

Health research barriers in the faculties of two medical institutions in India

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Background: Health policy formation refers to the design of a conceptual framework to find possibilities, facilitate feasibilities, and identify strong and weak points, as well as insufficiencies, by research. Doing research should clarify qualities and standards for policy and decision-making to enable the success of development of health care in a country. Evaluation of the impact of health interventions is particularly poorly represented in public health research. This study attempted to identify barriers and facilitators of health research among faculty members in two major institutions in India, ie, the All India Institute of Medical Sciences (AIIMS) and the University College of Medical Sciences (UCMS) and Guru Tegh Bahadur (GTB) Hospital in Delhi.

Methods: The participants were asked to fill in a questionnaire that canvassed individual characteristics, ie, years of experience, place of work, academic rank, final educational qualification, work setting, educational group, primary activity, and number of publications in the previous 5 years. Barriers and facilitators were categorized into personal, resources, access, and administration groups. The data were processed using SPSS version 16, independent *t*-tests, Chi-square tests, and multivariate logistic regression.

Results: The total number of faculty members at both institutions was 599, 456 (76%) of whom participated in this study. The primary activities reported by faculty at UCMS (teaching) and Faculty at AIIMS reported (Research and Provision of health care services) as a major activity ($P < 0.01$). The majority of faculty members at UCMS and GTB Hospital were professors, whereas most of the faculty members at AIIMS were associate professors ($P < 0.01$). Of 47 barriers and facilitating factors, there were 26 barriers and 21 facilitating factors at AIIMS and 39 barriers and eight facilitating factors at UCMS. Faculty members at UCMS had 6.572 times more barriers to health research than those at AIIMS.

Conclusion: Close proximity between AIIMS and the Indian Council of Medical Research and the National Medical Library, housing, transport, and a good reference library with an adequate knowledge support system provided suitable opportunities for faculty members at AIIMS to do research. To overcome the barriers, institutions must have enough financial support, decreased nonessential clinical, laboratory, and service schedule duties on the part of faculty members, preparation of good and relevant statistical courses and workshops, and access to good statistical software packages.

Keywords: health research, barriers, facilitators, medical institutions

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Introduction

Research is the systematic and rigorous process of enquiry, which aims to describe phenomena and to develop and test explanatory concepts and theories. Ultimately, research aims to contribute to a scientific body of knowledge.¹ Understanding possibilities, facilitating

feasibilities, and finding weak and strong points are the essential research parameters. Identifying insufficiencies and determining qualities and standards of research are the objectives of research programs.² The success of a country's efforts at development depends upon the degree to which its planners and program managers use and apply research for decision-making.³

Previous studies of research utilization have used a conceptual framework to describe the use of research in health policy formation. The framework consists of two elements, ie, categorization of the potential benefits of using research in health policy formation, and a description of the stages involved in the utilization of research in policy-making.⁴

A systematic perspective is required to understand how research and knowledge from various sources is produced and synthesized, how the demand for relevant knowledge is cultivated, and whether that knowledge is used to strengthen the effectiveness of health systems, improve health, and reduce inequities. This perspective forms the underlying concept of a health research system. Such systems have four basic components, ie, stewardship, finance, human and institutional capacity, and research production and application.⁵

Universities have been trying to set up research units in all departments and, in this way, a considerable amount of university budgets is spent on scientific research.⁶ Universities and centers of higher education are assigned three main duties, ie, knowledge development, knowledge transfer, and provision of specialist services to society. To perform each of these duties, systematic research is one of the important factors for promotion of research at the university level.⁷ It is clear that academic institutions all over the world contribute a lot to health research. Faculties within academic institutions play an important role and contribute to this task. The available literature shows that efforts are needed to identify facilitating factors and barriers in the faculties to produce more meaningful output from health research in India. Faculty members in academic institutions face a number of difficulties in conducting research, including lack of use of research findings, difficulties related to statistical analysis, lack of support for research activities from the institution, shortage of time, lack of interest in research activity, high work load, budget difficulties, social responsibilities, lack of resources, and lack of institutional support.⁵

South Asia represents a quarter of the world population but has a weak public sector for health care, so research in this region is particularly important. Despite diversity in their geographical, linguistic, and political structures, Afghanistan,

Bangladesh, Bhutan, India, the Maldives, Nepal, Pakistan, and Sri Lanka face common health care challenges.⁵

While performing research, most of the difficulties and obstacles faced can be resolved, and at times, the study of obstacles which we come across lead to better methods of research. Lack of attention in this regard postpones important studies. These delays often cause irreparable damage, leading to unsuccessful research.⁸ Identification of obstacles can lead to improvement of relationships between researchers and the beneficiaries of the research, and facilitation of problem-solving leads to benefits from research.⁶

Research expenditure in India is only 10% of that in developed countries. A search on PubMed on lack of public health research from India in 2002 brought up 4495 papers based on original research, only 3.3% of which were in public health, human resources, and health policy. Evaluation of the impact of health interventions has been particularly poorly represented in public health research.⁹

Taking into account the population and total gross domestic product adjusted for parity of purchasing power between Australia and India, quality-adjusted health research output and public health research output were 19.6 and 31 times higher, respectively, in Australia than in India.⁹ This study is an attempt to compare barriers and facilitators in health research encountered by faculty members in two major institutions of All India Institute of Medical Sciences (AIIMS) and the University College of Medical Sciences (UCMS) and Guru Tegh Bahadur (GTB) Hospital in Delhi.

Materials and methods

This descriptive analytical study was done in two institutions having similar professional profiles in teaching, research, and health care services, to determine and compare the status of research, its barriers and facilitators, and types and areas of health research in different departments of two medical institutions, ie, AIIMS, UCMS and GTB Hospital in Delhi. It also aimed to identify the causes of any relevant differences, if any in these institutions.

Faculty members at AIIMS and UCMS and GTB Hospital were asked to fill in a questionnaire after their informed consent had been obtained. The questionnaire canvassed individual characteristics age, gender, marital status, years of experience as a faculty member, place of work, academic status, highest educational qualification, work setting, educational group, primary activity, type and number of research papers published in the previous 5 years, and 47 questions about personal, access, administrative, and resource barriers to and facilitators of research activity. Those questions were

prepared after consultation with some of the participants who were authentic academic sources as perceived by the respondents. Each item in the questionnaire was addressed by two questions, ie, “how is your ability on this item”, with three choices (strong [3], adequate [2], and weak [1]) and “how do you think this factor impacts on health research”, with seven choices (highly positive [7], moderately positive [6], mildly positive [5], no impact [4], mildly negative [3], moderately negative [2], highly negative [1]). We considered a “strong”, “adequate”, and “positive” impact as a facilitator and a “weak”, “no”, and “negative” impact as a barrier. Barriers and facilitators were further categorized into four groups, ie, personal, resource, access, and administrative. All barriers and facilitators were summed in a single variable considered to be the dependent variable. Validity and reliability were checked by matching with indicators developed after going through the responses. SPSS version 16 (SPSS Inc, Chicago, IL) was used to process the data collected. Analytic statistics were used for comparing quantitative and qualitative variables, ie, the independent *t*-test and Chi-square, respectively. Multivariate logistic regression (forward method) was used to estimate the odds ratios for independent variables.

Results

The total number of faculty members at AIIMS and UCMS and GTB Hospital was 599 according to the database, but only 456 (76%) members participated in this study. At AIIMS, there were 430 faculty members and the rate of participation was 70%, whereas there were 169 faculty members at UCMS and GTB Hospital and their rate of participation was 92%.

Table 1 shows that the majority of faculty members (40.2%) at AIIMS were aged 41–50 years, whereas at UCMS nearly one third (33.5%) of faculty members were aged <40 years or aged 51–60 years. At AIIMS, faculty members were younger than at UCMS (73.2% versus 60.6%). The difference in the proportion of faculty members aged older than 40 years at these institutions was significant ($P < 0.01$).

Table 2 indicates that faculty members at AIIMS had significantly more years of work experience in the 5–9-year band. Significantly ($P < 0.01$) higher proportions of faculty

members at UCMS had either more than 20 years of experience or less than 5 years of experience. Most (31.1%) of faculty members at UCMS and GTB Hospital had more than 25 years of experience, but most faculty members at AIIMS had 5–9 years of experience (22.6%).

As Table 3 shows, a majority (52.6%) of faculty members at UCMS and GTB Hospital were professors, whereas a similar proportion (59.2%) at AIIMS were assistant or associate professors. There was a statistically significant difference between place of work and academic rank ($P < 0.01$).

Significantly more teaching was done as a primary activity at UCMS than at AIIMS, whereas significantly more research and provision of health care services were undertaken as primary activities at AIIMS ($P < 0.01$). As seen in Table 4, teaching as a primary activity was undertaken significantly more often at UCMS than at AIIMS, whereas research and provision of health care services was a significantly more common primary activity at AIIMS ($P < 0.01$).

During the previous 5 years, the mean overall number of papers published in international journals by faculty members at both institutions was 12.22, with a minimum of one paper and maximum of 105 papers. The mean number of papers published at AIIMS was 14.96 while at UCMS and GTB Hospital it was 6.53. There was a significant difference in favor of AIIMS, and a significantly ($P < 0.01$) wider variety of published research papers was seen at AIIMS (Table 5).

In this study, research barriers and facilitators were categorized into four types, ie, personal, resources, access, and administrative. As shown in Table 6, it is worthwhile to mention that, of 16 possible personal barriers and facilitators, there were five barriers and 11 facilitators at AIIMS and nine barriers and seven facilitators at UCMS. According to Table 7, of 11 resource barriers and facilitators, there were eight barriers and three facilitators at AIIMS and all factors were barriers at UCMS. As shown in Table 8, of eight access barriers and facilitators, there were three barriers and five facilitators at AIIMS and seven barriers and one facilitator at UCMS. As shown in Table 9, of 12 administrative barriers and facilitators, there were 10 barriers and two facilitators at AIIMS whereas all factors were barriers at UCMS.

Table 1 Distribution of faculty member in AIIMS and UCMS and GTB hospital by age groups (n = 456)

Place of work	Age groups				Total (%)
	<40 years (%)	41–50 years (%)	51–60 years (%)	>61 years (%)	
UCMS	52 (33.5%)	42 (27.1%)	52 (33.5%)	9 (5.8%)	155 (100.0%)
AIIMS	100 (33.2%)	121 (40.2%)	72 (23.9%)	8 (2.7%)	301 (100.0%)
Total	152 (33.3%)	163 (35.7%)	124 (27.2%)	17 (3.7%)	456 (100.0%)

Notes: $\chi^2 = 11.13$; $P = 0.01$; $df = 3$.

Table 2 Distribution of years of experience as a faculty member and place of work (n = 448)

Years of experience as faculty member	Place of work		Total (%)
	UCMS (%)	AIIMS (%)	
<5 years	30 (19.9%)	25 (8.4%)	55 (12.3%)
5–9 years	18 (11.9%)	67 (22.6%)	85 (19.0%)
10–14 years	17 (11.3%)	56 (18.9%)	73 (16.3%)
15–19 years	12 (7.9%)	53 (17.8%)	65 (14.5%)
20–24 years	27 (17.9%)	36 (12.1%)	63 (14.1%)
>25 years	47 (31.1%)	60 (20.2%)	107 (23.9%)
Total	151 (100.0%)	297 (100.0%)	448 (100.0%)

Notes: $\chi^2 = 34.33$; $P = 0.01$; $df = 5$.

The independent variables related to all barriers and facilitators were ranked according to their odds ratios. As seen in Table 10, faculty members at UCMS had 6.572 times more barriers to health research than faculty members at AIIMS. Faculty members aged under 50 years had 1.358 times more barriers than those aged over 50 years. Faculty members who had fewer papers in continuing education meetings and workshops had 1.243 times more barriers than those who had more papers in continuing education meetings and workshops. Faculty members who had less than 20 years of experience had 1.140 times more barriers than those with more than 20 years of experience.

Discussion

The gap between performance in research and practice is the result of several interacting factors, including limited time and resources on the part of practitioners, insufficient training, lack of feedback and incentives for use of evidence-based practices, and inadequate infrastructure and systems organization to support translation.¹⁰ This study focused on barriers and facilitators faced by faculty members at AIIMS and UCMS and GTB Hospital, according to the areas of research undertaken by these faculties. With regard to personal barriers and facilitators, five barriers and 11 facilitators were identified at AIIMS versus nine barriers and seven facilitators at UCMS and GTB Hospital.

Skill in doing research, knowledge of research methodology, interest in research, deciding on important research areas, ability to identify an appropriate duration of research, the capacity to develop an independent research program (eg, protocol development), and skills to evaluate other research reports were facilitators at both institutions, as has been reported elsewhere.^{11–17}

Lack of familiarity with statistical methodology, training and experience in data analysis, language that covers the spectrum of necessary communication skills, including translation of research papers in languages other than English, moral support during research, and support from colleagues were barriers at both institutions. These barriers have also been identified by other researchers.^{11–18}

Such differences are related to factors such as experience in writing grant applications and knowledge of the grant application process, the ability to find suitable collaborators with an interest in the proposed research area at the home institution, knowledge of funding sources for research, and faith in the findings. These results were reflected in the numbers of papers presented at continuing education workshops and conferences and published in journals by faculty members, who faced 1.43 times more barriers at UCMS and GTB Hospital than at AIIMS. The reasons for this difference may include more faculty members at AIIMS being younger than 40 years of age than at UCMS (73.2% versus 60.6%, respectively). The majority (31.1%) of faculty members at UCMS and GTB Hospital had more than 25 years of experience, but at AIIMS the majority (22.6%) had 5–9 years of experience. So they had more ideas, perception, ambitions and there was a need to do research for promotion. In total, 52.6% of faculty members at UCMS and GTB Hospital were professors, with a similar proportion (59.2%) holding the rank of assistant or associate professor at AIIMS. Another possible explanation is that teaching is a primary activity at UCMS, whereas research and provision of health care services are primary activities at AIIMS. In the category of resources, of 11 barriers and facilitators, there were eight barriers and

Table 3 Distribution of academic rank and place of work (n = 453)

Place of work	Academic rank					Total (%)
	Professor (%)	Additional professor (%)	Associate professor/reader (%)	Assistant professor/lecturer (%)	Any others (%)	
UCMS	81 (52.6%)	1 (.6%)	19 (12.3%)	40 (26.0%)	13 (8.4%)	154 (100.0%)
AIIMS	86 (28.8%)	35 (11.7%)	71 (23.7%)	106 (35.5%)	1 (.3%)	299 (100.0%)
Total	167 (36.9%)	36 (7.9%)	90 (19.9%)	146 (32.2%)	14 (3.1%)	453 (100.0%)

Notes: $\chi^2 = 62.41$; $P = 0.01$; $df = 4$.

Table 4 Distribution of primary activity and place of work (n = 455)

Place of work	Primary activity			Total (%)
	Research (%)	Teaching (%)	Providing of health care services (%)	
UCMS	3 (1.9%)	78 (50.6%)	73 (47.4%)	154 (100.0%)
AIIMS	24 (8.0%)	84 (27.9%)	193 (64.1%)	301 (100.0%)
Total	27 (5.9%)	162 (35.6%)	266 (58.5%)	455 (100.0%)

Notes: $\chi^2 = 25.90$; $P = 0.01$; $df = 2$.

three facilitators at AIIMS, and all factors were barriers at UCMS and GTB Hospital.

Access to good statistical software, consultation pertaining to research, research budgets at the institution, availability of funds to travel to meetings and training programs, internal and external financial support to fund research proposals in the country and at their particular institution, training programs to attract researchers to their institution, hands-on assistance with how to apply for funding for the first time and appropriate staffing at institutions to implement grants were all barriers at both institutions. These observations have been reported by other investigators.^{11–15,17,19,20}

Motivation on the part of research scholars and ancillary personnel, competition for a limited supply of research money, and support and/or commitment from the researcher's home department were facilitators for faculty members at AIIMS but were barriers at UCMS.

Although there were a lot of barriers at both institutions, there seemed to be fewer of these at AIIMS. It seems that AIIMS had a more facilitating environment because of close contact with the Indian Council of Medical Research and the National Medical Library, housing, transport, and an adequate knowledge support system. Accessibility to related resources like the Internet was a facilitator at both institutions, as already reported by Dunn et al¹⁴ and Shavers et al.¹⁷ Of eight access barriers and facilitator factors, there were three barriers and five facilitators at AIIMS and seven barriers and one facilitator at UCMS. Access to consultative sources like research networks and consortiums, access to workshops

on writing grant applications, availability of colleagues knowledgeable in a particular area and willing to critique the application prior to submission in order to provide feedback were barriers at both institutions, which is consistent with the observations of others.^{14,15,17,20} The difference is related to items such as access to good quality relevant biomedical journals, research samples, literature, and resources, which were facilitators for faculty members at AIIMS but were barriers at UCMS. Of 12 administrative barriers and facilitators, there were 10 barriers and two facilitators at AIIMS, with all factors being barriers at UCMS.

Cooperation between executive and administrative organizations and units, provisions for administrative efforts specifically for executing research in the institution, a research culture in medical and health institutions generally and within individual institutions, a communication gap between medical and health institutes (eg, between scientific research administrators and researchers), fear in some institutions of an unfair evaluation of the proposed methodology section in research proposals submitted for grants, equitable duration of release from teaching responsibilities, organizational support, space to seat research staff, difficulty in maintaining equipment because of administrative procedures, and tardy financial settlement processes were barriers at both institutions, and support findings reported elsewhere.^{11,12,14,17,20} Space to keep equipment and freedom of the principal investigator to make decisions were facilitators for faculty members at AIIMS and barriers at UCMS.

No further differences were found between the two institutions with regard to administrative barriers and facilitators, indicating that administration in India does not support faculties to do research, and this observation is well supported in the literature. Taking into account the population and total gross domestic product adjusted for parity of purchasing power between Australia and India, the quality-adjusted health research output and public health research output were 19.6 and 31 times higher, respectively, in Australia than in India.⁹

Institutional policy-making regarding research and its provision has a direct impact on facilitation of research and

Table 5 Distribution of faculty members according to the number of papers published in International Journals and place of work

Place of work	Number and percentage of papers published in International Journals					Total (%)
	1–5	6–10	11–15	16–20	>20	
UCMS	69 (58%)	27 (22.70%)	12 (10.10%)	7 (5.90%)	4 (3.40%)	119 (100%)
AIIMS	97 (39.30%)	52 (21.10%)	20 (8.10%)	23 (9.30%)	55 (22.30%)	247 (100%)
Total	166 (45.35%)	79 (21.58%)	32 (8.74%)	30 (8.19%)	59 (16.12%)	366 (100%)

Notes: $\chi^2 = 55.90$; $P = 0.01$; $df = 4$.

Table 6 Personal barrier and facilitator factors

Personal barrier and facilitator factors	AIIMS	UCMS
Skill in doing research	Facilitator	Facilitator
Knowledge of research methodology	Facilitator	Facilitator
Familiarity with statistical methodologies	Barrier	Barrier
Interest in research	Facilitator	Facilitator
Deciding on thrust areas for research	Facilitator	Facilitator
Ability to identify duration of research study	Facilitator	Facilitator
Training and experience in data analysis	Barrier	Barrier
Capacity to develop independent research programs (eg, protocol development)	Facilitator	Facilitator
Grant-writing experience and knowledge of the grant application process	Facilitator	Barrier
The ability to find collaborators at the investigator's home institution with interest in the proposed research area	Facilitator	Barrier
Knowledge avenues for funding research	Facilitator	Barrier
Language that covers the spectrum of communication skills including translation of research papers in languages other than English	Barrier	Barrier
Skills to evaluate other research reports	Facilitator	Facilitator
Moral support during research	Barrier	Barrier
Trust in the findings	Facilitator	Barrier
Support and attitudes from colleagues	Barrier	Barrier

its outcomes. Expenditure on research in India is only 10% of that in developed countries. Of the 4495 original research papers identified in this study, only 3.3% were in the areas of public health, human resources, or health policy. Evaluation of the impact of health interventions was particularly poorly represented in public health research.⁹

Odds ratio testing shows that the four independent variables, ie, place of work, age of faculty members, participation

Table 7 Resources barrier and facilitator factors

Resources barrier and facilitator factors	AIIMS	UCMS
Access to good statistical software packages	Barrier	Barrier
Consultative powers pertaining to the research	Barrier	Barrier
Budget for the research in the institution	Barrier	Barrier
Motivation in the research scholars/the persons related to research work	Facilitator	Barrier
Availability of funds to travel to meetings and training programs	Barrier	Barrier
Internal and external financial support to fund research proposals in the country and your institution in particular	Barrier	Barrier
Training programs to encourage researchers in your institution	Barrier	Barrier
First time hands-on assistance about how to apply for funding	Barrier	Barrier
Competition for limited supply of money	Facilitator	Barrier
Appropriate staff at institutions to implement grants	Barrier	Barrier
Support and/or commitment from the researcher's home department	Facilitator	Barrier

Table 8 Access barrier and facilitator factors

Access barrier and facilitator factors	AIIMS	UCMS
Access to good quality relevant biomedical journals	Facilitator	Barrier
Accessibility to the related sources like internet	Facilitator	Facilitator
Accessibility to consultative powers like networks and consortiums pertaining to the research	Barrier	Barrier
Accessibility to the research samples	Facilitator	Barrier
Access to grant-writing workshops	Barrier	Barrier
Available colleagues knowledgeable in a particular area and willing to critique the application prior to submitting in order to provide feedback	Barrier	Barrier
Access to literature	Facilitator	Barrier
Access to resources	Facilitator	Barrier

in continuing education meetings and workshops, and years of experience as a faculty member are stronger barriers and facilitators. These findings seem reasonable, because a person with more experience is likely to have more opportunities to publish papers and attend conferences and therefore be more likely to overcome barriers to research. Faculty development plays an important role in promotion of research. Faculty development is a planned program to prepare institutions and faculty members for their academic roles and to improve an individual's knowledge and skills

Table 9 Administrative barrier and facilitator factors

Administrative barrier and facilitator factors	AIIMS	UCMS
Co-operation from the executive and administrative organization and units	Barrier	Barrier
Provisions related to administrative efforts specifically in executing research, in the institution	Barrier	Barrier
A research culture in medical and health institutions generally and your institution in particular	Barrier	Barrier
Communication gap between the medical and health institutes (eg, scientific research administration and researchers)	Barrier	Barrier
Fear of an unfair evaluation of study section by institution	Barrier	Barrier
Equitable release time from teaching responsibilities	Barrier	Barrier
Organizational support	Barrier	Barrier
Space to seat research staff	Barrier	Barrier
Space to keep equipment	Facilitator	Barrier
Difficulty in maintaining equipment because of administrative procedure	Barrier	Barrier
Too long process for financial settlements	Barrier	Barrier
Freedom to principal investigator for decision-making	Facilitator	Barrier

Table 10 Significant variables ($P < 0.05$) of determinants for all barrier and facilitator factors on multivariate analysis

Dependent variable	Independent variables	P value	OR	95% CI	
				Lower	Upper
All barrier and facilitator factors	Place of work	0.01	6.57	3.48	12.40
	Age groups	0.02	1.36	1.07	1.73
	Papers in CME/workshops	0.05	1.24	1.01	1.54
	Years of experience as a faculty member	0.04	1.14	1.01	1.29
	Primary activity	0.01	0.58	0.41	0.81
	Scientific and industrial research laboratories	0.01	0.54	0.39	0.75
	Laboratories under atomic energy board	0.01	0.53	0.35	0.78
	Biomedical laboratories under department of science and technology	0.01	0.52	0.37	0.71
	Biomedical laboratories under department of biotechnology	0.01	0.49	0.35	0.68

in the areas of teaching, research, and administration, both now and in the future.^{21,22}

Conclusion

Shortage of time, busy clinical, laboratory, and service schedules, shortage of necessary equipment, lack of familiarity with statistical methodology, limited training and experience in data analysis, poor internal and external financial support, limited access to workshops on writing grant applications, inequitable release time from teaching responsibilities, and difficulty in maintaining equipment were recognized as important barriers to research at both institutions. We suggest that preparing adequate financial support, utilizing available financial resources, reducing nonessential clinical, laboratory, and service obligations, providing good and relevant statistical courses and workshops, consulting processes, training programs, and appropriate staff at institutions to implement grants, can help to develop productive faculty members and enhance research capability at medical institutions in India.

Disclosure

The authors report no conflicts of interest in this work.

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