

Original Article

The Role of Medical Research Centers in Health Research System Promotion in I.R. of Iran: 2001–2014

Monir Baradaran Eftekhari, PhD¹; Katayoun Falahat, MSc^{1*}; Asghar Ebadifar, DDS, MSd^{1,2}; Masoumeh Eltemasi, MSc¹; Zahra Sobhani, MSc¹; Elham Ghalenoee, MSc¹; Elham, Habibi MSc¹; Shahin Akhondzadeh, PhD^{1,3}

¹Deputy of Research and Technology, Ministry of Health and Medical Education, Tehran, Iran

²Dentofacial Deformities Research Center, Research Institute of Dental Sciences, Department of Orthodontics, Dental School, Shahid Beheshti University of Medical Sciences, Tehran, Iran

³Psychiatric Research Center, Tehran University of Medical Sciences, Tehran, Iran

Abstract

Background: Research centers, defined as organized research units having research as their primary mission, are positioned as an organizational solution to tighten the knowledge to do gap in health research system (HRS). Therefore, this study aims to explore the roles of medical research centers (MRCs) in promoting HRS.

Methods: In this cross-sectional study, we reviewed the evaluation results of research performance of MRCs from 2001 to 2014. Data of evaluation indicators (in knowledge production and capacity building domains) were gathered and finally compared for these years.

Results: In the mentioned period, the number of medical research centers has grown by more than 11 folds. In the domain of knowledge production, the total number of published articles and published articles in ISI, Web of Science per researcher rose from 0.5 and 0.05 to about 3.5 and 1.2, respectively. The number of indexed articles in scientific international databases has increased more than 66 times and the total number of citations of MRCs' articles has increased to more than 80 000. In the domain of capacity building, the trend of workshops and held congresses is ascending.

Conclusion: MRCs are well empowered in knowledge production in national HRS.

Keywords: Evaluation, health research system, medical research center

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Introduction

Strengthening and investment in health research system (HRS) have increased in low- and middle-income countries in order to achieve the health related Millennium Development Goals (MDGs).¹ In 2004, the Ministerial Summit on Health Research called governments in low- and middle income-countries to fund health research to reduce inequity and social injustice.^{2,3}

The main element that distinguishes a HRS and attracts policymakers' attention is the attempt to develop methods and networks to facilitate the use of health research in order to produce research evidence addressing national needs.⁴⁻⁷ Policymakers need evidence-based research to focus on priority health challenges.⁸ The most acknowledged approach to gaining such research is multidisciplinary approach.⁹

Research centers are positioned as an organizational solution to tighten the knowledge to do gap. They have been defined as organized research units having research as their primary mission with multidisciplinary and team based structure.¹⁰ Research centers are more successful

in collaborative research, innovation and knowledge translation due to their structure.^{10,11} Studies have been undertaken to assess, implement and analyze HRS nationally or internationally^{12,13} and the role of medical research centers (MRCs) in National Health Research System (NHRS) all over the world.^{9,14,15} Although some studies have been conducted in Iran on assessing, analyzing and evaluating NHRS,¹⁶⁻¹⁸ there is no evidence on MRCs' roles in this system. Therefore, this study aims to explore the roles of MRCs in strengthening NHRS to promote health.

Materials and Methods

This is a cross-sectional study which has been performed based on existing reports on national budget laws, national scientometrics and evaluation results of research performance of MRCs from 2001 to 2014. Since 2001, the Undersecretary for Research and Technology, Ministry of Health and Medical Education (MOHME) as the main policy maker in NHRS is responsible to evaluate MRCs' research performance annually and all MOHME

*Corresponding Author: Katayoun Falahat, 13th Floor, Block A, Deputy for Research and Technology, Ministry of Health and Medical Education, Tehran, Iran. Email: kfalahat@yahoo.com

approved MRCs are involved. MRCs are evaluated by comprehensive research indicators derived from HRS functions defined by the World Health Organization (WHO) and modified by the MOHME.¹⁸⁻²⁰ These indicators are revised and developed annually based on NHRS policies considering stakeholders' opinions. Research indicators are categorized in two main domains as mentioned in Table 1.

After gathering data, as there are many different types of MRCs, they are divided into eight categories according to their budget (dependent on or independent from governmental budget), duration of activity (more than 3 years, 1 to 3 years, less than 1 year) and type of research (clinical and biomedical) to be compared. So, in this article, we explore the probable role of MRCs in NHRS promotion according to the results and experience of one decade evaluation of MRCs' research performance and comparing them with research performance of national Universities of Medical Sciences (UMSs) as the main body of HRS in Iran.

In this study, all ethical principles have been considered.

Results

The results of this study are presented in three parts as follows:

Input

Review of one decade of existing data showed the

considerable rise of MRCs in both clinical and biomedical types. The number of approved MRCs has increased from 53 in 2001, to 359 in 2010 and 638 in 2014 (Table 2).

In 2001, 83% of MRCs were related to UMSs which has reached 93% in 2015. In 2015, two MRCs were related to private sector and 36 had independent annual budget. The findings in 2001 indicated that just 12 health-related organizations (including UMSs) had approved MRCs and after one decade, more than 50 health-related organizations have approved MRCs.

Also, the number of employed researchers (academic and non academic members) in MRCs has risen from 637 in 2001 and 3828 in 2010 to 5736 in 2014. In other words, on the average more than 10 researchers work in each MRC in 2014. As important input measure, annual MOHME's MRCs supporting budget has grown from 4.8 million RIs per MRC in 2001 to 387.5 million RIs in 2014. It is also recognized that 98.5% of MRCs' budget is supplied by governmental resources. In 2016, the number of non-governmental MRCs was 20.

Output

The most important indicator in knowledge production and utilization domain is published articles. In MRCs, the total number of published articles and the number of published articles indexed in ISI Web of Science database had ascending trends in this period (Figure 1).

Another important indicator in this domain is articles'

Table 1. Research Indicators of Medical Research Centers Evaluation

Domain	Indicators
Input	Number of research centers
	Number of employed researchers
	Amount of financial support
Output	Number of published articles indexed in ISI/Web of Science, PubMed/Medline and other scientific international database*
	Number of citations to articles and articles referred in textbooks
	Number of articles presented in national and international congresses
	Number of national and international patents
	Number of defended post graduated thesis
	Number of applied interventional projects improving health system
Process of capacity building	Number of absorbed national and international grants
	Number of training workshops
	Number of national and international research congresses
	Number of prizes achieved in Razi and Kharazmi festivals
	Number of collaborations with UN agencies

*Other scientific international database such as Scopus, Embase, CAB, CINHALL, Biological Abstract, Index Medicus for the Eastern Mediterranean Regional Office, Index Copernicus etc.

Table 2. Number of Different Types of Medical Research Centers in 2001–2015

Type of MRC	Year							
	2001	2004	2006	2008	2010	2012	2014	2015
Clinical (No.)	29	56	73	127	194	211	340	386
Biomedical (No.)	24	45	58	97	165	181	298	338
Total (No.)	53	101	131	224	359	392	638	724

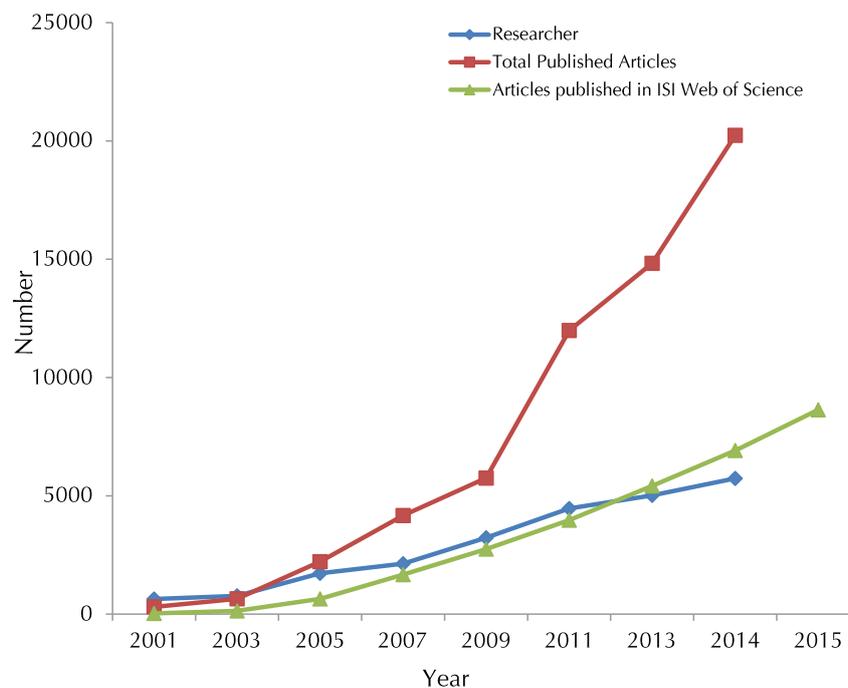


Figure 1. Number of Annual Researchers and Published Articles of MRCs in 2001–2015. These numbers per researcher rose from 0.5 and 0.05 in 2001 to about 3.5 and 1.2 in 2014, respectively. More than 90% of MRCs published articles have been indexed in scientific international databases in 2015 which was 28% in 2001.

citations which was added to the list of MRCs' evaluation indicators due to its importance in 2005. The total number of MRCs articles' citations has grown by 16 folds from 2005 to 2010 and has approximately reached 17877 in number. The number of total citations to MRCs article was 83856 in 2014. Also, the number of MRCs' citations to articles in textbooks (which has been added to MRCs' evaluation as an indicator from 2004) was 37 at that time and reached 681 in 2014.

The findings revealed that MRCs' researchers presented 355 articles in national and 292 articles in international congresses in 2001 compared to 6235 and 5479 in 2015, respectively. In 2001, the proportion of articles presented in international congresses per researcher was 0.46 which has reached 0.85 in 2014. The number of national and international patents registered by MRCs has increased from 5 in 2001 to 35 in 2014.

The findings of other indicators showed that the number of defended post graduate theses in MRCs was 232 in 2001 which has increased to more than 16 times ($n = 3720$) in 2014. Also, the number of national and international grants rose from 48 projects to 147 (a more than 3-fold increase) and the budget absorbed by these grants has grown more than 9 times in this decade.

Process of Capacity Building

The results of indicators in capacity building domain showed that the trend of workshops held by MRCs has ascended annually (from 92 to 625). The number of national and international research congresses held by

MRCs was 23 in 2001 which has increased to 315 in 2014. The number of prizes achieved by MRCs in Razi and Kharazmi festivals has also risen (8 to 40). The number of collaborations with United Nations (UN) agencies had no noticeable change in this period.

Discussion

In this study, 3 main research domains, namely input, output and process of capacity building in MRCs, were reviewed and each domain has several indicators. Regarding input, the results indicated that the number of MRCs, especially university research centers, is growing (doubled from 2010 to 2014) and requests for more research centers are likely expressed by policy makers.¹⁵ This ascending trend of increasing research centers which must be navigated toward solving community needs and priorities, has been defined as a great strategy by National Master Plan for Science and Education to achieve first scientific position in science and technology in the Islamic world.^{22,23} According to the Research Centers and Services Directory website (2011), approximately 40000 research centers are active worldwide (<http://library.dialog.com/bluesheets/html/bl0115.html#B1>).²¹

The establishment of MRCs requires infrastructures such as financial and human resources which have also been defined as two main functions of HRS in fostering the advancement of health promotion.^{19,20,24} More than 99% of research and development (R&D) national expenses are afforded by the governmental sector and only 5% of this budget has been allocated to health

research.²⁵ Although the results revealed that the number of MRCs' researchers and MOHME allocated budget have increased, nationally, low investment on health research (low ratio of GERD to GDP) and deficiencies in priority-based planning system in distribution of governmental financial and human resources remain considerable challenges for NHRS.^{26,27}

Considering research structures, MRCs have the capability to sustain their resources deficit through implementing research funding mechanisms such as conducting collaborative projects, grant proposals, attracting post graduate and PhD students, research management and consultation services.⁹

The results showed that more than 90% of MRCs research activities had been presented in knowledge production and utilization domain. The proportions of total articles and articles indexed in ISI/Web of Science published by MRCs to total articles and articles indexed ISI Web of Science published by country UMSs were 67% and 86% in 2014.²⁸ Considering total researchers in both revealed that the ratio of article per researcher is 3.5 in MRCs whereas this ratio is 1.67 in UMSs.²⁸ Also, according to SCOPUS database, approximately 87% of country citations in health-related fields up to 2014 belong to MRCs. Considering the accountability of health research outputs in the form of number of indexed articles and articles' citations as the basis of promoting scientific ranking,^{25,26} the outstanding role of MRCs is highlighted in knowledge production.⁹ Having research focused team-based structure, multidisciplinary approaches and expanded scientific infrastructure (e.g. PhD theses, collaborative projects etc) results in MRCs producing high quality research outputs.¹⁰

The findings in capacity building domain – which enables the environment for knowledge production in developing countries²⁹ - revealed MRCs' skills in training and mentorship. The considerable growth in the number of training workshops and defended post graduated theses are noticeable indicators of MRCs in this role. Training junior researchers and students helps to generate knowledge, provide experience through collaboration approaches, and create different flows of financial and human resources, strengthen and sustain their resources to conduct health researches.⁹ This study showed that MRCs are not much familiar with the power of collaboration as the main factor to do research. In multidisciplinary MRCs, researchers from a variety of disciplines and sectors work as a project team. This collaboration will produce more policy relevant researches and increase the ability to access key stakeholders and resources. More attention to activities such as attending national and international congresses, collaborative projects and agreements (especially with

industry), and grants make MRCs well empowered in this role.^{9,10}

In conclusion, MRCs are well empowered in knowledge production in national HRS. The role of capacity building through mentorship and research structure development is also considerable.

Conflict of Interest Disclosures

The authors have no conflicts of interest.

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