Original Article

A methodology for investigating and addressing sexual and reproductive health inequities in the sustainable development agenda

Sherine Shawky[1], Hoda M Rashad[1], Zeinab A Khadr[1], Shible Sahbani[2], Mohamed A Afifi[2].

[1] Social Research Center, The American University in Cairo, Egypt
[2] United Nations Population Fund for Arab States Regional Office (UNFPA/ASRO), Egypt.
Corresponding author and reprints: Sherine Shawky, MD, PhD. Senior Scientist, AUC Avenue, PO Box 74, New Cairo 11835, Egypt.

Email: shshawky@aucegypt.edu

Abstract

Background: Countries are committed to the international agenda and essential to achieving sexual and reproductive health goal is their capability to integrate equity lens in structural social determinants framing of inequalities. The aim is to propose comprehensive practical methodology which can alert countries to the injustice of sexual and reproductive health inequalities and provide tool to guide evidence-based policies and actions.

Method: The methodology was founded on literature review. This was followed by consultation meetings and workshops to drive scientific output. Finally, the methodology was applied on data in five Arab countries to illustrate its relevance.

Results: There are five contributions made. First, integrating equity lens to conceptual framing of sexual and reproductive health inequalities. Second, operationalizing the framework by articulating comprehensive list of indicators, adding distribution of gender norms, and choosing two inequality measures (index of dissimilarity and concentration index redistribution need) to allow for assessment of magnitude and comparisons. Third, illustrating the responsiveness of the health system and its relative contribution as social determinant of health. Fourth, demonstrating unfairness of root social structures and of social configurations of sexual and reproductive health. Finally, using the decomposition analysis and six questions to identify entry points for actions and responsibilities.

Conclusion: the proposed methodology provides countries clear way to assess severity and fairness of health-related conditions and not specifically sexual and reproductive inequalities. It offers an ethical urgency for addressing health inequities and guidance to main stream fairness in the full package of national policies.

Keywords: Equity; Methodology; Inequality; Sexual and Reproductive Health; Sustainable Development Agenda.

Cite this article as: Shawky S, Rashad HM, Khadr ZA, Sahbani S, Afifi MA. A methodology for investigating and addressing sexual and reproductive health inequities in the sustainable development agenda.SDH. 2020;e25. DOI: http://dx.doi.org/10.22037/sdh.v6i1.33678

Introduction

It is now well accepted that the current international and national concerns for achieving the International Conference on Population and Development (ICPD) goal and the Sustainable Development Agenda (SDA) have initiated a significant impetus for almost all national governments to build commitment on promoting health and well-being "For All"(1-3). The ICPD has tuned, as early as

1994, the national policies to focus on human rights and established the underpinning linkages between population and development. It emphasized that Sexual and Reproductive Health (SRH) and Rights (SRHR) are important outcomes and vital in improving the quality of life for everyone. Furthermore, achieving the SRH goal has major implications for fulfilling the Sustainable Development Agenda. SDG3 "***ensure healthy lives and promote well-being for all***", SDG5 "***achieve gender equality and empower all women and girls***", SDG11 "***Make cities and human settlements inclusive, safe, resilient and sustainable***" and SDG16 "***promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels***" clearly spell out SRH-related targets and indicators (4). Essential to achieving the SRH goal is the capability of countries to assess and monitor progress to improve SRH and promote SRH equity "Leaving No One Behind".

Countries are committed to the international agenda to improve SRH for all. However, they are still not clear about a practical methodology to monitor progress on the equity front and identify entry points for action. Equity in health is an ethical obligation, the problem is that it is not adequately investigated, but is usually indirectly inferred from the existence of unfair inequalities in the distribution of health-related outcomes across the various population subgroups and policies are inclined towards the health system's role. But, investigating and addressing inequities in health is multifaceted because it entails a methodology that covers many aspects (4–6). The chief anchor of this methodology includes a multilevel framing, recognizing the social dimensions which make people disadvantaged, computing the acceptable health inequalities across the social stratifications, as well as synthesizing and judging the fairness of the root causes for such health differences in order to reach equity-oriented policies and actions.

Despite the wealth of efforts (4-7,11,12, 21,22), there is still no comprehensive methodology that enables countries achieve the SRH equity goal. This imposes a key question "How can countries appreciate and address the SRH inequalities as manifestations of the unfairness of the upstream public policies?" There is currently a need to introduce an approach to alert countries to SRH inequalities, point to their root causes and guide policies for SRH.

The overall aim of this article is to participate in the ongoing international efforts by proposing a comprehensive practical methodology which can alert countries to the severity and unfairness of SRH inequalities, as well as provide a tool that allow advocating for urgency of action on SRH inequities and guide formulation of evidence-based policies and actions. In this respect five countries (Egypt, Jordan, Morocco, Oman and Sudan) were carefully chosen for application as they represent diversity of national context, they have available population-based databases from large household surveys and key actors in each country accepted to participate and review the work as a step to encourage dissemination of results and uptake of recommendations.

METHOD

To develop a comprehensive practical methodology, five steps were adopted. The first step was a thorough literature search to capture the conceptual framing and the landscape of SRH dimensions and challenges with emphasis on SRH inequalities. The search used the PubMed, Google Scholar, and Google search engine with the terms "health inequalities", "health observatories" and "health inequality indicators". Occasionally, names of concrete organizations and terms (i.e., World Health Organization, United Nations

Population Fund, Sustainable Development Goals, ….) were also used. The search, also covered peer-reviewed and grey literature, policy documents and strategies and program evaluations. In addition, a search of the data sources from large household surveys, routine data systems, international databases and other sources was conducted to identify the available SRH information. The search was performed by two researchers from February to April of 2018. All reports, studies, databases that included health equity frameworks, sexual and reproductive health (SRH) indicators, SRH related social stratifications, health inequality measures and actions commonly used for monitoring and relieving the SRH inequalities were included in the review.

The second step was the adaptation of the social determinants of health (SDH) framework to make it more applicable to the study of SRH inequities. The adaptation stressed on the social arrangements that are closely interrelated to policies and interventions. The framework aimed at linking SRH inequalities with the fairness in the upstream structural determinants. The framework looked for a multilevel conceptual framing reorganizing the different the social determinants of SRH inequities. The Social Research Center of the American University in Cairo, a well-established academic center, which is a full participant in the international equity development discourse, in collaboration with United Nations Population Fund for Arab States (UNFPA/ASRO) allowed the many conceptual and methodological contributions of this work.

The third step was consultation meetings and workshops with development partners and national partners in Arab countries (National Population Council in Egypt, Higher Population Council in Jordan, National Observatory for Human Development in Morocco, Ministry of Health in Oman and National Population Council in Sudan) to further discuss the conceptual framing and capture the SRH related social groups relevant to a regional context as an initial preparatory step to test the methodology.

The fourth step included application of the developed health inequality approach on the available tabulated and raw data. The first application was for Egypt (23) as a model for the approach using Egypt Demographic and Health Surveys 2005 and 2014, as well as Egypt Heath Issues Survey 2015. The model methodology was repeated on data for four more Arab countries (Jordan Population and Family Health Surveys 2002 and 2012, Morocco National Survey on Population and Family Health 2011, Oman National Reproductive Health Survey 2008 and Sudan Multiple Indicator Cluster Survey 2014) to further test the relevance of the approach in monitoring and prioritizing SRH inequalities. The application, also, aimed at tracing the SRH inequalities to the unfairness of the structural and intermediate determinants to reflect inclusive policy recommendations and point to priority entry points for action. The 5-country applications demonstrated the context specific SRH inequalities, the invisible vulnerable social stratification, as well as the missing and outdated information. They alerted policy makers and institutions to the need for in depth analytical effort to guide recommendations for inter-sectoral country level policies and actions. The results of the 5-country applications were further compiled in a regional report (24), they are not within the scope of this paper as the focus here is to demonstrate the methodological approach.

The fifth step builds on the previous information to identify the entry points for action relevant to the conceptual framing. The aim in this step is to guide policies for SRH and achieve the SRH goal.

RESULTS

The approach was designed to provide a comprehensive practical methodology that

can be used by countries to guide formulation of evidence-based policies and actions for addressing SRH inequities. The methodology is presented in Table 1 and includes the following components.

I. Conceptual Framing of the Social Determinants of Health Inequity

The initial step for countries to assess SRH inequities is to use a theoretical conceptual framing to organize the thinking process and identify the visual depiction of the organization of the various components. A rich literature exists on numerous frameworks illustrating the pathways by which the social mechanisms impact health (5,22, 25-30). The proposed Social Determinants of Health Inequities (SDHI) framework, presented in Figure 1, was founded on the framework of the Commission of the Social Determinants of Health (CSDH) (27) it has several advantages. The CSDH framework provides a way to illustrate the channels by which the Social Determinants of Health (SDH) affect health status and distribution among the various social stratification. In the CSDH framework, the concept of SDH covers the complete array of social conditions in which people are born, grow, live, work and age. These forces are referred to as "***intermediate determinants of health***". According to the framework, prevalent and persisting inequalities in health can be linked to the unequal distribution of these contextual conditions, which are the outcome of the deeper social, economic, political, environmental and cultural systems and structures referred to by CSDH as the "***structural determinants***" or "***the causes of the causes***". Drawing on this framework, four major blocks were described to link the social determinants and differential health outcomes as follows:

Table 1: Methodology for Investigating and Addressing Sexual and Reproductive Health Inequities

Conceptual Framing	Operationalizing the Theoretical Framework			Guiding Policies and Actions
Social Determinants of Health Inequity Framework (SDHI)	Articulating the Indicators	Selecting Social Stratifications	Identifying the Inequality measures	Intersectoral action for Health
• Merging the CSDH and the WHO-HSS monitoring frameworks • Adapting the frameworks into SDHI framework: o Adding social and development interventions to the second block of CSDH framework o Splitting the risk factors related to the material circumstances from the individual risk factors in the third block of CSDH framework o Defining two health system's domains (capacity and performance) in the third block of CSDH framework	• Impact indicators • Individual outcome (risk factor) indicators • Material circumstances outcomes (risk factor) indicators • Health system capacity indicators • Health system performance indicators	• Administrative/geographic location • Wealth index • Gender index relevant to context where methodology was applied	• Index of dissimilarity expressed in percent • Concentration index redistribution need expressed in percent	• Tracing SRH inequalities to the fairness of the structural determinants • Using advanced statistics to prioritize the root causes of ill-health • Defining entry points for action and responsibility on national level

CSDH: Commission on Social Determinants of Health; WHO-HSS: World Health Organization Health Systems Strengthening; SRH: Sexual and Reproductive Health

1. **Socio-economic political context**: represent the national policies and culture norms that determine the main characteristics of the country
2. **Socio-economic position**: represent the extent of social stratification resulting from national context and responsible for the vulnerabilities in exposure and health outcomes/impact as income, gender, education, occupation, ethnicity/race, ….
3. **Intermediate determinants of health**: represent the extent of differential exposures and vulnerabilities in individual's material circumstances, psychological, biological and behavioral factors. They also include health system determinants.
4. **Distribution of health and well-being**: represent the resulting health impact including mortality and morbidity

The proposed SDHI framework (Figure 1) is a modest adaption of the CSDH framework to provide more clarity of the various components. The first block (socioeconomic and political context) and the last block (distribution of health and well-being) remained the same. The second block (socio-economic position) and the third (intermediate determinants of health) were the focus of the adaptation. The adaptation paid special attention to the social arrangements that impart more readily to policies and interventions. The adapted second block included both, the socio-economic position, as well as the social and development interventions as intervening forces to relieve social vulnerabilities and improve conditions in which people live. The adapted third block differentiated between the systematic differences in the distribution of the material circumstances and those of the individual factors which are affected by the structural determinants and end in disparities in the distribution of health and well-being. This adaptation was done to differentiate between the role of the health

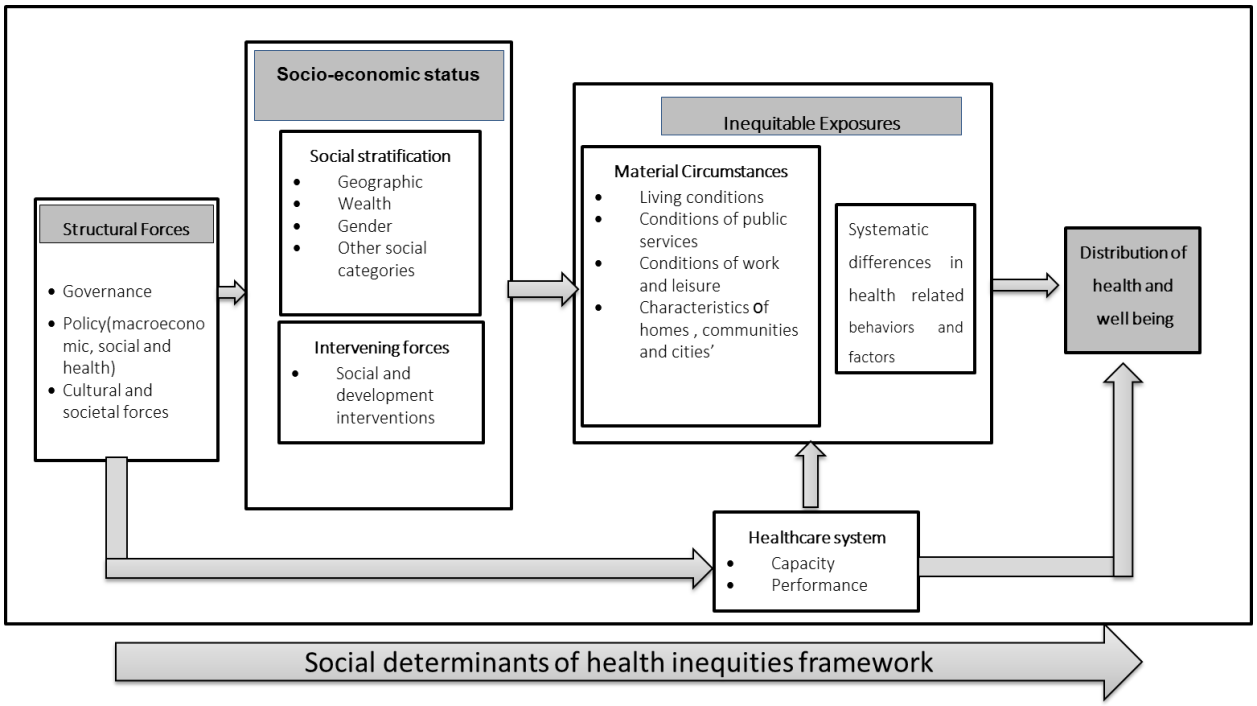

Figure 1: Social determinants of health inequities framework

Source: Adapted from the merged CSDH framework[11] and WHO-HSS monitoring framework[30]

system and that of the other sectors in promoting health and preventing risk factors and diseases, which in turn influence health and well-being among the different population subgroups.
The adaptation in the third block, spelled-out the fairness of the health system and its relative involvement as social determinant of SRH inequality. In the CSDH framework there is no conceptual framing for the health system. Thus, to define the health system in the SDHI framework, the World Health Organization (WHO) Operational Health System Strengthening Monitoring Framework (HSS)[30] was merged in CSDH framework. The four domains of the WHO-HSS Monitoring Framework were used to illustrate the health system capacity and performance as SDH affecting the SRH and their unequal distributions by the national socio-economic and political context. This framework brings together the health systems capacity and performance in a results chain. It presents four major indicator areas: 1) system inputs and processes, 2) outputs, 3) outcomes, and 4) impact. System inputs, processes and outputs define the health system capacity, while the outputs, outcomes, and impact illustrate the consequent health system performance.

The adopted SDHI conceptual framing stresses the importance of all sectors not only the health sector as a sole player. It linked the distribution of the socioeconomic groupings with the distribution of SRH inequalities in the impact and outcome (risk) factors. It also traced the inequalities to their structural root causes determining the social grouping and shaping the vulnerable exposures, as well as the capacity and performance of all sectors, not only the health sector. This emphasis moves the policy discourse from its usual focus on changing risk behaviors and on improving general socioeconomic conditions to appreciating the need to address the structural root determinants with their channels of impact on the distribution of vulnerable exposures and health.

II. Operationalize of the Theoretical Framework

The second step in the approach is to operationalize the theoretical framework. This was done in three steps as follows:

II.1 Articulating the Sexual and Reproductive Health Indicators

The first step in the operationalization process was to identify the SRH-related indicators. The SRH-related indicators used in the Sustainable Development Goals (SDGs), UNFPA and WHO were assembled and organized to reflect each component of the framework.

There were numerous SRH-related indicators organized according to the SDHI framework into three domains:

The SRH impact indicators: these indicators reflect the whole impact of the government achievement, living conditions and health systems influence on SRH. These SRH impact indicators (Table 2) were classified into SRH-related mortality and morbidity indicators.

- The SRH material circumstances (risk factors related to living conditions) indicators (Table 3) whether the characteristics of the household, community and the geographic or administrative national region. These indicators were calculated as the negative outcome reflecting vulnerabilities to demonstrate the irresponsiveness of the public services to population needs and point to the underserved population subgroups
- The health system determinants include the indicators referring to the health system capacity and performance (Table 4). Still, the health system indicators were calculated as the negative outcome of

lack of capacity or performance to demonstrate the irresponsiveness of the health system to population needs and point to weak health system capacity and the underserved population subgroups.

II.2 Selecting Social Stratifications

The second step in the operationalization was to identify the relevant socio-economic stratification that grasps the disparities in the population experience on national level. The literature presents many social groupings that can be used to illustrate the social dimensions of ill-SRH. The challenge is to identify the social stratification(s) sensitive to grasp the SRH inequalities, as well as point to the vulnerable populations. The defined social stratifiers in SDG17.18 include "***income, gender, age, race, ethnicity, migratory status, disability, geographic location***". The approach looked for a minimum list of stratifiers that are sensitive to SRH.

Based on the literature, previous research[18] and the analysis of the five-country data, two social stratifications, the administrative/geographic and wealth

Table 2: Sexual and Reproductive Health Impact Indicators

Indicator	SDGs	Other
Mortality		
1. Maternal mortality ratio	SDG3.1.1	UNFPA, WHO
2. Perinatal mortality rate		WHO
3. Neonatal mortality rate	SDG3.2.2	WHO
4. Infant mortality rate		UNFPA, WHO
5. Mortality rate attributed to cancer (breast, cervical)	SDG3.4.1	WHO
6. Mortality rate attributed to household and ambient air pollution	SDG3.9.1	
7. Mortality rate attributed to unsafe water, unsafe sanitation and lack of hygiene (exposure to unsafe Water, Sanitation and Hygiene for All (WASH) services)	SDG3.9.2	
Morbidity		
8. Cancer incidence by type of cancer (breast, cervical)		WHO
9. Number of new HIV infections per 1,000 uninfected population	SDG3.3.1	WHO
10. Hepatitis B incidence per 100,000 population	SDG3.3.4	
11. Percent of men aged (15-49) interviewed in a community survey reporting episodes of urethritis in the last 12 months		WHO

SDGs: Sustainable Development Goals

UNFPA: United Nations Population Fund

WHO: World Health Organization

Table 3 Sexual and Reproductive Health Outcome (Risk Factors) Indicators

Indicator	SDGs	Others
Social and psychological risk factors		
1. Adolescent birth rate (aged 10–14 years; aged 15–19 years) per 1,000 women in that age group	SDG3.7.2	UNFPA, WHO
2. Proportion of women aged 20-24 years who were married or in a union before age 15 and before age 18	SDG5.3.1	UNFPA
3. Proportion of girls and women aged 15-49 years who have undergone female genital mutilation/cutting	SDG5.3.2	WHO
4. Proportion of ever-partnered women and girls aged 15 years and older subjected to physical, sexual or psychological violence by a current or former intimate partner in the previous 12 months, by form of violence	SDG5.2.1	UNFPA
5. Proportion of women and girls aged 15 years and older subjected to sexual violence by persons other than an intimate partner in the previous 12 months	SDG5.2.2	UNFPA
6. Proportion of persons victim of physical or sexual harassment, in the previous 12 months	SDG 11.7.2	UNFPA
7. Proportion of population subjected to physical, psychological or sexual violence in the previous 12 months	SDG16.1.3	UNFPA
8. Proportion of young women and men aged 18-29 years who experienced sexual violence by age 18	SDG16.2.3	
9. Proportion of victims of violence in the previous 12 months who reported their victimization to competent authorities or other officially recognized conflict resolution mechanisms	SDG 16.3.1	
Biological risk factors		
10. Prevalence of infertility in women		WHO
11. Anemia among women of reproductive age		WHO
12. Anemia in pregnant women		WHO
13. Low birth weight among newborns		WHO
Material circumstances		
14. Proportion of youth (aged 15-24 years) not in education, employment or training	SDG 8.6.1	
15. Literacy rate among persons 15-24 years		WHO
16. Average hourly earnings	SDG 8.5.1	SDG 8.5.1
17. Unemployment rate	SDG8.5.2	
18. Proportion of population using safely managed drinking-water services	SDG6.1.1	
19. Access to improved drinking water (%)		WHO
20. Proportion of population using safely managed sanitation services, including a hand-washing facility with soap and water	SDG6.2.1	
21. Access to improved sanitation facilities (%)		WHO
22. Proportion of population living in households with access to basic services	SDG1.4.1	
23. Proportion of urban population living in slums, informal settlements or inadequate housing	SDG 11.1.1	
24. Proportion of population that has convenient access to public transport	SDG 11.2.1	
25. Proportion of population that feel safe walking alone around the area they live	SDG16.1.4	

SDGs: Sustainable Development Goals; UNFPA: United Nations Population Fund; WHO: World Health Organization

Table 4: Sexual and Reproductive Health System Indicators

	Indicator	SDGs	Others
Capacity			
1.	% Government expenditure directed towards reproductive health		UNFPA, WHO
2.	Number of countries with laws and regulations that guarantee full and equal access to women and men aged 15 years and older to sexual and reproductive health care, information and education	SDG5.6.2	
3.	Existence of policy on cervical cancer screening		WHO
4.	Existence of policy on breast cancer screening		WHO
5.	Proportion of countries that (a) have conducted at least one population and housing census in the last 10 years; and (b) have achieved 100 per cent birth registration and 80 per cent death registration	SDG17.19.2	UNFPA
6.	Proportion of sustainable development indicators produced at the national level with full disaggregation when relevant to the target, in accordance with the Fundamental Principles of Official Statistics	SDG 17.18.1	
7.	Mandatory notification of maternal deaths		WHO
8.	Number of facilities with functioning basic essential obstetric care per 500 000 population		WHO
9.	Coverage of essential health services (defined as the average coverage of essential services based on tracer interventions that include reproductive, maternal, newborn and child health, infectious diseases, non-communicable diseases and service capacity and access, among the general and the most disadvantaged population)	SDG3.8.1	
10.	Number of people covered by health insurance or a public health system per 1,000 population	SDG3.8.2	
11.	Number of facilities with functioning comprehensive essential obstetric care per 500 000 population		WHO
12.	Proportion of the population with access to affordable medicines and vaccines on a sustainable basis	SDG3.b.1	
13.	Total net official development assistance to medical research and basic health sectors	SDG3.b.2	
14.	Health worker density and distribution	SDG3.c.1	
15.	International Health regulations (IHR) capacity and health emergency preparedness	SDG3.d.1	
16.	% Primary health care facilities providing at least 3 modern family planning methods		WHO
17.	Delivery points providing necessary medical and psychological services for women with FGM		WHO
18.	Reproductive health service delivery points providing youth friendly services		WHO
19.	Number of skilled birth attendants per 1000 population		WHO
20.	% Midwives who received evidence-based reproductive health, including family planning, in-service training in a given year		WHO
21.	% Reproductive health service providers trained in youth-friendly service provision		WHO
Performance			
22.	% Women knowing at least three risk factors/danger signals of pregnancy-related complications		WHO
23.	% Women knowing at least three risk factors/danger signals of delivery-related complications (in the countries with lower rates of institutional deliveries)		WHO
24.	Antiretroviral therapy (ART) coverage among all adults and children living with HIV		WHO
25.	Percentage of key populations at higher risk (who inject drugs, sex workers, men who have sex with men) who have received an HIV test in the past12 months and know their results		WHO
26.	Percent of pregnant women (15-24) attending antenatal clinics, whose blood has been screened for syphilis, with positive serology for syphilis		WHO

Indicator	SDGs	Others
27. Percent of pregnant women (15-24) attending antenatal clinics, whose blood has been screened for HIV and who are sero-positive for HIV		WHO
28. Reproductive age, 15–49 years, screened for cervical cancer during the past five years		WHO
29. Pregnant women received tetanus vaccination		WHO
30. Deliveries in health facilities		WHO
31. Proportion of births attended by skilled health personnel	SDG3.1.2	UNFPA, WHO
32. Proportion of caesarean section deliveries		WHO
33. Unmet need for family planning		UNFPA, WHO
34. Proportion of women of reproductive age (aged 15–49 years) who have their need for family planning satisfied with modern methods	SDG3.7.1	
35. Antenatal care coverage (1+;4+ visits)	SDG3.8.1	WHO
36. Demand for family planning satisfied with modern methods		WHO
37. Proportion of women aged 15-49 years who make their own informed decisions regarding sexual relations, contraceptive use and reproductive health care	SDG5.6.1	UNFPA, WHO
38. Contraceptive prevalence rate		UNFPA, WHO
39. Obstetric and gynecological admissions owing to abortion (spontaneous or induced) related complications		WHO
40. % Young men and women age 15–24 years OR "at risk" groups who have correct comprehensive knowledge on HIV prevention		WHO

SDGs: Sustainable Development Goals; UNFPA: United Nations Population Fund; WHO: World Health Organization

classifications appeared to be relevant for revealing the SRH inequalities. These two stratifiers are available in almost all data sets, and provide a simple way in interpreting inequalities, which can be easily captured by policy makers.

A country's administrative classification covers the population within a geographic area and grasps the SRH vulnerabilities and service coverage. The administrative classification is used for planning services and allocating budget on national level. It also allows policy makers to easily spot the vulnerable geographic locations. The administrative/geographic classification may also produce a standard method for monitoring health inequalities and comparing countries. The wealth index reflects the conditions in which people live and the individuals' socio-economic status. The wealth quintiles is a vital guide to the package of social policies to address inequalities in health.

As each country is encouraged to identify the social stratification relevant to its context, a third stratifier, the gender norms index was developed as a demonstration of a potential social stratifier to reflect the significant culture-related gender norms within the five countries where the methodology was applied. The gender norms index attempted to define the gendered context in a community in which people live. The gendered cultural context was built on the culture-related perceptions and attitudes, as well as their related behaviors and practices. The components of the gender norms index were as follows with slightly different adaptations based on the available data in the five countries.

- Culture-related perceptions and attitudes

  - Proportion of those who reported below 18 years as an ideal age for girls' marriage
  - Proportion of those who believe that female genital mutilation/cutting (FGM/C) is a religious belief
  - Proportion of those who justify husband's physical violence
- Culture-related practices and behavior
  - Proportion of women who married before the age of 18 years
  - Proportion of women who were subject to FGM/C
  - Proportion of women who were exposed to physical, emotional or sexual violence by husband
  - Proportion of women who were exposed to violence by any person other than the husband
  - Proportion of women who did not reach secondary education

The proportions of each of these perceptions, attitudes, behaviors and practices were calculated at the level of the locality then added together to produce gender norms index. The index was then classified into four categories (most conservative, conservative, less conservative and least conservative).

II.3 Identifying the Inequality Measures

The third step in the operationalization was to identify the appropriate inequality measure. The literature displays numerous health inequality measures [4,6,12-18]. The commonly used include:

- Gini Coefficient (Gini)
- Weighted absolute mean difference (wMD), the weighted standard deviation (wSD) and the coefficient of variation (CV)
- Population attributable fraction (PAF)
- Index of dissimilarity expressed in percent (ID%)
- Theil index of inequality (Theil T)
- Slope index of inequality (SII) and the relative index of inequality (RII)
- Concentration index (CI) and concentration index percent redistribution need (rCI%)

The final decision was to use the ID% for the non-ordered administrative/geographic classification and the rCI% for the ordered wealth index and gender norms index. The decision was based on a previous research[18] that carried out a rigorous comparison among the various inequality measures. The results of the research reached two major findings. The first finding is that the ID% and the rCI% are highly correlated and have many advantages. Both measures respect the population distribution their values represent the deviation from inequality. Their calculation is based on the population distribution and is weighed by the observed health-related condition. They provide a measure of magnitude of inequality, thus help in ranking priority SRH inequalities. They are easily calculated on tabulated and raw data and are easily understood by policy makers. A cut off point ≥ 10% for both measures can be used to mark the priority SRH inequalities. The second finding is that the male and female populations have different health inequality patterns and thus the ID% and the rCI% should be calculated for each population by social stratification independently.

III Guiding Policies and Actions

III.1 Tracing SRH inequalities to the fairness of the structural determinants

This step attempts to move the discourse from SRH inequality to SRH equity as it links the unequal distribution in SRH outcomes to the unfairness in the social context that are the result of the structural determinants. This step aims at investigating the fairness of the root structural determinants using the six domains described in Solar and Irwin

(2010)[31]. These domains include the governance; the macroeconomic policies; the social policies; the relevant public policy; culture and societal values; and the epidemiological conditions. These domains shape the national ability to redistribute its resources among its population.

The question is whether the policies and actions within these six domains are successful in ensuring a fair distribution of resources, opportunities, services, power relations, inclusiveness and voice among the various social groups. Are these policies and actions planned to change the circumstances in which people live to allow the disadvantaged social groups to make the choices and acquire the services to improve their health and well-being.

Based on the above, to address the SRH inequality challenge identified by the geographic and wealth distributions, six questions can be clearly placed on the six arrows in adopted SDHI framework to identify the causes of ill health and inequalities in health and point to roles and responsibilities of the various players in the national context:

1. Are the health interventions curing morbidities and reducing mortalities?
2. Are the health interventions reducing the negative impact of risk factors on health?
3. Do the adopted policies and culture norms affect the health system?
4. Do the risk factors affect population health?
5. Do the social and development interventions relieve social vulnerabilities and improve living conditions?
6. Do the adopted policies and culture norms result in social vulnerabilities and affect the social and development interventions?

III.2 Using advanced statistics to prioritize the root causes of ill-SRH

Countries may also seek to generate evidence on country level on the contribution of the unequal distribution of the determinants to SRH inequalities. A decomposition analysis can be used building on the wealth inequalities to compute the share of the various social determinants in the detected SRH inequalities. According to Wagstaff et al[19], the decomposition analysis allows for estimating the proportional contribution of the various determinants to the inequality in a health outcome as follows:

$$CI = \sum_k \left(\frac{\beta_k \bar{X}_k}{\mu}\right) CI_k + \frac{GCI_\varepsilon}{\mu} = CI_{\hat{y}} + \frac{GCI_\varepsilon}{\mu}$$

Where:

CI: concentration index for the health variable of interest

$\bar{X}_k$: the mean of set of health determinants X_k

CI_k: the concentration index for X_k.

GCI_ε: the generalized concentration index for ε_i

ε= an error term

μ is the mean of y

III.3 Defining the entry points for action and responsibility on national level

The last step in the approach is to identify the roles and responsibilities of the different national actors by responding to the previous six questions. Actually the answers to these questions define the entry points for action from all sectors on national level (Table 5). The answer to the first question "Are the health interventions curing morbidities and reducing

Table 5: Key questions and entry points for policies and actions on sexual and reproductive health

Questions	Entry points for actions	Responsible
1. Are the health interventions curing morbidities and reducing mortalities?	Curative and rehabilitation interventions	Health system
2. Are the health interventions reducing the negative impact of risk factors on health?	Health promotion and prevention interventions	Health system
3. Do the adopted policies and culture norms affect the health system?	Health sector and health policy reform	Health system, national governance and public policies
4. Do the risk factors affect population health?	Improve living conditions, and behavioral interventions	Social and development sectors
5. Do the social and development interventions relieve social vulnerabilities and improve living conditions?	Social and development vulnerability relieving interventions	Social and development sectors
6. Do the adopted policies and culture norms result in social vulnerabilities and affect the social and development interventions?	Structural upstream policies and culture-related reforms and interventions	National governance and public policies

mortalities?" is related to the curative and rehabilitation interventions of the health system? The answer to the second question "Are the health infigureterventions reducing the negative impact of risk factors on health?" is related to the health system's health promotion and diseases prevention strategies". The answer to the third question "Do the adopted policies and culture norms affect the health system?" refers to joint health system leadership, the national governance and the package of public policies on national level. The answer to Question 4 "Do the risk factors affect population health?" is a non-health sector responsibility to improve living conditions and change people's behaviors that are the outcome of their living circumstances, as well as their beliefs and culture". The answer to Question 5 "Do the social and development interventions relieve social vulnerabilities and improve the living conditions?" is still beyond the health system as it refers to pure social and development relieving interventions. Still the answer to Question 6: "Do the adopted policies and culture norms result in social vulnerabilities and affect the social and development interventions? "is a higher-level national governance, public policy and culture-related reforms and interventions.

Thus, the first two entry points fall within the health systems responsibility. However, the third entry point is a shared national and health system responsibility. Furthermore, the last three entry points addressing the last three questions are beyond the health system's responsibility, but still the health system can advocate for better health and alert the other sectors to the pitfalls in their services and irresponsiveness to people's needs.

DISCUSSION

Inequalities in health in general and SRH in particular are global concerns and a development goal. In this methodology, health equity is the key for addressing the drudgeries of the unfair under development.

The proposed methodology has several advantages. First, it provides a full range comprehensive approach built on SDHI framing, uses conceptually articulated comprehensive list of SRH-related indicators, relevant social stratifications and appropriate inequality measures. Second, it allows for assessing the severity SRH inequalities, monitoring progress over time, as well as identifying the underprivileged population subgroups. Third, it links the inequalities in the distribution of the health conditions to the inequalities in the distribution of their determinants as manifestation of the unfairness in policies and attempts to identify the priority entry points for actions and responsibility to achieve the SRH goal. Fourth, is applicable to all countries, allows for comparison between countries and can be applied to the total population and/or the male and female populations, as well as to any health-related condition not specifically SRH.

The methodology is grounded on the framework of the CSDH[1] that is widely used in literature as the foundation for many frameworks and is highly reputable for its clear illustration of the various channels that relates the structural causes to the health inequalities. The added value of the proposed SDHI is the undertaken adaptation to spell out clearly the various components of the CSDH framework with special emphasis on the various determinants lending themselves to policy interventions. In addition to merging the CSDH framework with the WHO-HSS strengthening framework[7] to show the distinction between SRH inequities which are the business of the "whole-of-government" and health system inequities which reflect the irresponsiveness of health system in responding to population needs. The importance of this adaptation relates to the health systems' role in addressing SRH related challenges and advocating for health outside the health sector.

The methodology relies on the indicators already available in the SDGs[4] and literature, but the effort was to provide clear distinction between the SRH impact and risk factors and the health system determinants. Furthermore, taking in account the health system capacity indicators reflect the influence of the national socio-economic and political context on the health system capabilities, while the health system performance indicators reflect the health system contribution to the healthcare inequity which is a portion of health inequity.

The methodology aimed at specifying a minimal set of population subgroupings to push to the forefront specific vulnerabilities that tend to be invisible. Two stratifiers were proposed for their relevance. The geographic/administrative classification is plausible to all countries and provides a means for reaching the geographically underprivileged populations. Wealth is the second important stratifier commonly used in literature and allows assessing the success of the package of social policies.

It is worth mentioning that these two stratifiers do not cover the whole range of context-specific social vulnerabilities. Each country is recommended to specify the additional social stratifications which can be changed through structural reforms. For example, low educational level and informal employment could lead to health inequalities which further support the need for a package of social policies to protect the vulnerable social groups. To illustrate the need for context specific social stratification, the contribution of this methodology was the use of the gender norms index as an important contextually relevant stratifier in the countries where the methodology was applied. Gender is a significant determinant of SRH, and gender inequity is a key development challenge. The interrelation between gender and the with other social determinants result in a highly unequitable SRH milieu. The importance of this relates to the expectation

that gender norm is an important social stratifier that invites specific actions to target influencing its distribution.

The methodology looked for identifying feasible measures of health inequalities. The ID% and rCI%, though are among the few methods that provide a measure of magnitude of inequalities[18], they are not commonly used. These two measures are easy to compute and can be applied on tabulated data if raw data is not available. The use of these two measures will allow countries assess the severity of SRH inequalities and set priories for policies and interventions.

The core contribution of this methodology is in demonstrating the impact of the unfairness of the social arrangements on the distribution of health outcomes and their risk factors. Such unfairness recognizes that these social inequalities in health express the degree of injustice in the society, thus moving the discourse from inequality to inequity. The methodology translates the unfair social arrangements to the need for good governance, equitable policies, and fair social patterns.

The methodology proposes an additional decomposition analysis[19-21] to identify the entry points for actions to reduce SRH inequities. However, this step is usually curtailed not just by the absence of raw data but also by the lack of technical skills to conduct and interpret such analysis.

Most importantly the approach defines six questions as means to identify entry points for action and draw the responsibilities of all national sectors to improve health and well-being of people for all and achieve the SRH goal.

This comprehensive methodological approach was carried out to help accomplish the first step in the process for investigating and addressing SRH. Thus, the next steps are to expand the application of the methodology on other health outcomes to highlight the health inequalities that remain unperceived and to respond to the many requests on how to improve SRH and promote SRH equity. There is, also a need for additional methodological contribution to translate the evidence into informed and context specific policies and actions. This direction of work, while crucial for more specific policies and actions, is not well developed and requires further analytical work to contribute to the international policy discourse.

In conclusion, the proposed methodology provides countries a clear way to assess the severity of SRH inequalities, trace them to their root cause and identify entry points for action and responsibilities for achieving the equity goal. The social injustice provide an urgency and an ethical imperative for addressing the SRH inequities and guidance to main stream fairness in all policies.

Acknowledgements

This manuscript is one outcome of a regional initiative on "Sexual and Reproductive Health Inequities" launched by the United Nations Population Fund for Arab States Regional Office (UNFPA/ASRO) and the Social Research Center of the American University in Cairo (SRC/AUC) in five countries (Egypt, Jordan, Morocco, Oman and Sudan) to reach a methodology for investigating sexual and reproductive health inequities.

We would like to express our sincere thanks to Dr Abdallah Zoubi, Dr. Abdellatif Lfarakh, Dr. Fatma Al-Hinai and Dr. Elham Abdalla Mohamed who devoted their time and knowledge to apply the methodology on the national data to help in testing the relevance of the methodology.

We are also grateful to the partner institutions: the National Population Council in Egypt, the Higher Population Council in Jordan, the National Observatory for Human Development in

Morocco, the Ministry of Health in Oman, and the National Population Council in Sudan. The leaderships of these institutions have actively participated in all phases of the initiative. WEappreciates the contributions of Dr. Abla Amawi, Dr. Ali Ben Table Al-Hanaei, Dr. Amr Hassan, Dr. El Hassan El Mansouri and Dr. Limiaa Abdelgfar Khalafalla.

***Ethics approval and consent to participate**:*

Not applicable

***Consent for publication**:*

Not applicable

Availability of data and material:

Not applicable

Competing interests:

The authors declare that they have no competing interests

Funding:

The research was conducting with the support of United Nations Population Fund for Arab States Regional Office (UNFPA/ASRO). UNFPA/ASRO provided both financial support and guidance for achieving this work

Authors' contributions:

SS: has done the literature review, made substantial contributions to the conceptualization, design, analysis and development of the methodology and participated in writing the manuscript. HR has built the conceptual framework, contributed to the design and development of the methodology and participated in writing the manuscript. ZK has developed the gender index and applied the decomposition analysis, as well as contributed to the conceptualization, design, analysis and development of the approach and participated in writing the paper. ShSa has helped in conceptualizing the methodology and provided comments on the manuscript. MA has substantively reviewed the approach, helped in conceptualizing the methodology and provided comments on the manuscript. All authors read and approved the final manuscript

REFERENCES

1. Commission on Social Determinants of Health. Closing the gap in a generation: health equity through action on the social determinants of health. Final Report of the Commission on Social Determinants of Health. Geneva: World Health Organization, 2008.
2. World Health Organization. Rio political declarations on social determinants of health. World Conference on Social Determinates of Health, Rio de Janeiro, Brazil, 19-21 October 2011;
3. United Nations. Resolution adopted by the General Assembly on 25 September 2015 70/1. Transforming our world: the 2030 Agenda for Sustainable Development http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E
4. Wagstaff A, Paci P, van Doorslaer E. On the measurement of inequalities in health. Soc Sci Med. 1991;33(5):545–557.
5. Asada Y. A framework for measuring health inequity. J Epidemiol Community Health. 2005;59:700–705.
6. Braveman P. Health disparities and health equity: concepts and measurement. Annu Rev Public Health. 2006;27: 167–194.
7. World Health Organization. Briefing Note: Proposed Operational Approach and Indicators to Measure Social Determinants of Health Equity. In: For Discussion at the Seventh Meeting of Commissioners; 17–19 January; Geneva, Switzerland. Department of Equity, Poverty and Social Determinants of Health. Brief Operational Indicators Version 1.5. 11.
8. Spinakis A, Anastasiou G, Panousis V, Spiliopoulos K, Palaiologou S, Yfantopoulos J. Expert Review and Proposals for Measurement of Health Inequalities in the European Union—Summary Report. Luxembourg: European Commission Directorate General for Health and Consumers; 2011. ISBN 978-92-79-18529-8.
9. Ahmad Reza Hosseinpoor, Nicole Bergen, Aluisio J. D. Barros, Kerry L. M. Wong, Ties Boerma1 and Cesar G. Victora. Monitoring subnational regional inequalities in health:

measurement approaches and challenges. International Journal for Equity in Health (2016) 15:18. Available at https://equityhealthj.biomedcentral.com/track/pdf/10.1186/s12939-016-0307-y.
10. World Health Organization Handbook on Health Inequality Monitoring With a Special Focus on Low- and MiddleIncome Countries. Geneva, Switzerland: World Health Organization, 2013.
11. World Health Organization. Briefing Note: Proposed Operational Approach and Indicators to Measure Social Determinants of Health Equity. In: For Discussion at the Seventh Meeting of Commissioners; 17–19 January; Geneva, Switzerland. Department of Equity, Poverty and Social Determinants of Health. Brief Operational Indicators Version 1.5.
12. O'Donnell O, van Doorslaer E, Wagstaff A, Lindelow M. Analyzing Health Equity Using Household Survey Data: A Guide to Techniques and Their Implementation. Washington, DC: World Bank, 2008. 12.
13. Pampalon R, Hamel D, Gamache P. A comparison of individual and area-based socio-economic data for monitoring social inequalities in health. Health Rep. 2009;20(4):85–94. 13.
14. Ontario Agency for Health Protection and Promotion (Public Health Ontario) Summary Measures of Socioeconomic Inequalities in Health. Toronto, ON: Queen's Printer for Ontario, 2013.
15. Spinakis A, Anastasiou G, Panousis V, Spiliopoulos K, Palaiologou S, Yfantopoulos J. Expert Review and Proposals for Measurement of Health Inequalities in the European Union—Summary Report. Luxembourg: European Commission Directorate General for Health and Consumers; 2011. ISBN 978-92-79-18529-8.
16. Chee G, Pielemeier N, Lion A, Connor C. Why differentiating between health system support and health system strengthening is needed. Int J Health Plann Mgmt. 2013;28: 85–94.
17. Koolman X, van Doorslaer E. On the interpretation of a concentration index of inequality. Health Econ. 2004;13: 649–656.
18. Shawky S. Measuring Geographic and Wealth Inequalities in Health Distribution as Tools for Identifying Priority Health Inequalities and the Underprivileged Populations. Global Advances in Health and Medicine 2018; Volume 7: 1–10.
19. Wagstaff A, van Doorslaer E, Watanabe N. On decomposing the causes of health sector inequalities with an application to malnutrition inequalities in Vietnam. J Econom 2003;112:207–23.
20. Ahmad Reza Hosseinpoor, Eddy Van Doorslaer, Niko Speybroeck, Mohsen Naghavi, Kazem Mohammad, Reza Majdzadeh, Bahram Delavar, Hamidreza Jamshidi and Jeanette Vega. Decomposing socioeconomic inequality in infant mortality in Egypt. International Journal of Epidemiology 2006;35:1211–1219 doi:10.1093/ije/dyl16.
21. World Bank. Analyzing Health Equity Using Household Survey Data A Guide to Techniques and Their Implementation. Owen O'Donnell, Eddy van Doorslaer, Adam Wagstaff, Magnus Lindelow, 2008
22. Douglas C Dover and Ana Paula Belon. The health equity measurement framework: a comprehensive model to measure social inequities in health. International Journal for Equity in Health 18:36. Available at https://doi.org/10.1186/s12939-019-0935-0.
23. Shawky S, Rashad H, Khadr Z. Reproductive Health Inequalities in Egypt: Evidence for Guiding Policies; The Social Research Center/The American University in Cairo, the United Nations Population Fund / Arab States Regional Office; 2019. https://documents.aucegypt.edu/Docs/src/Reproductive%20Health%20Inequalities%20in%20Egypt.pdf
24. Rashad, H., S. Shawky, and Z. Khadr (2019) "Reproductive Health Equity in the Arab Region: Fairness and Social Success" Regional Study; The Social Research Center, The American University in Cairo, UNFPA/ASRO. https://documents.aucegypt.edu/Docs/src/Reproductive-Health-%20Equity-in-the-Arab-Region.pdf
25. Ansari Z, Carson NJ, Ackland MJ, Vaughan L, Serraglio A. A public health model of the social determinants of health. Soz Praventivmed. 2003;48(4): 242–51. Available from:. https://doi.org/10.1007/s00038-003-2052-4.
26. Dahlgren G. Whitehead M. Policies and Strategies to Promote Social Equit in Health. Stockholm, Sweden: Institute for Futures Studies; 1991.
27. Commission on Social Determinants of Health. Closing the gap in a generation: health equity through action on the social determinants of health. Final Report of the Commission on Social Determinants of Health. Geneva: World Health Organization, 2008.
28. Oakes JM, Rossi PH. The measurement of SES in health research: current practice and

steps toward a new approach. Soc Sci Med. 2003;56(4):769–84.

29. Diderichsen F, Evans T, Whitehead M. The social basis of disparities in health. In: Evans T, editor. Challenging inequities in health: from ethics to action. New York: Oxford University Press; 2001. p. 12–23
30. World Health Organization. 2009. Monitoring and Evaluation of Health Systems Strengthening: An Operational Framework. Paper prepared by WHO (Ties Boerma and Carla Abou-Zahr), World Bank (Ed Bos), GAVI (Peter Hansen) and Global Fund (Eddie Addai and Daniel Low-Beer) as part of the joint work on health systems strengthening and IHP+ common evaluation framework.
31. Solar O, Irwin A. A conceptual framework for action on the social determinants of health. Social Determinants of Health Discussion Paper 2 (Policy and Practice). Geneva, Switzerland: World Health Organization; 2010