Identification of Reproductive Health Monitoring Indicators in Iran

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Abstract

Introduction As a result of recent demographic changes, Iran has revised its reproductive health programs. To respond to the essential need for monitoring the new programs and policies, this study aimed to identify tailored, appropriate, and measurable RH indicators in the Iranian context, using available evidence and international indicators.

Method This is an applied mixed-methods research, which was conducted in four phases:

Identification of goals of RH policies and programs, scoping review of the RH indicators in the literature, developing and ranking the identified indicators, and finalization of indicators. Qualitative content analysis was used to analyze the textual data of the documents and policies. We analyzed the studies in the scoping review by narrative synthesis. The final indicators were selected through the consensus of experts, with a cut-off point of 75%.

Result We identified 689 indicators through document analysis and scoping review. After three round of screening, 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.

Conclusion: The nature and number of indicators for monitoring and evaluation of reproductive health programs might vary at different organizational levels; hence the need to develop specific indicators for each level is pivotal. In addition, the need for collection, processing and dissemination of reliable data for evaluation of these programs is essential.

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 for reducing maternal and infant mortality and improving maternal health, achieving which requires reproductive health (RH) services (2). 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 to its functions and processes” (3). RH is an integral segment of public health and a key ingredient of human development. It is essential to the meaning of being a human and is of paramount importance in the health system(4).

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 the 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 towards improving RH status, either as a direct measure or proxy of impact, or as a measure of

progress towards policy goals (5, 6). Therefore, regular monitoring and evaluation (M&E) of RH services and status needs the use of specific indicators; which is essential to determine whether the goals have been met (3).

In the context of Iran, the main challenges in satisfying RH include unmet needs of family planning (FP), inequalities in access to basic obstetric services, and some challenges in data registration in relation to maternal morbidity and mortality (4, 7). Monitoring RH indicators is an important task in Iran. Despite the global guideline for reporting RH indicators, there are some technical obstacle in Iran's health information systems for statistical modelling (8) to formulate globally comparable estimates.

In addition, 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 (9, 10). 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 (11).

Given the changes in policy direction, short, mid and long-term planning is fundamental to achieve population growth. Taking into account the inconsistency between some international indicators and the current country's population policies, it is imperative to adopt appropriate approach for monitoring macro domestic programs and policies, both for monitoring purposes, as well as providing coherent reports to the international organizations and partners. This study aims to identify and define appropriate and tailored RH indicators, in line with Iran's recent population macro policies, as well as available evidence about international indicators. The study also identified areas of data quality concerns and put forward improvement strategies.

Method

This is an applied mixed-methods study. We collected data from 21/06/2020 until 18/02/2021 and conducted simultaneous data analysis during each stage of the study. The study was designed and implemented in four phases (Table 1).

Table 1
Summary of the study phases

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

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

First, to identify the goals of policies and programs for RH and population, we collected and reviewed all national plans, legal documents, rules and regulations, and the monitoring process related to the research topic which developed by 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 the goals related to the input, processes and output of programs.

Qualitative content analysis was used to analyze the textual data of the documents and policies, whose aim was to analyze the content of documents manually and without any software program. The output of the document analysis at this stage was identifying the goals and executive activities of RH and population programs in a systematic and transparent manner.

Phase 2: 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. We searched the databases including PubMed/ Scopus/Cochrane/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- Examining the indicators of countries that similar to Iran put population growth policies on their agenda. They included Kuwait, Turkey, Russia, Germany, Japan and Singapore. 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.

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 model) 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 validities of the proposed indicators: We screened the identified indicators during several steps as follows:

First stage screening: 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 screening: 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 national monitoring agenda. We held two consultation sessions that took six hours in total and was facilitated by the principal investigator (AT).

Third stage screening: We used a standard tool as a checklist to evaluate the content and construct validity of the indicators that were screened in the previous stages. The checklist had four criteria: utility of the indicator; technical competence of the indicator; collectability and analyzability of the indicator; and consistency of the indicator (Table 2).

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

Criterion	Consider these items to check the criteria
Utility of the indicator	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 designated time frame?
Technical competence of the indicator	Is this indicator significant and important 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 of the indicator	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, of the indicator	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 validities. The overall response rate was 28 (70%).

We used MS Excel 2017 software (<https://www.microsoft.com/en-us/microsoft-365/excel>) for data analysis in the third phase. A cut-off point of 75% was applied to the studied indicators. That is, indicators the importance of which 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 frequencies of the respondents, the weight and priority of each indicator were calculated.

Phase 4: Finalization of indicators

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

Results

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.

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 in-depth analysis and review, which revealed 371 indicators associated with RH and population. In addition, 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 (12-17). 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) were examined. This revealed 102 extra indicators related to RH and population.

Table 3
General documents of Iran's RH and population program

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	

In total, after document analysis, scoping review, review of global organizations, and comparative study of countries, 689 indicators were identified (Appendix 2). The largest number of indicators (371 indicators) was extracted from the scoping review (Table 4). We listed the identified indicators and two members of the research team (EM & MT) screened them to exclude duplicates and possible irrelevant indicators. This reduced the number of indicators to 304. We then conducted the second stage screening 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 screening to assess their content and construct validity. This resulted in 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 program 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
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 screening	37

Validity and reliability of indicators:

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

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

Indicator	Criteria for indicator evaluation				Final scores of indicators		
	utility of and need for the indicator (0-1)	technical competence of the indicator (0-1)	collectability and analyzability of the indicator(0-1)	Consistency, balance and convergence of the indicator (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

Indicator	Criteria for indicator evaluation				Final scores of indicators		
	utility of and need for the indicator (0-1)	technical competence of the indicator (0-1)	collectability and analyzability of the indicator(0-1)	Consistency, balance and convergence of the indicator (0-1)	Mean (1-10)	Standard deviation	Rank
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 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

Indicator	Criteria for indicator evaluation				Final scores of indicators		
	utility of and need for the indicator (0-1)	technical competence of the indicator (0-1)	collectability and analyzability of the indicator(0-1)	Consistency, balance and convergence of the indicator (0-1)	Mean (1-10)	Standard deviation	Rank
Childless married women by age	0.024	0.025	0.023	0.024	7.313	2.242	24
Access to reproductive healthcare services	0.024	0.024	0.022	0.024	7.223	2.98	25
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
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

Indicator	Criteria for indicator evaluation				Final scores of indicators		
	utility of and need for the indicator (0-1)	technical competence of the indicator (0-1)	collectability and analyzability of the indicator(0-1)	Consistency, balance and convergence of the indicator (0-1)	Mean (1-10)	Standard deviation	Rank
Ideal number of children (Mean)	0.022	0.022	0.019	0.022	6.545	2.851	35
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
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

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 of the utility of and need for the indicator (0-1), technical competence of the indicator (0-1), and consistency, balance and convergence of the indicator (0-1), were assigned to total fertility rate (0.03, 0.028, and 0.030, respectively). The highest score of 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

The recent RH and population programs aim at increasing birth rate to address the pattern of demographic changes in Iran. This is a radical policy change of family planning policy that was in practice for about two decades. As a result, the Family Health Office of the MoHME (as the stewardship of health system) needs to identify appropriate indicators to quantitatively measure the implementation of these programs and their consequences in Iran. This study was conducted to identify and develop monitoring and evaluation indicators for RH and population programs in Iran.

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, family strengthening, and improving the quality of couples' sexual relationships. The outputs of national programs implemented in Turkey and Kuwait, whose approach to increasing childbearing is similar to that 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 (18) and Kuwait's programs on infertility, access to RH, marriage, and maternal death (19). Output differences between programs in these countries and Iran included the gender gap and violence against women, cesarean section, and sex education in schools (18, 19). 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 (20-22) 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 (22).

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 rate 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 method, and postpartum care. Indicators associated with reducing fertility age and increasing infertility treatment have also shown their ultimate impact on the fertility rates growth in Russia (23).

Two of the most important indicators of population policies are total fertility rate and age specific fertility rate, which are used as the main indicators of policy outcome in the current programs of European countries and Singapore (24). These were also among the selected indicators of Iran in the present study. Age specific fertility rate allows 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 about the impact of population policies and apply the necessary reforms accordingly (25).

Indicators such as age dependency ratio, population under 15 years, and population aged 65 years and older look like 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 (26). Iran is on a very sensitive edge of transition to population aging and increasing dependency ratio, particularly in the regions with high population density. These outcome indicators will change along with the long-term impact of population policies, which will be possibly helpful in the planning and allocation of health services (27).

We also developed infertility indicators, including both population indicators and specific indicators of infertility prevention and diagnosis programs. In Portugal, population growth programs focus specifically on insurance coverage of infertility and its diagnosis and treatment. One specific indicator that directly measures the outcome of this program is "Proportion of deliveries associated with assisted reproductive technologies (ART)" (28). Turkey is another country that funds the treatment of infertile couples as one of its programs to promote childbearing. Diagnosis and referral of infertility has been implemented in the Turkish health system for about ten years. Similar to Portugal, the indicators of this program have examined the births following assisted reproductive treatments (29). 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 that policies on infertility treatment coverage will 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 Turkey, South Korea, Kuwait, Russia and global health organizations (18, 30, 31). 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 (5). In Iran, with the transformation of macro population policies, contraceptive health programs underwent some reforms. Therefore, lack of access to contraceptives and the related indicators are the unique features of the current Iranian program (32). Indeed, identified indicators in this study can be modified considering the initial feedback received after measuring them. Sexual health indicators selected in this study are also a subset of international RH indicators. All RH indicators that were proposed in this study have been selected in line with the religious and cultural context and within the framework of family bonds and normal relations in Iran.

This study sought to monitor and evaluate childbearing promotion programs in Iran by compiling the 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 period of time, show the pattern of changes in input, process and amount of service coverage, 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, we envisage, the evaluation of system performance, and will enable, we hope, contextual-based and timely feedback for appropriate revision of the related programs.

One 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 with the national policies of Iran. This was galvanized by two rounds of experts' consensus, which enhanced the validity and reliability of the indicators, which can be used by other countries. Nevertheless, actual measurement and evaluation of the indicators are necessary to ensure their contextual suitability in Iran and other similar settings.

Conclusion

Successful implementation of population policies, specifically in the case of fundamental variations with the international programs and policies such as population growth policies in Iran, requires identification and development of specific indicators for monitoring and evaluation of relevant policies and interventions. In response to the recent shifts in Iran's population macro policies, this study reported the first comprehensive national attempt in identification and classification of appropriate indicators for effective, timely and efficient monitoring and evaluation of the current RH programs in Iran.

The nature and number of indicators for monitoring and evaluation of RH and population programs might vary at different organizational levels (micro service delivery level, macro policy level, etc.). It would be desirable therefore to develop distinct indicators for each level separately. 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.

In addition, timely and appropriate data collection, which is a multisectoral task, is essential for many selected indicators in this study. We advocate fostering a meaningful intersectoral collaboration between

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

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.

Declarations

Ethics approval and consent to participate

This research was ethically approved by Tehran University of Medical sciences ethics committee (reference No IR.TUMS.MEDICINE.REC.1399.451). Consent to participate was not applicable for this study.

Consent for publication

Not applicable

Availability of data and materials

The data is all presented in the text.

Competing interests

The authors declare that have no competing interest that may be relevant to the submitted work.

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Authors' contributions

EM and MT designed the study protocol and undertook the data analysis; they conducted the first and 2nd phases of the study, respectively. MY, FS, and NA contributed to the 3rd phase. AK, HE, FG, FK, and AR contributed to the 4th phase. MY, SHB, and AO contributed to the findings interpretation. AT supervised all these processes. All authors contributed to the manuscript drafting. HM critically revised the manuscript. AT is the guarantor. All authors read and approved the final manuscript.

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Appendix

Appendix is not available with this version.