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Research Article

### DETERMINANTS OF BRAIN DRAIN AMONG MEDICAL STUDENTS; A CASE CONTROL STUDY

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**Abstract:** *Brain Drain is the departure of educated or professional people from one country, economic sector, or field for another usually for better pay or living conditions<sup>[1]</sup>*

**Objectives:** *To know the determinants of brain drain among medical students*

**Design:** *Case control study*

**Place:** *King Edward Medical University*

**Study period:** *3 months*

**Subjects and Methods:** *Case-control study with 1:1 case to control ratio was conducted. A total of 300 subjects [150 cases and 150 controls] were recruited in study. 147 males [49%] and 153 females [51%] were part of the study. Informed consent was taking from the participants. Convenient sampling was used. Data was collected, compiled and analyzed by using SPSS version 16. After describing the demographic characteristics using frequency tables, simple and multivariate logistic regression were used to calculate odds ratio and their 95% confidence intervals.*

**Results:** *Better quality of training [OR: 12.642 95% CI: 7.306-21.873] and following footsteps of elder sibling [OR: 6.00 95% CI: 1.720-20.933] are the two main determinants of our study. Other factors included better social life abroad, better career opportunities, favoritism in our country and better pay package, better living conditions, lack of research opportunities in this setup, relatives residing abroad, fewer promotion opportunities in Pakistan, better PG training, flexible working hours in foreign countries and security issue in our country were also significant.*

**Keywords:** *Brain Drain, Physician Migration, Health sector, Emigration.*

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**INTRODUCTION:**

Brain Drain is the departure of educated or professional people from one country, economic sector, or field for another usually for better pay or living conditions[1]. It is the situation in which large numbers of educated and very skilled people leave their own country to live and work in an another one where pay and conditions are better[2]. Migration of physicians is nothing new and has followed the international migration patterns[3]. There is shortage of health professionals in rich countries which is met by doctors from developing counties. Around a quarter of doctors working in developed countries are International Medical graduates[IMGs][4].

Pakistan loses a major portion of its graduating doctors to brain drain. About 60.4% medical students in King Edward Medical University, 95% in Aga Khan University and 65% in Baqai University intend to go abroad for further training and job purposes[5, 6]. Moreover majority of IMGs decide to become permanents residents instead of returning to their country of origin which leads to declining healthcare workforce on part of donor country[7].

Previous researches in Pakistan have shown the association of brain drain with several economic, social and political factors. Economic factors include lesser job opportunities and lesser salaries in the home country. The social factors contributing towards physician migration are increased research opportunities and job security abroad. An unstable political situation at home also motivates physician to migrate to better political environment[5, 8-10].

All these factors have been assessed in cross sectional studies in Pakistan. No case control study has been done so far nationally that could measure the degree of association of these factors. It is important to study how much these factors influence brain drain so that appropriate actions to prevent it accordingly.

**MATERIALS AND METHODS:**

A case control study was conducted among all medical students from 1st year to Final year of King Edward Medical University, Lahore for 3 months [March 2016 to May 201600]. The sample size taken was 300 individuals. We divided them into two groups, Group 1 consisting of 153 cases [those who wanted to go abroad] and Group 2 consisting of 147 controls [those who didn't want to go abroad]. The sample was collected using convenient sampling technique. Students of allied health sciences were not included in the study. Data was collected using a pre-tested questionnaire. Data was analyzed using SPSS version 16.

**RESULTS:**

Better quality of training [OR: 12.642 95% CI: 7.306-21.873] and following footsteps of elder sibling [OR: 6.00 95% CI: 1.720-20.933] are the two main determinants of our study. Other factors included better social life abroad, better career opportunities, favoritism in our country and better pay package, better living conditions, lack of research opportunities in this setup, relatives residing abroad, fewer promotion opportunities in Pakistan, better PG training, flexible working hours in foreign countries and security issue in our country were also significant.

**Table 1: Frequency and Percentage**

Variables	Frequency	Percentage
Age of patient		
20 and below	109	36
21 and above	191	64
Sex of participants		
Male	147	49
Female	153	51
Socioeconomic Status		
Upper Class	40	13
Middle Class and lower	260	87
Year of Study		
1 <sup>st</sup> year	56	19
2 <sup>nd</sup> year	31	10
3 <sup>rd</sup> year	77	26
4 <sup>th</sup> year	105	35
5 <sup>th</sup> year	31	10

**Bivariate Analysis:**  
Demographic Variables

**Variables related to quality of life:**

Variables	Case N=153	Control N=147	Crude odd ratio	95% CI		Chi sq. value	P- value
				Lower/ Upper			
Think doctors in Pakistan are underpaid? <ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> </ul>	141 12	134 13	1.140	.502	2.587	.098	.754
Better pay package influences your decision to go abroad? <ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> </ul>	108 45	55 92	4.01	2.479	6.502	33.251	.000
Obtaining a better social life, the reason behind going there? <ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> </ul>	78 75	22 125	5.909	3.399	10.273	43.758	.000

Variables	Case N=153	Control N=147	Crude odd ratio	95% CI		Chi sq. value	P- value
				Lower	Upper		
Sex <ul style="list-style-type: none"> <li>• Male</li> <li>• Female</li> </ul>	93 60	54 93	.375	.235	.597	17.352	.000
Socioeconomic <ul style="list-style-type: none"> <li>• Middle class &amp; lower</li> <li>• Upper Class</li> </ul>	149 4	111 36	.083	.029	.239	31.046	.000
Better living conditions abroad influence decision? <ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> </ul>	93 60	43 104	3.749	2.317	6.066	30.079	.000

Do you think raising a family is difficult in Pakistan? • Yes • No	85 68	93 54	.726	.457	1.153	1.847	.174
Do you think studying abroad has become a status symbol? • Yes • No	124 29	115 32	1.190	.678	2.089	.367	.545
Is better marriage proposal chances cause of your migration? • Yes • No	21 132	25 122	.776	.413	1.458	.622	.430

**Variables related to train abroad:**

Variables	Case N=153	Control N=147	Crude odd ratio	95% CI		Chi sq. value	P- value
				Lower /	Upper		
Post graduate training from abroad is essential to become a good doctor? • Yes • No	74 79	43 104	2.266	1.407	3.648	11.514	.001
Foreign post-graduation education is easier than Pakistan? • Yes • No	36 117	42 105	.769	.459	1.290	.991	.320
Find career opportunities more promising abroad? • Yes • No	136 17	89 58	5.213	2.853	9.528	32.124	.000
Do you think that there is better quality of training abroad? • Yes • No	141 12	100 47	5.552	2.787	10.942	27.629	.000
If yes, then does this affect your decision to go abroad? • Yes • No	123 30	36 111	12.642	7.306	21.873	94.053	.000
Does flexible working hour system attract you to go abroad? • Yes • No	75 78	46 101	2.111	1.138	3.382	9.790	.002

**Variable related to training in Pakistan:**

Variables	Case N=153	Control N=147	Crude odd ratio	95% CI		Chi sq. value	P- value
				Lower	Upper		
Satisfied with medical education of Pakistan? <ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> </ul>	105 48	74 73	.451	.282	.722	11.178	.001
Think enough job opportunities in Pak? <ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> </ul>	50 103	63 84	.647	.405	1.036	3.307	.069
Think in Pakistan, the ladder for a doctor to reach a good socioeconomic status is too high? <ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> </ul>	111 42	103 44	1.129	.684	1.863	.226	.635
Favoritism the cause migration? <ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> </ul>	44 109	13 134	4.161	2.133	8.118	19.319	.000
Does more competition in Pakistan make you desire settling abroad? <ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> </ul>	35 118	23 124	1.599	.892	2.866	2.513	.113
Are fewer promotion opportunities a factor of migration? <ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> </ul>	112 41	77 70	2.483	1.533	4.023	13.944	.000
Lack of research cause? <ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> </ul>	109 44	64 83	3.213	1.991	5.184	23.571	.000

**Other Variables:**

Variables	Case N=153	Control N=147	Crude odd ratio	95% CI		Chi sq. value	P- value
				Lower	Upper		
Following footsteps of siblings? • Yes • No	17 136	3 144	6	1.720	20	9.913	.002
Peer pressure influencing your decisions? • Yes • No	47 106	22 125	2.519	1.427	4.449	15.505	.001
Do you think studying/working abroad is a yardstick for success in life? • Yes • No	78 75	41 106	2.689	1.664	4.345	16.700	.000
Is the national security issue a factor behind your immigration? • Yes • No	48 105	28 119	1.943	1.138	3.317	6.021	.014
Are you satisfied with the health safety measures in hospitals? • Yes • No	7 146	22 125	.272	.113	.659	9.270	.002
Is the fear of catching an infectious disease in Pakistan's health care system the reason behind your immigration? • Yes • No	27 126	18 129	1.536	.806	2.927	1.716	.190

**Table 3:** Multivariate Analysis

Variables	Adjusted Odds Ratio	95% CI		P-value
		Lower	upper	
Socioeconomic	.047	.012	.179	.000
Find career opportunities more promising abroad?	2.983	1.298	6.856	.010
Obtaining a better social life abroad the reason behind going there?	2.685	1.107	6.513	.029
If yes then does this affect your decision to go abroad?	8.402	3.844	18.362	.000
Is lack of research opportunities promoting migration?	2.969	1.409	6.254	.004

**DISCUSSION:**

In our research, results showed that medical students are not satisfied with the medical education of Pakistan as 59% of the respondents were in favor of foreign medical education. It was significant in bivariate analysis with an odds ratio of .451 but insignificant in multivariate analysis. It was supported by researches conducted in Karachi and Lahore[10, 11]. Therefore, reevaluation of medical school and post-graduation training is direly needed to slow down the loss of physicians.

Our research supports that following the footsteps of siblings is significant as a bivariate factor with an odds ratio of 6.00, but not as a multivariate factor. It was supported by Nadia Sajjad study[12].

The conclusion of our research was that peer pressure is promoting brain drain among the students of KEMU with 23% of medical students in favor of it. It is significant as a bivariate factor with an OR of 2.519, but not significant as multivariate factor. It was supported by previous researches[5]. This calls for intervention in the form of counselling programs.

Our research showed that only 8% medical students go abroad because of their family/relatives residing there. It is significant as a bivariate factor with an OR of 2.667, but not significant as a multivariate factor. Previous researches[5, 8] also support it.

Our research supports that post graduate training from abroad is essential to become a good doctor with 39% of medical students in favor of it. Its significant as a bivariate factor with an odd ratio of 2.266, but not significant as a multivariate factor. It was supported by Nadir Ali's study[6] with 80% of the medical students supporting it.

Our research supported that less pay is promoting brain drain among the students of KEMU with 54% of medical student in favor of it. It is significant as a bivariate factor with an OR of 4.015, but not as a multivariate factor. It was supported by Sheikh's study[5]. Nazish Imran's study[9] concluded it to be the most significant factor for brain drain with 60.4% students wanting to pursue their career abroad because of lucrative salaries.

Our research showed that better career opportunities abroad plays important role in brain drain among students of KEMU with 75% supporting it. It is significant both as bivariate and multivariate factor with an odds ratio of 5.213. It was also supported by Rubina Kauser's study[13] in which 56% of doctors in its favor. Another study[9] also considered this as the most important push factor.

Our research concluded that obtaining a better social life abroad promotes brain drain among students with 33% students in its favor. It is a significant factor both in bivariate and multivariate analysis with an odds ratio of 5.909. Mohammad Amir Hashmi[8] also considered social factor as the major driver of emigration as 50% of respondents were in its favor. A different research[11] obtaining a better social life is considered as major motivator of migration among young adults.

In our research better living conditions is an important determinant for brain drain with 45% students considering it to be significant. Moreover, it is significant in bivariate analysis with an OR of 3.749, but not significant in multivariate analysis. A previous study[5], considered it significant with 31% doctors agreeing to it.

Our research showed that national security is an important determinant with 75% respondents having this view. It's significant in bivariate analysis with an OR of 1.9, but not significant in multivariate analysis. While research by Tahir[13] proved the same with 80% of the doctors agreeing national security to be a significant determinant in brain drain. In our research results showed that health safety measures in Pakistan is a significant determinant with 90% of the medical students in its favor. It's significant in bivariate analysis with an OR of 0.272, but insignificant in multivariate analysis. Another research[13] supported our research and showed that 58% of the doctors disagreed to this factor.

Results showed that quality of training is a significant factor as 80% of students agreed to it. It is significant in bivariate analysis with an OR of 5.52 but not significant in multivariate analysis. While in another research by Imran[9] 60% of the students wanted to go abroad for better quality of training.

In our research, 53% of the medical students wanted to go abroad because of better quality training. It is significant both in bivariate and multivariate analysis with an OR of 12.6. Standard of post graduate training appears to greatly influence decision to go to

foreign countries as shown by multiple researches in the past[9, 13, 14].

Our research supports favoritism to be significant with 19% students agreeing to it. It is significant in bivariate analysis with an OR of 4.161 but not significant in multivariate analysis. It is previously supported by Sheikh's study[5] which states that only 2.1% doctors considered it to be a factor of migration.

In our research longer working hours are significant as a determinant of brain drain among medical students. It is significant in bivariate analysis with an OR of 2.111 but not significant as a multivariate factor. It was also previously supported by many prior papers [9, 10, 13]

It was also concluded that poor promotion opportunities are also promoting brain drain as 63% students agreeing to it. It is significant bivariate factor with an OR of 2.483 but not as a multivariate factor. This factor was supported by the research conducted by M. Tahir[13] in which 83% doctors claimed poor professional infrastructure as a push factor. Another research by M. Amir Hashmi[8] supports our results by stating that brain drain is attributed to little employment opportunities.

In our research lack of research opportunities is an important determinant of brain drain with 58% students considering it to be significant. It is significant in both bivariate and multivariate analysis with an OR of 3.213. It is supported by a research by Sunita Dodani[15] which supports it to be a significant determinant of brain drain.

In our research, yardstick to success is a significant factor with 60% of the students agreeing to it to be important. Moreover it is significant in bivariate analysis with an OR of 2.689 but not significant in multivariate analysis. This was also supported by a previous paper[14].

Brain drain and physician migration is an issue impacting a great deal of burden on the condition of economics and health systems in Pakistan. To resolve this issue, a multidisciplinary approach is needed. The main determinant in our research has been lack of a standardized medical education. By proper career/mental health counselling, admissions based on merit and a unified method of teaching involving all the institutes, we can encourage our students to pursue higher education in their home country. The government institutes involved in making policy reforms should work in liaison with the doctors



working in the field. More jobs should be created according to the country's needs and the problems faced by the doctors should be addressed on a priority basis. The involvement of the political leaders in resolving doctors' issues will encourage our students to go for a job in their own country. It will instill a feeling of patriotism and sense of belonging in them. Providing doctors with a service structure with appealing research and promotion opportunities will motivate them to work in their own countries. It is also the need of the hour to provide better resources, health safety and security in the hospitals for the patients as well as the doctors to enhance job satisfaction. After implementing these reforms, an interventional study should be done to see their impact on lessening brain drain.

#### LIMITATIONS:

1. Our research has been done in a single institute which might induce a bias.
2. Our sampling method was convenient sampling to make it more feasible for the research to be conducted.

#### CONCLUSION:

Brain drain among the medical students was found to be significantly associated with promising career opportunities, better social life, better quality training, lack of research opportunities, following footsteps of the siblings, better pay package, better living conditions, yardstick to success, relatives residing abroad, post-graduation training, flexible working hour system, national security and health safety measures.

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