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Identification of Indicators for Reproductive Health and Population Programs Monitoring in Iran

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ABSTRACT

Background & aim: Given recent demographic changes, Iran has revised its reproductive health (RH) programs. To respond to the need for monitoring the new programs and policies, this study aimed to identify appropriate indicators for RH and population programs monitoring in the Iranian context.

Methods: A mixed-methods approach was applied which was conducted in four phases: identification of goals of RH policies and programs, a scoping review of the RH indicators, developing and ranking the identified indicators, and indicators' finalization. The final indicators were selected through consensus, with a cut-off point of 75%. Data was collected from June 21, 2020, until February 18, 2021. Data analysis was conducted simultaneously during each stage of the study. MAXQDA.11 and MS Excel 2017 software were used in the first and third phases for data analysis.

Results: A total of 37 RH indicators were finalized after three rounds of screening. The first five indicators with the highest score were: total fertility rate, population under 15 years, total population, population aged 65 years and older, and age-specific fertility rate. The lowest score was related to the recuperation index (degree of recuperation relative to fertility decline at younger ages).

Conclusion: The nature and number of indicators might vary at different organizational levels; so, the need to develop specific indicators is pivotal.

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Introduction

Reliable health information is pivotal for effective health policy-making and public health affairs. Indicators can measure and monitor health status, service delivery, acceptability of healthcare service performance, or policy goals (1). Sustainable Development Goals (SDGs) have emphasized the need to reduce maternal and infant mortality and improve maternal health, achieving which requires reproductive health (RH) services. The World Health Organization (WHO) defines RH as "a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity, in all matters relating to the reproductive system and its functions and processes" (4). RH is an integral segment of public health and a key ingredient in human development. It is essential to the meaning of being human and is of paramount importance in the health system (5- 6).

WHO, together with other international organizations, has developed a comprehensive list of RH indicators for monitoring RH services and status. These indicators measure RH services and their integration into health systems, aiming to draw attention to the main measurable components of RH. Most of these indicators facilitate the evaluation of RH policies and are recommended for data collection, aggregation, and dissemination at the national level. Both at the national and global levels, the RH indices should measure progress toward improving RH status, either as a direct measure or proxy of impact or as a measure of progress toward policy goals (7-10). Therefore, regular monitoring and evaluation (M&E) of RH services and status requires the use of specific indicators, which are essential to determining whether the goals have been met (4).

In the context of Iran, the main challenges in satisfying RH include unmet needs for family planning (FP), inequalities in access to basic obstetric services, and some challenges in data registration about maternal morbidity and mortality (5, 11). Previous research revealed challenges in family planning, sexual, psychosocial, and maternal health (12-13), with effects on reproductive health. Little evidence exists about appropriate and contextual-based reproductive health indicators in Iran, hence the need to develop such indicators for monitoring and planning programs seems essential.

Monitoring RH indicators is an important task in Iran. Despite the global guidelines to monitor and report RH indicators, some technical obstacles in Iran's health information systems have hindered appropriate statistical modeling to formulate globally comparable estimates (14).

Regarding population policies, as a consequence of various contextual issues, i.e., the revolution, the imposed war with Iraq, and religious, economic, and cultural issues, Iran has experienced different periods, sometimes with radical policy shifts)(15-16).

The Total Fertility Rate (TFR) is declining in Iran (1980:2.9; 2005:1.8; 2019: 2.1), which indicates increasing aging as well as a decreasing population for the coming years (17-18). As a result, the recent mega policies for population decreed by the supreme leader (2014) have mandated a major shift in general population policies towards increasing TFR. The programs of the Ministry of Health and Medical Education (MoHME) of Iran regarding RH have accordingly changed to reflect the required policy change (19).

Given changes in population policy direction, short-, mid-, and long-term planning is fundamental to achieving population growth. Taking into account the inconsistency between some international indicators and ran's population policies, it is imperative to adopt an appropriate approach for monitoring macro-domestic programs and policies, both for monitoring purposes and providing coherent reports to international organizations and partners. It should be mentioned that we assumed that the current macro revisions in population policies had shifted the MoHME's strategy to keep in line with the ICPD's 1994 direction. Therefore, to minimize the negative impact of such shifts in macro policy on RH indicators, this study aimed to identify appropriate indicators for RH and population programs monitoring in the Iranian context.

Materials and Methods

This is a mixed-methods study. The study was designed and implemented in four phases 1) Identifying the goals of population policies and

RH programs through qualitative document analysis 2) The scoping review of relevant RH indicators 3) Developing and ranking the indicators and 4) Finalization of indicators via consensus of experts (Table 1). The Tehran University of Medical Sciences ethics committee has ethically approved this study (reference number IR. TUMS. MEDICINE. REC.1399.451).

We collected data from June 21, 2020, until February 18, 2021, and conducted simultaneous data analysis during each stage of the study. In the initial stage of the study, we realized that there are several indicators in the field of RH. Therefore, concerning the macro policies in Iran, we decided to take into account both high-level policies and indicators in the field of RH that are used at the international level. Finally, a usable list for the country from these two sources was provided. All methods were carried out following relevant guidelines and regulations of the Declaration of Helsinki.

Table 1. Summary of the study phases

Phases of the study	Research method	Output
Phase 1: Identifying the goals of population policies and RH programs	Qualitative Document analysis	Identifying the goals and outputs of general population policies and RH and population programs
Phase 2: The literature review of relevant RH indicators	A scoping review	List of international indicators related to RH, as well as indicators used in countries with similar policies as Iran
Phase 3: Developing and ranking the indicators	Consensus of experts using standard tools by an expert panel	List of prioritized RH and population programs
Phase 4: Finalization of indicators	Consensus of experts by an expert panel	Final list of indicators to be used for monitoring and evaluation of RH and population programs

Phase 1: Identifying the goals of population policies and RH programs

First, to identify the goals of policies and programs for RH and the population, we collected and reviewed all national plans, legal documents, rules and regulations, and the monitoring process related to the research topic, which was developed by the Deputy of Health at the MoHME-Iran. The full text and content of all documents were classified and synthesized. The obtained documents were carefully studied, the related phrases were extracted, and notes were taken accordingly. At this stage, a document information worksheet was used to delve into the relevant documents, programs, and regulations. During the review of the programs, we attempted to identify goals related to the input, processes, and output of the programs.

Qualitative content analysis was used to analyze the textual data of the documents and policies, whose aim was to analyze the content of the documents. We developed an information worksheet to collect and categorize these documents and prepared them for thematic analysis. Relevant documents were categorized using Microsoft Word software. An inductive thematic content analysis approach was used to analyze the data (Elmo 2007) and categorize themes.

MAXQDA.11 software was used to assist in data management. AH.T. and E.M. analyzed the data separately to assure the validity of the qualitative analysis. The output of the document analysis at this stage was identifying the goals, and executive activities of RH and population programs systematically and transparently.

Phase 2: The literature review of relevant RH indicators

This phase was a scoping review to identify the various indicators and methods of evaluation of programs and policies related to RH and population at the international level. Because of that, we applied to type three of scoping review i.e. “To summarize and disseminate research findings. This kind of scoping study might describe in more detail the findings and range of research in particular areas of study”(20). We searched the databases, including PubMed,

Scopus, Cochrane, the WHO website, and ProQuest thesis, to evaluate the classified mechanisms and indicators in a more detailed and classified manner. The scoping review consisted of three steps:

A- Reviewing the studies and articles published in the scientific databases;

B- Reviewing the indicators of RH and population on the websites of global organizations (WHO, World Bank (WB), and the European Union (EU));

C- Identifying the indicators in countries with population growth policies similar to Iran by doing a comparative study (Kuwait, Turkey, Russia, Germany, Japan, and Singapore), taking into account population policies posted on government websites, related laws and indicators, and incentive policies to control or increase the population.

We defined the keywords by searching "Mesh treasures" in PubMed and Cochrane and retrieved all related words. The keywords used included:

- Indicators */ Measure */ Evaluation */Implementation */ Monitoring */Population policy **/Family policy **/ Pronatalist policy **/ Family size **/Fertility preference **/Fertility desire **/Childbearing preference**/Determinants of fertility **/Low fertility ***/Fertility decline ***/Rise in fertility ***/ Marriage age ****/ Delay first pregnancy ****/ Parenthood postponement ****/Reproductive health*****

We included studies that were relevant to the objectives of this research and were published in Persian or English between 2000 and 2020 and analyzed them by narrative synthesis. This is a common approach to the synthesis of data, which can provide a first step in looking systematically at and organizing the data (21). While narrative synthesis can involve the manipulation of statistical data, its defining characteristic is that it adopts a textual approach to the process of synthesis to 'tell the story of the findings from the included studies. In this way, we synthesized the findings from multiple studies. We chose primarily the words and texts that fell under our keywords.

Phase 3: Developing and ranking the indicators

This phase was performed in two stages:

A) **Preliminary compilation of the monitoring and evaluation indicators:** We reviewed the literature and indicators of countries with similar policies and processes and analyzed their relevant indicators and regulations. Further, we gathered, extracted, and analyzed the objectives of identified programs (according to input, process, and output models) as well as the dashboard of program evaluation indicators from WHO, WB, and the United Nations (UN) and compiled them as preliminary indicators for monitoring and evaluating the RH and population programs.

B) **Assessing the content and construct validity of the proposed indicators:** The identified indicators during several steps were screened as follows:

First-stage: the indicators were examined by two members of the research team, aiming to remove duplicate items as well as any possible unrelated indicators.

Second-stage: We asked selected experts from the MoHME to examine the indicators in terms of their relevance to the research topic, importance, and the possibility of their integration into the national monitoring agenda. The principal investigator (AT) facilitated two consultation sessions as an expert panel that lasted for a total of six hours.

Third-stage: We used a standard tool as a checklist to evaluate the content and construct validity of the indicators screened in the previous stages. Seven experts in the field of RH and demographers reviewed the checklist to determine its validity. First, the Content Validity Index (CVI) was calculated for each item separately, indicating a CVI range of 0.79 to 1. Then, the Content Validity Ratio (CVR) was calculated for each item. According to Lawshe's method for assessing content validity, in case of any doubts, an item perceived to be ''essential'' by more than half of the panelists has some degree of content validity (22). Finally, after matching the content validity index with the content validity ratio and clarifying the checklist, they were included in the final draft of the checklist. The checklist had four criteria including utility; specific technical effectiveness; collectability and analyzability; and consistency of the indicator (Table 2).

Table 2. Criteria to analyze the indicators of monitoring and evaluation of RH and population programs

Criteria of the indicator	Consider these items to check the criteria
Utility	Does the indicator measure the desired state of health? Is there a need for this indicator at a national level? Could the information obtained from this indicator be necessary for management and Policy-making in the relevant fields at the national level? Is it likely to collect the relevant data systematically? Is it likely to collect the relevant data during the designated time frame?
Technical competence	Is this indicator significant in this technical and specialized field (RH and population programs)? Is this indicator sensitive to changes in performance? Is this indicator reliable and sensitive? Is this indicator valid and specific? Is this indicator repeatable? Has been this indicator designed and developed based on scientific evidence?
Collectability and analyzability	Are there any particular systems and mechanisms required to collect the data required for this indicator in the country? Can this indicator be calculated using available data? Does this indicator currently exist in the national monitoring and evaluation system? Are the financial and human resources available to measure this indicator? Is measuring this indicator worth its cost?
Consistency	Does the data obtained from this indicator allow an acceptable assessment of the national response to reproductive health and population measures? Does the data obtained from the indicator allow the country's performance to be compared with that of other countries? Is the indicator consistent with the national context?

We screened the indicators against the checklist and then sent them to 40 experts in two groups: RH experts at the MoHME and affiliated medical universities (staff and executive levels/scientific and executive experts) across Iran (N=27); plus, selected university faculty members and researchers in the field of demography and RH (N=13). The two groups of experts examined the developed indicators using the index evaluation tool and scored these indicators in terms of their content and construct validity. The overall response rate was 28 (70%).

In the third phase, we used MS Excel 2017 software (https://www.microsoft.com/en-us/microsoft-365/excel) for data analysis. A cut-off point of 75% was applied to the studied indicators. That is, indicators whose importance was verified (according to each of the four criteria) as high or very high by at least three-quarters of the experts were considered. A score between 1 and 10 was assigned to each indicator based on each criterion. Then, based on the frequency of the respondents, the weight and priority of each indicator were calculated.

Phase 4: Finalization of indicators

To determine the final list of the indicators, the research team established two expert panels and policy dialogue sessions with relevant officials (N=13) at the MoHME. The sessions lasted six hours in total, during which all indicators were reexamined and final amendments were made to finalize the indicators.

To meet ethical issues, the study participants were contacted so that they could be prepared for the expert panel sessions. In the introductory sessions, informed consent was obtained for participation and discussion recordings, and the necessary explanations were given regarding the principles of confidentiality, non-disclosure of information, and preservation of audio records.

Results

Results of the phase 1: A review of the upstream and supporting documents and laws related to RH and population policies led to the identification of six policies and programs (Table 3). After analyzing the content, goals, and outputs of each program, a total of 106 indicators were determined.

Table 3. General documents of Iran's RH and population programs

Number	Title	Notified by	level
1	General population policies	Imam Khamenei, Supreme Leader of the Islamic Revolution	National, provincial
2	Marriage training program with inter-agency collaboration	MoHME	Comprehensive Health Services Center
3	Sexual health of family	MoHME	Comprehensive Health Services Center
4	Childbearing training /counseling	MoHME	Comprehensive Health Services Center
5	Intensive reproductive care services for women with medical conditions	MoHME	Comprehensive Health Services Center
6	Prevention and early detection of infertility - integration into the network system	MoHME	Comprehensive Health Services Center
	Total	6	

Results of the phase 2: In step A of this phase i.e reviewing published articles, a total of 2026 studies were found in the initial English search, i.e., Cochrane (35), PubMed (681), Scopus (1267), and other sources (43), 1776 of which were deleted either for topic irrelevance or duplication. We critically evaluated the remaining studies and entered 23 studies into an in-depth analysis and review, which revealed 371 indicators associated with RH and population. In step B, which was related to reviewing the websites of global organizations, we identified 110 related indicators by searching the websites of global organizations (WHO, WB, and EU). Finally, we reviewed national reports and articles on population and family policies in countries with pronatalist policies that encourage population growth, i.e., France, Poland, Greece, Korea, Japan, Finland, Latvia, Russia, Turkey, Germany, Singapore, Ireland, Kuwait, Slovakia, Britain, and Bulgaria(23-28). In step C of this phase, After a review of the related literature and indicators and given the availability of information from these countries, the indicators of six countries (Kuwait, Turkey, Russia, Germany, Japan, and Singapore) as countries with population growth policies were examined. This revealed 102 extra indicators related to RH and population.

In total, after document analysis, scoping review, review of global organizations, and comparative study of countries, 689 indicators were identified. The largest number of indicators (371 indicators) were extracted from the scoping review (Table 4).

Following listing the identified indicators, two members of the research team (EM and MT) screened them to exclude duplicates and possible irrelevant indicators. This reduced the number of indicators to 304. The second stage screening was conducted in collaboration with the experts from the MoHME. The indicators were examined in terms of their relevance to the research topic, their importance, and the possibility of their integration into national surveys in Iran. This reduced the list of indicators to 44, which were then prioritized and finalized during the third stage of screening to assess their content and construct validity.

This resulted in the inclusion of 37 final indicators (Table 4).

Table 4. Frequency of indicators collected in the compiling stage for monitoring and evaluation of the RH and population programs in Iran

Sources of indicators	Number of identified indicators
Documents and plans	106
Scoping review of studies	371
Websites of selected global organizations	110
Selected countries policies	102
The initial sum of indicators	689
Number of indicators after initial screening (removal of duplicates, etc.)	304
Number of indicators after the second stage screening	44
Number of indicators after the third stage of screening	37

Table 5. Results of reliability and validity of general indicators of RH and population

Indicator	Criteria for indicator evaluation				Final scores of indicators		
	Needed and useful (0-1)	Technical merit (0-1)	Feasible to collect and analyzed data (0-1)	Consistency, Balance, and Convergence (0-1)	Mean (1-10)	Standard deviation	Rank
Total fertility rate	0.03	0.028	0.031	0.03	9	1.825	1
Population under age 15 (%)	0.027	0.027	0.034	0.029	8.857	1.477	2
Total population	0.028	0.028	0.032	0.028	8.848	1.794	3
Population aged 65 and over (%)	0.027	0.027	0.034	0.029	8.786	1.473	4
Age-specific fertility rate	0.028	0.027	0.033	0.028	8.786	2.23	5
Population growth rate	0.029	0.028	0.028	0.029	8.75	1.892	6
Crude birth rate	0.027	0.026	0.034	0.027	8.648	2.315	7
Old-age dependency ratio	0.026	0.027	0.032	0.027	8.571	1.921	8
Young age dependency ratio	0.025	0.024	0.031	0.027	8.179	1.799	9
Average household size	0.026	0.026	0.028	0.027	8.093	2.308	10
Prevalence of primary infertility in women by age	0.027	0.027	0.022	0.026	7.875	2.256	11
Prevalence of infertility in women by age/by reason	0.026	0.027	0.022	0.027	7.88	2.107	12
Mean Age at first marriage by gender	0.024	0.025	0.028	0.024	7.732	2.834	13
Mean/median time to first birth from a marriage	0.026	0.026	0.024	0.026	7.795	2.326	14
Mean maternal age at first childbirth	0.025	0.026	0.026	0.024	7.768	2.637	15
Total divorce rate	0.025	0.024	0.027	0.024	7.705	2.364	16
Share of families with one child, two children, three or more	0.026	0.025	0.023	0.026	7.607	2.204	17
Dependency ratio	0.022	0.022	0.03	0.024	7.435	2.571	18
Prevalence of secondary infertility in women by age	0.025	0.026	0.022	0.025	7.5	2.359	19
Prevalence of infertility in women by reason	0.025	0.025	0.022	0.025	7.463	2.328	20
Children ever born (Mean)	0.024	0.023	0.027	0.023	7.361	2.807	21
Total population projections	0.025	0.025	0.022	0.025	7.404	2.601	22
Lifelong never-married proportion	0.022	0.023	0.026	0.025	7.277	2.123	23
Childless married women by age	0.024	0.025	0.023	0.024	7.313	2.242	24
Access to reproductive healthcare	0.024	0.024	0.022	0.024	7.223	2.98	25

Indicator	Criteria for indicator evaluation				Final scores of indicators		
	Needed and useful (0-1)	Technical merit (0-1)	Feasible to collect and analyzed data (0-1)	Consistency, Balance, and Convergence (0-1)	Mean (1-10)	Standard deviation	Rank
services							
The Proportion of deliveries associated with assisted reproductive technology	0.024	0.024	0.023	0.023	7.196	2.988	26
Access to reproductive health information	0.024	0.025	0.021	0.023	7.214	2.627	27
Age-specific marriage rate	0.023	0.023	0.024	0.022	7	2.805	28
The total marital fertility rate	0.023	0.022	0.025	0.022	6.991	3.296	29
Age-specific abortion rates	0.025	0.024	0.019	0.023	6.982	2.743	30
Percentage of childless women who intend to have a birth	0.024	0.024	0.021	0.022	6.902	2.767	31
Voluntary childlessness by age	0.022	0.023	0.02	0.023	6.806	2.466	32
Projected old-age dependency ratio	0.022	0.021	0.021	0.023	6.769	2.582	33
Parity-adjusted total fertility	0.023	0.021	0.023	0.021	6.663	3.022	34
The Ideal number of children (Mean)	0.022	0.022	0.019	0.022	6.545	2.851	35
The Parental leave take-up rate	0.022	0.021	0.019	0.021	6.34	2.969	36
Percentage intending to have a (further) child by age	0.022	0.022	0.018	0.021	6.352	2.328	37
Desired family size	0.02	0.022	0.02	0.02	6.268	2.843	38
Completed cohort fertility	0.022	0.021	0.017	0.022	6.323	2.823	39
The Proportion of women trying to get pregnant for 1 year or more	0.021	0.021	0.018	0.022	6.29	3.092	40
Maternity and parental leave spending per child born	0.02	0.019	0.02	0.021	6.1	3.5	41
Paid leave weeks	0.02	0.02	0.02	0.02	6.09	3.042	42
Parity progression ratios	0.018	0.018	0.019	0.019	5.643	3.366	43
The recuperation index (degree of recuperation relative to fertility decline at younger ages)	0.017	0.017	0.015	0.017	5.071	3.503	44

Validity and reliability of indicators:

The validity and reliability of indicators were assessed during the third stage of screening. 28 out of 40 experts from various fields of RH, obstetrics, and demography from the MoHME and medical universities across Iran responded to our survey (Table 5).

The average score of the majority of indicators was above 7 (the score of each indicator was between 1 and 10). The highest score was related to the total fertility rate index (mean = 9, standard deviation = 1.8), and the lowest score was related to the recuperation index (degree of recuperation relative to fertility decline at younger ages) (mean 5.07, standard deviation 3.5). The highest scores for the utility of and need for the indicator (0-1), technical competence (0-1), and consistency, balance, and convergence (0-1), were assigned to total fertility rates (0.03, 0.028, and 0.030, respectively). The highest score for collectability and analyzability of the indicator (0-1) was assigned to the raw birth rate (0.034) (Table 5).

The five indicators that received the highest averages were:

- Total fertility rate
- Population under 15 years (٪)
- Total population
- Population aged 65 years and older (٪)
- Age-specific fertility rate

Discussion

This study aimed to identify appropriate indicators for RH and population programs monitoring in the Iranian context. A total of 37 RH indicators were finalized. The first five indicators with the highest score were: total

fertility rate, population under 15 years, total population, population aged 65 years and older, and age-specific fertility rate.

The main goals of the most cutting-edge programs for population increase in Iran were increasing fertility, reducing infant mortality, raising public awareness about RH, preventing and treating infertility, reducing abortion, strengthening families, and improving the quality of couples' sexual relationships. The outputs of national programs implemented in Turkey and Kuwait, whose approaches to increase childbearing are similar to those of Iran, had both similarities and differences with those of programs implemented in Iran. Similarities included outcomes such as Turkey's study of marriage, divorce, and infant mortality (29) and Kuwait's programs on infertility, access to RH, marriage, and maternal death (19, 30). Output differences between programs in these countries and Iran included the gender gap and violence against women, the rate of cesarean sections, and sex education in schools (29-30). These differences could be attributed to differences in the infrastructure and the priorities of different interventions and policies in Iran, as opposed to these two countries.

One study that reviewed international indicators in RH and population among OECD member states (31-33) concluded that, based on the focus of policies on different dimensions involved in childbearing, the indicators of RH and education have undergone significant changes. The type of model used in population policies and the extent to which social welfare improved in interventions had a positive effect on the output of indicators promoting childbearing. The most successful programs to promote childbearing have been reported to focus on balancing work and childcare, and the indicators of these programs have led to the highest positive growth (33).

Results of studies in countries in line with current population policies in Iran, e.g., Russia, as one of the most successful countries in encouraging childbearing, revealed the use of different indicators to monitor its population programs. In Russia, the main problem of low fertility rates is related to Russian couples' interest in single-child families. As a result, their focus is on indicators of RH such as safe sex, prenatal care, delivery methods, and postpartum care. Indicators associated with reducing fertility age and increasing infertility treatment have also shown their ultimate impact on fertility rate growth in Russia (34).

Two of the most important indicators of population policies are the total fertility rate and the age-specific fertility rate, which are used as the main indicators of policy outcomes in the current programs of European countries and Singapore (35). These were also among the selected indicators of Iran in the present study. Age-specific fertility rates allow policymakers to determine whether executive interventions have the same effect on any age group of women in the country. It can also indirectly demonstrate delays in family formation and childbearing. Analyzing the relationship between this and other indicators, especially process indicators, might provide insights into the impact of population policies and apply the necessary reforms accordingly (36).

Indicators such as age dependency ratio, population under 15 years, and population aged 65 years and older look to be more relevant in countries that have been experiencing population aging in recent years or are likely to do so in the coming years. Turkey, which is very similar to Iran in terms of the population pyramid and the aging population in years to come, uses these indicators in its population policies (37). Iran is on the very sensitive edge of the transition to population aging and increasing dependency ratios, particularly in regions with high population density. These outcome indicators will change along with the long-term impact of population policies, which will possibly be helpful in the planning and allocation of health services (38).

We also developed infertility indicators, including both population indicators and specific indicators for infertility prevention and diagnosis programs. In Portugal, population growth programs focus specifically on insurance coverage for infertility and its diagnosis and treatment. One specific indicator that directly measures the outcome of this program is the "proportion of deliveries associated with assisted reproductive technologies (ART)"(39). Turkey is another country that funds the treatment of infertile couples as one of its

programs to promote childbearing. Diagnosis and referral of infertility have been implemented in the Turkish health system for about ten years. Similar to Portugal, the indicators of this program have examined births following assisted reproductive treatments(40). Our study, however, determined the indicator "prevalence of infertility in women by age/reason" for Iran, which is more at the input level of the evaluation system. In case policies on infertility treatment coverage change in Iran, an indicator similar to the one used in Portugal can be utilized.

Our study also selected indicators related to marriage, divorce, and marriage counseling programs for Iran, which are similar to those in Turkey, South Korea, Kuwait, Russia, and global health organizations (29, 41-42). RH indicators, i.e., access to RH care services and contraceptives, are also used in the population policies of many other countries, especially at the level of international reports (7). In Iran, with the transformation of macro-population policies, contraceptive health programs underwent some reforms. Therefore, the lack of access to contraceptives and the related indicators are the unique features of the current Iranian program (7, 43). Indeed, the identified indicators in this study could be modified considering the initial feedback received after measuring them. The sexual health indicators selected in this study are also a subset of international RH indicators. The Iranian religious and cultural context has had a great impact on the selection process of indicators by policymakers; as an example, indicators are defined within the framework of family and formal marital relationships.

This study aimed to identify appropriate RH indicators in the Iranian context by compiling a set of indicators that are consistent with current RH programs and macro-population policies. The indicators that were extracted, screened, and finalized in different stages of this research are specific to the current policies and health programs of Iran. Utilization of these indicators can, in a given time, show the pattern of changes in input, process, and amount of service coverage, the output of each program, and ultimately the consequences of policies. The unification of these indicators and their method of extraction throughout the country, even at the level of comprehensive health centers, can facilitate, as we envisage, the evaluation of system performance and will enable, as we hope, contextual-based and timely feedback for appropriate revision of the related programs.

In response to the recent shifts in the population macro policies, this study reported the first comprehensive national attempt at the identification and classification of appropriate indicators. Another strength of this study is obtaining smart indicators for monitoring and evaluation of RH programs from the list of available international indicators and adapting them to the national policies of Iran. This was galvanized by two rounds of expert consensus, which enhanced the validity and reliability of the indicators, which can be used by other countries. Although this study collected smart indicators for monitoring and evaluation of RH programs, it seems that actual measurement and evaluation of the indicators could be necessary to create explicit evidence for policy makers in Iran. The main limitation of this study was related to access to studies and information on RH indicators in certain countries because of sanctions. We tried to connect with the main authors of the studies to reduce this limitation.

Conclusion

While Iran is determined to increase its population birth rate in response to recent demographic changes and according to ongoing reproductive policies, our selected indicators, subject to necessary modifications to be used in various monitoring and evaluation levels, can bring a solid foundation to ensure successful implementation of such policies, in line with other national plans towards sustainable health development. Population under 15 years old, overall population, population 65 and older, and age-specific fertility rate were the first five indicators with the highest scores. We advocate the MoHME to use our identified indicators as a baseline to define hierarchical sets of indicators for various local, provincial, national, and international levels when measuring progress towards the intended outcomes of reproductive and population policies in Iran. Also, we call for strengthening a meaningful inter-sectoral collaboration between the MoHME and other entities, i.e., the National Register Office, and

Iran's Center of Statistics, to bridge the gap in data collection and analysis. In particular, the Integrated Portal of Iranian Health (SIB system) at the MoHME needs reconstruction to accommodate necessary pieces of citizens' information to gather data in response to selected indicators.

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Conflicts of interest

The authors declared no conflicts of interest.

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