

RESEARCH EXPERIENCE, INTEREST AND PERCEIVED BARRIERS OF CLINICAL STAFF WORKING AT THE INTENSIVE CARE DEPARTMENT OF A TERTIARY CARE ACADEMIC HOSPITAL IN SAUDI ARABIA

HASAN M. AL-DORZI*, BRINTHA NAIDU**, SHAKEEL KHOKHAR***, DAVID WHITE****, YASEEN M. ARABI*****

Abstract

Background: Promoting clinical research is important considering the shortage of clinical investigators and the increasing need for large multicenter studies. Participation of clinical staff in research is crucial to achieve this goal. Our objective was to assess the research experience and interest of clinical staff working at a tertiary-care intensive care unit (ICU) and explore the perceived research barriers.

Methods: A written survey was administered to 185 multidisciplinary ICU staff at a 900-bed tertiary-care academic hospital in Riyadh. It consisted of questions/ statements on previous research experience, interests and barriers. Responses were either Yes/No answers or graded according to the 5-point Likert scale.

Results: Most (62.8%) staff responded (age = 33.9 ± 7.2 years, 69.6% females, 76.0% nurses, 10.4% physicians, clinical experience = 7.6 ± 6.8 years). Fifty (40%) respondents participated in clinical research (physicians 69.2%, nurses 37.9% and respiratory therapists 25%, $p=0.052$), 42 (33.6%) of them in the current ICU but only 11.2% presented in-person their research projects at national/ international meetings. Most respondents (86.2%) believed that participation in research would enhance their career. There was no differences in research tasks clinical staff were willing to perform except for writing manuscripts with physicians (69.2%) and respiratory therapists (58.3%) more willing than nurses (29.5%), $p=0.03$. Perceived research barriers were lack of time (76.8%), of financial compensation (58.4%) and of encouragement (48.8%).

Conclusions: The majority of clinical staff working at a tertiary-care ICU of an academic hospital was interested in conducting research but the lack of time, financial compensation and encouragement were perceived as significant barriers.

Key words: Critical care, Critical care nursing, Education, Biomedical research

* MD, Section Head of the Adult ICU and Consultant, Intensive Care Department, King Abdulaziz Medical City; Assistant Professor, College of Medicine, King Saud bin Abdulaziz University for Health Sciences.

** RN, MS, Nurse Manager, Surgical Intensive Care Unit.

*** MBBS, EDIC, Assistant Consultant, Intensive Care Department.

**** CCRN, CCFN, INE, ARNA B. Nurs; M.Nurs (Crit Care); M. Health Admin, Grad Cert Ret. Nurs. Director-Clinical Nursing, Critical Care Services.

***** MD, FCCP, FCCM, Chairman, Intensive Care Department, King Abdulaziz Medical City. Associate Professor, College of Medicine, King Saud bin Abdulaziz University for Health Sciences.

Affiliation: King Abdulaziz Medical City, Riyadh 11426 Saudi Arabia.

Corresponding author: Dr. Yaseen M. Arabi, Chairman, Intensive Care Department, King Abdulaziz Medical City, Associate Professor, College of Medicine, King Saud bin Abdulaziz University for Health Sciences, Riyadh 11426, Saudi Arabia, Tel: 966-11-8011111 x18899/x18855/x18877, Fax: 966-11-8011111 X18880. E-mail: yaseenarabi@yahoo.com

Introduction

Globalization of clinical research, a recently growing phenomenon¹, requires expanding the pool of clinical researchers in developing countries, whose contribution to clinical research remains low in proportion to their population. An illustration of that is the number of studies registered in the clinicaltrials.gov website in 2011. There were 894 clinical trials from 13 Middle-Eastern countries, 2,007 clinical trials from 6 South-Asian Countries, 6,835 clinical trials from France, 8,755 clinical trials from Canada, and 57,066 clinical trials from the United States². This is probably related to multiple factors that include inadequate knowledge of clinical research processes, deficient training and specialization in this field and lack of support from healthcare institutions, private industry and governments leading to shortage of qualified clinical investigators. In Saudi Arabia, the healthcare system has been rapidly developing in the last few decades. As it relates to “Intensive Care Speciality” at our institution, this has been associated with an increase in clinical research performance. Reflective of that is the gradual growth of clinical research, which started by performing observational studies³⁻⁵ and developed to conduct investigator-led clinical trials^{6,7} and then participation in renowned international multicenter trials^{8,9}.

The objectives of this survey were to determine research experience, interest and perceived barriers to conduct research for clinical staff working in the Intensive Care Department of a tertiary-care academic center in Saudi Arabia.

Methods

The study was approved by the Institutional Review Board. This was a survey that was conducted at the Intensive Care Department of a tertiary-care academic hospital, in Riyadh, Saudi Arabia. The hospital was a 900-bed teaching tertiary care center and had been accredited by the Joint Commission International since 2006. The staff came from more than 50 nationalities including Saudi Arabia, Australia, South Africa, Philippines, India, Pakistan, Malaysia, and other Middle Eastern countries. The hospital

was established in 1983 and became affiliated with King Saud Bin Abdulaziz University for Health Sciences, which was established in 2005, and with King Abdullah International Medical Research Center, which was founded in 2007. Selected hospital staff were given academic titles with promotion dependent partly on research performance and publication. The Intensive Care department covered a 21-bed medical/surgical closed intensive care unit (ICU) that treated a heterogeneous group of patients including trauma patients, a 14-bed intermediate care unit and an 8-bed neuro-critical care unit. At the time of the survey, the department was staffed with 12 North American board-certified critical care physicians and 10 registrars for 24 hours per days, 7 days a week¹⁰ and provided training to critical care fellows and rotating residents from different specialities. Additionally, there were 150 nurses, many of whom had critical care training and some were undergoing postgraduate studies, 40 respiratory therapists (RTs) and two clinical pharmacists. All staff were primarily hired to perform clinical work.

The initial draft of the survey was designed by the director of the departmental clinical research program. The draft was then revised after obtaining feedback from two charge nurses and one registrar. It was later finalized after review by the Department Chair. The final survey was made up of 35 items that covered the following: demographic information, training background, previous research experiences, research interests and barriers. In addition, participants were asked to rate their knowledge of nine different research skills, including generation of study proposals, data collection and management and statistical analysis, as lacking, adequate, good or excellent. Otherwise, responses were mostly either Yes/No answers or graded according to the 5-point Likert scale¹¹. At the end of survey, respondents were asked to write down perceived barriers other than those stated and to register their names if they were willing to participate in clinical research in the department. Surveys were distributed in paper form to all available staff in November 2008 and to staff that joined thereafter in November 2010. Multiple reminders were sent to all staff to complete surveys, but participation was voluntary.

Statistical analysis was done using SPSS version

17.0 software (SPSS, Chicago, Ill). Continuous variables were reported as means with standard deviation and categorical variables as absolute and relative frequencies. The Chi-squared test was used to assess the difference between categorical variables and the student t-test was used for the analysis of differences in the means of continuous variables.

Results

General characteristics of respondents

One hundred eighty five surveys were distributed and 125 were returned (response rate of 62.8%). The characteristics of respondents are presented in Table 1.

Research experience and interests

The vast majority of respondents (95.2%) agreed that clinical research is important in critical care and 50 respondents (40%) indicated that they have participated in such research in the past (69.2% of physicians, 37.9% of nurses and 25% of RTs, $p = 0.052$). Only 14 (11.2%) respondents indicated that

they have presented their research project in person at national or international meetings (no difference among physicians, nurses and RTs, $p = 0.18$). A significant number of respondents ($n = 42$, 33.6%) indicated that they have participated in research while working in the department (no difference among the 3 disciplines, $p = 0.56$). Ninety nine (87.2%) respondents thought that the department was a good platform for research and 90 (75.6%) were interested in conducting research in the department in the future. Only 8.8% of respondents were not interested in performing research at all. Most respondents (86.2%) believed that participating in research will enhance their future career.

Clinical staff rating of knowledge of different research topics

Table 2 describes clinical staff rating of their knowledge of nine different research topics. Significant number of respondents lack knowledge in most research topics. Of note is that more than two thirds of them thought that they are able to collect and manage data and almost one half reported that they knew how

Table 1
Characteristics of respondents

| | Respondents (N = 125) |
|--|--|
| Age (years), mean \pm SD | 33.9 \pm 7.2 years (median = 32 years; quartiles 1 and 3, 28 and 38 years, respectively) |
| Female gender, N (%) | 87 (69.6) |
| Professional status, N (%) | |
| Physicians | 95 (76.0) |
| Nurses | 13 (10.4) |
| Respiratory therapists | 12 (9.6) |
| Others | 5 (4.0) |
| Nationalities, N (%) | |
| Saudi | 18 (14.4) |
| Filipino | 25 (20.0) |
| South African | 12 (9.6) |
| Malaysian | 11 (8.8) |
| Australian | 11 (8.0) |
| Other nationalities (N = 17) | 48 (38.4) |
| Clinical work experience (years), mean \pm SD | 7.7 \pm 6.4 (median = 6 years; quartiles 1 and 3, 4 and 9 years, respectively). |
| Previous work at a hospital that conducted research, N (%) | 53 (42.4) |
| Current work (years), mean \pm SD | 3.5 \pm 3.3 years (median = 2, quartiles 1 and 3, 1 and 5 years, respectively). |

Table 2
Intensive care unit clinical staff rating of their knowledge of different research topics (Number of respondents is 125)

| | Lacking N (%) | Adequate N (%) | Good N (%) | Excellent N (%) |
|---|------------------|-------------------|---------------|--------------------|
| Research ethics | 37 (29.6) | 48 (38.4) | 30 (24.0) | 2 (1.6) |
| Conducting literature review | 38 (30.4) | 45 (36.0) | 45 (23.2) | 5 (4.0) |
| Writing proposals | 48 (38.4) | 45 (36.0) | 21 (16.8) | 2 (1.6) |
| Study designs | 49 (39.2) | 42 (33.6) | 20 (16.0) | 0 (0) |
| Data collection and management | 30 (24.0) | 39 (31.2) | 43 (34.4) | 6 (4.8) |
| Statistical analysis | 56 (44.8) | 39 (31.2) | 22 (17.6) | 1 (0.8) |
| Writing abstracts and manuscripts | 57 (45.6) | 42 (33.6) | 18 (14.4) | 1 (0.8) |
| Manuscript submission to journals | 68 (54.4) | 34 (27.2) | 13 (10.4) | 2 (1.6) |
| Presentation of research work (oral or poster presentation) | 54 (43.2) | 36 (28.8) | 24 (19.2) | 4 (3.2) |

to perform statistical analysis. Knowledge to write and submit manuscripts and to present research results as posters seemed to be more lacking than other research activities. There was no statistical difference in the rating of physicians, nurses and RTs regarding all the nine research topics.

Fig. 1 describes the research activities that the respondents were willing to perform in the future. Of note is that most (77%) respondents were willing to perform data collection. There was no difference in the type of research activities among physicians, nurses and RTs except for writing abstracts and manuscripts as physicians (69.2%) and RTs (58.3%) were more willing to do that than nurses (29.5%), $p = 0.03$.

Research barriers

Fig. 2 describes the factors perceived by different clinical staff to hinder performance of research. Physicians, nurses and RTs agreed that lack of time and of compensation were important factors with no statistically significant differences among the groups (p -values of 0.30 and 0.52, respectively). All RTs, 62.6% of nurses and 30.8% of physicians thought that lack of encouragement was also an important factor ($p < 0.001$ among the three groups). Other barriers stated by respondents included lack of training in research and presence of only one biostatistician in the department.

Fig. 1
Research activities that clinical staff of a tertiary-care intensive care unit were willing to perform

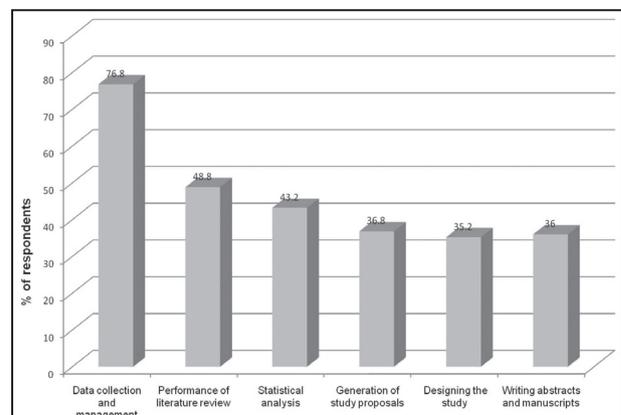
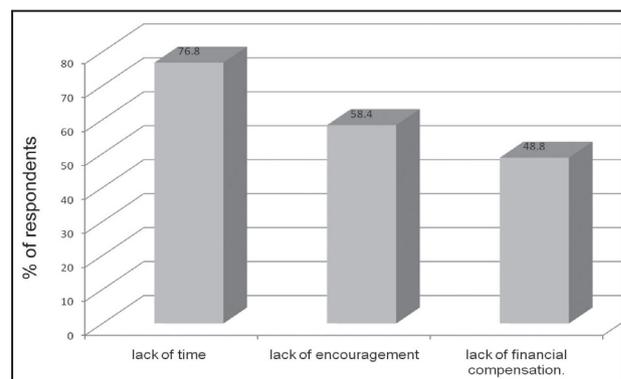


Fig. 2
Barriers to participation in clinical research as perceived by the clinical staff of a tertiary-care intensive care unit



Discussion

This study evaluated research experience, interest and barriers of clinical staff working in the Intensive Care Department of a tertiary-care hospital in Saudi Arabia and found that a minority of physician, nursing and respiratory care staff had prior research experience while the majority of staff in these three disciplines showed high interest in participating in research in the future. In addition, these healthcare providers indicated that they needed education on various research areas and perceived the lack of financial support, time and encouragement as important research barriers.

We found a high interest in performing research among clinical ICU staff primarily hired to perform clinical work. This was likely, at least in part, due to the belief that it would enhance their future career. Research accomplishments and publications are frequently used to gain promotion and improve academic status. A survey of 139 medicine departments chairs in the United States and Canada found that performance of clinical research, in particular the journals in which publications appeared, the number of peer reviewed publications and presentation of research in national meetings, was an important criterion for promotion of clinical educators¹². This seemed to be more important for promotion committee chairpersons¹³. As our institution developed over time to be a more academic center, conducting research and publication were crucial to obtain academic titles in the university and for subsequent promotion.

Promoting clinical research is important especially with the existence of worldwide shortage in clinical investigators and clinician scientists, even in developed countries. In the United States, the percentage of physicians engaged in research decreased steadily from a peak of 4.6% in 1985 to 1.8% in 2003¹⁴. This was related to both the growth of the pool of practicing physicians and the decline of the number of physician-scientists¹⁴, due to multiple reasons that included debt owed by medical graduates forcing them to go into the more financially rewarding clinical practice, lengthy clinical training, scarcity of research mentors¹⁵, difficulty attaining research grants and uncertainties about promotion in academic hospitals¹⁶. These reasons may not be all applicable in

other countries, such as Saudi Arabia, as the education and healthcare systems might be different. However, the same problem of clinical investigator shortage is present and surely more severe, making the expansion of researchers' pool more urgent. Although 33.6% of our clinical staff participated in research, only 11.2% presented their research at national or international meetings, suggesting that the number of principal investigators was modest.

To solve the problem of clinical investigator shortage, Western countries resorted to multifaceted approach. Research was promoted by the foundation of MD/ PhD dual degrees, research fellowships and various clinician-investigator programs¹⁷⁻²⁰ and by the incorporation of research in specialty and subspecialty residency programs. Short and focused research courses can also boost research knowledge and experience. Sherman et al. found that pediatric residents who participated in a formal education process on the topic of informed consent in their residency education program positively affected residents' knowledge and attitudes about the processes and issues involving informed consent²¹. In a controlled before-and-after study, Löwe et al. investigated the effectiveness of a one-year resident clinical research training program that included a weekly class in clinical research methods, completion of a research project and mentorship found that those who went through the training program had better methodological knowledge and that higher proportion of them were writing journal articles (87% vs. 36%) than those who did not²². Our survey was conducted in preparation for a departmental research course and aimed at identifying clinical staff who were interested in clinical research and the research areas they would like to learn about. This was added to our institution's efforts to enhance research culture by offering several postgraduate courses and workshops in various clinical research topics, such as bioethics, regulatory requirements and research methodology, and by encouraging staff to conduct clinical research as accomplishments in this field added positively to their annual evaluation, which was required for contract extensions/rehiring.

In this survey, significant number of clinical staff alleged adequate knowledge in many research areas. Surprisingly, more than 50% of respondents reported

adequate or more than adequate knowledge in many research skills. A survey at two Swiss teaching hospitals in which participants (n = 409) rated their ability to perform 26 research-related activities, found that the proportion of respondents who were able to perform a specific activity was 33.2% on average and that the most important factors determining skill levels were current time commitment to research, past experience, and formal training²³. Our survey did not specifically address the knowledge issue as the Swiss study did, but we believe that in the current study clinical staff might have overestimated their ability to perform certain research activities and that their responses reflected their perceptions and attitudes about clinical research.

To facilitate participation of clinical staff in research, barriers should be identified and addressed. In our survey, most ICU staff believed that lack of financial support and the closely linked lack of time were important factors that hindered participation in clinical research. A Canadian study conducted to identify barriers perceived by junior clinician-scientists found that the financial aspect was important²⁴. A review of seven studies that evaluated the disincentives to academic medicine found that lower financial rewards were the most frequently cited factor²⁵. To address this issue, the National Institute of Health in the United States increased research funding and established multiple awards for clinical researchers such as the K23 for new investigators in patient-oriented research and K24 for midcareer investigators and Clinical Research Repayment Program to repay educational debts for individuals who spent most of their time in clinical research¹⁶. This financial problem may be further solved by providing healthcare providers with protected time for research,

creating formal salary policies at organizational level, obtaining grant support and establish a clear path for both promotion and tenure. Our institution had recently gained ground in organizing and supporting clinical research. Previously, research projects were the results of individual efforts. More recently, research had received additional support from King Abdullah International Medical Research Center, which provided research grants, statistical support and research coordination, thus eliminating many of the barriers that were present before.

The current study has several limitations. These are primarily related to the survey methodology, specifically sampling and measurement. Not all staff responded, which may have led to the overrepresentation of those who had strong opinions about clinical research. However, the relatively high response rate probably reduced this voluntary response bias. The staff knowledge that participation in the survey was voluntary and had no effect on their evaluation should have reduced socially desirable responses.

In conclusion, this study found that the vast majority of clinical staff from multiple disciplines working at the Intensive Care Department of a tertiary-care academic hospital in Saudi Arabia were interested in conducting research and identified research areas that they need more education. These findings could result in targeted tutoring and training. Moreover, the lacks of time, of encouragement and of financial compensation were perceived as significant barriers to participation in clinical research. Finding the appropriate incentives and addressing perceived barriers are crucial to the success and maintenance of any research program.

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