commission for Health Specialties (SCFHS) are essential for improving academic research practices. This study aimed to identify the research training needs, awareness, confidence, and barriers to conducting research among R1 trainees.

Methodology

A cross-sectional study was conducted from February to April 2026 using a validated, self-administered questionnaire distributed via WhatsApp to approximately 150 participants. Data from 107 R1 trainees who responded were analyzed using SPSS Statistics version 26.0 (IBM Corp., Armonk, NY), using descriptive and inferential statistics, with statistical significance set at $p \leqslant 0.05$.

Results

Of the 107 trainees, 59.8% were male, and the mean age was 28.2 (± 3.3) years. Before enrolling in their training programs, 57.9% had completed research methodology courses, and 62.6% agreed that research benefits clinical practice. Across 10 domains, ranging from literature searches to manuscript submission, the average confidence score was 3.3 (± 1.1) out of 5. The lowest self-reported confidence score among R1 trainees was observed in basic statistical analysis (2.8 ± 1.2). There was no statistically significant difference in mean research confidence between trainees enrolled in diploma and residency programs. The primary barriers to conducting research projects included difficulty balancing clinical duties (mean: 4.0 ± 1.0), limited protected time for research due to clinical commitments (mean: 3.8 ± 1.0), unclear research expectations (mean: 3.6 ± 1.0), and lack of statistical support (mean: 3.6 ± 1.0).

Conclusions

Nearly two-thirds of R1 trainees expressed confidence in most research milestones. However, the common barriers identified in our study included difficulty balancing clinical duties, lack of protected time for research due to clinical commitments, unclear research expectations, and lack of statistical support. Advocacy and guidance from policymakers are essential to helping trainees overcome these barriers and successfully balance their clinical duties with scholarly activities to support their future professional development and academic advancement.

Categories: Medical Education
Keywords: awareness of research, confidence and barriers, needs assessment, postgraduate programs' trainees, qassim, saudi arabia

Introduction

Research is an indispensable component of modern medical practice, spanning undergraduate medical education through postgraduate residency and fellowship training. Engaging in ongoing scholarly activities enhances evidence-based clinical decision-making and practice. Furthermore, research fosters critical thinking, promotes evidence-based medicine, and equips future physicians and allied health professionals with the skills necessary to contribute to medical innovation [1].

In Saudi Arabia, the Saudi Commission for Health Specialties (SCFHS) plays a pivotal role in monitoring and accrediting postgraduate medical training programs, which increasingly emphasize a balance between clinical and research competencies. Currently, the SCFHS requires postgraduate board programs to submit a formal research proposal by the end of the second year of residency (R2), as a mandatory prerequisite for eligibility to sit the R2 promotion examinations. Although the SCFHS grants program directors autonomy in

managing residents' research activities, programs that require a full research submission typically mandate completion and submission of the final project by the end of the third year of residency (R3). This is particularly true for three-year board programs, such as Family Medicine (FM) [2,3]. Ultimately, the respective program board directors, in coordination with their programs' research units, determine the specific deadlines for submitting the research proposal and final manuscript.

The first year of residency (R1) is a foundational period during which trainees adapt to the rigorous demands of their chosen specialty, including mandatory research expectations [2]. Successfully navigating these projects requires not only foundational knowledge but also a clear understanding of the sequential stages, or "milestones," of the research process. Throughout the training program, these milestones typically include identifying a research question, conducting a literature review, developing a proposal, obtaining ethical approval, collecting and analyzing data, writing the manuscript, and finally presenting or publishing the findings [4,5].

Despite the growing emphasis on scholarly output, R1 residents frequently face significant challenges, including limited prior research experience, heavy clinical workloads, insufficient protected research time, and inadequate mentorship [6]. However, a critical yet often overlooked barrier is limited awareness of the sequential steps and expectations associated with research milestones. Without this foundational awareness, residents may struggle to plan effectively, manage their time, and seek timely support, potentially leading to project delays, frustration, and suboptimal research quality [6,7].

This challenge is well documented both globally and locally. A study from China found that residents frequently struggle with limited dedicated research time, inadequate supervision, and underdeveloped research skills [8]. Similarly, data from Saudi Arabia showed that residents across specialties face common barriers, including work-related stress, a lack of mentors, inadequate research facilities, and insufficient research skills or ideas [9]. Another local study focusing on FM residents identified the main obstacles to conducting research as an unfavorable research environment, time constraints, limited research skills, and insufficient technical or financial support [10]. Compounding these issues, statistical support remains a major hurdle: 36% of residents cited a lack of statistical support as a primary barrier, while 37% found the publication process itself highly challenging [11].

Interest in research remains high among local practitioners. In Saudi Arabia, nearly 70% of FM physicians express a strong interest in conducting research, and two-thirds consider it essential to advancing the field. However, only about one-third are actively engaged in research, and 30% supervise FM residents on at least one research project [10]. Although SCFHS postgraduate programs require research participation and often offer structured research methodology courses, a significant gap remains in R1 residents' practical understanding of the sequential milestones involved in the research process [2]. This lack of structured guidance, hands-on support, and mentorship throughout the research process not only exacerbates resident stress and limits the quality and volume of scholarly output but also hinders the development of a sustainable research culture within the SCFHS training system [2,3].

To the best of our knowledge, empirical evidence regarding awareness of research milestones and related training needs among R1 residents in the Qassim Region remains limited. Assessing baseline awareness is critical because it directly influences residents' ability to plan and execute research effectively. Therefore, this study aims to address this knowledge gap by providing a baseline assessment to inform and guide targeted educational interventions. Specifically, it aims to assess research training needs, awareness of research milestones, self-reported confidence in performing research tasks, and perceived barriers to research progression among R1 trainees in postgraduate training programs.

Materials And Methods

Study design, setting, and operational definition of research milestones

A cross-sectional, survey-based study was conducted among R1 residents enrolled in postgraduate training programs under the SCFHS within the Qassim Health Cluster, Saudi Arabia. This design was selected to assess residents’ baseline perceptions, awareness, confidence, training needs, and perceived barriers to conducting research at the start of residency. The study was conducted during the 2025-2026 academic year. For this study, a “research milestone” was operationally defined as an academic stage within the residency research curriculum, encompassing mandatory timelines, research proposal submission deadlines, Institutional Review Board (IRB) approval procedures, and graduation-related research requirements, such as thesis submission and defense deadlines.

Population, sampling, and eligibility

The target population comprised all 150 registered R1 residents across medical, dental, nursing, and allied health specialties within the Qassim Health Cluster. As the study targeted the entire registered population, a census sampling approach was adopted, eliminating the need for traditional sampling techniques. The inclusion criteria comprised all R1 residents registered in SCFHS postgraduate training programs within Qassim Province. Residents who declined to participate or were training outside the Qassim Health Cluster

were excluded. Ultimately, 107 residents participated in the study, representing diverse specialties, including Internal Medicine, Family Medicine, General Surgery, Pediatrics, Obstetrics and Gynecology, Emergency Medicine, Anesthesia, Radiology, Psychiatry, Dermatology, dental specialties, Nursing, Clinical Pharmacy, Blood Bank/Transfusion, and Physical Therapy.

Data collection instrument

The questionnaire items were constructed using the practical research experience of Family Medicine residents (spanning nine years) at the Family Medicine Academy (FMA), Qassim Health Cluster, Saudi Arabia. We also reviewed literature from Saudi Arabia [6,9,10] and China [8] to refine the tool. To align with current SCFHS training guidelines and CanMEDS competencies, novel variables were integrated. The FMA Program Director and two research-experienced faculty members reviewed, refined, and validated the instrument.

The final questionnaire comprised five distinct sections. Section 1 covered demographics, including age, gender, specialty, and degree program. Section 2 assessed research awareness through five items, including prior coursework in research methodology, perceived benefits of research for clinical practice, research engagement and completion, and familiarity with the CanMEDS "Scholar" competency. Section 3 assessed research confidence through 10 items, measuring self-reported confidence across key research competencies, such as literature searching, proposal writing, IRB application preparation, statistical analysis using SPSS Statistics, manuscript drafting, and manuscript preparation for publication. Responses were recorded on a 5-point Likert scale (1 = not confident at all, 5 = very confident) and reported as means and standard deviations (SD).

Section 4 assessed barriers to research through nine items, examining systemic and personal obstacles, including time constraints, clinical workload, lack of mentorship, funding, infrastructure, statistical support, IRB submission, and research skills. Responses were rated on a 5-point Likert scale (1 = not a barrier, 5 = critical barrier). Section 5 covered qualitative feedback and research status through two items: one closed-ended question assessing participants' current research status and one open-ended question inviting recommendations for improving research training.

Validity and reliability

Regarding validity, two experienced research faculty members at FMA assessed content validity, and the FMA program director assessed face validity through a series of meetings, which supported effective questionnaire development. The instrument demonstrated internal consistency; Cronbach's alpha was 0.8 for the 10-item confidence subscale and for the nine-item barriers subscale.

Pilot study

Before full deployment, we conducted a pilot study with five residents to evaluate the questionnaire's clarity, flow, and completion time. Following approval from the Designated Institutional Officer (DIO), the pilot confirmed the instrument's feasibility and did not require structural modifications. The final analysis excluded data from pilot participants.

Data collection procedure

Data were collected using a self-administered online version of the validated questionnaire. The survey link was distributed via official trainees' email and WhatsApp groups within the Qassim Health Cluster. To improve the response rate, we sent gentle weekly reminders throughout the data collection period.

Data analysis

Data were exported from Microsoft Excel to SPSS Statistics version 26 (IBM Corp., Armonk, NY) for data cleaning, coding, and statistical analysis. Descriptive statistics, including frequencies, percentages, means, and SDs, were used to summarize participant demographics and scale characteristics. The questionnaire included 10 items measuring research confidence and nine items assessing perceived barriers, with each item rated on a 5-point Likert scale. Individual mean scores were calculated for each variable, and overall scale scores were computed as the grand mean of the corresponding items. Inferential statistics, specifically independent-samples t-tests, were used to compare mean research confidence scores across binary demographic categories, including gender and degree type (diploma versus residency), with statistical significance set at $p \leqslant 0.05$.

For comparisons of mean research confidence by gender and degree type (diploma versus residency), a composite score approach was used. Each research milestone was rated on a 5-point Likert scale (1 = not confident at all, 5 = very confident). For the 10 research milestones, the total composite score ranged from 10 to 50, with a minimum possible score of 10 (10 × 1) and a maximum possible score of 50 (10 × 5).

For the qualitative analysis of the open-ended question, we first assessed response rates and data integrity

to account for missing or non-substantive entries, such as punctuation marks, zeros, or blank responses. Of the 107 participants, 37 provided substantive textual feedback. These responses were compiled in Microsoft Excel, analyzed using thematic condensation, and categorized into seven distinct themes: conducting research courses or workshops; providing research supervision and mentorship for trainees; increasing the number of lectures and practical sessions; providing lectures and supplementary materials; making research publication non-obligatory within the training program; mandating the initiation of research in the first year; and allocating dedicated time for research. Frequencies and percentages (n, %) were then calculated for each theme using the total number of qualitative respondents as the denominator.

Ethical considerations

Ethical approval was obtained from the Qassim Health Cluster Institutional Review Board (IRB) (approval number 607-47-011138), dated February 12, 2026. Participants provided informed consent online before completing the survey and were informed of their right to withdraw from the study at any time during data collection. Participation was voluntary throughout the study. The confidentiality of participants' personal information was maintained, and the data were not shared with any external agencies.

Results

Participant characteristics

A total of 107 postgraduate year 1 (PGY1/R1) trainees from various residency and diploma programs within the Qassim Health Cluster, Saudi Arabia, participated in this study, yielding a response rate of 71.3% (107/150). Table *1* presents the participants' demographic and professional characteristics. The mean age of the trainees was 28.2 ± 3.3 years. Males accounted for 59.8% (n = 64) of the sample, while females accounted for 40.2% (n = 43). Regarding program type, 75.7% (n = 81) of the participants were enrolled in residency programs, whereas 24.3% (n = 26) were enrolled in diploma programs.

Variables	Frequency (n)	Percentage (%)
Mean age of the participants: 28.2 ± 3.3 years		
Gender		
Male	64	59.8
Female	43	40.2
Program degree		
Residency	81	75.7
Diploma	26	24.3
Program specialty		
Family Medicine	24	22.4
Nursing Diploma	15	14.0
Internal Medicine	14	13.1
Emergency Medicine	11	10.3
Pediatrics	8	7.5
General Surgery	7	6.5
Dental specialty (OMFS, Orthodontist, Periodontology, Restorative Dentistry)	7	6.5
Clinical Pharmacist Diploma	6	5.7
Anesthesiology	5	4.7
Dermatology	3	2.8
Obstetrics and Gynecology	2	1.9
Psychiatry	2	1.9
Blood Bank and Transfusion Diploma	1	0.9
Radiology	1	0.9
Physical Therapy: MSK	1	0.9

TABLE 1: Demographic characteristics and awareness of training needs assessment for research among postgraduate year 1 trainees (PGY1/R1) (n = 107)

OMFS: oral and maxillofacial surgery; MSK: musculoskeletal

By specialty, the largest proportion of respondents were from Family Medicine (22.4%, n = 24), followed by Nursing Residency (14.0%, n = 15), Internal Medicine Residency (13.1%, n = 14), and Pediatrics Residency (7.5%, n = 8). General Surgery and dental specialties, including Oral and Maxillofacial Surgery (OMFS), periodontology, restorative dentistry, and orthodontics, each represented 6.5% (n = 7) of the cohort. Clinical Pharmacy trainees accounted for 5.7% (n = 6) of the sample, followed by Anaesthesiology residents (4.7%, n = 5), Dermatology residents (2.8%, n = 3), and trainees in Obstetrics and Gynecology and Psychiatry (1.9%, n = 2 each). The remaining specialties, including Blood Bank and Transfusion Residency, Radiology Residency, and Physiotherapy Residency, each represented 0.9% (n = 1) of the cohort (Table *1*).

Research baseline, awareness, and perceptions

As shown in Table *2*, approximately 57.9% (n = 62) of the trainees had completed a research methodology course before entering their current postgraduate program. When asked whether completing a full research project would be an added advantage to their training, the majority responded “yes” (58.9%, n = 63), while 29.0% (n = 31) were neutral (“maybe”) and 12.1% (n = 13) responded “no.” Similarly, 62.6% (n = 67) agreed that research helps inform clinical practice decisions, whereas 24.3% (n = 26) responded “maybe” and 13.1% (n = 14) responded “no.” Regarding awareness of “Scholar” as a core CanMEDS competency required in SCFHS training programs, 56.1% (n = 60) were aware, 15.0% (n = 16) responded “maybe,” and 29.0% (n = 31)

were unaware. Despite varying levels of baseline awareness, more than three-quarters of the trainees (76.6%, n = 82) expressed a clear intention to actively engage in research during their training. Another 15.9% (n = 17) responded: “maybe,” while only 7.5% (n = 8) responded “no” (Table 2).

Questions assessing the participants' awareness of the training needs assessment for research	Frequency (n)	Percentage (%)
Received the research methodology course before entry to the program		
Yes	62	57.9
No	45	42.1
Full research completion is an added advantage to your program training		
Yes	63	58.9
Maybe	31	29.0
No	13	12.1
Research is helpful in guiding your clinical decision-making in routine practice		
Yes	67	62.6
Maybe	26	24.3
No	14	13.1
Awareness of scholarship is one of the CANMEDS competencies of SCFHS		
Yes	60	56.1
Maybe	16	15.0
No	31	29.0
Plan to actively engage in research during training		
Yes	82	76.6
Maybe	17	15.9
No	8	7.5

TABLE 2: Awareness of training needs assessment for research among postgraduate year 1 trainees (PGY1/R1) (n = 107)

SCFHS: the Saudi Commission for Health Specialties

Confidence in research milestones

Table 3 describes the trainees' self-reported confidence across 10 distinct research-related tasks within their training program. The average confidence score across all 10 variables was 3.2 ± 1.1 on a 5-point scale. Trainees expressed the highest confidence in the data collection process, with 56.0% (n = 60) reporting being "confident" or "very confident" (mean: 3.6 ± 1.1). Conversely, R1 residents reported the lowest confidence in performing basic statistical analysis using SPSS, at 31.7% (n=34), mean: 2.8 ± 1.2. The mean confidence scores and standard deviations for the remaining research milestones were as follows (Table 3): conducting a literature search: 3.4 ± 1.1; writing a research question and objectives: 3.4 ± 1.1; designing data collection instruments: 3.3 ± 1.2; developing a research proposal: 3.2 ± 1.1; preparing for the IRB submission: 3.2 ± 1.2; data interpretation and report writing: 3.2 ± 1.1; using reference management software: 3.2 ± 1.2; and manuscript submission for publication: 3.2 ± 1.2 (Table 3).

Research confidence	Not confident at all (1), n (%)	Slightly confident (2), n (%)	Moderately confident (3), n (%)	Confident (4), n (%)	Very confident (5), n (%)	Mean (± SD)
Conducting literature searches	4 (3.7%)	22 (20.6%)	27 (25.2%)	32 (29.9%)	22 (20.6%)	3.4 (± 1.1%)
Writing a research question and objectives	3 (2.8%)	21 (19.6%)	33 (30.8%)	27 (25.2%)	23 (21.5%)	3.4 (± 1.1%)
Developing a research proposal, including methodology	9 (8.4%)	19 (17.8%)	33 (30.8%)	27 (25.2%)	19 (17.8%)	3.2 (± 1.19%)
Designing data collection instruments	6 (5.6%)	23 (21.5%)	27 (25.2%)	28 (26.2%)	23 (21.5%)	3.3 (± 1.20%)
Preparing an IRB application	13 (12.1%)	17 (15.9%)	27 (25.2%)	30 (28%)	20 (18.7%)	3.2 (± 1.27%)
Data collection process	4 (3.7%)	16 (15%)	27 (25.2%)	33 (30.8%)	27 (25.2%)	3.6 (± 1.13%)
Performing basic statistical analyses using SPSS software	21 (19.6%)	21 (19.6%)	31 (29%)	21 (19.6%)	13 (12.1%)	2.8 (± 1.28%)
Findings interpretation and writing a report	7 (6.5%)	21 (19.6%)	35 (32.7%)	25 (23.4%)	19 (17.8%)	3.3 (± 1.1%)
Using reference management software	10 (9.3%)	20 (18.7%)	34 (31.8%)	22 (20.6%)	21 (19.6%)	3.2 (± 1.2%)
Preparing a manuscript for publication	10 (9.3%)	17 (15.9%)	33 (30.8%)	28 (26.2%)	19 (17.8%)	3.3 (± 1.2%)

TABLE 3: R1 residents' confidence in performing research-related tasks and barriers during the research project (n = 107)

SD: standard deviation; IRB: institutional review board

Barriers to research completion

Trainees evaluated nine structured barriers using a 5-point Likert scale ranging from 1 (not a barrier) to 5 (a critical barrier), as summarized in Table *4*. The primary constraint identified was difficulty balancing duties (mean score: 4.0 ± 1.0), closely followed by a lack of protected time due to the clinic (mean score: 3.86 ± 1.0 out of a maximum score of 5). Other prominent barriers identified by the trainees included unclear expectations about research (mean score: 3.6 ±1.0), lack of statistical support (mean score: 3.6 ± 1.1), lack of an assisted mentor/supervisor (mean score: 3.6 ± 1.2), lack of funding for research (mean score: 3.4 ± 1.1), limited access to research infrastructure (mean score: 3.3 ± 1.2), lack of knowledge or skills about research (mean score: 3.3 ± 1.2), and difficulty accessing the IRB (mean score: 3.1 ± 1.2) (Table *4*).

Research barriers	Not a barrier (1), n (%)	Minor barrier (2), n (%)	Moderate barrier (3), n (%)	Major barrier (4), n (%)	Critical barrier (5), n (%)	Mean (± SD)
Difficulty balancing clinical duties	3 (2.8%)	4 (3.7%)	24 (22.4%)	30 (28.0%)	46 (43.0%)	4.0 (± 1.0%)
Lack of protected time due to a clinic	3 (2.8%)	9 (8.4%)	26 (24.3%)	31 (29.0%)	38 (35.5%)	3.8 (± 1.0%)
Unclear expectations about research	2 (1.9%)	14 (13.1%)	33 (30.8%)	30 (28.0%)	28 (26.2%)	3.6 (± 1.0%)
Lack of statistical support	5 (4.7%)	14 (13.1%)	31 (29.0%)	24 (22.4%)	33 (30.8%)	3.6 (± 1.1%)
Lack of an assigned research mentor	6 (5.6%)	14 (13.1%)	29 (27.1%)	26 (24.3%)	32 (29.9%)	3.6 (± 1.2%)
Lack of funding for research	6 (5.6%)	17 (15.9%)	35 (32.7%)	25 (23.4%)	24 (22.4%)	3.4 (± 1.1%)
Limited access to research infrastructure	9 (8.4%)	18 (16.8%)	35 (32.7%)	20 (18.7%)	25 (23.4%)	3.3 (± 1.2%)
Lack of knowledge/skills about research	10 (9.3%)	18 (16.8%)	36 (33.6%)	18 (16.8%)	25 (23.4%)	3.3 (± 1.2%)
Difficulty accessing IRB	13 (12.1%)	20 (18.7%)	33 (30.8%)	20 (18.7%)	21 (19.6%)	3.1 (± 1.2%)

TABLE 4: R1 residents' perceptions of barriers during research project task completion (n = 107)

SD: standard deviation; IRB: institutional review board

When we examine the relationship between confidence scores and trainees' demographic subgroups, the independent t-test found no significant difference in mean confidence scores between males (32.2 ± 7.51) and females (31.48 ± 7.16; $p > 0.05$). Similarly, an independent t-test comparing mean confidence scores by diploma (32.1 ± 9.29) and residency (31.9 ± 6.67) levels showed no statistically significant difference ($p > 0.05$) (Table 5).

Gender	Sample (N)	Mean confidence (± SD)	t-value and p-value
Gender			
Male	64	32.2 (± 7.51)	t = 0.49, p = 0.624
Female	43	31.5 (± 7.16)	
Residents' degree			
Residency	81	31.9 (± 6.67)	t = 0.128, p = 0.899
Diploma	26	32.1 (± 9.29)	

TABLE 5: R1 residents' demographic factors and mean research confidence score

SD: standard deviation

Current stage of research and trainees' suggestions

Figure 1 illustrates the current stage of research of the R1 trainees during the data collection period. Of the 107 participants, 53.2% (n = 57) were at the research idea stage, 35.5% (n = 38) were planning to take a research course, and 6.5% (n = 7) had not yet started their research project.

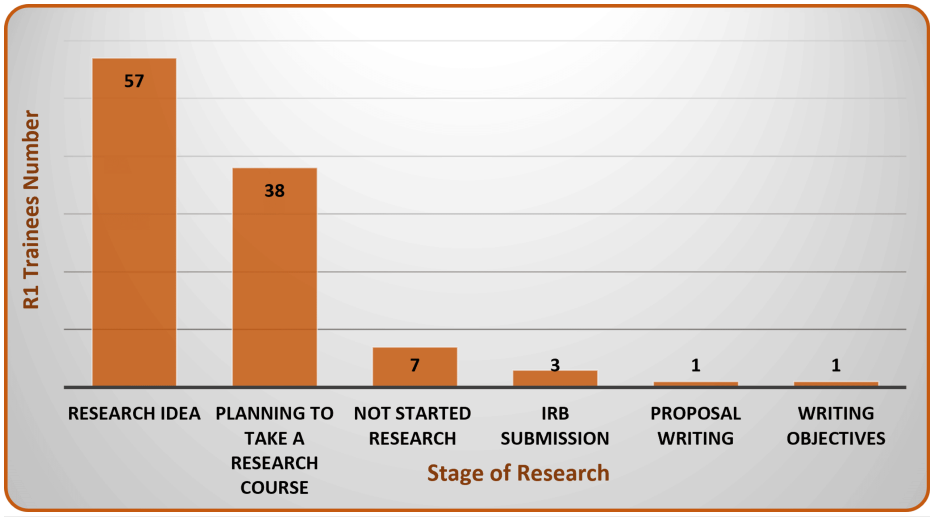


FIGURE 1: Current stage of research among first-year (R1) residents (n = 107)

IRB: institutional review board

Regarding suggestions for improving research training among first-year trainees, only 37 of the 107 residents responded to the open-ended question. Among these 37 respondents, 54.1% (n = 20) indicated a need for dedicated research courses or workshops, suggesting that these could be offered during separate periods or through monthly lectures (e.g., via Zoom). Another important suggestion, raised by 18.9% (n = 7) of the respondents, was to provide formal research supervision and mentorship. Finally, 13.5% (n = 5) of the respondents highlighted the need for additional lectures combined with hands-on practical sessions (Figure *2*).

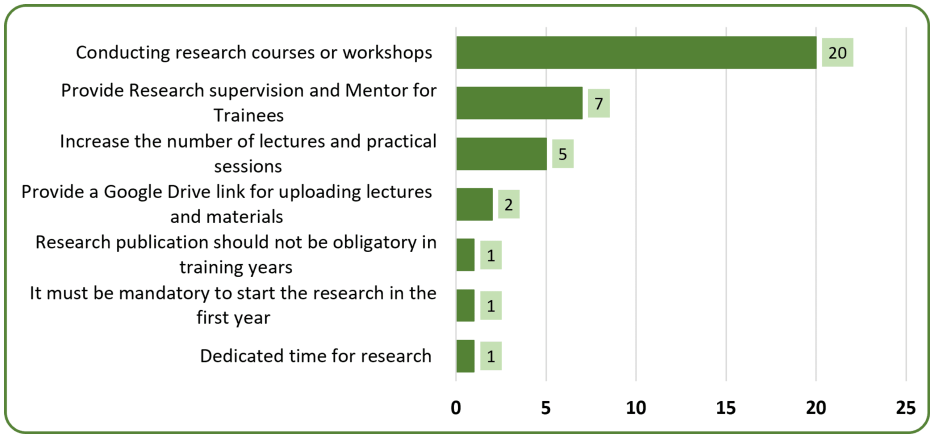


FIGURE 2: First-year (R1) residents' comments or suggestions to improve future research training (n = 37)

Discussion

Recognizing research milestones and developing early awareness of the research process during the initial months of postgraduate training are critical for reducing stress and ensuring timely project completion. This study assessed baseline awareness, confidence, and specific research training needs among PGY1 trainees across medical, residency, and diploma programs within the Qassim Health Cluster. The cohort's mean age (28 ± 3.0 years) reflects a population beginning postgraduate specialty training relatively early in their careers. This early engagement presents a valuable opportunity for healthcare institutions to foster long-term academic and clinical research productivity.

Baseline prior training and perceived value

In this study, 57.9% of residents had completed a formal research methodology course before entering their

postgraduate programs. This finding indicates substantial prior exposure to research methodology, potentially reflecting the introductory research workshops regularly offered to undergraduate students and interns by health clusters and medical universities across Saudi Arabia. The literature suggests that early exposure to scientific training significantly enhances subsequent academic engagement and clinical competence [12]. International frameworks similarly emphasize that integrating research principles early in residency equips physicians with essential evidence-based medicine skills and improves clinical decision-making [13-15]. These findings align with the perceptions of our cohort: 62.6% agreed that research informs clinical decisions, and 58.9% considered it an asset to their postgraduate curriculum.

These positive perceptions are consistent with broader regional findings. Previous studies in Saudi Arabia have reported that up to 97.9% of residents believe research enhances healthcare delivery [16] and can strengthen their curricula vitae for competitive fellowship placements [12]. Furthermore, recent local evidence highlights the broader institutional benefits of medical research, with 90% of stakeholders reporting improved clinical service effectiveness and 89.1% reporting enhanced institutional teaching capacity [17].

Research milestones, confidence, and the biostatistics deficit

The overall mean confidence score across the required research milestones was 3.3 ± 1.1 out of 5, indicating a moderate level of self-reported confidence among PGY1 trainees. However, confidence was notably lower for basic statistical analysis using SPSS (mean ± SD: 2.8 ± 1.2). This relative lack of confidence in statistics is a well-documented challenge in postgraduate medical education. It is often attributed to limited undergraduate biostatistics training, heavy clinical workloads, and the inherently abstract nature of quantitative data analysis for clinically oriented learners. Our findings are consistent with international evidence indicating that residents often have lower proficiency in biostatistics and data interpretation, underscoring the need for targeted, practical statistics courses integrated into postgraduate training programs [18].

Institutional barriers and structural constraints

Despite their baseline confidence, trainees identified several major structural barriers to completing research projects. The most prominent obstacles were difficulty balancing clinical and research responsibilities and a lack of protected research time. These findings are consistent with a multicenter Saudi study that identified time constraints, insufficient institutional funding, limited access to scientific libraries, and inadequate research skills as major barriers to academic research. That study recommended standardizing research integration across medical specialties [19]. Similarly, a local narrative review confirmed that limited faculty mentorship and insufficient protected research time remain widespread challenges across regional training programs [12].

Earlier studies, including one conducted in Riyadh in 2014, reported substantial barriers among residents, including a lack of formal research training (93.2%), time constraints (89.5%), work-related stress (83.2%), and inadequate supervision (73.3%) [16]. These findings are further supported by 2025 data from Riyadh, which indicate that administrative resource constraints and limited time allocation remain significant challenges to data collection and research implementation in the region [17].

Strengths and limitations

A key strength of this study is its multispecialty, multiprogram approach, encompassing 15 distinct training specialties within the Qassim Health Cluster. Another strength is its identification of practical training needs based on residents' self-reported confidence. However, several limitations should be acknowledged. First, data were collected using a self-administered questionnaire, which may introduce nonresponse bias and potential misinterpretation of survey items. Second, the cross-sectional design captures a single point in time and cannot establish causal relationships between variables. Third, because the sample was drawn exclusively from a single health cluster, the generalizability of the findings to the wider Saudi Arabian postgraduate training population may be limited. Finally, only 37 participants responded to the open-ended question on suggested improvements, limiting the extent to which these recommendations can be generalized to trainees across all programs. Future multicenter, nationwide longitudinal studies are needed to validate these findings, assess changes in research awareness and confidence over time, and inform the development of targeted research training interventions.

Conclusions

The mean confidence scores for research milestones among all R1 trainees of the Qassim health cluster are reasonably good. In spite of their acceptable research confidence, R1 trainees identified several barriers to research progression, including difficulty balancing clinical duties, lack of protected research time, unclear research expectations, and insufficient statistical support. We conclude that trainees and relevant decision-makers should carefully weigh the advantages and disadvantages of research commitments to ensure that research projects are completed within the stipulated training period while supporting scholarly activities and academic advancement. Guidance and advocacy from policymakers are essential to fostering a supportive research environment within training institutions.

Appendices

Questionnaire

Section 1: Demographic Information

1. **Age (in years):** _____
2. **Gender:** [ ] Male [ ] Female
3. **Current Residency Specialty (e.g., Internal Medicine, General Surgery, Pediatrics, Family Medicine, OB/GYN, etc.):**
   [ ] Internal Medicine [ ] General Surgery [ ] Paediatrics [ ] Family Medicine
   [ ] Obstetrics & Gynaecology [ ] Emergency Medicine [ ] Anesthesiology
   [ ] Radiology [ ] Dermatology [ ] Psychiatry [ ] Nursing diploma
   [ ] Clinical pharmacy diploma [ ] Blood bank and transfusion diploma
   [ ] Physical therapy [ ] Other (Please specify):_____
4. **Program degree:** [ ]Diploma [ ]Residency [ ] Fellowship

Section 2: Awareness about Training Need Assessment

5. Have you taken any research methodology courses till now?	Yes / No
6. Is full research completion an added advantage for your program training?	(Yes / No / Maybe)
7. Is research helpful for my clinical decisions in our regular practice?	(Yes / No / Maybe)
8. Are you aware that scholarship is one of CANMED competencies of SCFHS?	(Yes / No / Maybe)
9. Do you plan to engage in research actively during training?	Yes / No / Maybe

Section 3: Rate the Confidence in performing research-related tasks, the Importance of supports/resources, and Barriers.

Statement	1	2	3	4	5
Rate your current confidence in performing each of the following research-related tasks. Use 5-point Likert scale: 1 = Not confident at all; 2 = Slightly confident; 3 = Moderately confident; 4 = Confident; 5 = Very confident.					
Confident					
10. Conducting literature searches (databases, search strategies):	☐	☐	☐	☐	☐
11. Writing a research question and objectives:	☐	☐	☐	☐	☐
12. Developing a research proposal:	☐	☐	☐	☐	☐
13. Designing data collection instruments:					
14. Preparing an ethics/IRB application:	☐	☐	☐	☐	☐
15. Data collection process:	☐	☐	☐	☐	☐
16. Performing basic statistical analyses (descriptive, t-test, chi-square):	☐	☐	☐	☐	☐
17. Interpreting statistical outputs, results & report writing:	☐	☐	☐	☐	☐
18. Manuscript submission for publication:	☐	☐	☐	☐	☐
19. Using reference management software (e.g., EndNote, Mendeley):	☐	☐	☐	☐	☐
Please indicate to what extent the following factors have affected your ability to undertake research during R1. Use 5-point frequency/impact scale: 1 = Not a barrier; 2 = Minor barrier; 3 = Moderate barrier; 4 = Major barrier; 5 = Critical barrier.					
Barriers					
20. Lack of protected time due to clinical workload	☐	☐	☐	☐	☐
21. Lack of an assigned research mentor	☐	☐	☐	☐	☐
22. Lack of statistical support	☐	☐	☐	☐	☐
23. Lack of knowledge/skills about research methods	☐	☐	☐	☐	☐
24. Difficulty accessing IRB/ethics support	☐	☐	☐	☐	☐
25. Lack of funding for research	☐	☐	☐	☐	☐
26. Limited access to research infrastructure (databases, software)	☐	☐	☐	☐	☐
27. Unclear expectations about research milestones for R1	☐	☐	☐	☐	☐
28. Difficulty balancing clinical duties and research tasks	☐	☐	☐	☐	☐

29. **What level of research progress stage are you in:**
    - Planning to take a research course
    - Research idea
    - Any other ----------
30. Any additional comments or suggestions for improving research training for R1 residents?

_____

FIGURE 3: Study questionnaire

Additional Information

Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

Concept and design: Amel A. Sulaiman, Muath I. Al-Rebdi, Chandra S. Sekhar, Fatima O. Sayed

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Disclosures

Human subjects: Informed consent for treatment and open access publication was obtained or waived by all participants in this study. Regional Research Ethics Committee, Qassim Province issued approval 607-47-011138. **Animal subjects:** All authors have confirmed that this study did not involve animal subjects or tissue. **Conflicts of interest:** In compliance with the ICMJE uniform disclosure form, all authors declare the following: **Payment/services info:** All authors have declared that no financial support was received from any organization for the submitted work. **Financial relationships:** All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. **Other relationships:** All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

Acknowledgements

We sincerely thank all study participants for their time and effort in completing the survey.

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