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Knowledge production in Iranian social determinants of health research centers: Toward health equity

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Abstract

Background: As the partner country of the WHO Commission on Social Determinants of Health (SDH), Iran has expanded the knowledge based on the social determinants of health- as one of commission recommendations- by establishing SDH research centers to collect evidence and design responses to the existing health equity gap. Considering the importance of the role assigned to these research centers, this study aimed to present the knowledge production of SDH research centers and determine their status in Iran's health research system (HRS).

Methods: In this cross sectional study, research performance of SDH research centers was assessed based on international research indicators and compared with national medical research centers and HRS knowledge production. Then, SDH research centers were scored and ranked based on the research indicators.

Results: Out of 37 approved SDH research centers, the knowledge performance of 33 research centers was reviewed. The total number of academic members was 334. The number of these centers' indexed published articles and the proportion of published articles per academic member have been doubled from 483 and 1.44 in 2015 to 984 and 2.94 in 2017. In this period, the number of citations of the past 5-year publications was 4355 according to Scopus database. The proportions of these centers' high-quality publication (Q1) and international collaborations per published articles were 14.8 and 8.25. In ranking, the first to third ranks were occupied by SDH research centers of Kermanshah, Kurdistan, and Qazvin Universities of Medical Sciences.

Conclusion: Although knowledge production seems desirable in mentioned research centers, it is essential to create a virtual research network to increase intersectoral collaboration and develop strategies to solve the puzzle of gathering evidence on the social determinants affecting health inequities.

Keywords: Health equity, Social determinants of health, Health research system, Research center, Knowledge production, Iran

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Introduction

Equity in health is an important priority, and equitable access to health care has been cited as the crucial responsi-

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↑What is "already known" in this topic:
Although there are 37 approved social determinants of health research centers in Iran, no study has been conducted on knowledge production assessment in these research centers.

→What this article adds:
According to this study, although the trend of knowledge production of social determinants of health research centers is increasing, in terms of quality of knowledge production (the number of indexed articles in ISI, high quality publication, citation, and international collaboration), these research centers are lower than average compared to all medical research centers, and more efforts should be made to improve the quality of research in these research centers.

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bility of governments and policymakers of all developed and developing countries to achieve many of the Millennium Development Goals (MGD) (1, 2). Based on the definition of health, which comprises the psychological, spiritual, social, and physical dimensions, a wide range of factors affect its equity (3). Many studies suggest that health inequities, which include differences in the presence of diseases, health outcomes, or access to health car e, are largely affected by disparities of gender, race, ethnicity, socioeconomic status, etc., collectively as social determinants of health (SDH) between and within population (4, 5). SDH" the social conditions in which people are born, grow up, live, work, and cross different stages of life" are shaped by social, political, and economic forces. These determinants, as the most powerful drivers of health equity, influence people's opportunities for accessing resources and power (Fig. 1) (6, 7).

The World Health Organization (WHO) considers health inequity by paying attention to the SDH as the cause of health inequities and disparities (7). In 2005, the WHO Commission on Social Determinants of Health (CSDH), was established as a global network, called policymakers, researchers, civil society, as well as national and international organizations to tackle the social causes of poor health and avoidable health inequalities (2, 8). The major recommendations for action of the Commission were to improve living conditions, reduce the inequitable distribution of money, power and resources for healthy life, and expand the knowledge through monitoring, research, and training (9). In this regard, one of actionable strategies of CSDH to achieve its goals was encouraging partner countries to generate knowledge, gather and review evidence, and research on effective policies and intervention considering disparities of SDH and health inequities within and between countries (10).

In 2005, Iran was also selected as the CSDH partnership country to tackle inequity and adopt an SDH approach in national health system according to its valuable and applicable experiences in developing and implementing the Primary HealthCare (PHC) system (11). Later, to institutionalize this approach, the Iranian Ministry of Health and Medical Education (MoHME) defined the national indicators for equity in health and developed the tools for monitoring and evaluating them. Additionally, in 2010, this approach was emphasized as a national priority in the policies, programs, and activities of Iranian universities of medical sciences (UMSs) (12). One of the most outstanding national action plans was the establishment of Social Determinants of Health Research Centers (SDHRC) in each UMS research structure (12, 13). Aligned with CSDH recommendations, SDHRC, defined as one of the efficient research bodies, can implement interdisciplinary and multidisciplinary research and generate evidence on extremely wide range of SDH based on their specific priorities to indicate the context-dependent underlying causes of health inequity such as culture and political policies and the best intervention to reduce the equity gap (5).

MoHME facilitated the process of establishing SDHRC and, to date, about 37 SDHRCs have been approved all over the country (14). These research centers operate under the supervision of SDH Secretariat of Social Affair Department of MoHME (11) and are evaluated annually (15).

Considering the existing challenges of SDH domain in the country (16) and the strategic role of these centers in Iran's health research system (HRS), and despite their annual evaluation, lack of enough evidence on their knowledge production and national situation, this study aimed to present the knowledge production of SDHRCs and determine their status in Iran's HRS. Results of this study can serve as a resource for policymakers and researchers to enhance interventions on the SDH and health equity in health-related or nonhealth-related sectors.

Methods

Setting

The present survey took place in I.R of Iran. In 2017, Iran had 56 governmental universities of medical sciences

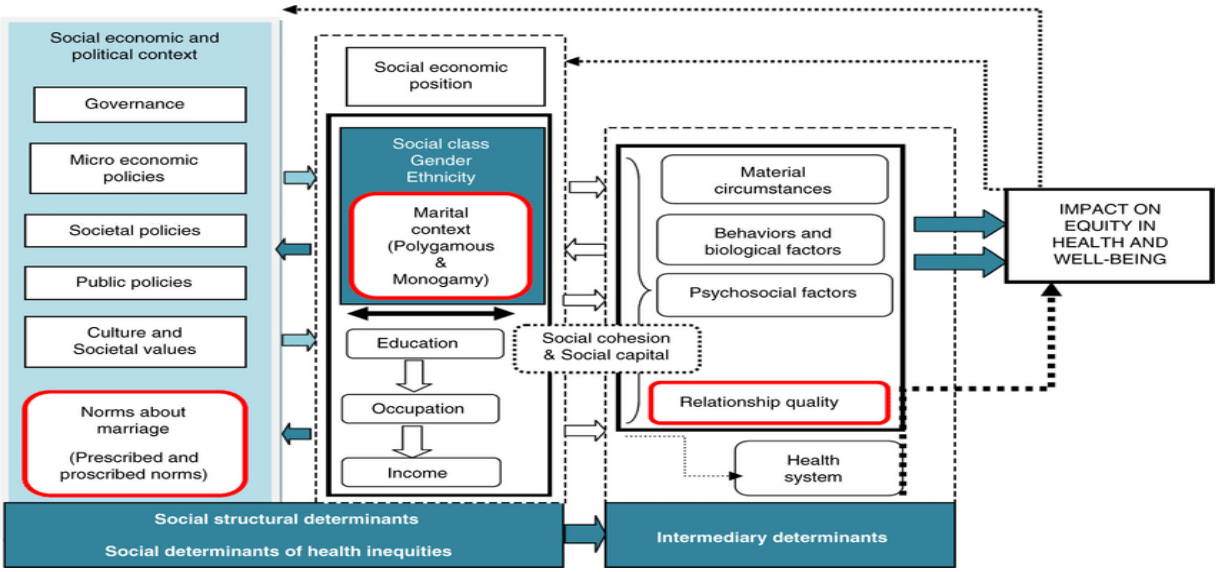

Fig. 1. WHO Social Determinants of Health Framework

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and 725 approved medical research centers (MRCs). All MRCs are approved by Development Council of Universities of Medical Sciences in the MOHME. The research activities of approved MRCs are evaluated annually by the Undersecretary for Research and Technology of MoHME via the national medical research evaluation system (17, 18). This evaluation is performed in a quantitative manner based on international scientific indicators, significantly enhancing the quality and quantity of studies and researches in national HRS (19). In the present study, SDHRC is defined as MRC in the domain of SDH and equity in health.

Study design

This was a cross sectional study conducted in the winter of 2018 based on the evaluation results of knowledge production in MRCs and UMSs in I.R of Iran. The research population comprised all approved SDHRCs by Development Council of Universities of Medical Sciences in the MOHME. The sample included all active SDHRCs with at least 3 years of official research activity and active participation in the MRCs research evaluation.

The knowledge production of SDHRCs was investigated based on the existing evaluation reports of MRCs research performance in years 2015, 2016, and 2017. These reports were retrieved from the website of the Undersecretary for Research and Technology of MoHME (14). In the evaluation process, all MRCs knowledge production were evaluated and scored based on international research indicators (20-22) and ranked under 6 groups based on the type and duration of activity and independent budget. These indicators (type, definition, selection criteria, data gathering procedures, and their weights) were regularly updated and revised based on the policies of the country's HRS and the feedback of stakeholders. The Expert Evaluation Committee included 7 experts on research, scientometrics, and representatives of UMSs, and MRCs recruited based on their expertise. Based on these indicators, all published articles of MRCs were extracted considering unique search strategy based on their affiliation from PubMed, ISI Web of Science, and Scopus databases, and evaluated and confirmed by research experts. After calculating the raw score, normalized score was computed based on indicator weight so that the highest score was considered the highest quantity in each indicator. For example, the highest number of 5-year citation was considered 400 and the score of the rest was calculated on this basis. Finally, considering the total score, MRCs were compared and ranked in each group.

The research indicators used to evaluate MRCs were as follow:

- Published articles: The number of each MRC published article indexed in scientific international databases, including ISI Web of Science, PubMed, and Scopus, according to its affiliation during 2015 to 2017. The weight of this indicator is 250. The number of papers indexed in PubMed, ISI Web of Science, and Scopus was multiplied by 2, 1.5, and 1, respectively. Then, scoring was performed based on the indicator weight.
- Citations per published article: The total number of citations in the evaluation year to MRCs' published articles in the past 5 years based on the Scopus database. The maximum weight of this index is 400.
- High quality publication (Q1): The number of each MRC published articles in 25% of the top journals in each category/area based on the SC imago Journal Ranking (SJR) index during 2015 to 2017. This index was calculated with the weight of 250.
- International cooperation (IC): The number of published papers resulting from international cooperation based on Scopus database during 2015 to 2017. The highest number of international cooperation receives the weight of 150.
- H-Index: The h-index for total articles published by each MRC based on Scopus databases. The weight of this index is 100.

In this study, to determine the research performance of SDHRCs, the research indicators of these centers were compared with MRCs and Iran's HRS. Also, SDHRCs were ranked based on their 3-year research performance extracted from MRCs evaluation reports with the same research indicators. In the present study, data analysis and scoring were done by SPSS version 21 considering descriptive statistics. Moreover, all ethical considerations were observed.

Results

Results are presented in 2 general sections. First, knowledge production of MRCs and Iran's HRS were presented, and all UMSs were reported based on research indicators (Table 1). Second, further details on ranking of SDHRCs were provided according to the international research indicators.

In this study, 33 out of 37 approved SDHRCs were investigated. Results showed that 29 out of the 56 Iranian UMSs had at least 1 SDHRC. These research centers did not have an independent budget and had at least 3 years of official experience. The oldest SDH research center was

Table 1. Comparison of research indicators between MRCs and HRS during 2015-2017

	MRCs			HRS (UMSs)		
Indicators	2015	2016	2017	2015	2016	2017
Published articles (N)	15288	19772	22234	23174	30417	34623
High quality publication (Q1) (N)	2002	3438	4137	3068	4640	5716
Q1/total published articles (%)	13.1	17.4	18.6	13.2	15.3	16.5
Citations to 5 year published articles (N)	63806	100414	148510	91929	145718	207155
International cooperation (IC) (N)	1964	2399	3779	2436	3544	5357
IC/total published articles (%)	12.8	12,77	17	10.5	11.7	15.5

MRCs: Medical Research Centers.
HRS: Health Research System.

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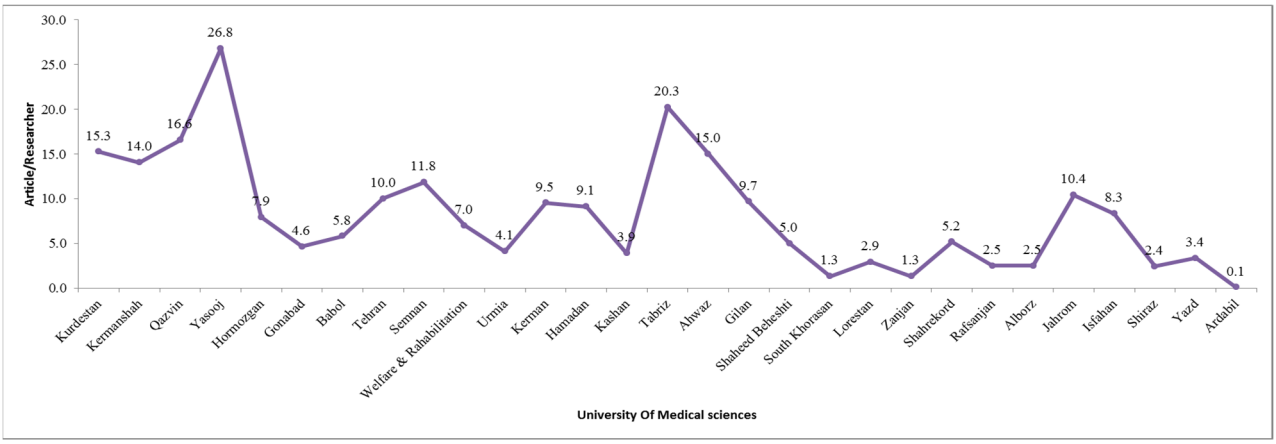

Fig. 2. Distribution of 3-year published articles per academic member in SDHRCs

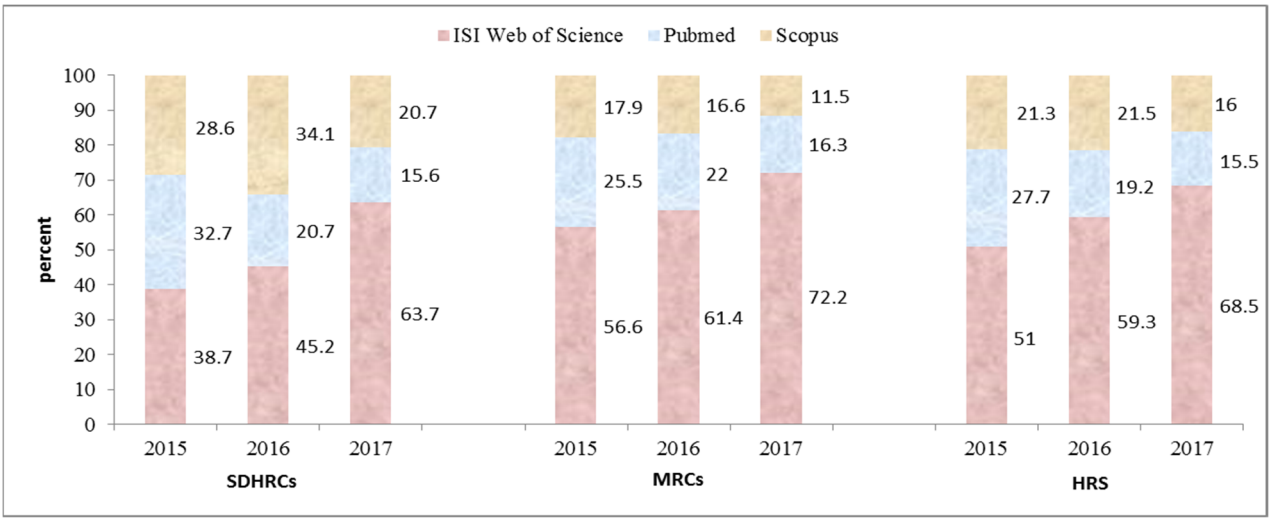

Fig. 3. The ratio of SDHRCs, MRCs, and HRS published articles in ISI Web of Science, PubMed, and Scopus in 2015, 2016 and 2017

the Social Development and Health Promotion Research Center of Kermanshah UMS, which was approved in 2006.

Moreover, 334 academic members worked in these SDHRCs in 2017, with the highest number (n = 25) working in the SDHRC of South Khorasan UMS (Birjand). The mean ratio of academic members per research center was approximately 10.

In the following, the results of research outputs of these centers are presented based on international research indicators from 2015 to 2017.

- Published articles: In general, 2370 papers were published by SDH research centers in ISI Web of Science, PubMed, and Scopus databases, comprising 483, 903, and 984 articles in 2015, 2016, and 2017, respectively. In that same period, the total published articles of the approved MRCs were 15 288, 19 772, and 22 234 in the same databases. Among studied research centers, the SDHRC of Kurdistan UMS had the highest number of published articles (n = 244) in this 3-year period. The proportion of published papers per academic member in the studied research centers was 1.44, 2.7, and 2.94 in 2015, 2016, and 2017, respectively. This ratio was 1.35, 1.75, and 1.85 in Iran's HRS, respectively. Also, the mean ratio of 3-year published articles per academic member in SDHRCs was 8.2 (Max = 26.8 Yasooj SDHRC and Min = 0.1 Ardabil SDHRC) and 4.7 in HRS respectively. The distribution of SDHRCs' published articles per academic member in each UMS is presented in Figure 2.

Moreover, approximately 52% of all articles published by these research centers (1222) in the studied period were published in the ISI Web of Science. However, this ratio is 64.3% in other MRCs and 60.7% in Iran's HRS in the same period (Fig. 3).

- Citations to the published articles: From 2015 to 2017, the number of citations by the SDHRCs in the past 5 years was 4355 according to Scopus database. The SDHRC of Kermanshah UMS with 566 citations had the highest number of citations from among similar SDHRCs in the same period. The ratio of citations per published papers in SDHRCs was 1.8, meaning that each article has approximately been cited by 2 other published articles in the Scopus database. This ratio was 5.4 and 5 in MRCs and Iran's HRS, respectively. The ratio of citation per article in SDHRCs, MRCs, and HRS during 2015, 2016 and 2017 is presented in Figure 4.

- High quality publication: The total number of articles published by SDHRCs in the top 25% of journals of each field was 196 during 2015 to 2017, based on the SJR index. The SDHRC of Kurdistan UMS had the highest num-

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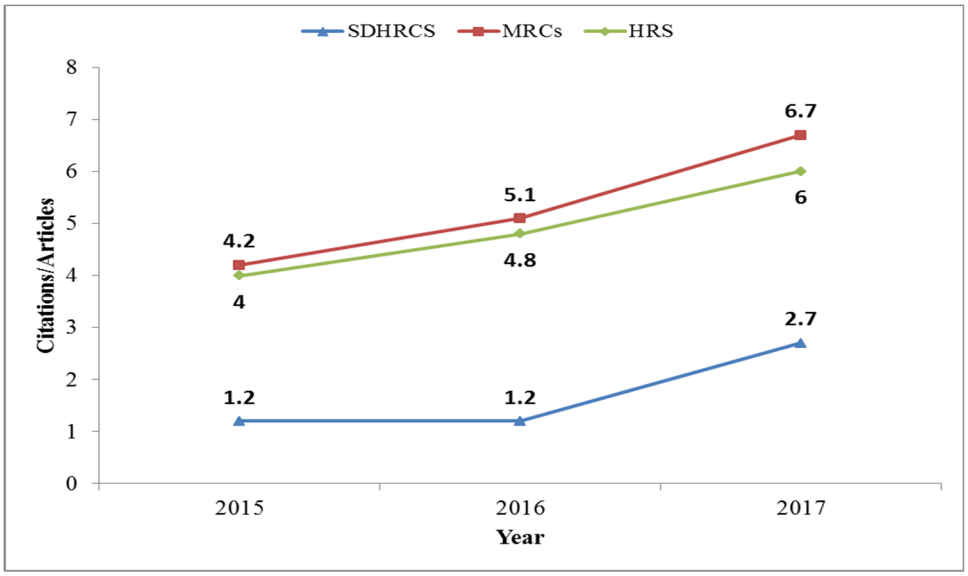

Fig. 4. The ratio of citation per article in SDHRCs, MRCs, and HRS in 2015-2017

ber, with 36 papers published in Q1 journals (14.8% of all articles published by this research center) in the mentioned period. Furthermore, the proportion of papers in Q1 journals per total published articles in SDHRCs was 8.4%.

- International collaboration: Further and more detailed reviews indicated 202 articles published by SDHRCs in 2015 to 2017 have been the result of international collaboration. The proportion of papers resulted from international collaboration per SDHRCs total published articles in 2015, 2016, and 2017 was 7.2, 6.86, and 10.67, respectively. This ratio was 12.8, 12.77, and 17 in MRCs in the same period. From among the studied research centers, the SDHRC of Qazvin UMSs had the highest number of articles derived from international collaboration (n = 50), as more than 4% of papers published by this research center had at least 1 foreign collaborator.

- H-Index: From among the studied research centers, the SDHRC of Kermanshah UMSs had the highest h-index (18) based on Scopus database. The 3-year mean of h-index shows the superiority of this research center compared to others.

Table 2 shows the results of ranking SDHRCs based on mentioned international research indicators. In this table, all the indicators have been computed and ranked considering total 3-year knowledge production of SDHRCs. Based on this scoring system, the first to third ranks were occupied by SDHRCs of Kermanshah, Kurdistan, and Qazvin UMSs.

Furthermore, using descriptive analyses tests, no significant relationship existed between SDHRCs according to total score, number of academic members, and years of experience ($p>0.05$).

Discussion

Globally, evidence-based policymaking and interventions on SDH are seen as an effective response in tackling health equities. Describing the extent of the problem requires valid data and updated context-dependent evidence on social determinants and appropriate ways to reduce health inequalities (23). Thus, SDHRCs are specifically established to develop methods for evaluating the impact of population level interventions to reduce equities in different contexts through the combination of research activities such as multidisciplinary knowledge production and knowledge translation as the 2 main vital processes in taking social action on health equalities considering their ideological, political, and economic barriers and limitations (24).

Results showed that approved MRCs in the domain of SDH makes approximately 5% of all approved MRCs in Iran. The number of SDHRCs has been tripled from 2011 to 2015. Although establishment of more SDHRCs has a significant role in expanding the research platform in this domain and is considered as a remarkable strategy by National Master Plan for Science and Education, it requires more infrastructures such as human and financial resources, especially in public health (17). Moreover, training and recruitment of social science researchers is seriously recommended. Also, more attention should be paid to facilitating the process of research grants and funding in universities. Nowadays, nationally, less than 0.5% of Iran's gross domestic product (GDP) is allocated to research and development (R&D) expenditures, of which about 60% is used in the governmental sector and only 5% is allocated to health research (25).

Recently, knowledge production indicators in international institutional research rankings have attracted considerable attention worldwide. Several well-known ranking systems, such as Academic Ranking of World Universities (ARWU) (21), Times Higher Education (22), and Scimago Institutions Ranking (20), utilize different types of indicators to assess and evaluate the research processes such as knowledge productions.

Common indicators in this field consist of number of published articles (output), number of citations, international cooperation, etc. (21, 22).

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Table 2. Ranking of SDHRCs based on mentioned international research indicators

Rank	University of Medical Sciences	Research Center	Researchers (N)	Date Approved	Article (N)	AS* of Output	Q1Articles (N)	AS of Q1 Articles	IC Arti-cles (N)	AS of IC Articles	Citations (N)	AS of Citations	Average h index	AS of h index Score	Total Score
1	Kermanshah	SDH	12	2013	224	229.51	13	72.22	24	72	566	400.00	11.3	100.00	873.73
2	Kurdistan	SDH**	16	2011	244	250.00	36	200.00	20	60	391	276.33	7.3	64.60	850.93
3	Qazvin	SDH	7	2011	116	118.85	20	111.11	50	150	284	200.71	9	79.65	660.32
4	Yasooj	SDH	6	2010	161	164.96	15	83.33	7	21	332	234.63	9	79.65	583.57
5	Hormozgan	SDH	18	2009	143	146.52	4	22.22	6	18	290	204.95	6.6	58.41	450.1
6	Gonabad	SD & HP***	19	2009	100	102.46	9	50.00	2	6	256	180.92	6.6	58.41	397.79
7	Babol	SDH	20	2012	116	118.85	11	61.11	3	9	210	148.41	6.6	58.41	395.78
8	Semnan	SDH	12	2013	142	145.49	4	22.22	5	15	203	143.46	6.3	55.75	381.92
9	Tehran	CBPR*****	6	2008	60	61.48	11	61.11	8	24	214	151.24	8.3	73.45	371.28
10	Kermanshah	SD & HP	11	2006	99	101.43	1	5.56	8	24	214	151.24	10	88.50	370.73
11	Welfare & Rehabilitation	SDH	11	2009	77	78.89	4	22.22	11	33	173	122.26	8.3	73.45	329.82
12	Kerman	SDH	12	2012	92	94.26	3	16.67	5	15	143	101.06	5.3	46.90	273.89
13	Hamadan	SDH	8	2013	73	74.80	6	33.33	5	15	127	89.75	6.3	55.75	268.63
14	Urmia	SDH	10	2013	41	42.01	10	55.56	6	18	141	99.65	6	53.10	268.32
15	Kashan	SDH	10	2013	39	39.96	5	27.78	3	9	130	91.87	6.6	58.41	227.02
16	Tabriz	SDH	4	2012	81	82.99	9	50.00	1	3	44	31.10	3.6	31.86	198.95
17	Ahwaz	SDH	5	2012	75	76.84	3	16.67	5	15	53	37.46	4	35.40	181.37
18	Gilan	SDH	6	2012	58	59.43	3	16.67	2	6	73	51.59	4.3	38.05	171.74
19	Shaheed Beheshti	SDH	5	2012	25	25.61	6	33.33	8	24	59	41.70	3.6	31.86	156.5
20	South Khorasan	SDH	25	2013	33	33.81	0	0	2	6	90	63.60	5.6	49.56	152.97
21	Zanjan	SDH	22	2012	29	29.71	7	38.89	3	9	26	18.37	3	26.55	122.52
22	Lorestan	SDH	15	2012	44	45.08	6	33.33	3	9	18	12.72	2.3	20.35	120.48
23	Shahrekord	SDH	6	2012	31	31.76	1	5.56	3	9	46	32.51	4	35.40	114.23
24	Rafsanjan	SDH	6	2012	15	15.37	3	16.67	2	6	46	32.51	4.3	38.05	108.6
25	Kerman	SD of DH******	5	2013	70	71.72	1	5.56	1	3	17	12.01	1.6	14.16	106.45
26	Gonabad	SDH	8	2012	25	25.61	0	0.00	2	6	59	41.70	3.3	29.20	102.51
27	Alborz	SDH	10	2012	25	25.61	1	5.56	3	9	35	24.73	3	26.55	91.45
28	Jahrom	SDH	5	2013	52	53.28	0	0.00	2	6	24	16.96	1.6	14.16	90.4
29	Isfahan	SDH	3	2011	25	25.61	0	0.00	0	0	42	29.68	3	26.55	81.84
30	Shiraz	SDH	7	2012	17	17.42	1	5.56	0	0	31	21.91	3.6	31.86	76.75
31	Yazd	SDH	4	2010	26	26.64	2	11.11	1	3	16	11.31	2.6	23.01	75.07
32	Yazd	SD of DH	7	2011	11	11.27	0	0.00	0	0	1	0.71	0.6	5.31	17.29
33	Ardabil	SDH	13	2012	1	1.02	1	5.56	1	3	1	0.71	0.6	5.31	15.6

*AS=Adjusted Score, **SDH= Social Determinants of Health, ***SD & HP= Social Development and Health promotion, ****CBPR= Community Based Participatory Research, ******SD of DH= Social Determinants of Dental Health

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Based on the results of this study, during 2015 to 2017, MRCs have published 57 294 research articles (taking into account collaborated papers). About 4% of these scientific articles have been published by SDHRCs, although the number of published articles has been doubled in this period. Also, comparison of the mean ratio of SDHRCs' 3-year published articles per academic members to Iran's HRS reveals that researchers and academic members in these research centers publish articles 4 times more than other academic members in Iranian UMSs. On average, each SDHRC's academic member has been involved in at least 7 articles, compared to 4 articles in HRS during these years.

This matter has certain advantages and disadvantages. The major advantage is the involvement of SDHRCs researchers with knowledge production, and this is consistent with the Measurement and Evidence Knowledge Network of WHO Commission Social Determinates of Health advice, which is essential to develop evidence based on SDH and health inequities (25). Much more important than describing social injustice, SDHRCs must participate in knowledge translation to move research into policy and provide community-based evidence for policymaking to promote health equity (26). There is evidence that demonstrates the importance of science in the development of actions and policies in reducing health inequities (24).

During 2015-2017, approximately 8% of SDHRCs' scientific articles were published in the top 25% of journals (Q1) in their respective majors, while this percentage was 16.7% in other MRCS and 15% in Iran's HSR in those 3 years, respectively. Although there are fewer Q1 journals related to SDH and health equity than other majors considering the SJR index (27), researchers in these centers must try to enhance the quality of their published papers.

Results of this study indicated that regardless of the increasing trend of the number of citations per published paper from 1.2 in 2015 to 2.7 in 2017 in SDHRCs, this proportion is still lower than Iran's HRS. The number of citations is considered as an representative index for article's quality and application (28, 29), although national policies, goals, and strategies in health research have direct impacts on its quantity (30). Nevertheless, based on the main mission of these research centers to generate appropriate evidence to have impact on equity, it was impossible to examine equity in this study, and further mixed method studies can investigate this topic.

The ratio of international cooperation in the studied research centers constituted only 8% of the SDHRCs total published papers, which is much less than this ratio in MRCs. Evidently, cooperation with other research centers active in this domain around the world can offer valuable experience to the researchers in these centers. Also, SDHRCs are new in Iran, and thus it is necessary to provide the essential infrastructure, such as research allocation and strengthening the capacity on research in major concepts regarding SDH, health equity, and relevant indices (5). Tackling health inequities needs more community-based research and actionable policies, where nonscholarly intersectoral cooperation related or nonrelated to health organizations can assist the researchers to achieve the best actionable evidence.

Considering the guidelines and recommendations provided by the CSDH of WHO, the major mission of these SDHRCs must generate knowledge and evidence to promote health equity, distribute equitable intermediate social determinants, and modify actionable policymaking in terms of structural social determinants (31). Thus, one of the limitations of this study was focusing on the knowledge production in these research centers and neglecting knowledge translation indicators. Other weaknesses were the presence of different types of affiliations applied by SDHRCs' academic members that caused disruptions in access to published documents in mentioned databases. In addition, there was lack of attention in SDHRCs' research input indicators, such as budget, human resources, research projects, and other infrastructures reflecting their potential research capabilities.

Conclusion

Due to the lack of scientific evidence regarding SDH fields, it is essential to set the national priorities through stakeholders' cooperation and plan mission-based strategies. Moreover, creating a virtual research network can complete the existing challenges in the puzzle of evidence on the social determinants of health.

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Conflict of Interests

The authors declare that they have no competing interests.

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