

Identifying research obstacles; a cross sectional comparative study of perceptions of postgraduate medical and dental residents in three public sector medical colleges

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Abstract

Objective: To explore the attitude of postgraduate medical and dental residents about research work and to identify barriers in the way of research activities.

Methodology: The cross-sectional study was conducted from May to July, 2018, at three public-sector medical and dental institutions in Quetta, the capital of Pakistan province of Balochistan, and comprised postgraduate residents. Data was collected using a pre-validated 16-item Likert scale questionnaire. Data was analysed using SPSS 23.

Results: Of the 72 subjects, 44(61.1%) were males. The overall mean age was 23.3 ± 4.6 years (range: 28-30 years). The residents demonstrated willingness to conduct clinical research with a mean score of 4.36 ± 0.65 . There was no association of attitudes and barriers with socio-demographic and personal characteristics ($p > 0.05$). Deficient lab facilities ($p < 0.001$), and inaccessibility to electronic and hospital data ($p = 0.003$) were the major factors identified as research barriers.

Conclusion: Barriers to research need to be addressed in designing research curricula to encourage and facilitate meaningful research.

Keywords: Obstacles, Research activities, Postgraduate residents, Perceptions. (JPMA 70: 1384; 2020).

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Introduction

Basic and applied research serves to build foundations that combats the challenges of providing good clinical practice and also encourage informed decisions on healthcare policy. Despite its acknowledged importance, there has been a steady decline in the number of physician research scientists even in the developed countries.¹ To enhance competence and professional development of medical students, innovative research training programmes have been introduced in medical education with a positive effect on their attitude, level of interest and practices. Research training at undergraduate/postgraduate levels not only promotes analytical judgement, nurtures creativity and active learning, it also strengthens critical thinking and communication skills.² These benefits have been shown to continue in their later professional life.³ Acknowledging the vital role of research in promoting life-long learning, research training and activities in postgraduate medical education have been

introduced as an essential component of the postgraduate curricula in various medical colleges in Pakistan, similar to other developing countries.^{4,5}

Pakistan is a developing country with its own peculiar healthcare problems and challenges. Solutions to these issues are also to be found in local scenarios as policies and procedures imported from Western world are not applicable or feasible. Research in undergraduate/postgraduate institutions will provide data to address and solve these issues. Unfortunately, healthcare professionals in Pakistan acknowledge the significance of research,⁶ but do not pursue careers in research beyond what is required for appointments, promotions or simply passing examinations due to their perception about research as an additional burden or hurdle.⁷ Lack of research knowledge, unavailability of mentors and funds and time management are some of the factors cited for declining interest in medical students to participate in research activities.^{3,8} Various authors from Pakistan have reported on the attitudes and barriers to research faced by Pakistani students.^{3,9} These studies have addressed medical undergraduate students and postgraduate trainees¹⁰ only

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with no report on perceptions of dental students. Additionally, all the reported literature from Pakistan has focussed on institutions in large metropolitan cities that are provincial headquarters with well-established medical colleges and healthcare institutions. Balochistan is a relatively less privileged and least developed province compared to the rest of the country with serious issues of governance, poverty and oppression due to an outmoded feudal system and lack of educational opportunities.^{11,12} The current study was planned to assess the perceived barriers to research among postgraduate residents (PGRs) in medical and dental fields.

Subjects and Methods

The cross-sectional study was conducted from May to July, 2018, at (Bolan Medical. Complex Hospital (BMCH), Quetta Institute of Medical Sciences (QIMS) and Institute of Public Health (IPH), Quetta, Balochistan. PGRs from BMCH and QIMS belonged to dentistry, whereas PGRs from IPH belonged to medicine. After taking ethical approval from Principal Bolan Medical College, Quetta, as well as informed consent from the subjects who were enrolled using non-probability convenience sampling, a self-administered and pre-validated questionnaire⁸ was utilised to assess PGRs' perceptions about barriers to research. PGRs absent at the time of data collection were excluded. The questionnaire consisted of 10 factors as research barriers among medical students. It was pilot-tested on 15 PGRs (5 each from the three institutions) who were later excluded from the final sample. The Reliability coefficient Cronbach's alpha of the questionnaire after pilot-testing was 0.771. The questionnaire recorded data on demographics (age in years, gender, parental education status, marital status, schooling and year of enrolment in medical/dental school) of the PGRs. Attitudes and perceptions about research barriers were recorded with 16 questions using a five-point Likert scale; 1 = Strongly disagree (SD), 2 = Disagree (D), 3 = Neutral (N), 4 = Agree (A), 5 = Strongly agree (SA). A demonstrator of dental section distributed and collected the questionnaires.

The data collected was analysed using SPSS 23. Qualitative variables were presented by calculating frequencies and percentages. Mean and standard deviation (SD) were calculated for continuous variables. Likert scale variables were recoded for further analysis by combining categories 'agree' and 'strongly agree' in to a single group 'agree'

recoded 3, categories 'strongly disagree' and 'disagree' into a single category 'disagree' recoded 1, while 'neutral' was retained and recoded 2. Scores of 6 questions on attitude were added to obtain a composite attitude score and similarly a composite score for perceptions to research barriers was calculated by adding the scores for 10 questions pertaining to this aspect. Chi-square test was used for evaluating association between research barriers and demographic data while Spearman's rank correlation was utilised to determine the correlation between attitudes and barrier scores. Normality assumption was evaluated with Kolmogorov-Smirnov test. Inter-group comparison between three institutions was done with Kruskal-Wallis test for non-normal data while normally distributed variables were analysed with one-way analysis of variance (ANOVA) followed by post-hoc pairwise comparisons with Games-Howel Test for normally distributed variables and Bonferroni correction for non-normal data. $P \leq 0.05$ was considered significant.

Results

Of the 80 PGRs, 72(90%) were included. Of them, 38(52.8%) belonged to BMCH, 15(21%) to QIMS and 19(26.4%) to IPH. Overall, there were 44(61.1%) males. The overall mean age was 23.3 ± 4.6 years (range: 28-30 years). Twenty-four participants (33.33%) were from 1st year followed by 23(32%), 3(4.16%) and 22(30.55%) from 2nd, 3rd and final year respectively. Forty-four PGR's (61%) had received their education from public schools. Parental educational analysis revealed that 44 (61.11%) of fathers versus 20 (28%) of mothers had received college-level or higher education. Six (8.33%) fathers and 18 (25%) mothers were illiterate.

In responses to questions on attitudes and perceived barriers to research, 62 (86%) participants were of the opinion that undergraduate students should participate in research. Ability of undergraduate students to plan and conduct a research project and write a scientific paper was acknowledged by 42 (58%) but only 22 (30%) agreed that medical students could plan and conduct research without supervisor. Also, 65 (90%) were willing to conduct clinical research while 58 (80%) were interested in community-based research. In analysing barriers to research data, lack of time and lack of proper lab and other facilities were identified by 65 (90%) respondents, followed by lack of proper mentoring from faculty 60 (83.33%) and absence of motivation or rewards for

Table-1: Responses to questions on Attitudes and Research Barriers Perceptions (n=72).

	SD n (%)	D n (%)	N n (%)	A n (%)	SA n (%)
Attitudes					
Confident in interpreting and writing a research paper	2 (2.8)	9 (12.5)	10 (13.9)	33 (45.8)	18 (25)
Undergraduate students should participate in research	1 (1.4)	3 (4.2)	6 (8.3)	40 (55.6)	22 (30.6)
Undergraduate students can plan and conduct a research project and write a scientific paper	4 (5.6)	13 (18.1)	13 (18.1)	26 (36.1)	16 (22.2)
Medical students can plan and conduct research without supervisor	11 (15.3)	26 (36.1)	13 (18.1)	11 (15.3)	11 (15.3)
Willingness to conduct clinical research	-	-	7 (9.7)	32 (44.4)	33 (45.8)
Willingness to conduct community based research	2 (2.8)	5 (6.9)	7 (9.7)	28 (38.9)	30 (41.7)
Barriers to Research					
Lack of proper mentoring from faculty	1 (1.4)	7 (9.7)	4 (5.6)	30 (41.7)	30 (41.7)
Uncooperative faculty	1 (1.4)	5 (6.9)	16 (22.2)	33 (45.8)	17 (23.6)
Lack of time	2 (2.8)	3 (4.1)	2 (2.8)	34 (47.2)	31 (43)
Lack of proper lab and other facilities	-	3 (4.2)	4 (5.6)	33 (45.8)	32 (44.4)
Deficient faculty research knowledge and skill	1 (1.4)	8 (11.1)	14 (19.4)	25 (34.7)	24 (33.3)
Inaccessibility of electronic and medical data	1 (1.4)	6 (8.3)	10 (13.9)	30 (41.7)	25 (34.7)
Lack of funding	4 (5.6)	8 (11.1)	7 (9.7)	28 (38.9)	25 (34.7)
Lack of motivation and or rewarding	-	2 (2.8)	9 (12.5)	31 (43)	30 (41.7)
Lack of appropriate knowledge and skill of research	2 (2.8)	8 (11.1)	9 (12.5)	37 (51.4)	16 (22.2)
Lack of interest	3 (4.1)	24 (33.3)	8 (11.1)	16 (22.2)	21 (29.2)

SD = Strongly Disagree, D = Disagree, N = Neutral, A = Agree, SA = Strongly Agree

research efforts 61 (84%). Inaccessibility of electronic and medical data and lack of funding for research were suggested barriers by 55 (76%) and 53 (73%) respectively. Also, 53 (73%) respondents admitted they lacked

Table-3: Inter-Institutional Group Comparison of Scores on Attitudes and Perceptions to Research Barriers.

Parameter Evaluated		n	Mean±SD	p-value*
Attitudes				
Undergraduate students can plan and conduct a research project and write a scientific paper	BMC	38	3.26±1.22	0.05
	QIMS	15	3.46±1.24	
	IPH	19	4.05±0.91	
	Total	72	3.51±1.18	
Perceived Barriers				
Deficient faculty research knowledge and skill	BMC	38	3.71±1.06	0.00
	QIMS	15	4.60±0.50	
	IPH	19	3.63±1.11	
	Total	72	3.87±1.04	
Inaccessibility of electronic and medical data	BMC	38	4.02±0.85	0.03
	QIMS	15	4.46±0.63	
	IPH	19	3.57±1.26	
	Total	72	4.00±0.97	

* Based on ONE WAY ANOVA; BMC: Bolan Medical. Complex Hospital; QIMS: Quetta Institute of Medical Sciences; IPH: Institute of Public Health.

Table-2: Attitudes and barriers composite scores of post-graduate residents (PGRs) in relation to socio-demographic and personal characteristics.

Socio-demographic	n	Composite Attitudes Score	Composite Barriers Score
INSTITUTION			
BMC	38	21.9 ± 3.6	39.8 ± 5.2
QIMS	15	22.5 ± 3.2	40.2 ± 3.7
IPH	19	24.2 ± 3.4	38.7 ± 6.0
p-value †		0.016*	0.780
GENDER			
Male	44	22.6 ± 3.6	3.9 ± 0.5
Female	28	22.7 ± 3.6	4.1 ± 0.5
p-value †		0.78	0.112
YEAR OF ENROLMENT			
1year	17	23.1 ± 3.1	37.8 ± 5.3
2year	22	22.7 ± 3.8	40.5 ± 2.9
3year	4	26.7 ± 3.9	44.0 ± 5.1
Final year	29	21.7 ± 3.4	39.4 ± 6.1
p-value †		0.113	0.120
TYPE OF SCHOOLING			
Public sector	44	22.5 ± 3.4	39.2 ± 5.3
Private sector	28	22.8 ± 4.0	40.3 ± 4.8
p-value †		0.935	0.487
FATHER EDUCATIONAL STATUS			
Illiterate	6	25.1 ± 3.6	44.0 ± 4.1
Read & write	4	24.2 ± 4.6	40.0 ± 6.6
Primary pass	9	22.4 ± 4.5	40.5 ± 2.0
Secondary pass	9	22.1 ± 2.2	39.7 ± 2.5
College	24	21.5 ± 3.3	37.6 ± 6.0
Higher education	20	23.2 ± 3.6	40.1 ± 5.3
p-value†		0.465	0.158
MATERNAL EDUCATIONAL STATUS			
Illiterate	18	21.7 ± 4.1	41.2 ± 4.8
Read & write	11	22.5 ± 2.0	39.1 ± 2.6
Primary pass	12	24.0 ± 3.9	39.1 ± 5.0
Secondary pass	11	22.0 ± 2.8	38.0 ± 6.1
College	13	22.3 ± 4.2	38.8 ± 6.6
Higher education	7	24.1 ± 3.6	41.1 ± 5.0
p-value†		0.752	0.553

* Chi-square test, Statistically significant; P < 0.05. † Mann Whitney, ‡ Kruskal Wallis tests; BMC: Bolan Medical. Complex Hospital; QIMS: Quetta Institute of Medical Sciences; IPH: Institute of Public Health.

appropriate knowledge and skill of research; 50 (69%) identified uncooperative faculty attitude and deficient faculty research knowledge and skills as barriers. Response to item 10 (lack of interest) as a research barrier was equally distributed among the postgraduate trainees with 37 (51%) acknowledging they lacked interest in research. (Table 1).

A statistically significant weak negative correlation was found between lack of interest as research barrier by PGRs and increasing educational level of father (p=0.024), but mother's educational level had no association with lack

of interest ($p > 0.05$). Similarly, no correlation was found between year of training and lack of interest in research ($p > 0.05$).

Composite attitude scores of PGRs enrolled in IPH were significantly better than the PGRs of BMCH ($p < 0.05$). All other parameters failed to achieve a statistically significant difference (Table 2).

Inter-institutional comparison of dental and medical postgraduate trainees was done (Table 3), and no correlation was found between attitudes and perceptions to research barriers ($p = 0.196$).

Discussion

To the best of our knowledge, the present study is the first to provide data on dental students and also to compare the perceptions of PGRs in internal medicine and dental surgery. Knowledge, constructive behaviour and intellectual expertise are essential components in research execution.¹³ Physician researchers connect basic sciences with clinical practice to explore new therapeutic strategies for improved patient care.¹⁴ Despite the overwhelming importance of research, the number of studies in healthcare institutions continues to dwindle.¹ Some of the reasons quoted for this attrition in pursuing research are financial constraints, lack of time, personal and family commitments and administrative institutional hurdles.^{7,8} As majority of research activities in Pakistan are undertaken by PGRs, it is important to identify their perceptions and attitudes towards obstacles in research activities to guide strategies to boost research practices among future physicians.

Pakistani medical students demonstrate positive attitude towards research¹⁴ and consider it beneficial and facilitative for their profession and a motivation for future research work.¹⁶ This is in contrast to a study reporting low motivation in Libyan students¹⁷ and another from India¹⁸ which identified demotivation as an important research barrier. Participants of a study in Ireland acknowledged the importance of research but majority showed lack of awareness of research activities.¹⁹ In our study, 40.27% PGRs acknowledged scientific paper writing and this figure was much higher than 16.8% reported earlier.⁸ Interestingly, while 81.7% of PGRs in a study declared their interest in medical research,²⁰ very few (10.4%) had actually written a research paper. A study reported that 66.4% participants recognised the importance of research in medical education, and 96%

agreed that research should be supervised.¹³ Surprisingly, in the present study, 50% participants were confident that research could be conducted even without supervision. One possible reason for this observation could be the lack of facilitation by faculty, forcing the students to pursue research activities on their own.

In Balochistan, male literacy rate (39%) is higher than females' (16%).²¹ This difference is well represented in our findings (61.11%). Results of current research on gender were comparable with other researchers.¹⁴ However, controversy exists as some authors^{8,20,22} reported equal gender distribution in their studies. Khan et al. reported that Pakistani male medical students had significantly higher mean score on attitude scale²³ contrary to Amin et al. who observed higher satisfactory scores on attitude of female medical students in their study, demonstrating good attitude towards scientific activities, but the difference was statistically non-significant.⁸ Our study demonstrated a higher attitude score on item 3, "Undergraduate students can plan and conduct a research project", in relation to inter-institutional group comparison of scores on attitude ($p = 0.05$). This probably reflects greater exposure to research activities in undergraduate medical years compared to dental students. Amin et al. observed same results as 76.1% participants agreed to participate in research work.⁸ The reason behind positive attitude towards research in their undergraduates may be application/utilisation of reformed/innovative curriculum which enhanced students' creativity and made them able to understand and develop interest in research work while traditional curricula decrease students' interest in extra-curricular activities.

Literature has reported role of faculty staff in research activities. Faculty having positive awareness of research provides encouragement to students.¹⁵ Supervisors can play a key role to conduct academic research by emphasising the benefits of research for students' future life and occupation. The current study identified low level of faculty knowledge and skill related to research (73%). Soe et al. reported 26.6% respondents identified untrained faculty,²⁴ while 37.1% participants of Amin et al. study agreed low faculty knowledge working as a barrier towards their research work.⁸ Trained faculty members enhance research work by providing encouragement, furnishing assistance in generating hypothesis, statistical analysis and scientific writing.⁸

Educational and research-based facilities by the

college/university research centres can enhance student participation in research activities. Results from the present study observed 76% participants ($p=0.03$) complained unavailability of data. In a study, 44% participants reported inaccessibility to electronic and medical data as a barrier to continue research.²⁴

In the current study, 90% PGRs reported item number 4, "lack of proper lab and other facilities", as a hurdle in research. Soe et al. identified 63.3% study population documented lack of facilities as a hurdle in their work.²⁴ Dadipoor et al. from Iran reported that the second most prevalent barrier was lack of facilities.¹⁵ The reason behind this deficiency is the lack of funding from institution, which was not a major deterrent identified in developed countries.¹⁵ This factor was reported by 74% of our participants and reflects a key difficulty faced in conducting research.

Lack of time was the major obstacle reported from around the world that is comparable with our findings.^{8,14,25} Problem of time management may be due to job work strain or extraordinary scientific practice, high-stake postgraduate exam tension²³ affecting PGRs psychologically and physically tiring them, creating an unfavourable atmosphere for research,²³ even with ample research facilities. Setting aside a specific time slot for research activity in the student curriculum may be helpful in reducing this barrier.

The current study was a multi-centre study where PGRs of both medicine and dentistry participated and conveyed their views about deficient research activities. Validated questionnaire enabled us to compare our results with previous studies. However, it was a comparative study that utilised a self-reporting questionnaire and has a chance of respondent bias. The perceptions of faculty, who are an equally important stakeholder, were not assessed. Attitudes and research barriers of private sector institution PGRs were also not addressed which are all limitations of the current study.

One the basis of the findings, however, we recommend preparing future scientists and researchers; research knowledge and skills should be encouraged at undergraduate level with motivation in terms of stipends/scholarships; innovative teaching with introduction to research methodology should be added in the curriculum; faculty should be trained with mandatory research workshops and refresher courses; and other facilities, like easy access to laboratory and data,

should be ensured.

Conclusion

PGRs demonstrated moderate attitude towards research. Although they were enthusiastic in acquisition of new knowledge through research, due to insufficient laboratory and/or other facilities, deficient faculty research knowledge and skill and time management, their interest in research activities decreased.

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