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Abstract

Background: Pakistan has recently observed a significant growth in public health education programmes. Little is known about the structure of these programmes nor whether they are adequately responsive to national health system needs.

Aims: We reviewed existing public health degree programmes in Pakistan along with an exploration of the national public health market and health system needs.

Methods: A mixed-methods study was conducted between January 2015 and March 2016. Seventeen public health degree programmes were reviewed for programmatic and instructional attributes. Thirteen key-informant interviews were conducted to explore health system needs and challenges related to public health workforce.

Results: We found substantial variation in public health academic programmes in terms of offered courses, credit hours, number of faculty and tuition costs. About 70% of public health degree programmes were generic (i.e. with no specific concentration track) and only 18% offered practicums. Overall median tuition cost in 2016 was US$ 10 350. During key-informant interviews, emerged themes for challenges included lack of practical public health skills, limited knowledge of latest theoretical principles, poor communication skills and insufficient IT

orientation. Identified themes about knowledge and skills areas to address future public health challenges of Pakistan included system thinking mind set, healthcare IT skills, and leadership and management skills.

Conclusions: Public health education in Pakistan falls short of meeting current national challenges. Pakistan needs a national public health accreditation body for regulating education, harmonizing global standards to local context and developing relevant career pathways.

Keywords: public health, education, health system needs, Pakistan

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Introduction

The World Health Organization has estimated a worldwide shortage of 17.4 million health care workers, with substantial disparities among and within regions (1). To fill this gap, the development of a competent health workforce will have to be aligned with relevant population needs. In Pakistan, although public health education has seen significant growth in last decade (2). Up to 2005, six institutes were offering public health degree programmes but in the last decade there has been a three-fold increase in public health degree-awarding institutes. Part of this growth can be attributed to the repeated natural disasters that the country saw during this period (2005–2017), generating the need for public health professionals (3,4). In the aftermath of the 2005 earthquake, which killed almost 100 000 people and affected 5 million families, the rehabilitation activities funded by international donor agencies resulted in an associated increase in demand for public health professionals. In 2010, major floods affected over 20

million people in Pakistan, with estimates of damage exceeding US$ 40 billion (5). Frequent movements of Afghan refugees across the north-western borders of Pakistan and ongoing internal displacements due to the insecurity conditions significantly add to existing challenges of public health professionals (6).

In addition to environmental disasters and violence, Pakistan has public health challenges linked to its demographic and epidemiological landscape. The sixth most populous country in the world, Pakistan is a lower middle-income country with an adult literacy rate of 57% and a higher proportion of younger population (33.8% aged 0–14 years) (7,8). It has a significant burden of communicable (38%) and noncommunicable diseases (51%) (7). Pakistan is one of the very few countries left in the world with endemic polio. With this background, it is imperative to assess whether existing public health education in Pakistan fulfils health system needs.

So far, little is known about the overall structure, curricula, courses offered or assessment policies of Pakistan's public health degree programmes. It is not known whether the curricula offered are competency-based or appropriately responsive to national public health challenges. In this study, we reviewed existing national public health degree programmes followed by an exploration of national public health and health system needs. This is the first study that reports an overview of public health-related graduate degree programmes and skill sets expected of a public health professional in Pakistan.

Methods

Design

This mixed methods study was conducted in two phases: phase I involved a review of public health degree programmes being offered; in phase II, key informant interviews were conducted with public health experts.

Academic programmes review

The academic programmes review gathered information about course composition and content, student admission criteria, faculty (both full-time and part-time), accreditation status and programme finances. As of January 2015, there were 21 degree-awarding institutes/universities offering public health degree programmes recognized by the Higher Education Commission in Pakistan; 81% of these are located in five major cities, Islamabad, Karachi, Lahore, Peshawar and Quetta. In our survey, we included public health degree programmes that had at least one class graduated from the programme and where admissions were open to the general public (as opposed to only military personnel or public sector employees), and those located in one of the five major cities. Programmes were broadly grouped into two types: general Master of Public Health (MPH)/Master of Science in Public Health (MSPH) programmes (i.e. with no specific

concentration track) and specialized MPH/MS (Master of Science) programmes (i.e. with a specific concentration track such as MS in epidemiology and biostatistics). The sampling flowchart is given in Figure 1 .

A pilot-tested, structured questionnaire was administered during January–June 2015 through a face-to-face meeting with the programme coordinators of the institutes retained for study offering public health degree programmes. All meetings were conducted by the same person (one of the authors). The questionnaire included items related to academic programme specifics like degree requirements, admission, accreditation and recognition status, courses and credit hours, faculty and fee structure. Where applicable, the institute websites, prospectuses and student handbooks were reviewed to obtain the required information before meeting programme coordinators. The meeting then helped in providing the missing information, updating certain information relating to the prospectus, website or handbook, and/or verifying the programme information already collected.

Key informant interviews

Expert key informants were purposely selected based on their affiliations with public health organizations, reputation and experience using a snowball sampling technique (original key informants were asked to suggest additional experts for interviews). Once three consecutive interviews failed to yield any new thematic information, the interviews were stopped.

We conducted 13 key informant interviews with experts from national and international organizations working in Pakistan’s public health field using pilot-tested semi-structured guides with open-ended questions. All interviews were conducted by three of the authors (MZ, UA and SA) from August 2015 through March 2016 in Karachi, Islamabad, Lahore and Peshawar.The key informant interviews helped identify experts’ perspectives about public health competencies required of a public health professional in Pakistan. Interviews focused on public health professional’s knowledge and skill set gap and areas needing improvement to meet national public health challenges.

Compliance with ethical standards

Ethical approval for the study was obtained from the institutional review board of Prime Foundation (Peshawar, Pakistan). Participation in both the qualitative and quantitative phases of the study was anonymous and voluntary, and informed consent were obtained from all participants.

Statistical analyses

Descriptive statistics were computed to characterize the participating programmes and experts. The programme characteristics for general and specialized public health master's degrees were compared using the Mann–Whitney U test (for continuous data) and 2-sample proportion tests (for categorical data) using SPSS, version 21. For the key informant in-depth interviews, expected themes were identified before data coding. Field notes were then closely reviewed to inductively advance the development of the codes. Coding identified broad themes for each of the main areas of inquiry (9). Median and ranges for programme tuition costs were derived and converted to US$ (2016) after adjusting for purchasing power parity. We used the most recent available 2016 Pakistan figure for purchasing power parity conversion factor for gross domestic product (10).

Results

Programme characteristics

Eleven out of the 21 degree-awarding institutes recognized by the Higher Education Commission that offer public health degree programmes met the inclusion criteria, offering 17 public health degree programmes (12 general MPH/MSPH, five specialized public health programmes).

Programme characteristics comparing general and specialized MS programmes are shown in Table 1. Ten of the 17 public health academic programmes (59%) were established in the past decade (2006–2015). The overall median age of the programmes we reviewed was 7 (interquartile range = 8) years. Twelve of the 17 MPH/MSPH degree programmes were generic (offering no specific concentration track) with median total credit hours of 60. Two MPH/MSPH programmes and one specialized public health MS programme offered practicums. Since most programmes (9/17) did not have detailed course information on their content, mode of delivery or assessments, the comparisons based on these variables are not reported. There was a great difference in numbers of academic faculty among institutes. For instance, number of faculty members in the surveyed institutes (including both full-time and part-time) ranged from 5–39. One public sector institute was treated as an outlier as it reported 70 faculty members being regularly involved in academic activities in their public health programme.

Institutes with MPH/MSPH degree programmes were offering courses that varied considerably in topics, types of offering (core versus elective) and credit hours. Commonly offered courses in MPH/MSPH programmes were epidemiology, biostatistics, communicable disease control, health education/promotion, health management/health administration and accounting, occupational/environmental health, and reproductive health with a research dissertation as a requirement for the degree.

Overall, median tuition cost of the specialized MPH/MS degree programmes was US$ 15 182, which was higher than that of the general (i.e. with no specialization) 2-year MPH/MSPH degree programmes (US$ 8369). The variation in total tuition costs for general MPH/MSPH degree programmes was great, ranging from US$ 5141 to US$ 15 182. The range was even higher (US$ 2018–61 001) for specialized MS level public health degree programmes (e.g. MS in epidemiology and biostatistics, MS in health management and economics, and MPH in community eye health).

Key informant interviews: thematic findings

Key informants (N = 13) were public health experts representing international and national nongovernmental organizations, public sector health departments and academic institutions based in Pakistan. Average professional experience and affiliations for the key informants are given in Table 2 . The minimum level of experience was 8.0 (standard deviation 2.8) years. The themes identified for each of the three areas of inquiry are given below. Table 3 shows the themes along with representative comments from key informants.

Area of inquiry 1: Currently used knowledge and skill set in Pakistan's public health organizations

The key informants' responses were grouped into one knowledge (basic public health science) and three skill set themes (communication, management and analytic skills) as follows:

Basic public health science (knowledge): All key informants mentioned the routine use of basic science knowledge (and associated skills). They indicated that the spectrum of knowledge (and associated skills) a public health practitioner deals with in Pakistan is broad and includes maternal and child health, nutrition, communicable diseases, disasters and emergency management, health systems, health care financial management, policy and strategy development.

Communication and writing skills: Key informants identified report writing, public speaking, interpersonal communication, and negotiation skills as the most commonly employed skills. Ability to draft memoranda of understanding was also identified as a commonly performed activity by two participants, both belonging to public sector organizations. Proficiency in English and one local language was noted as a key skill for public health professionals. Other skills mentioned included leadership, advocacy, social mobilization, team work and conflict resolution.

Health management skills: The majority of key informants argued that while basic principles and practice of management stay the same, it is the unique local health context in which these skills are used that makes them important. One interviewee commented that “our immunization-related field workers have mostly got basic nonmedical qualifications. And with increasing distrust among communities regarding immunization, managing this human resource poses additional managerial challenges”. The management skills that were stressed the most were event management, project management, coordination and problem solving, quality assurance and management, monitoring and evaluation, human resource management, procurement, logistics, and supply management.

Analytical skills: Frequent use of basic research skills (information gathering and literature review, development of data collection tools, data collection and analysis), ability to use data analysis software packages (MS Excel, EpiInfo, SPSS) and developing indicators and targets for project frameworks were identified as routine public health tasks.

Area of inquiry 2: Knowledge and skill sets that are usually lacking in the current fresh public health graduates in Pakistan

The four identified themes related to second main inquiry were:

Lack of practical public health skills: All key informants singled out the absence of important public health practical skills as the most frequent observation among fresh public health graduates. One interviewee from an international nongovernmental organization noted that “almost always we end up giving the practical skills from scratch”.

Poor communication skills: Most (11/13) key informants identified communication skills (report and grant writing, verbal presentation skills, interpersonal communications, and capacity building/teaching skills) as a major shortcoming. One participant noted that “in Pakistan, when you are working in the field for promotion of vaccination or family planning, good interpersonal communication skills are vital. That’s why we cannot afford someone with poor communication skills”. Limited technical writing skills among fresh graduates were highlighted. One participant suggested that during training the “evaluation of MPH graduate[s] should be on the basis of assignments that check critical thinking in addition to writing skills,” and that given the current state of fresh graduates, “it doesn’t seem like it’s being done”.

Limited knowledge of latest theoretical principles: key informants noted that considerable progress has been made recently in public health but fresh graduates have little knowledge

about the latest trends. One participant noted that few graduates would know about evidence-based interventions for improving maternal and child nutrition. Fresh graduates had limited theoretical knowledge in most public health areas. Nine of the 13 participants stated that, for a master's level graduate, having an understanding of the basic underpinnings of public health and the latest related developments is important. One participant noted that "if you are trained in Pakistan, I would like you to know at least the basics of communicable disease control, and epidemics investigation". Another interviewee indicated that the public health graduates "have limited knowhow of the existing health policies at the provincial or even national level' and that they 'are not aware of the local public health infrastructure".

Insufficient information technology (IT) orientation: Six key informants pointed out that fresh graduates have limited skills with Microsoft Office applications and statistical packages (e.g. EpiInfo, SPSS). One participant from the health department stated, "forget about a hi-fi data software, the graduates don't know the basic [MS] Excel [functions]".

Area of inquiry 3: Knowledge and skill sets that will become increasingly relevant

Knowledge and skill areas for addressing future public health challenges in Pakistan: Key informants mentioned multiple areas that in the future will become increasingly relevant in Pakistan's public health context. These were grouped into three themes related to health systems, health care IT, and leadership and management.

Skills to improve health system with system-thinking mind set: The most prominent emerging theme was skills related to health system improvement and system thinking. According to key informants, the future entails a system-thinking mind set, evidence-based decision-making, alignment of local/national priorities to international frameworks, quality enhancement programmes, innovative and effective capacity-building of the workforce, implementation of well drafted contractual agreements, and careful integration of vertical programmes. They argued for early exposure in public health training to these concepts and skills. Key informants stressed that capacity-building in the workforce and the community will take "the centre stage" of a typical public health professional's job in future. One participant commented that "capacity-building should be taught as a science as we are entering in an era where community education will be revolutionized. In future, new effective methods of capacity building will become prevalent".

Health care IT skills: Most (10/13) key informants recognized the importance of a general understanding of health care IT principles for future public health graduates. They indicated that the trend for IT-based operations is growing in Pakistan with focus on eHealth/m-health, health care geographic information system, district health information system, web-based monitoring

and evaluation, and a management information system for human resources, logistics, and procurement. One participant, noted that “there is a strong (international donors’) push towards transparency and accountability, and to ensure efficient documentation and reporting, information technology’s role will grow”.

Leadership and management skills: Almost all key informants emphasized the importance of leadership and management skills. One participant noted that “skills required for leading change in a constantly evolving health system are desperately required of public health professionals”. Interviewees urged that future public health professionals require mastery in cultural competence, negotiation, and conflict avoidance and resolution skills. Interviewees also stressed team work, diversity and inclusiveness.

Discussion

Based on surveyed programmes and key informant interviews, we found important gaps in public health education and practice. One major finding was the lack of adequate practical exposure during training. Only two MPH/MSPH degree programmes had formal practicums/internships. In lieu of practicums/internships, most programmes offered 5–7 single-day public health field visits. Studies from India, Nepal and South Africa have reported similar trends related to inadequate practical exposure during public health training (11–13). Without adequate practical exposure during training, students are vulnerable to developing an inability to apply classroom knowledge to real world problems. Studies show that practicums and internships allow students to exercise the learned competencies on actual public health challenges and to develop lasting professional networks (14–16). Above all, providing in-training experiential exposure helps students focus on the outcomes of their education in terms of developing relevant competencies (17).

Like in other countries in the Region (2,18,19), our study found a greater number of general public health master’s programmes as opposed to specialized ones. This is understandable since most of the programmes are relatively young (median age 7 years), and we expect that the trend towards specialization will increase with time. One of the major themes from interviews was a mismatch between the content of public health academic programmes and the current health system needs. Programmes for which detailed curricula were available mostly had traditional as opposed to competency-based curricula. Thus, public health education is provided largely as an abstract science as opposed to a pragmatically-rooted discipline that is tuned to address real-world needs. Current recommendations insist on following a competency-based approach starting with “backward planning” that first specifies local health issues. Once the most pertinent problems are identified, desired competencies and well defined learning outcomes are developed and integrated into the curriculum to address those predetermined community needs (20–23). The authors therefore recommend that public health academic programmes in Pakistan be restructured to achieve greater alignment with evolving community

and health system needs. Similarly, an outcome-oriented, competency-based curriculum should be developed providing skills-based professional education that the community, the health system and employers are looking for (21).

Published studies have attributed the mismatch between community needs and health care workers' competencies to fragmentary, rigid, and outdated curricula, professional "tribalism" and lack of interdependence, outdated pedagogy, and limited responsiveness to local needs (1,24–27). A recent report advocated a series of instructional and institutional reforms to address the challenges related to health care coverage, cost, quality and workforce (20). Our study proposes similar recommendations. Adopting a competency-based curriculum using real-world locally relevant case studies, giving practical exposure to students during training, and optimizing the weighting of covered content according to system needs are a few of the instructional reforms that will help develop a systems-based, responsive, competent public health workforce.

In Pakistan, gaps pertaining to structured, standardized and need-based public health education largely exist due to lack of a specific public health accreditation body. Currently, the Higher Education Commission serves as an overarching accreditation body for any type of graduate and postgraduate education. Institutes involved in medical and dental training must also be recognized by the Pakistan Medical and Dental Council. The accreditation of public health degrees from the Pakistan Medical and Dental Council (in addition to the Higher Education Commission) is only required for medical and dental graduates if they intend to take an academic position at a medical or dental school. Thus, at present a single professional body for uniform accreditation of public health programmes does not exist in Pakistan. Without an external legal regulatory framework encompassing all types of public health education (for both medical and nonmedical graduates), institutes will have little incentive to implement competency-based curricula addressing Pakistan's public health challenges. A public health academic accreditation body can enforce the use of competency-based curricula with practicum and/or internships (28). The authors believe that a national public health accreditation body is urgently needed to perform: assessment of national public health needs; development of nationally relevant, public health competencies; regulation of the adoption of public health competencies; and accreditation of public health programmes. It is worth mentioning that one of the milestones set by WHO's global strategy on human resources for health is that "all countries will have established accreditation mechanisms for health training institutions by 2020" (1).

This study had limitations. First, we were unable to compare the contents, delivery and assessment of courses across different programmes due to the unavailability of detailed course and dissertation information. However, this points to a lack of well-defined and standards-based educational programmes. An in-depth study on identifying differences in content, delivery and assessment among similarly labelled courses would be an interesting, albeit practically

challenging, question to pursue. Second, although we attempted to include a wide range of public health experts as key informants, they did not represent every niche of the public health profession, and thus the identified challenges are limited to their experience. Third, our programme review was limited to five major cities for reasons of feasibility. Although these five cities contain the majority (81%) of public health institutes, the findings of the programme review may not be generalized across all institutes. Finally, the authors did not intend to present an exhaustive list of knowledge and skill sets for a public health degree programme, only to demonstrate the existence of significant gaps in public health education. These can however, be used as a starting point for the development of a competency-based curriculum in Pakistan.

Conclusion

This study identifies key gap areas in public health education, and suggests establishing a grounded, evidence-based curriculum for quality public health education in Pakistan. Public health institutes should implement a competency-based approach addressing system needs. A national public health accreditation body is needed which, apart from regulating public health education, harmonizes existing relevant public health standards to local context, and develops public health career pathways.

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Competing interests: None declared.

Enseignement en santé publique et besoins du système de santé au Pakistan : étude à méthodologie mixte

Résumé

Contexte : Le Pakistan connaît depuis peu une forte augmentation du nombre de ses programmes d’enseignement en santé publique. La structure de ces programmes et leur adéquation aux besoins du système de santé national restent méconnues.

Objectif : Nous avons examiné les programmes en santé publique diplômants qui existent actuellement au Pakistan et nous avons étudié le marché national pour ce domaine ainsi que les besoins du système de santé.

Méthodes : Une étude à méthodologie mixte a été réalisée entre janvier 2015 et mars 2016. Dix-sept programmes en santé publique diplômants ont été passés en revue afin de déterminer leurs caractéristiques programmatiques et pédagogiques. Treize entretiens avec des informateurs clés ont été menés afin d'analyser les besoins du système de santé et les problèmes des personnels dans le secteur de la santé publique.

Résultats : Nous avons constaté des différences considérables entre les filières académiques en santé publique, tant sur le plan des cours proposés que des heures d'étude, des effectifs du corps enseignant et des frais de scolarité. Environ 70 % des programmes diplômants en santé publique étaient génériques (c'est-à-dire sans filière spécialisée) et seuls 18 % proposaient des stages pratiques. La valeur médiane des frais de scolarité généraux (en 2016) s'élevait à 10 350 dollars US. Au cours des entretiens avec les informateurs clés, les problématiques soulevées comprenaient le manque de compétences pratiques en matière de santé publique, les connaissances limitées concernant les derniers principes théoriques, les faibles compétences en communication et l'orientation insuffisante vers les moyens informatisés. Les thématiques identifiées dans les domaines des connaissances et des compétences nécessaires afin de relever les défis futurs du Pakistan en matière de santé publique comprenaient une approche intellectuelle systémique, des compétences informatiques axées sur les soins de santé et des aptitudes en leadership et en gestion.

Conclusions : L'enseignement en santé publique au Pakistan n'est pas à la hauteur des difficultés auxquelles le pays fait face à l'heure actuelle. Le Pakistan a besoin d'un organisme d'accréditation national en santé publique capable de réglementer l'enseignement, d'harmoniser les normes mondiales en fonction du contexte local et de développer des filières professionnelles pertinentes.

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