

Health research funding and its output in Pakistan

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Abstract

Background: Health research is very important for formulating evidence-based policies.

Aims: To assess the health research funding and its output in the last 5 fiscal years (2013/14 to 2018) in Pakistan.

Methods: Information about health research funding was retrieved from 3 major local agencies, the Higher Education Commission, the Pakistan Science Foundation and the Pakistan Health Research Council. Details of funding from international donors were retrieved and the number of publications was estimated from Pubmed and Pakmedinet.

Results: A total of 1261.6 million Pakistan rupees (Rs) (US\$ 8.4 million) was spent on health research in the last 5 fiscal years, the majority from local donors ($P < 0.02$). Overall funding increased from Rs 104.7 million in 2013–2014 to Rs 349.8 million 2017–2018. In publications data, 24 796 original articles were published, including 16 137 Medline and 8659 non-Medline indexed. Overall there was a gradual increase in the number of publications per year, statistically significant for Medline indexed journals. Research funding had a strong correlation (Cronbach $\alpha=0.88$) with publications.

Conclusion: Health research funding directly affects health research output. The funding on health research should be considered an investment rather than expenditure.

Keywords: health research, funding, investment, Pakistan

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Introduction

Health research is of paramount importance and plays a pivotal role in the improvement of existing health systems, framing evidence-based health care policy, and in generating new initiatives and advancing knowledge about problems relating to public health and their solutions (1,2). It has an important role in identifying the economic and social determinants of health, and ultimately forms the basis for improvement in health programmes and policies (3). This is beneficial to a country in many ways ranging from reducing the direct cost of disease to the development of techniques/products for treatment of disease, and is recognised as an important aspect of economic development and an evidence-based, informed approach to population health (1,2,4,5).

It is imperative for developing countries to recognise the importance of health research and gain momentum in this field (4,5). According to the World Health Organization (WHO), in low- and middle-income countries health research must address local needs, and the evidence generated should be incorporated into policy (1,2). However, the WHO Global Observatory on Health Research and Development showed that there are 73 times more health researchers in the high-income countries than in low-income countries (6). A quarter of the world's population is living in South Asia, where health infrastructure is weak. Due to low investment, there is a dearth of health research in South Asia to

determine the gaps between disease and health delivery systems (7). It has been reported that researchers from South Asia contribute only 1.2% to the annual research.

As in many other countries of the Region, the health research situation in Pakistan is not satisfactory (8). Pakistan has only 25 full time equivalent public health researchers per million population (6). The poor status of health research in Pakistan is due to lack of a research culture, lack of demand for research, low capacity, unavailability of funds and improper dissemination (9). This study describes the spending on health research in Pakistan in the last 5 fiscal years and its impact on research output.

Methods

We collected information about the spending on health research during the last 5 fiscal years, July 2013–June 2018, from 3 major Pakistani funding agencies, Pakistan Health Research Council, Islamabad, Pakistan Science Foundation, Islamabad, and the Higher Education Commission, Pakistan. For the Pakistan Health Research Council the information was retrieved from the records of the Research, Development and Coordination section using a pre-designed proforma. Letters were sent to the Higher Education Commission and the Pakistan Science Foundation asking them to provide the required information. Letters were also sent to about 63 health research institutions in the country asking them to provide de-

tails of funding other than the Pakistan Health Research Council, the Higher Education Commission and the Pakistan Science Foundation. Besides this, information about international funding was retrieved from the National Bioethics Committee Pakistan, which gives ethical clearance to internationally funded projects in Pakistan (10).

The research output, i.e. number of publications in local and international journals, was collected from Pakmedinet (<http://www.pakmedinet.com/>) and PubMed (<https://www.ncbi.nlm.nih.gov/pubmed>). For PubMed, an advance search was conducted with medical subject headings (MeSH) (www.ncbi.nlm.nih.gov/pubmed) as described earlier (11). In the MeSH tree, the major topic includes all the communicable and noncommunicable diseases and health disciplines. We used the following pattern of search terms:

- MeSH major topic (list of communicable and non-communicable diseases, list of all medical and health disciplines separated by word OR),
- AND,
- affiliation Pakistan,
- publication date (year).

Pakmedinet was developed in 2001 and indexed about 85 health journals published in Pakistan. The list of all these journals was retrieved along with their publications and filtered for consistency, i.e. regular publication in the last 5 years. About 40 journals had regular issues, therefore their publications were counted on a yearly basis. All other local journals which did not meet the criteria of regularly publication or indexing in Pubmed were excluded.

All data were entered into *MS Excel* and analysed using *SPSS*, version 20. Pearson correlation was used to assess the correlation between funding and publication. *P*-value < 0.05 was considered statistically significant.

Results

A total of 1261.6 million Pakistan rupees (Rs) (US\$ 8.4 million) was spent on health research during the last 5 fiscal years, 2013–14 to 2017–18. The spending made by the Pakistan Health Research Council, the Pakistan Sci-

ence Foundation and the Higher Education Commission along with the international donors is detailed in Table 1. The mean annual spending was Rs 252 (standard deviation 157) million (US\$ 1.68 million). Overall a statistically significant increase was observed for funding with an increasing pattern for local funding, Rs 104.7 million in 2013–14 to Rs 349.8 million in 2017–18 ($P < 0.02$). However, the pattern for international funding was inconsistent (Figure 1). A sharp increase in health research spending was seen in 2015–16 whereas there was only a gradual increase in number of publications during that period (Figure 2).

Overall, 24 796 original research articles were published during 2013–2018. Of these, 16 137 were in Medline indexed and 8659 in non-Medline indexed (local) journals. The overall number of publications annually per 100 000 population was 2.3, while publication in Medline indexed journals was 1.52 per 100 000 population annually. A gradual increase was seen in the number of publications over the years. This trend was significantly greater in Medline indexed journals compared with local non-Medline indexed journals (Figure 2) ($P < 0.04$).

The comparison of funding with the number of publications showed a strong correlation, Cronbach α 0.88 indicating that increasing funding had a positive impact on the research output. However, the correlation between funding and pattern of publication, i.e. Medline indexed and non-Medline indexed, was not statistically significant.

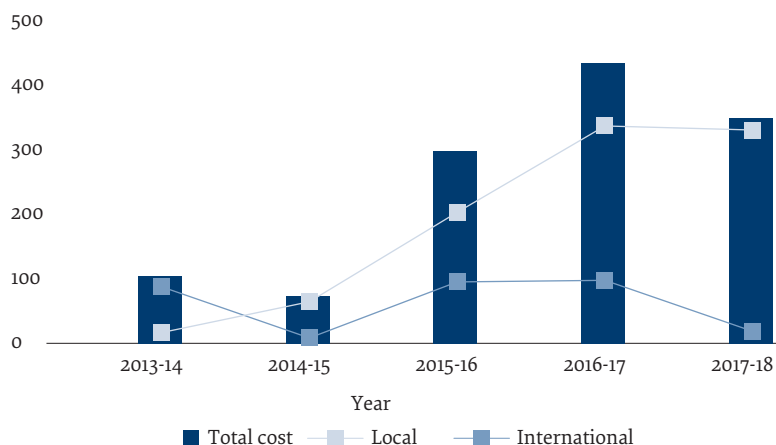
Discussion

Our findings showed that health research output, i.e. number of publications, was directly associated with adequate resources. It has been reported that increasing expenditure on health has a direct effect on increasing publications (12). Health research is important for any country to identify health-related problems and gaps for improvement, and provides evidence-based information to the policy-makers to frame health policies. It is equally important for all countries, however, it attains greater significance in the developing and resource-poor countries. It has been reported that health research in South Asia is scarce and has little role at policy level (13).

Table 1 Details of local and international health research spending in Pakistan, July 2013–June 2018

Year	Spending (million Pakistan rupees)				International	Total
	Higher Education Commission	Pakistan Science Foundation	Pakistan Health Research Council	Institutional		
2013–14	7.43	1.23	4.10	4.08	87.86	104.7
2014–15	8.21	2.69	2.62	51.11	8.50	73.13
2015–16	129.45	6.53	10.2	57.15	95.42	298.75
2016–17	241.88	8.83	14.77	71.82	97.89	435.19
2017–18	259.86	4.03	2.85	64.28	18.81	349.83
Total	646.83	23.31	34.54	248.44	308.48	1261.6

Figure 1 Spending [Pakistan rupees (Rs)] on health research during 2013-2018



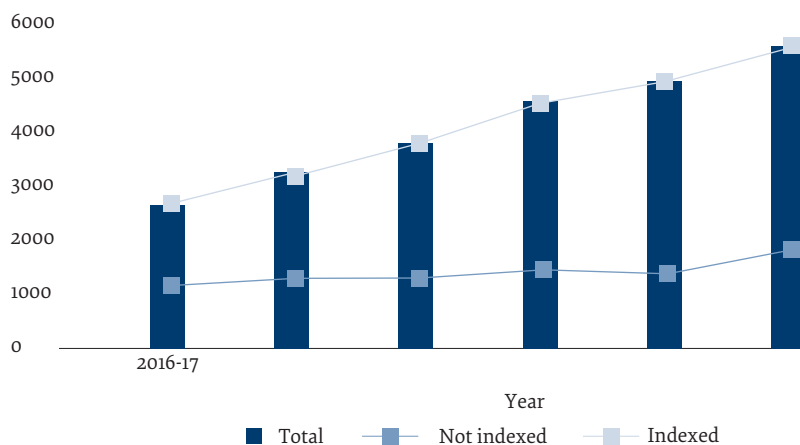
Pakistan is a developing country with a double burden of communicable and noncommunicable diseases, and ranks among the top 10 countries having a high burden of tuberculosis, hepatitis, diabetes, etc. (14). The overall health budget is low and health research is not on the list of priorities. In our study, total spending on health research for the last 5 years was US\$ 1.68 million, about 0.00003% of GDP (2018) in Pakistan. The health research funding in India was US\$ 1.42 billion, about 0.09% of GDP (13). The research and development expenditure was 0.68% of GDP in Egypt, 0.47% in Qatar and 0.49% in the United Arab Emirates (15). In the current study, we saw a gradual increase in the number of publications, with a significant rise in articles in Pubmed indexed journals, which has a significant association with health research funding. It has been shown that research output has a direct relation with policies and health research funding (16). It has been reported that Pakistan has contributed 8% of the PubMed indexed publications made from the countries of the WHO Region for the Eastern Mediterranean. Further comparison of Medline publications in Pakistan gave a value of 1.52 per 100 000 population per year, less than

Kuwait (12.5), Tunisia (10.5) and Qatar (9.5), but greater than Syria (< 1), Sudan (< 1) and Yemen (< 1) (15).

In order to reduce the burden of disease and provide quality services to the public, there is a need to generate scientific evidence for proper utilization of the available resources. The current findings are a positive indication for health research in the country but there are potential challenges, including the low priority given to research at government level and consequent poor funding and lack of incentive, resulting in a constant brain drain and absence of a national priority list. Further, there is no uniform funds dispersal system as the Pakistan Health Research Council, Higher Education Commission and Pakistan Science Foundation working in isolation, resulting in duplication and waste of money. Similarly, the majority of international donors have their own priorities for research and only a few of them are actually funding the country's needs-based research.

As is evident, major health research funding is derived from the public sector, thus, the current economic crisis might have a direct impact on health research. The

Figure 2 Number of publications on health research in Pakistan during 2013–2018



government has already slashed many development projects. There are growing fears of low funding for the Higher Education Commission and other research organizations, ultimately affecting the research output. To maintain the momentum and face the challenge, the mindset needs to change from “research as spending” to “research as investment”. The government should enhance funding in research with proper allocation in the budget. Allocated funds should be dispersed through a uniform and coordinated mechanism for rational utilization. The international donors could be sensitized on the key health issues to increase inflow; researchers

should also explore international funding opportunities. It will be disastrous for Pakistan if it fails to maintain the momentum of health research in the country.

Although it is mandatory for all institutions to obtain ethical clearance from the National Bioethics Committee for international grants and for those at national level, in some cases the institution may take ethical clearance from the local institutional ethical review board for small scale studies. Therefore, it is possible that information from some of the projects may have been missed and this constitutes a limitation of our study.

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Le financement de la recherche en santé et ses résultats au Pakistan

Résumé

Contexte : La recherche en santé est très importante pour élaborer des politiques fondées sur des bases factuelles.

Objectifs : Évaluer le financement de la recherche en santé et ses résultats au cours des cinq derniers exercices fiscaux (de 2013 à 2018) au Pakistan.

Méthodes : Les informations sur le financement de la recherche en santé ont été obtenues auprès de trois grands organismes locaux – la Commission de l'enseignement supérieur, la Fondation pakistanaise des Sciences et le Conseil pakistanaise de la recherche en santé. Les données concernant le financement par des donateurs internationaux ont été collectées et le nombre de publications a été estimé à partir de PubMed et PakMediNet.

Résultats : Un total de 1261,6 millions de roupies pakistanaises (8,4 millions de dollars des États-Unis) a été dépensé pour la recherche en santé au cours des cinq derniers exercices fiscaux, provenant en grande partie de donateurs locaux ($p < 0,02$). Le financement global est passé de 104,7 millions de roupies en 2013-2014 à 349,8 millions de roupies en 2017-2018. Dans les données relatives aux publications, 24 796 articles originaux ont été publiés, dont 16 137 indexés et 8659 non indexés dans Medline. Dans l'ensemble, on constate une augmentation progressive du nombre de publications par an, celle-ci est statistiquement significative pour les revues indexées dans Medline. Le financement de la recherche présentait une forte corrélation (alpha de Cronbach de 0,88) avec les publications.

Conclusion : Le financement de la recherche en santé a une incidence directe sur ses résultats. Il doit être considéré comme un investissement et non comme une dépense.

تمويل البحوث الصحية ونواتجها في باكستان

محمد عارف نديم سقيب، إبراهيم رفیق

الخلاصة

الخلفية: للبحوث الصحية أهمية بالغة في صياغة السياسات المستندة بالبيانات.

الأهداف: هدفت هذه الدراسة إلى تقييم تمويل البحوث الصحية ونواتجها خلال السنوات المالية الخمس الماضية (2013-2014 حتى 2018) في باكستان.

طرق البحث: حصلنا على معلومات عن تمويل البحوث الصحية من ثلاث مؤسسات محلية رئيسية، هي: هيئة التعليم العالي، ومؤسسة العلوم الباكستانية، ومجلس البحوث الصحية الباكستاني. وحصلنا على تفاصيل التمويل من الجهات المانحة الدولية، وقدّر عدد المنشورات الواردة في قاعدة بيانات PubMed و Pakmedinet.

النتائج: أنفق ما مجموعه 1261.6 مليون روبية باكستانية (8.4 ملايين دولار أمريكي) على البحوث الصحية في السنوات المالية الخمس الماضية، ومعظمها من جهات مانحة محلية (القيمة الاحتمالية > 0.02). وارتفع إجمالي التمويل من 104.7 ملايين روبية باكستانية في الفترة 2013–2014 إلى 349.8 مليون روبية باكستانية في الفترة 2017–2018. وبالنسبة لبيانات المنشورات، فقد نُشرت 24796 مقالة أصلية، منها 16137 مقالة مُفهرسة في قاعدة بيانات مدلاين، و8659 مقالة غير مُفهرسة في قاعدة البيانات ذاتها. وعموماً، كانت هناك زيادة تدريجية في عدد المنشورات سنوياً، وهي ذات دلالة إحصائية للمجلات المُفهرسة في قاعدة بيانات مدلاين. وكانت هناك علاقة قوية بين تمويل البحوث (معامل ألفا كرونباخ 0.88) والمنشورات.

الاستنتاجات: يؤثر تمويل البحوث الصحية تأثيراً مباشراً في ناتج تلك البحوث. وينبغي اعتبار التمويل المخصص للبحوث الصحية استثماراً وليس إنفاقاً.

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