On Examining Health Inequities in Arab Countries:

Some Policy Considerations

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Abstract:

Measurement of health inequities has gained prominence in recent times for its importance in locating specific identities or attributes associated with health deprivation. Besides, the disaggregated measurement of health outcomes has come handy in recognizing inequities and serves towards efficient intervention in addressing the same. Given the significance of examining health inequities, this paper attempts at comprehending health inequities in selected maternal and child health indicators of Arab countries This exercise enables a comparison of the magnitude of health inequity across the selected countries namely; Egypt, Jordan, Morocco, Pakistan, Sudan, Tunisia and Yemen, based on an index of relative deprivation. The paper finds that the inequities are relatively higher for maternal health as compared with child health. Among the selected countries, Egypt and Jordan seem to fare well compared with the others. The characteristic identities associated with larger inequities are maternal education and location.

Keywords: Relative Disparities, Health inequity, Maternal and Child Health, Socioeconomic Factors, Developing Countries, Income.

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1. Introduction

The concept of equitable health articulates profuse attributes of ethical justification ensued mainly from the disciplines of philosophy, medical-ethics and economics. Based upon these ethical ideals and principles, health inequality measurements are made at individual as well as group specific levels. However, the latter approach, which emphasizes upon important social determinants of health inequalities arguably, offers better policy inferences as compared to the former (Macinko & Starfield, 2002; Braveman et al, 2000). It is a challenging task to operationalise and measure several contexts of health inequity. But developing tools to provide a comprehensive and consistent description of inequities over time and space is essential to guide public policy on health. Availability of health information and its level of disaggregation become crucial in evaluating health inequities. Prior to the advent of Demographic health surveys (DHS), health information was restricted to mortality related aggregate measures and therefore it was practically impossible to evaluate inequities. Information collected in DHS provides a unique opportunity in this aspect and its wide coverage offers an opportunity to comprehend health disparities across many countries/regions of the world. One such region is the Arab region where the entire region is yet to be surveyed. Some of the health indicators in the region may be better compared with other regions of the

world, but given the prevailing levels of socio-economic inequality, its impact on health is worth examining. Hence this is a preliminary attempt in that direction to evaluate health disparities across a selected set of countries of the Arab region. With this purpose, the discussion is planned in the following manner; section 2 suggests a new method for comprehending health inequities, section 3 informs about the data and variables used for the exercise whereas section 4 provides with the results thus obtained. Further, in section 5 we offer some theoretical reasoning behind the observed health disparities and attempt to corroborate it with some relevant evidence. The final section concludes by discussing the major findings of the study.

2. Methods

Measurement of inequity is generally made on the premise of an ideal against which any departure is said to be inequity. Such measurement could be between individuals or population groups. In this paper our concerns are related with the assessment of group disparities. While comparing any outcome between two population-groups we are ought to observe a disparity positioned around the aggregate prevailing level of the outcome. However, these disparities could not be directly termed as inequities rather they are derived inequities subject to the application of different ethical or economic ideals. We employ here a distinct approach of measuring group inequities manifested across a set of health outcomes in the form of relative deprivations. This measure derives the deviation from an ideal situation which says that the population subgroup share should be equal to the share in vulnerability. Based on this ideal, we construct the Index of Relative

Disadvantage (RDI) for the selected Arabic countries which displays the relative disadvantage that a specific group experiences with regard to any outcome. This has been computed here mainly for some important indicators of maternal and child health across relevant characteristics. This measure primarily exposes the degree of deprivation experienced by different characteristic groups.

Following (Jayraj & Subramanian, 2002), the RDI is derived in the following manner. We begin with a measure, which provides the incidence of health deprivation in the population and term it as the Ailment Prevalence Rate (APR). For a given population it is defined as the ratio of the number of ailing persons to the total population and is analogous to the poverty headcount ratio. Despite being an elementary index the strength of APR lies in its ease of interpretation and simple decomposability. The decomposability of APR allows us to write it as a population weighted sum of the group specific APRs.

$$APR=\sum_{i=1}^{n}\theta_i APR_i \qquad ...(i)$$

where, θ_i is the share of group i in the total population; APR_i is the ailment prevalence rate of group i; and i denotes the number of groups (ranging from i=1,2,…,k). For analytical purpose, these groups could be conceived in terms of aggregation of individuals with similar socioeconomic status or any other grouping criterion. A simple manipulation of (i) provides with the contribution (ω_i) of each group to total APR as

$$\omega_i = \frac{\theta_i APR_i}{APR} \qquad ...(ii)$$

A prerequisite to develop any measure of deprivation is to unambiguously define a reference norm based on ethical or economic principles and the relative deprivation is

then measured as the deviation from the reference norm. This measure follows the popular notion of equity in relative terms and defines a state of zero relative deprivation (neither advantaged nor disadvantaged) if the contribution of group i in APR is equal to its population share, i.e., $\omega_i = \theta_i$. if $\omega_i < \theta_i$, group i is relatively advantaged and if, $\omega_i > \theta_i$ the group concerned is relatively disadvantaged. These deviations from zero relative deprivation is written as

$$\delta_i = \frac{\omega_i - \theta_i}{\theta_i} \qquad ...(iii)$$

To normalize, δ_i is divided by δ_i^{max}, the maximum value that these deviations can attain. From (iii) it is evident that δ_i is maximum when ω_i attains its maximum value (ω_i^{max}) for any given θ_i. In order to derive the value ω_i^{max} equation (ii) is expressed in an alternative form as

$$\omega_i = \frac{\frac{n_i}{n} \times \frac{\alpha_i}{n_i}}{\frac{\alpha}{n}} = \frac{\alpha_i}{\alpha} \qquad ...(iv)$$

where, n_i is the population of group i and n is the aggregate population, therefore $n_i/n = \theta_i$ and α_i is the number of ailing individuals in group i and hence $\alpha_i/n_i = APR_i$. From (iv) it follows that ω_i is maximized when α_i is maximum. Note that α_i attains the maximum value of α if $n_i \geq \alpha$ and the maximum value of n_i when $n_i < \alpha$, that is

$$\omega_i^{max} = 1 \qquad ...\forall n_i \geq \alpha \qquad ...(v\text{-}i)$$

$$\omega_i^{max} = \frac{\theta_i}{APR} \qquad ...\forall n_i < \alpha \qquad ...(v\text{-}ii)$$

Since now we have defined the maximum values for ω_i we can proceed further to define δ_i^{max}, as follows;

$$\delta_i^{max} = \frac{1}{\theta_i} - 1 \qquad ...\forall n_i \geq \alpha \qquad ...(vi - i)$$

$$\delta_i^{max} = \frac{1}{APR} - 1 \qquad ...\forall n_i < \alpha \qquad ...(vi - ii)$$

Finally, the normalized value of the index of relative deprivation (RDI) is given by,

$$\delta_i^{*} = \frac{\delta_i}{\delta_i^{max}} = \frac{\omega_i - \theta_i}{1 - \theta_i} \qquad ...\forall n_i \geq \alpha \qquad ...(vii - i)$$

$$\delta_i^{*} = \frac{\delta_i}{\delta_i^{max}} = \frac{\omega_i - \theta_i}{\theta_i} \times \frac{APR}{1 - APR} \qquad ...\forall n_i < \alpha \qquad ...(vii - ii)$$

In order to express δ_i^{*} in terms of group specific population shares and ailment prevalence rates as well as APR for the aggregate population we use (ii) to write

$$\omega_i - \theta_i = \theta_i \left(\frac{APR_i}{APR} - 1 \right) \qquad ...(viii)$$

The manipulation done in (viii) allows for the following desired expression of δ_i^{*} as,

$$\delta_i^{*} = \left(\frac{\theta_i}{1 - \theta_i} \right) \left(\frac{APR_i}{APR} - 1 \right) \qquad ...\forall \theta_i \geq APR \qquad ...(ix - i)$$

$$\delta_i^{*} = \frac{APR_i - APR}{1 - APR} \qquad ...\forall \theta_i < APR \qquad ...(ix - ii)$$

Equation (viii) finds an easy and interesting interpretation in the sense that *a group is said to be relatively disadvantaged whenever δ_i^{*} is positive and is recognized relatively advantaged whenever δ_i^{*} is negative*. A ranking of i number of groups in ascending order of the obtained values of δ_i^{*} will place the least disadvantaged (most advantaged) group at the top of the index and the most disadvantaged (least advantaged) at the bottom of the index.

3. Data sources and variables

In order to construct the picture of extent of health deprivation across and it's spatial and group related dispersal, we have utilized the information available in the Demographic and Health Survey (DHS) country reports for seven Arabic countries. These countries (survey year) are Egypt (2005), Jordan (2002), Morocco (2003-04), Pakistan (1990-91), Sudan (1990), Tunisia (1988), and Yemen (1997). Notwithstanding the fact that for some countries it may pose a time zone problem it has the advantage of being one of the better information bases for these countries, which adopts an almost uniform questionnaire across surveys. Though, it limits us to perform analysis on more recent information as regards these countries, nevertheless, we chose to work with the available data to comprehend the larger cross country scenario and to explore how inequities are being displayed across different socioeconomic characteristics. Apart from the fact that the validity of our findings in case of a few countries might have some independent (relatively recent) historical clues, this paper also arguably offers some methodological and measurement-related insights, which could be exploited for presenting a more contemporaneous analysis as and when, the recent data become available.

By and large, for cross-country studies indicators such as life expectancy and mortality rates across population groups are employed. But increased number of health surveys and better information dissemination for equally sensitive health outcome indicators has allowed examining disparities in a much comprehensive manner. In this regard, the domain of maternal and child health has emerged as a major criterion to comprehend the

health inequities and allows for better interventions right from the preliminary stages of life. Therefore, we have used the measures related to child and maternal health and dataset on socioeconomic group disparities. As indicators of child and maternal health we have analysed the data on non-immunized population, malnutrition, prevalence of childhood ailments disease and institutional deliveries related indicators. These variables are defined in Table 1.

INSERT TABLE 1 HERE

4. Results

This section discusses the results obtained from the proposed method of RDI for comprehending the health disparity profile across the selected Arabic countries. These results are discussed under four subsections, where each subsection is exclusively devoted to discuss the specific group inequities across gender, place of residence, educational class and wealth profiles respectively.

4.1 Gender dichotomy and health disparities

In this section, the characteristic group of concern is gender, males and females. We present a consolidated picture of group related disparities in the distribution of ill-health or health disadvantages across the seven Arabic countries. The index of relative disadvantage (RDI) is computed separately for females and reported in Table 2 (a). As

regard child malnutrition, there is no definite pattern of disadvantage/advantage for either males or females. This is evident from the RDI values which bear positive and negative values across the nutritional indicators for the girl child. Similar is case across the health ailment indicators of ARI and Diarrhea, which in fact suggests a slightly advantageous position of female child in countries like Yemen and Morocco. The positive values of RDI for incomplete immunization in case of Sudan, Yemen and Tunisia are indicative of the disadvantageous position of girl child. Though, one may be skeptic regarding the estimates for these countries to depict a decade old scenario nonetheless, higher RDI values of 33 percent for Tunisia and 81 percent for Yemen are indicative of higher disparities between males and females that are definitely unacceptable at all for any point of time.

INSERT TABLE 2 HERE

4.2 Spatial location and health inequities

This section attempts to comprehend health inequities in terms of spatial dichotomy in the form of rural and urban locations. Undoubtedly, it is an important classification and has direct bearing upon health policymaking or to enhance health benefits. Here, Table 3 presents the picture of the disparities, which obtains between the rural and the urban areas in the distribution of health. The index of relative disadvantage (RDI) is computed separately for rural areas and is reported in Table 3. This table is parallel in construction to Table 2 but here in addition to other variables information regarding inequities in ANC visits and non-institutional childbirths are also included. What is immediately discernible

from the Table is that RDI is positive for almost all the indicators and across all the countries indicating the rural disadvantage and urban advantage in this regard. Furthermore, rural child and women are found to be relatively more disadvantaged in a systematic manner particular when the case of immunization, ANC visits and institutional deliveries are considered. Across the countries, the extent of disadvantages faced by the rural residents is by no means insignificant. For instance, in case of indicators such as non-immunized child, it ranges between 13 to 76 percent, for no-ANC visits from 14 to 60 percent and for non-institutionalized births it varies from 7 to 52 percent. Overall Egypt and Jordan demonstrate comparably lower disparity between the characteristic groupings whereas all other countries display substantially higher disparities. This calls for immediate attention and more so in providing for urban amenities in rural areas.

INSERT TABLE 3 HERE

4.3 Educational categories and health inequities

Educational stratification is said to be one of the important socioeconomic groupings to identify health inequities, especially as regard maternal and child health. Fundamentally, this is the reason for the observed positive RDI values especially across indicators of ANC, immunization and institutional deliveries signifying high relative disadvantages of being illiterate (see Table 4). In contrast with the educated ones, being illiterate poses a relative disadvantageous position of over 24 percent across these countries in seeking ANC care with the highest disparities of 65 percent for Tunisia. Though we acknowledge that it reflects a decade old story but the most recent ones are also no different from these

pictures. For instance, the most recent findings on Egypt and Jordan are suggestive of disquieting disadvantages of 32 and 24 percent respectively. Apart from this, literacy levels of mothers seems to have substantial bearing upon the nutritional status of child as indicated by the large positive RDI values for stunting, wasting and undernutrition. Except for Egypt and Jordan all other countries illiterates do stand at a vulnerable position as far as nutrition is concerned. This holds true across region and is easily the common factor which should be universally focused to enhance maternal and child health conditions though, it may also be possible that the illiterate ones are more plausibly among the low income households. Nevertheless, these RDI estimates indicate that if the mother is literate than it is advantageous for the child to escape undernourishment outcomes.

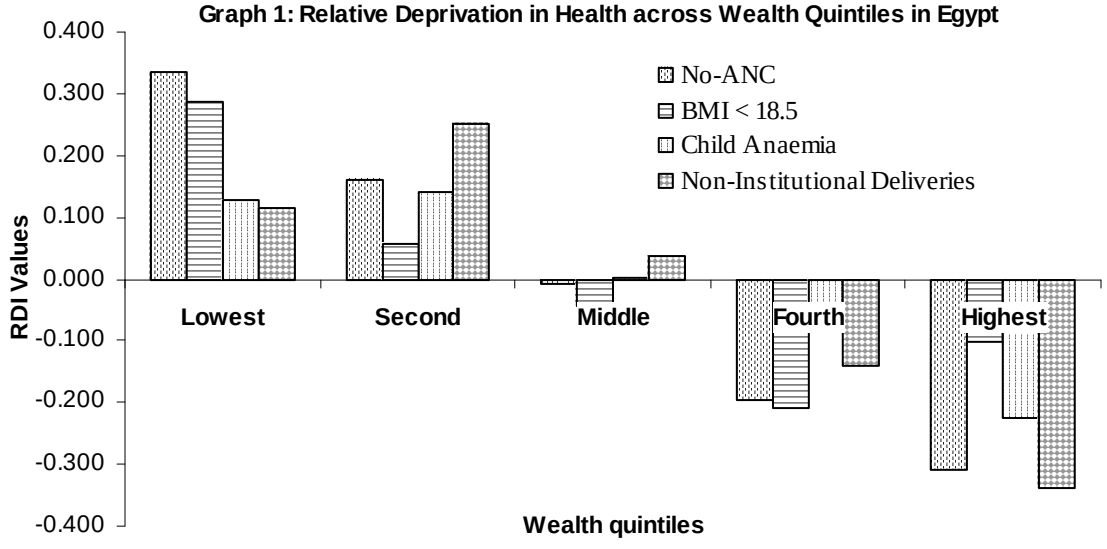
INSERT TABLE 4 HERE

4.4 Wealth quintiles and health inequities in Egypt

In this section we discuss the observed group disparities in health outcomes relating to the wealth dimension. In this regard, the non-availability of direct information in DHS country reports regarding the distribution of health outcomes across wealth groupings restricts the scope of analysis in this section to Egypt only. Nonetheless, if one wishes similar calculations could be performed by venturing into the unit level records of DHS for the respective countries. Returning back to the central issue, it is widely acknowledged that income of an individual significantly affects its health outcomes (Kakwani et al, 1997; Humphries & van Doorslaer, 2000) and the same is observable across the wealth quintiles in case of Egypt and Morocco. In graph 1 we show the RDI

values for four indicators related to maternal and child health, suggests that bottom two wealth quintile groups are consistently disadvantaged across all these indicators compared to the two relatively better off groups at the other extreme. For the indicator of BMI of ever-married females the relative disadvantages faced by the lower wealth quintiles were also estimated to be the highest. As regards the indicator of malnutrition among children there was no specific pattern observable across wealth groups. When compared to other indicators, the poorest quintiles were relatively lesser disadvantaged in case of childhood ailments with RDI values of ARI and Diarrhea being one percent and six percent respectively. Some of these findings, particularly nutritional status, suggest that health disparities necessarily need not get manifested along the income gradient but there can be certain other specific features which could potentially contribute towards the cause. On this remark, the next section presents a theoretical explanation for the observed group-related health disparities across these countries.

Graph 1: Relative Deprivation in Health across Wealth Quintiles in Egypt



5. Theoretical insights for the observed health inequities

In economic literature health has been largely conceived as a product resulting from a production process. Apart from the specificities of age and sex in determining health, such production involves aspects of consumption behaviour, education, income, environmental conditions and medical care accessibility and its utilisation. In other words, the resulting combination of these inputs primarily determines an individual's health status. It may be noticed that by definition demand arises from a combination of the above mentioned factors. It is widely acknowledged that individuals with better endowments of these factors have higher demand for health compared to the least endowed. These well-endowed individuals are better equipped to minimize causal (input related) as well as uncertain adversities on health whereas weakly endowed persons largely fail to insure themselves against health vulnerabilities. In this section we subscribe to the arguments presented in Grossman (1972) as well as Wagstaff (1986 & 2002) and suitably modify them to draw some valuable inferences regarding the existence of group related disparities in developing countries.

The discussion begins with the income domain and thereafter incorporates group related non-income aspects in the analysis. It supposes a convex-concave relationship between health and medical care, fundamentally to better elucidate the expected relationship between health and medical care expenditure in a developing country setting by

accounting for the indivisible nature of health expenditure. As we shall see that this small modification helps to comprehend health inequality in a striking manner. To elaborate, the relationship between medical care expenses and health outcomes is read in three phases – phase of *no returns, increasing returns* and, finally, *diminishing returns*. It is largely true for a developing country that an individual seeks medical care only when found in a perceptibly poor health status. Under such circumstances, the first thing would be to seek access to medical care. Allowing for a universal popularity of institutional health care here we bring in the elements of traveling expenses (or transaction cost in general) and diagnostic expenditures as a significant determining factor. It must be noticed that all these expenditures are unavoidable and across circumstances indivisible. This reflects an important feature of health care seeking behavior because if this initial indivisible component is high enough it may discourage health care seeking behavior especially among the low income individuals. For instance, it may affect the perceptive behavior towards ailments particularly among low income households. These elements of transaction or diagnostics have been issue of concern among developing countries and could be clubbed together to form the first phase of *no returns to health*. Nevertheless, once the ailment is diagnosed, the treatment (drugs or surgical) provides an increasing return on health outcomes for any additional expenditure. This phase of *increasing returns to health* remains till the strict drug dosage schedule, as advised by the medical personnel, is in operation. After this stage, further increments in medical care expenditure obtains declining marginal improvements in health and this marks the third phase of *diminishing returns to health*. Further, health (H) is supposedly produced with the help of a vector of goods and services, medical care (M) and the individual's time on health

producing activities and that the medical care is nor substitutable neither complementary to the other inputs. Individuals decide on how much of their income (Y) has to be allocated for producing health and, therefore the rest on, non-health related consumption (C). Figure 1 explores the case of any such individual. Quadrant I depicts the frontier of possible combinations for health and non-health related consumption that exhausts the individual's income. The individual is assumed to have well-behaved, monotonic and convex, preferences for health vis-à-vis non health related consumption as shown by the indifference curves. Here, the point of tangency between the consumption frontier and the indifference curve gives the preferred combinations of health and non-health consumption. Quadrant II depicts the convex-concave relationship between medical care and health whereas quadrant III sketches individual's budget constraint. Quadrant IV contains the 45^0 line to trace consumption back to Quadrant I.

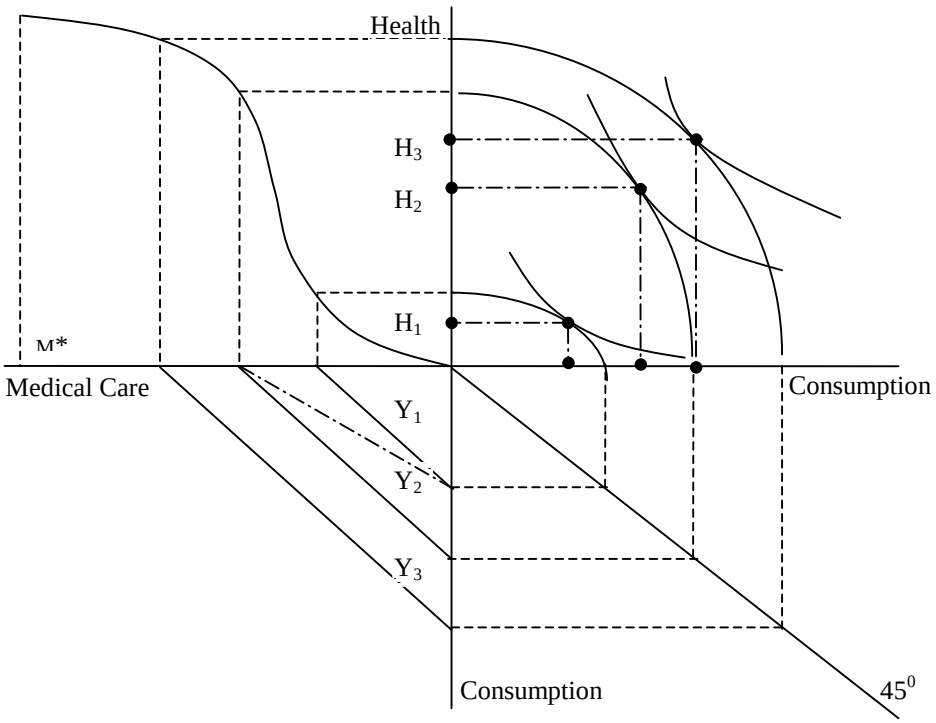
5.1 *Purely income related health inequality*

It is evident from the model that individuals with higher income would probably possess better health then compared to low income ones. In figure 1, the individual with a budget constraint Y_2 has higher income than individual with budget constraint Y_1 ($Y_2>Y_1$). The higher income Y_2 would have a consumption frontier outside the frontier of Y_1 implying that the individual with income Y_2 would end up with a higher level of health. The level of health inequality between them is shown by the gap between H_2 and H_1, while the degree of relative inequality is equal to the ratio H_2/H_1. Similar is the case when we compare Y_3 with Y_1 or Y_2 because $Y_3 > Y_2 > Y_1$. This suggests that, if individuals have

different incomes, and all less than the amount required where the marginal benefits of medical care expenditure is zero (say, M*), there would be some degree of income related health inequality[1]. The framework suggests that if everyone's income is above Y_2, then, rising (average) income levels for all would lead to reduction in health inequalities irrespective of the impact upon income inequality. This is because the phase of diminishing health returns settles in for any additional medical care at higher levels of income. The concerns regarding the less obvious effects of rising average incomes on health inequalities holds good at very low levels of income, such as below Y_2 level. To elaborate, if incomes are between Y_1 and Y_2 there are increasing returns, and for incomes less than Y_1, the returns on medical care are very low or even zero. This argument comes out strikingly once a larger component of *no returns* is introduced for initial phase of care seeking. Reduction in the price of medical care through subsidies would allow purchasing a larger quantity of medical care and, therefore, lead to increased health benefits. This is shown by the rotation of the dotted budget constraint Y_1 in figure 2. The important thing to be noticed here is that the reduction in prices of medical services for which the health benefits are the maximum comes only after one has incurred the initial transaction cost. Therefore, interventions to reduce transaction cost could also prove to be crucial in reducing health inequalities.

[1] Once all individual income crosses this hypothetical threshold level (M*) there would not be any income related health inequality irrespective of different levels of income in the region beyond M*; a proposition which could be tested by examining health inequities among very high though equal income individuals but not without controlling for other elements. However, the hidden assumption over here is that the marginal benefits approach zero for a finite range of income and not asymptotically.

Fig. 1: Health inequalities in the demand for health framework

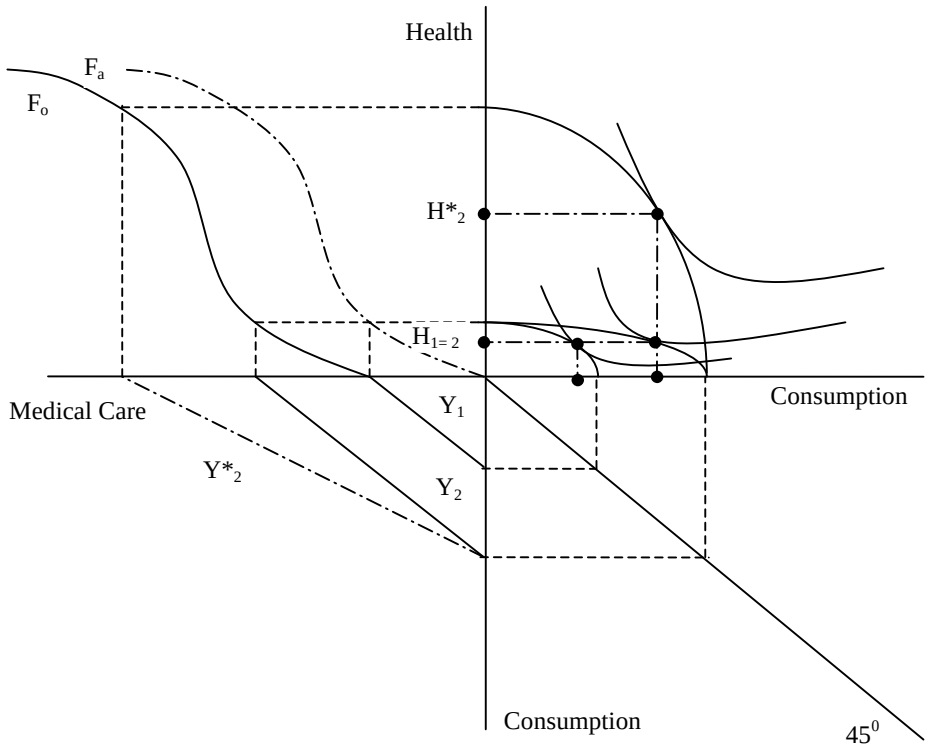


5.2 ***Group related health inequality***

Given the income, it is demonstrated that publicly financed health care reduces the price of medical care and allows for purchasing a greater amount of medical care thus compressing health inequalities (Wagstaff, 2002). But it necessarily need not have an equitable impact if certain non-income dimensions such as place of residence or normative behavior of the individual as regards gender discrimination or poor health awareness and education are brought into consideration. This is precisely the case with many developing countries wherein despite free public provision of maternal and child health services the health outcomes vary substantially. To theoretically verify this proposition, we consider the case of differential geographical accessibility to health care service across individuals which could be grouped for simplicity as rural and urban areas. In figure 2, the argument of differential access to health care has been incorporated along

with subsidized health services in order to demonstrate its influence upon health inequality.

Fig. 2: Health inequalities with differential access to medical care



In the absence of any access related problem the health-medical care function would be given by the curve F_a (which is similar to one described in Figure 1). In such case the individual with lower income Y_1 would be able to achieve positive health benefits of amount H_1. Now if we provide for the case of improper access to health services, the health-medical care function gets shifted to the left and this new function is here labeled as F_o. It is noticeable that the curve F_o does not begin from the origin as F_a. It implies that in order to benefit from medical services, individuals are now required to incur a certain amount of access related expenditures (such as travel cost). Under such circumstances the individuals with incomes less than Y_1 would not be able to achieve any health benefits

whereas, individuals with income Y_2 would be able to obtain H_2 (H_1=H_2) level of health benefits. Furthermore, if the medical services are subsidized than the individuals with income Y_2 would be able to utilize these services and achieve greater health benefits. This change follows by rotating the budget constraint of Y_2 as depicted by the dotted budget constraint. In this process the degree of health inequality also increases from OH_2 to OH^*_2. Altogether, it must be observed that in the absence of subsidization and accessibility problems the gap between health inequities was narrower then compared to a condition of highly subsidised health system with accessibility problems. In other words, a rational policy to address health inequalities, in fact, aggravates the inequality problem. Such problems, therefore, are required to be addressed in a dynamic sense, but meanwhile in this process inequality creeps in the health space. The type of health inequality is labeled as group related effects because even if we control for income the differential accessibility to health care significantly affects health outcomes across regions. We conclude this simplistic framework by arguing that subsidizing medical services reduces health inequality only under universal access otherwise it may aggravate the problem by benefiting only to the individuals who belong to better groups.

5.3 Some Corroboration

Our measurement of group disparities and disadvantages has indicated that there exists a substantial difference between certain socioeconomic groupings as explained with the help of a simple model. In this sub-section our aim is to substantiate the offered theoretical reasoning and provide some straightforward evidence for the same. The DHS

country reports for Jordan and Yemen provide us with useful information regarding accessibility problems for maternal health care which is to a great extent related to spatial disadvantages (Table 5).

INSERT TABLE 5 HERE

According to Table 5 (a), in Jordan altogether 61 percent of the urban and 76 percent of the rural ever married women have some kind of problem in accessing health care. of this lot, only one third of the problem is a direct outcome of monetary constraints whereas the two thirds of the problem arise mainly due to some of the aspects related to gender issues such as getting permission to go for treatment or not wanting to go alone, awareness problems such as not knowing where to go and spatial problems such as distance to health facility, transportation difficulties and concerns regarding availability of female providers. Particularly in rural areas of Jordan, almost half of the ever married women population report of physical accessibility problems including distance and transportation. Similar problems are also experienced by women in Yemen who wish to use health facilities as the place for delivery (Table 5-b). Around three-fourths of the urban women who did not deliver at any health facility considered home to be a better place of delivery indicating an element of choice and only 8 percent of the women actually faced accessibility constraints. But in the case of rural women, only one-half of the women wished to deliver at home whereas around 25 percent of the women were faced with problems like unavailability or remoteness of services.

Turning our attention towards the extreme child health outcomes of under five mortality and infant mortality, we attempt to understand what type of intervention factors could help to lower these undesired outcomes across Arabic countries. For this purpose we employ a multiple regression analysis using the vital indicators information for 16 Arabic countries available in the world development indicators 2006, published by The World Bank. Table 6 shows the results of a regression of the under five and infant mortality rates on the major intervention elements of immunization coverage (percentage of children aged 12-23 months with DPT), adult female literacy (percentages 15+), PPP gross national income per capita (2004), public health spending (as a percent of total) and health workers index (physicians, nurses and midwives per 1000 population).

INSERT TABLE 6 HERE

For under five mortality, the results of model 1 indicates that GNP per capita as well as public health spending though bears the expected negative signs but are statistically insignificant in reducing the mortality rates. Major and direct intervention factors of immunization coverage and female education bear strong and significantly negative relationship with mortality rate. Since largely it is argued that public health spending should affect health outcomes but it is not. However, arguing from the theoretical position of the paper in order to justify these findings, instead of public spending we use a variable of health workers index for the population. This variable has an advantage in the sense that public spending may be high but could be concentrated or either it could be

the case that the private spending must be very low to provide its counterpart a statistically higher share. Model 2 uses the health workers index which has lesser defects along with the immunization rate which is another direct determinant of child health. It is found that both the variables turn out to be statistically significant with expected signs. The coefficient of health workers index suggests that a marginal increase in the concentration of health workers could bring down child mortality levels by around 11 units. Similarly, one percent increase in the immunization rate could bring about improvements in child mortality levels by 1.2 units. The R-squared values also suggest that these two major influential variables alone explain 90 percent of the causes behind under-five mortalities. Model 3 and Model 4 are used to comprehend the effectiveness of these factors upon infant mortality levels. The regression results of infant mortality also indicate that though public health spending and GNP per capita could bring down the mortality levels but not as much as improved immunization coverage and better female education.

6. Discussion and conclusion

This paper has attempted to measure disparities and disadvantages in health across seven Arabic countries and thereafter provided a theoretical reasoning for the observed disparities by corroborating some evidence. In order to measure health disparities across different countries this paper suggested a new measure of RDI. Instead of computing multiple characteristics-based inequities in a single health outcome, it was deemed fit to assess multiple characteristics based inequity across a set of health outcomes. The prime focus in this paper has been to identify certain group related characteristics, which are

crucial in determining these health disparities. For the Arabic countries it was observed that though many countries possess higher levels of health achievements but there are certain health disparities, which get manifested with certain characteristics. Though it is not claimed here that the findings of this paper are startling but what was essentially aimed from this macro-exercise was to identify the immediate intervention worthy features which could make a difference. With this perspective, the paper identified the two major characteristics of maternal education and physical accessibility (especially a rural problem) giving rise to disparity in health outcomes of both mother and the child. In an analysis of the distribution of health problems across different well-defined socio-economic groupings, we find that a disproportionate burden of it is borne by rural and illiterate residents relative to urban and educated ones. Furthermore, within the countries analysed, Egypt and Jordan were observably the countries with better health and health equity profiles whereas Sudan and Yemen were performing poorly. Our findings lead us to argue that urban factions are advantaged in terms of health outcomes not only because they are educated but also due to the fact that they have adequate access to health facilities. However, it was also observed that not all among the urban mothers believe that health facilities are better than their home for child birth and ANC care, which is essentially a matter of choice or more to do with the quality of the facility itself. Low-income countries of Pakistan, Sudan and Yemen are also identified with higher levels of nutritional disparities particularly in the rural sectors. Hence it is not surprising to note that child mortality rates are higher in these countries. To conclude, this exercise is a preliminary exposition of the kind of health disparity prevailing in the Arab World. While health indicators in general may not be of alarming levels when compared to the other

regions of the world, there remains a notable disparity across characteristics groups. Identifying the level and characteristic of such disparity reiterates the significance of gauging inequities in circumstance of a better prevailing situation in aggregate. Often the identified attributes associated with these inequities could very well direct intervention, which not only will bridge such inequities but help lettering the levels of these outcomes. A temporal monitoring of such inequities is made possible by the periodic conduct of DHS surveys in these countries. It therefore needs to be encouraged across all the nations world-wide for a better cross-sectional and temporal evaluation.

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Table 1: Definitions of maternal and child health Indicators used in the analysis

Stunting (H/A)	Children whose height-for age is below minus two standard deviations (-2 SD) from the median of the reference population are considered short for their age, or *stunted.*
Wasting (W/H)	Children whose weight-for-height measures are below minus two standard deviations (-2 SD) from the median of the reference population are too thin for their height, or *wasted.*
Underweight (W/A)	Children whose weight-for-age measures are below minus two standard deviations (-2 SD) from the median of the reference population are *underweight* for their age
Not fully immunized (N-imm)	A child (12-23 months) is considered not to be fully immunized if the child has not received either of the vaccinations, namely; BCG, a measles or MMR vaccination, three DPT vaccinations, and three polio vaccinations.
Acute Respiratory Infection (ARI)	If in the last two weeks the child (< 5 years of age) had cough accompanied by short rapid breathing that was chest related.
Diarrhea	Whether any of the children under five years of age had had diarrhea during the two-weeks preceding the survey
No Antenatal Care (N-ANC)	A birth is considered not to have received any care if the mother said that she had made none antenatal care visits, to a trained medical provider for care for the pregnancy.
Non-Institutional deliveries (N-inst)	Child births or deliveries not at any health facility
BMI	The body mass index (BMI) is expressed as the ratio of weight in kilograms to the square of height in meters (kg/m2) and here is analysed for ever-married women.

Table 2: Gender inequity in selected indicators as per alternative measures

2) Estimated Values of Relative Deprivation Index (RDI) for Females

Country	H/A	W/H	W/A	Not fully immunised	ARI	Diarrhoea
Egypt	-0.067	-0.025	-0.001	-0.022	0.055	0.000
Jordan	0.082	-0.121	0.068	-0.023	-0.096	0.003
Pakistan	-0.021	-0.106	-0.011	-	-	-
Sudan	-	-	-	0.027	-0.043	-0.014
Tunisia	0.051	0.314	-0.014	0.326	-	-0.033
Yemen	-0.014	0.218	-0.020	0.806	-0.041	-0.042
Morocco	-0.056	-0.011	-0.020	-0.209	-0.044	-0.05

Source: computed by authors using group-specific information from DHS Reports for respective countries.

Table 3: Location-wise inequity profile as per alternative measures

3) Estimated Values of Relative Deprivation Index (RDI) for being Rural

Country	H/A	W/H	W/A	Immunised	ARI	Diarrhoea	No ANC	Deliveries
Egypt	0.079	-0.345	-0.051	0.126	-0.016	0.070	0.141	0.516
Jordan	0.168	0.069	0.208	0.756	-0.007	0.029	0.269	0.073
Pakistan	0.186	0.121	0.196	-	-	-	0.441	0.642
Sudan	-	-	-	0.185	-0.027	0.156	0.596	-
Tunisia	0.352	-0.117	0.353	0.378	-	0.206	0.335	-
Yemen	-0.014	0.218	-0.020	0.393	0.020	0.126	0.408	0.283
Morocco	0.289	0.184	0.365	0.400	0.028	0.037	-	-

Source: computed by authors using group-specific information from DHS Reports for respective countries.

Table 4: Education-related inequity profile as per alternative measures

4) Estimated Values of Relative Deprivation Index (RDI) for being Illiterate

Country	H/A	W/H	W/A	Immunised	ARI	Diarrhoea	No ANC	Deliveries
Egypt	0.100	-0.041	0.087	0.094	-0.035	0.028	0.317	0.304
Jordan	0.143	0.047	0.082	0.799	0.017	-0.017	0.237	0.096
Pakistan	0.344	0.374	0.345	-	-	-	0.422	0.500
Sudan	-	-	-	0.233	-0.018	0.141	0.653	-
Tunisia	0.276	0.018	0.234	0.349	-	0.143	0.399	-
Yemen	0.227	0.195	0.247	0.281	0.067	0.181	0.472	0.194
Morocco	0.324	0.188	0.405	0.433	0.087	-0.036	-	-

Source: computed by authors using group-specific information from DHS Reports for respective countries.

Table 5: Place of residence and problems in accessing health care for women

5 a) Percentage of all ever-married women who reported they have big problems in accessing health care for themselves when they are sick, by type of problem and place of residence, Jordan 2002

	Knowing where to go for treatment	Getting permission to go for treatment	Getting money for treatment	Distance to health facility	Having to take transport	Not wanting to go alone	Concern there my not be a female provider	Any of the specified problem
Urban	9.3	6.2	29.4	24.8	25.9	26.2	25.5	61.3
Rural	12.2	10.9	33.2	44	46.6	35.6	27.8	75.7

5 b) Percent distribution of births in the five years preceding the survey that were not delivered at a health facility by reason for not using a health facility, according to place of residence, Yemen 1997

	Services not available	Services too far away	Costs too high	Premature/sudden delivery	Home is better	Other	Missing	Total
Urban	4.8	3.5	6.7	8.8	76.1	0.0	0.2	100
Rural	5.5	19.9	13.5	5	55.9	0.1	0.1	100

Source: DHS country reports for Jordan (2002) and Yemen (1997).

Table 6: Regression results for under-five mortality and infant mortality

	Under-five mortality		**Infant mortality**	
	Model 1	***Model 2***	***Model 3***	***Model4***
Variables	**Parameter** ***(t-value)***	**Parameter** ***(t-value)***	**Parameter** ***(t-value)***	**Parameter** ***(t-value)***
Constant	214.476***	186.365***	156.602***	162.189***
	(7.673)	*(5.922)*	*(7.635)*	*(8.748)*
Immunization rate (DPT)	-1.245***	-1.2126***	-.764***	-0.882***
	(-3.685)	*(-2.809)*	*(-3.083)*	*(-3.397)*
GNP per capita at PPP 2004	-0.001		-2.36E-04	
	(-0.617)		*(-.297)*	
Adult female literacy rate	-0.819***		-.638***	-0.823***
	(-2.733)		*(-2.901)*	*(-4.177)*
Public spending on health	-0.075		-0.247	
as percent total	*(-0.165)*		*(-0.172)*	
Health workers index	-	-10.810***		
		(-3.193)		
F-statistic for model	20.09	29.88	19.87	36.02
R-sqaured	0.920	0.895	0.919	0.911
Adjusted R-squared	0.874	0.865	0.873	0.886
N	16	16	16	16

Note: For the estimation, information is used from World Development Indicators 2006. *** at one percent level of significance.