Unwanted fertility among the poor: an inequity?
Duff Gillespie, a Saifuddin Ahmed, a Amy Tsui a & Scott Radloff b

Objective To determine if higher fertility and lower contraceptive use among the poorer segments of society should be considered an inequality, reflecting a higher desire for large families among the poor, or an inequity, a product of the poor being prevented from achieving their desired fertility to the same degree as wealthier segments of society.

Methods Using the most recent Demographic and Health Surveys from 41 countries, we analysed the differences in fertility in light of modern contraceptive use, unwanted fertility (defined as actual fertility in excess of desired fertility) and the availability of family planning services found among poorer and wealthier segments of society. The asset index in each survey was used to construct wealth quintiles and the concentration index (CI) of income inequality was found in health variables.

Findings The relationship between the CI found in the total fertility rate and the use of contraceptives was linear, R-square of 0.289. Unwanted births in the poorest quintile were more than twice that found in the wealthiest quintile, respectively 1.2 and 0.5, although there was wide variation among the 41 countries. The CI in our measure of family planning availability (radio messages, knowledge of services and contact with field workers) was largely positively associated with the CI in modern contraceptive prevalence, respectively R-squares of 0.392, 0.692 and 0.526.

Conclusion In many countries the higher fertility and lower contraceptive use found among poorer relative to wealthier populations should be considered an inequity.


Introduction
In 2000, the United Nations Millennium Declaration created the Millennium Development Goals (MDGs). These goals established the elimination of poverty and the attainment of equity as a core organizing theme for development activities, including health. A large literature on inequalities in health exists, although this knowledge has not consistently translated into programmes designed to fill inequality gaps. In contrast, there has been very little research on possible inequalities in fertility, the number of children people have. We think an important reason why fertility inequalities have not received much attention is that they do not easily fit into the concept of inequality.

Although there is not a consensual definition of inequality, most economists and ethicists agree with Whitehead in distinguishing between a difference that has no moral implications, an inequality, and a difference that does have moral implications and is considered unjust, an inequity. The fact that Scandinavian-Americans are quite often blond is an inequality with no moral implications. Yet the fact that poor children's mortality rate from preventable diseases is much higher than that found among children from wealthier families raises many moral issues and is considered an inequity. A difference labelled an inequality is likely to have a societal response quite different from a difference designated as an inequality. Indeed, an inequality, in the absence of inequity, may not provoke any societal response.

Inequities exist between different groups: gender, ethnic, regional, religious, social and racial groups. However, most attention is given to inequalities between the poor and wealthy or, more accurately stated for many developing countries, between the poor and the less poor, since so few persons in these countries would be considered wealthy in industrialized nations. In this paper, we examine whether unwanted fertility among the poorer strata of societies compared with the wealthier strata is an inequality or an inequity. In order for a condition to be considered an inequity, we believe it must have four characteristics:

• It must be disproportionately present in a disadvantaged population relative to better-off population segments.
• It must be amenable to effective interventions.
• It must be undesirable.
• Interventions to relieve or lessen this condition are less available to the disadvantaged than to wealthier populations.

The above four properties of inequality are much discussed in the health inequality-inequality literature, but have received scant attention in the family planning literature. We use these characteristics as the analytical framework for determining if the differences in unwanted fertility between the poor and less poor segments of society constitute an inequality produced by an injustice, or simply represent a difference between fertility patterns reflecting one group’s desire for larger families and another group’s preference for smaller families.

a The Bill and Melinda Gates Institute for Population and Reproductive Health, Bloomberg School of Public Health, Johns Hopkins University, Baltimore, MD, USA
b Office of Population and Reproductive Health, United States Agency for International Development (USAID), Washington, DC, USA

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Methods

Our analysis is based on Demographic and Health Surveys (DHS) data from 41 developing countries collected by Measure DHS. All of these national household sample surveys collected extensive data from women between the ages of 15 and 49 years concerning their reproductive behaviour and included an asset index for categorizing respondents’ relative socioeconomic status. The asset index is the weighted sum of household assets, with weights derived from a principal components analysis. Household assets include housing characteristics (e.g. number of rooms, type of floor, access to water and type of toilet) and ownership of consumer durables (e.g. radio, television, motor vehicle and bicycle). Using the asset index, wealth quintiles were calculated for the 41 developing countries with available DHS data as of 2003. Most analyses group the population into wealth quintiles, with the first being the poorest and the fifth being the least poor.

We also use the concentration index (CI), an analytical tool used extensively by The World Bank, to quantify the extent to which an income-related difference, or inequality, is present in a health variable. A CI of zero means there is no inequality. A negative or positive CI indicates the concentration of income inequality in a particular variable. The further the CI value is from zero, the stronger the income-related inequality. A negative CI means that a bad condition, such as measles, is disproportionately found among the poor. Contrastingly, a positive CI is associated with something good, like immunization coverage, being less in poorer strata of society and greater in the wealthier strata.

Three common demographic measures are used in this study: the total fertility rate (TFR), the unwanted total fertility rate (UTFR), and the modern contraceptive prevalence rate (MCPR). TFR is the total number of births the average woman would have at the end of her childbearing period if she passed through this period bearing children at observed rates of age-specific fertility. The DHS calculates wanted fertility rates by comparing the number of living children at the conception of each child in the past three years with the ideal number of children reported by female respondents. If the number of children living at the time of conception is less than the ideal number, the birth is considered wanted. If the number living is equal to or greater than the ideal number, the birth is considered unwanted. The difference between the wanted fertility and actual total fertility is the unwanted fertility rate.

MCPR is calculated based on the respondents’ reported use of modern contraceptive methods at the time of the interview. Modern methods include male and female sterilization, oral contraceptives, IUDs, injectables, implants, male and female condoms, foams and jellies. Not included in MCPR are rhythm, withdrawal and periodic abstinence. We choose to use MCPR since this most directly reflects the service interventions sponsored by organized family planning programs.

Our statistical approach involves calculation of the concentration index for total and unwanted fertility and modern contraceptive use measures for each of the 41 countries with available survey data (Table 1). The values are plotted against each other and simple regression lines are fitted to display their relationships graphically. We also assess inequitable coverage of three contraceptive service delivery interventions — radio exposure to family planning messages, knowledge of a family planning source, and contact with a family planning fieldworker — using the concentration index. The relationship between the concentration indices for each of these measures with that for MCPR are also displayed graphically with regression lines to capture their linear or curvilinear associations.

Results

In this section we will determine if the difference in unwanted fertility between the poor and wealthy is an inequity, by seeing if there is evidence to support the four required characteristics.

Disproportionately present in disadvantaged population

It is axiomatic that the poorer a group, the more disadvantaged they are relative to those better off. What may be surprising is the pervasiveness of their handicapped situation. Essentially, the poor find themselves positioned unfavourably relative to those better off in every developmental category. In the 41 countries surveyed, the poorest quintile had a TFR of 6, almost twice as high as the TFR of 3.1 found in the wealthiest quintile. The first condition for an inequity is thus satisfied, as TFR is much higher among the poor than the less poor.

This inequality in TFR, prima facie, can not be considered an inequity. The poor may have more children than the less poor because they want more children than their wealthier counterparts. If the poor want and have more children than those wealthier, it can hardly be considered an inequity even if larger families may exacerbate their disadvantaged position in society.

Effective intervention

To be an inequity, an undesirable condition must be amenable to an intervention that can eradicate or ameliorate it. When an effective intervention is more commonly practiced by the better off social strata than by the less well off, an inequity most likely exists. However, if there is no effective intervention, there can be no inequity. The fatal hereditary disease Tay-Sachs is found almost exclusively among Ashkenazi Jews and has no cure. Since Ashkenazi Jews are not being deprived of an effective treatment, there is no inequity.

Humans can and do control their fertility. It is well established that family planning is the main reason for the dramatic drop in the world’s fertility during the second half of the past century. Other important variables that directly impact reproduction are marriage patterns, breastfeeding and abortion. The global decline in fertility has been remarkable: in the early 1950s the world’s TFR was 5, while today it is 2.7. Looking only at the less-developed world, the comparable TFRs are 6.2 and 2.9.

The strong relationship between family planning and TFR in the 41 countries study is shown in the left panel of Fig. 1. The explained variation (R-square value) for the fitted linear relationship is 0.593. The correlation of −0.77 (not shown) is for all 41 countries in this study. Higher levels of contraceptive use are associated with lower TFRs. Specifically, for every 13-point rise in modern contraceptive prevalence, the total fertility rate declines by 1 birth.

The right panel of Fig. 1 shows the relationship between inequalities in TFR and modern CPR. The fit for these two inequalities is less tight (R-square of 0.289) than for the actual values, seen in the left panel. However, the
relationship is clearly linear. A one-unit change in unequal access to modern contraception results in a 0.179 increase (P < 0.001, 95% CI = 0.88, 0.279) in TFR inequality.

Family planning thus is an effective way for individuals and groups to lower their fertility if they so desire; and reducing inequality in access to modern contraception will also reduce the inequality in fertility. The second condition for an inequity is then satisfied — there is an intervention, family planning, that can be used to regulate fertility.

Undesirable
No one wants to die or see a loved one die, and illness is equally unwelcome. If one group has higher mortality and morbidity rates than another, one can assume the disadvantaged group would want access to interventions that will reduce their disproportionate number of deaths and illnesses. Persons calling for universal coverage of effective health interventions and who expose the inequities of present coverage do not have to convince others about the undesirability of sickness and death. But pregnancy is not an illness, and a birth is the beginning of life, not its end.

Fertility, and ways to control it, has many more nuances than death and ways to avoid death. Death is almost always viewed as undesirable. Learning one is pregnant is often a happy discovery, but it is also frequently received with dismay, as evidenced by the 46 million abortions annually. Over half of the world’s couples are practicing family planning to avoid pregnancy. Whether a pregnancy or baby is received with joy, ambivalence or despair depends on such things as gender, birth order, age and marital status of the parents and their socioeconomic situation. The extensive use of prenatal sex selection to abort female fetuses is one of the more horrific manifestations of gender bias. Although high fertility rates do not carry horrific manifestations of gender bias.

It is possible to estimate how much observed fertility is unwanted and if this varies from one socioeconomic stratum to the next. Table 1 presents the differentials in total and unwanted fertility by wealth quintiles and the concentration index for each of the 41 developing countries. Three countries (Bolivia, Haiti and Yemen) show national unwanted fertility levels of 1.8–2.0 births per woman. It is striking that no quintile in any of the 41 developing countries registers an average unwanted fertility rate of 0; the lowest is 0.2 births in Kazakhstan and Niger. Significant excess fertility levels of 2 births or more are found among the poorest quintiles in Bolivia, Colombia, Haiti, Nepal, Peru and the Philippines. A high ratio is observable between the (unweighted) average number of unwanted births in the poorest two quintiles of 1.2 and 1.1 and the wealthiest two with 0.5 and 0.8 respectively. The average concentration index of –0.133 reflects the substantial disparity in reproduction levels beyond what women want.

Fig. 2 displays the relationship between inequality in modern contraceptive prevalence and inequality in unwanted fertility. While higher levels of MCPR inequality are positively correlated with higher inequality in unwanted TFR, it is the desirable reduction in joint inequality that is the noteworthy finding. The left side of Fig. 2 maps countries where MCPR and unwanted fertility inequality are particularly low. Some 21 countries have CI values for MCPR 0.2 or lower and CI values for unwanted fertility 0 or lower. (The closer to 0 or the more negative the CI, the less inequality in unwanted fertility.) Another quarter of the countries experience moderate inequality in MCPR (0.2 to 0.4) and marginal unwanted fertility, while the balance have significant MCPR in-
equality (CI values over 0.4) but are not characterized by much inequality in unwanted fertility. Most of the countries in these latter two groups are located in sub-Saharan Africa, where the concept of excess or unwanted fertility is not yet endemic in the population.

Effective interventions are less available to the disadvantaged

The final condition needed for an inequity is a disparity between the poorest and wealthiest quintiles in terms of the availability of health technologies and services that address the inequality; in this case, excess fertility expressed as unwanted fertility. For there to be inequity, the wealthiest must have adequate service coverage and the poorest, inadequate. Obviously, if both the quintiles have inadequate access, a detrimental situation exists, but it is an equitable
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To determine if an inequitable disparity in family planning services exists between the quintiles, we examine three indicators for childbearing-aged females: exposure to family planning messages over the radio, knowledge of a family planning source and family planning outreach (contact by a family planning worker). These indicators are directly correlated with modern contraceptive practice and reflect the population’s access to family planning information, service outlets and community fieldworkers. In all the 41 surveys, female respondents reported whether they have heard a family planning message on the radio in recent months, whether they know of a place to obtain a family planning method and if they have been visited by a fieldworker in the past year who discussed family planning with them.

Table 2 (available on the web version only at http://www.who.int) provides the national prevalence on the three indicators for each of the 41 countries; fieldworker outreach is not available for five countries. Among these countries, the MCPR concentration index values are lowest in Kazakhstan with a CI value of 0.024 and highest in Mauritania (0.571 and 0.379 respectively). The Philippines shows the least inequity on all three family planning service coverage indicators (0.011, –0.026, –0.158 respectively) although national coverage levels are moderate and low in the case of source knowledge (17.7%).

In Fig. 3, panels (a) to (c) display the relationship between inequality in the three service coverage indicators and inequality in modern contraceptive prevalence. With increasing inequality in service coverage, inequality in modern contraceptive use rises fairly linearly. The R-square values between the concentration indices for the three indicators and modern contraceptive use are high, respectively 0.392, 0.692 and 0.526. The close relationships between inequalities in radio exposure, source knowledge and fieldworker contact, and inequality in MCPR are further reflected in the regression coefficients or slopes for these lines (not shown). For example, a unit change in the concentration index for radio exposure results in a 0.91 (nearly one unit) change in the concentration index for MCPR. The counterpart changes for source knowledge and fieldworker contact are 1.08 and 1.16 respectively.

These three indicators evidence the disparities between the wealthiest and poorest segments of the population and their direct correlation with inequality in modern contraceptive use. The fourth characteristic of an inequity is thus met. The poorest women have relatively less access to contraceptive service coverage than wealthier women and are less likely to use modern contraceptives. This places them at higher risk of unplanned pregnancies and associated negative outcomes for mother and child.

All three panels in Fig. 3 help identify country clusters with high income inequalities in both service coverage and MCPR, where targeted expansion of interventions among the disadvantaged can reduce inequity. Recent stalls in the fertility transitions of several sub-Saharan African countries show the need for intensification of family planning intervention efforts.

Discussion

Inequity is a useful organizing concept for mobilizing resources for reducing mortality and pointing out the need to develop special health interventions that target the poor. However, when considering reproduction and the role of family planning interventions, the equity concept needs to be applied more cautiously than in the case with other health interventions.
Equity analyses are useful in countries where fertility is much higher among the poor, where the poor do not want the high fertility they experience, and where weak family planning service coverage of the poor is associated with their lower contraceptive use and higher unwanted fertility. The policy and programmatic message is clearly that family planning programs in these areas need to increase their focus on the poor.

However, the concept of equity does not uniformly fit well with fertility, primarily because children are desired and, not infrequently, many children are desired. Table 1 shows that several sub-Saharan African countries had unwanted fertility CIs around zero. Their equity was not characterized by universally low fertility, high contraceptive use and good service coverage. Rather, their equity was characterized by universally high fertility, low contraceptive use and poor service coverage.

From a public health perspective, applying the equity concept to countries like Malawi has limitations. Malawi and Indonesia have comparable CIs for unwanted fertility, CI values of –0.008 and –0.041 respectively. But Malawi’s TFR is 6.5, one of the highest in the world and more than twice as high as Indonesia’s TFR of 2.6. If Indonesia were to eliminate all of its unwanted fertility, 0.4, it would essentially be at fertility replacement level of 2.1. If Malawi eliminated all of its unwanted fertility, 1.1, it would still have a TFR of 4.1, well above that for the developing world as a whole at 3.0.

An inequity in unwanted fertility has ethical implications, the principal one being the poor’s lack of access to information and services to prevent high-risk births. Countries with equity at very high levels of fertility and low levels of unwanted fertility, e.g. Burkina Faso, have no apparent ethical issue; thus the inequity advocacy card can not legitimately be played. However, high fertility equity should not lead to benign neglect any more than equity in high mortality or very low bed net coverage to combat malaria should lead to complacency.

Still, one needs to appreciate the inherent harms of children dying unnecessarily from malaria compared with the moral ambivalence and programmatic challenges when confronting very high and desired fertility equitably distributed across a population. In countries with high wanted fertility, policy-makers and health providers need to be especially careful to avoid a paternalistic approach of providing the services they feel the population needs rather than those the people desire.

Reproductive health, including family planning, was purposively excluded from the MDGs in 2000 and there have been efforts to get reproductive health mainstreamed into all the MDGs. The most logical and convincing case, using mortality reduction as a goal, has been made for inclusion in the MDGs for child and maternal health. As with other MDGs, equity is the binding concept for justifying and promoting these two MDGs. Our analysis suggests that looking at family planning and fertility through an equity lens is justified for those countries with joint inequalities in unwanted fertility and access to family planning. In other countries, where there is little or no unwanted fertility inequity and where high fertility among the poor contributes to other health inequities, greater emphasis should be given to the health benefits of birth spacing and couples’ rights to reproductive health information and services. This emphasis is especially appropriate in many sub-Saharan African countries.

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Fecundidad no deseada entre los pobres: ¿una forma de inequidad?

**Objetivo** Determinar si la mayor fecundidad y el bajo uso de anticonceptivos entre los sectores más pobres de la sociedad debe considerarse una forma de desigualdad, que reflejaría una preferencia de los pobres por formar familias numerosas, o bien una forma de inequidad, consistente en que se impediría a los pobres reducir su fecundidad en la misma medida en que pueden hacerlo los sectores más ricos de la sociedad.

**Métodos** Utilizando las Encuestas de Demografía y Salud más recientes de 41 países, analizamos las diferencias de fecundidad en función del uso de anticonceptivos modernos, la fecundidad no deseada (definida como la fecundidad real por encima de la deseada) y la disponibilidad de servicios de planificación familiar entre los sectores más pobre y más rico de la sociedad. Se determinaron los quintiles de riqueza a partir del índice de recursos obtenido con cada encuesta, y se calculó el índice de concentración (IC) de la desigualdad de ingresos para las variables relacionadas con la salud.

**Resultados** Se observó que la más fuerte fecundidad y el uso más limitado de anticonceptivos entre los pobres en comparación con las personas más ricas. En efecto, la relación entre la tasa total de fecundidad y el uso de anticonceptivos, con una R² de 0.289, fue significativa. Los nacimientos no deseados en el quintil más pobre superaban en más del doble los hallados en el quintil más rico: 1,2 y 0,5 respectivamente; no obstante, había amplias diferencias entre los 41 países. El IC de nuestra medida de la disponibilidad de servicios de planificación familiar (mensajes radiofónicos, conocimiento de los servicios y contacto con los trabajadores sobre el terreno) estaba muy positivamente asociado al IC de la prevalencia de uso de anticonceptivos modernos, con R² de, respectivamente, 0,392, 0,692 y 0,526.

**Conclusión** En muchos países, la mayor fecundidad y el bajo uso de anticonceptivos detectados entre los pobres en comparación con la población rica deben considerarse una forma de inequidad.

**Resumen**

La relación entre el índice de concentración encontrado para la cantidad de fecundidad total y el uso de anticonceptivos modernos es lineal (R² = 0,289). El número de nacimientos no deseados es dos veces más alto en el quintil más pobre en comparación con el quintil más rico, aunque las diferencias varían notablemente entre los 41 países. El IC de nuestra medida de la disponibilidad de servicios de planificación familiar está asociado positivamente con el IC de la prevalencia de uso de anticonceptivos modernos, con R² de, respectivamente, 0,392, 0,692 y 0,526.

**Métodos** Se determinaron los quintiles de riqueza a partir del índice de recursos obtenido con cada encuesta, y se calculó el índice de concentración (IC) de la desigualdad de ingresos para las variables relacionadas con la salud.

**Conclusión** En muchos países, la mayor fecundidad y el bajo uso de anticonceptivos detectados entre los pobres en comparación con la población rica deben considerarse una forma de inequidad.

**Méthodes** A partir de enquêtes démographiques et de santé les plus récemment réalisées dans 41 pays, nous avons étudié les différences de fécondité en tenant compte des moyens contraceptifs modernes utilisables, la fécondité non désirée (définie comme la fécondité en excès par rapport à la fécondité souhaitée) et la disponibilité de services de planification familiale pour les segments pauvres et riches de la société. Dans chaque enquête, l’indice de revenu a été utilisé pour constituer les quintiles les plus riches et l’indice de concentration des inégalités de revenus a été déterminé.

**Résultats** La relation entre l’indice de concentration trouvé pour le taux de fécondité totale et l’utilisation de moyens contraceptifs est linéaire (R² = 0,289). Le nombre de naissances non désirées est deux fois plus élevé dans le quintile le plus pauvre que dans celui le plus riche (respectivement 1,2 et 0,5), bien qu’il existe de grandes variations entre les 41 pays considérés. L’indice de concentration correspondant à notre mesure de la disponibilité de services de planification familiale (messages radiophoniques, connaissance des services et contact avec des agents de terrain) présentait une forte corrélation positive avec l’indice de concentration de la prévalence des moyens contraceptifs modernes (R² valant respectivement 0,392, 0,692 et 0,526).

**Conclusion** Dans nombre de pays, le taux de fécondité plus élevé et le recours plus limité aux moyens contraceptifs observés chez les plus démunis par comparaison avec les populations aisées doivent être considérés comme un problème d’équité.

**Resumen**

Determinar si la mayor fecundidad y el uso de anticonceptivos entre los sectores más pobres de la sociedad debe considerarse una forma de desigualdad, que reflejaría una preferencia de los pobres por formar familias numerosas, o bien una forma de inequidad, consistente en que se impediría a los pobres reducir su fecundidad en la misma medida en que pueden hacerlo los sectores más ricos de la sociedad.

**Métodos** Utilizando las Encuestas de Demografía y Salud más recientes de 41 países, analizamos las diferencias de fecundidad en función del uso de anticonceptivos modernos, la fecundidad no deseada (definida como la fecundidad real por encima de la deseada) y la disponibilidad de servicios de planificación familiar entre los sectores más pobre y más rico de la sociedad. Se determinaron los quintiles de riqueza a partir del índice de recursos obtenido con cada encuesta, y se calculó el índice de concentración (IC) de la desigualdad de ingresos para las variables relacionadas con la salud.

**Resultados** Se observó una relación lineal entre el IC hallado en la tasa total de fecundidad y el uso de anticonceptivos, con una R² de 0,289. Los nacimientos no deseados en el quintil más pobre superaban en más del doble los hallados en el quintil más rico: 1,2 y 0,5 respectivamente; no obstante, había amplias diferencias entre los 41 países. El IC de nuestra medida de la disponibilidad de servicios de planificación familiar (mensajes radiofónicos, conocimiento de los servicios y contacto con los trabajadores sobre el terreno) estaba muy positivamente asociado al IC de la prevalencia de uso de anticonceptivos modernos, con R² de, respectivamente, 0,392, 0,692 y 0,526.

**Conclusión** En muchos países, la mayor fecundidad y el bajo uso de anticonceptivos detectados entre los pobres en comparación con la población rica deben considerarse una forma de inequidad.
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