Equitable Distribution of Poor Quality of Care? Equity in Quality of Reproductive Health Services in Ethiopia

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Abstract
The Ethiopian health system faces persistent inequities in health-care utilization and outcomes, despite continued efforts to expand health service coverage. There is little evidence in the literature describing the status of equity in the quality of healthcare. This paper aims to understand the disparities in quality of antenatal care (ANC) and family planning (FP) among the poor and non-poor communities. We used the 2016 Ethiopia Demographic and Health Survey (DHS) data to compute a Multidimensional Poverty Index (MPI), and the 2014 Service Provision Assessment (SPA) data to assess quality of ANC and FP services—defined as the level of adherence to World Health Organization (WHO) clinical and service guidelines. We merged the two datasets using geographical coordinates, and aggregated service users into facility catchment area clusters using a 2-km radius for urban and 10-km radius for rural facilities. We computed ANC and FP quality and MPI indices for each facility and assigned these to catchment areas. Using the international cutoff point for deprivation (MPI = 33.3%), we evaluated whether the quality of ANC and FP services varies by poor and non-poor catchment areas. We found that most of catchment areas (75.7%) were deprived. While the overall quality of ANC and FP services are low (33% and 34% respectively), we found little variation in the distribution of the quality of these services between poor and non-poor areas, urban and rural settings, or regionally. The short-term focus needs to be on improving the overall quality of services rather than on its distribution.

Introduction
Ethiopia has made significant progress over the last two decades in improving access to maternal and child health services. As a result, child and maternal mortalities have decreased significantly, although Ethiopia still remains one of the places with the highest rate of mortalities in the world. While achieving a significant reduction in maternal mortality requires further expansion of health service coverage, it is equally important to improve the quality of care provided, including ensuring consistent availability of essential inputs and adherence to clinical procedures when providing care.

Despite increased efforts to expand health service coverage across the country, the Ethiopian health system continues to face inequitable utilization of healthcare, resulting in disparities in health outcomes among different segments of the population. For example, the recent National Health Accounts survey documented that people in the poorest wealth quintile households were less likely to seek care compared with their counterparts in the richest households, despite the former reporting a higher incidence of illness. Large regional and gender disparities in health seeking behavior were also documented. Furthermore, disparities have been reported in health outputs and outcomes, including in antenatal care, facility-based deliveries, and child mortalities between different geographic and socioeconomic groups.

Inequity in healthcare refers to differences in access, utilization, output, or outcome that are not due to clinical needs, preferences of clients or appropriateness of intervention. Health-care inequity implies the existence of systematic disparities in health or major determinants of health between different groups, such as regions, urban and rural areas, social, economic, cultural, or religious groups, or by age or gender. As such, equity in health refers to fairness in healthcare provision—mainly an
equal chance of treatment for the same condition as well as fairness in the distribution of health benefits among different groups—irrespective of socioeconomic, demographic, cultural, or geographic differences.

Equity was emphasized as one of the key transformational agendas in the Ethiopian Health Sector Transformation Plan (HSTP) to address disparities in access to healthcare, its utilization, and outcome. Ensuring an equitable distribution of good-quality care was one of the key targets of the HSTP where “the quality of care provided does not differ by any personal characteristics including age, gender, socioeconomic status, or place of residence.”6 While the existence of disparities in health utilization, outputs and outcomes in Ethiopia are well known,4 the level of (in)equity in quality of care has not been documented.

This paper seeks to understand the equity of quality of women’s reproductive health-care services—adherence to the clinical standards of antenatal care and family planning services—among poor and non-poor facility catchment areas in Ethiopia. Understanding the equity of quality of care among different geographic and socioeconomic groups will help the health system better target equity improvement initiatives among different socioeconomic groups and geographic areas with will support the effort to achieve the HSTP targets.

Materials and Methods

Data Sources

We used the 2016 nationally representative Ethiopia Demographic and Health Survey (DHS) data for constructing MPI,4 and the 2014 Ethiopia Services Provision Assessment Plus (SPA+) data for computing the ANC and FP quality indices.

The Ethiopia DHS survey is undertaken approximately every five years since 2000, collecting socioeconomic, demographic, and health data from households and individuals for every survey. With a representative sample and response rate of over 95%, DHS has been a reliable source of data for measuring progresses in health development in several developing countries. This study draws data on dwelling conditions, ownership of assets, educational as well as nutritional status of households from the 2016 Ethiopia DHS survey that collected data from over 17,000 HHs.4

The 2014 Ethiopia SPA+ is also a nationally and regionally representative health facility survey covering 1,327 of the 23,123 public and private facilities available in the country.7 This sample included a census of hospitals and a random sample of health centers, health posts, and private clinics representing facilities in all nine regions and two city administrations of Ethiopia. SPA+ survey collected data on availability of services, facility readiness, observation of clinical actions, and exit interviews on client experience with health-care providers.7

A total of 1,640 ANC consultations were observed in 284 facilities and 1,026 FP consultations were observed in 239 facilities. Over 70% of these observations occurred in urban areas, and 85% of them in public facilities. Hospitals and health centers constituted about 94% of FP and 97% of ANC observations, while health posts and private clinics provided the remaining observed services. Table A1 shows the distribution of facilities and ANC and FP observations by region.

Measure of Socioeconomic Status

Socioeconomic status, such as the level of poverty, is often represented by one-dimensional measures, such as income or expenditure. However, poverty is manifested by various aspects of economic and social conditions, and no one particular indicator alone can capture the multiple dimensions of one’s socioeconomic status. The multidimensional poverty index (MPI), developed by the Oxford Poverty and Human Development Initiative,8 is considered a better tool to capture multiple aspects of poverty experienced by an individual, household, or community.

The MPI is constructed based on three dimensions: education, health, and living standards. The three dimensions consist of 10 indicators: years of schooling and school attendance, child nutrition and mortality, asset ownership, type of floor, type of cooking fuel, type of sanitation facilities, source of water, and availability of electricity (see Figure A1 list of indicators). Each of the dimensions and each of the indicators within a dimension are given an equal weight, and MPI score is calculated using the weighted indicators. A person or household is considered multi-dimensionally poor, if they are deprived in at least one-third of the weighted indicators, which implies that 33.3% is used as MPI cutoff point to differentiate the poor from non-poor.8

We assessed the level of poverty by measuring MPI for each facility catchment area—167 for ANC and 142 for FP—after dropping catchment areas represented by less than five households.

Measure of Quality of ANC and FP Services

Measuring the quality of ANC and FP services is not straightforward, and not every aspect of quality can be measured.9 Studies often use availability of inputs, such as drugs and health workers, processes by which services are delivered, and availability of
infrastructure as proxies for quality of care. However, although these inputs are crucial to high-quality health systems, the availability of inputs alone does not guarantee good-quality care. For example, it has been shown that structural quality is a poor correlate of care competence.

We constructed quality indices using data from observations of consultations and adherence to clinical actions recommended by the WHO and Ethiopian national guidelines for ANC and FP services. ANC and FP quality was determined by measuring the level of adherence by care providers to the standard clinical guidelines for provision of these services (see Figures A2 and A3 for list of services and clinical actions for ANC and FP services used to construct indices). It’s known that provision of services with the expected protocols, safety, and ethical standards is expected to enhance quality of services.

Analysis

We merged the 2016 Ethiopia DHS and 2014 Ethiopia SPA+ datasets using geocodes. In urban areas, households surveyed in the DHS and living within a 2-km radius of a SPA+ facility were considered to be within that facility’s catchment area. In rural areas, households sampled in the DHS and living within a 10-km radius of a SPA+ facility were thought to be within that rural facility’s catchment area (sensitivity tests were also undertaken using 1 km and 5 km as well as 5 km and 15 km for urban and rural areas, respectively, given that DHS location data include random error that potentially displaces points by 2–10 km).

We first computed deprivation indices for each dimension of poverty (education, health, and living standards) using the 10 indicators of poverty as discussed above (see Figure A1). This was followed by computation of a composite index (MPI) for the three dimensions of poverty, after which a poverty head count ratio (proportion of individuals in poverty) was computed within the defined radius catchment areas. The MPI is a product of the number of those impoverished (head count ratio) and the average poverty rate (the intensity of poverty). MPI was computed for each of the catchment areas of the facilities surveyed in SPA+, and was later aggregated by region and place of residence (urban/rural). Following Sharma et al., we then classified catchment areas into quintiles using the % share of the poor in the catchment area using the international poverty (MPI) cutoff point of 33.3%.

We finally computed quality of ANC and FP services (i.e., the percentage of actions taken out of those expected as per the clinical guidelines) using observational data obtained from SPA+ data. Quality indices were generated using the ratio of clinical actions performed and the frequency of expected actions based on the number of clinical observations. We then computed ANC and FP quality by level of poverty in the catchment areas, and we used concentration curves to show the distribution of (in)equity of quality of ANC and FP services between poor and non-poor catchment areas. We also conduct Kruskal-Wallis Test to examine the differences on disparity in quality of ANC by level of poverty at MPI at 33.3% cutoff point. Comparison of ANC and FP quality was then made by region, level of urbanization, and type and ownership of facility where services were provided (i.e., health center, hospital, public, private, etc.).

Results

Multidimensional Poverty

The national level of multidimensional poverty was calculated to be 75.7%, implying the existence of high level of multidimensional poverty in the country. The regional breakdown of MPI shows that Oromia and Amhara regions have the largest share of multidimensionally poor households, while the predominantly urban regions of Addis Ababa and Harari have among the lowest shares of multidimensionally poor households. As expected, MPI results show that Addis Ababa (the capital city) is the least multidimensionally poor region, with an MPI score of 22.6% (see Figure 1 below).

Quality of ANC and FP Services

Quality of maternal care computed from SPA+ data showed a generally low level of quality of ANC and FP services (i.e., a low level of adherence to ANC and FP service guidelines). More specifically, women who sought ANC and FP services were provided, respectively, with only 33% and 34% of clinical actions recommended by the WHO or national guideline. Levels of ANC quality were relatively higher in Amhara and Tigray regions (47% and 39%, respectively), while Oromia and Gambella regions scored lowest on ANC quality (24.5% and 30%, respectively). Likewise, Addis Ababa provided the highest quality FP services (49%), while Amhara scored the lowest FP quality (23%). Overall, there was little variation in the quality of ANC and FP services across regions (Figures 2 and 3).

Hospitals tended to provide marginally better-quality services (more complete ANC and FP services), while lower clinics and health posts scored a lower quality
score for these services. We found no difference in ANC and FP quality between public facilities and private clinics (Figure 4).

**Quality of Reproductive Health Care and Poverty**

We did not find significant differences in the quality (completeness) of ANC and FP services provided in communities with different levels of multidimensional poverty. Women from both poor and non-poor areas receive about the same quality of reproductive health services. ANC quality in the poorest MPI quintile was 33% compared to only 32% in the richest MPI quintile. FP quality in the poorest MPI quintile was 33% compared with 37% in the richest MPI quintile (Figure 5). However, none of these differences were statistically significant as observed in Figure 6 where the concentration curves for ANC and FP quality are quite close to the line of perfect equality with concentration index for ANC = 0.02,

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**Figure 1.** Multidimensional Poverty in Ethiopia by Region

Note to Figure 1: Shows multidimensional poverty score by region. Lower score reflects lower multidimensional poverty.

**Figure 2.** Quality of Antenatal Services by Region

Note: Figure 2 shows antenatal care quality index—the level of adherence by providers to expected clinical actions—by region. Higher number indicates better quality of ANC.
Figure 3. Quality of Family Planning Services by Region Note: Figure 3 shows family planning quality index—the level of adherence by providers to expected clinical actions—by region. Higher number indicates better quality of family planning service.

Figure 4. Quality of Antenatal and Family Planning Services by Facility Type Note: Figure 4 depicts quality of ANC and FP services—the level of adherence by providers to clinical guidelines—by type of facility.

P-value = 0.07, and concentration index for FP = −0.03, P-value = 0.09. We also conducted Kruskal–Wallis Test to examine the differences on disparity in quality of ANC and FP by level of poverty at MPI at 33.3% cutoff point. We found no significant differences (Chi square = 6.033, p = .1967, df = 4 for ANC and Chi square = 2.761, p = .5985, df = 4 for FP) in quality of care among the five categories of level of poverty shown in Figure 5.

Discussion

Health equity has been a focus of the international health agenda for some time now, and it is one of the transformational agenda in Ethiopia’s HSTP (2015/16-2019-20). While there is a growing body of literature on the equity of health utilization and outcomes in Ethiopia, there has been very little evidence on (in) equities in health-care quality.
Disparity in Quality of ANC and FP by Poverty Level

Figure 5. Quality of ANC and FP Services by Level of Poverty Note: Figure 5 depicts the quality of ANC and FP services—the level of adherence by providers to clinical guidelines—by multidimensional poverty index (MPI) at 33.3% cutoff point, which is shown by X-axis. Number of facilities under each MPI category ranges 17 to 54 for ANC and 13–49 for FP.

Figure 6. Concentration Curve of the Quality of ANC and FP Services Note: Figure 6 reflects the concentration of quality of FP (left panel) and quality of ANC (right panel) by level of poverty (represented by Y-axis). The closer the Lorenz curve to the line of equality (the 45-degree line) the more equal distribution of quality between the poor and non-poor, as is the case in Figure 6.

This paper sought to understand whether the quality of reproductive health-care services varies between the poorer and richer communities in Ethiopia. We found that the quality of these services were low despite the fact that the coverage of both ANC and FP increased significantly in recent years. We also found that there was little disparity in ANC and FP quality across MPI groups, as the quality of these services is low for everyone. Likewise, we found no significant differences in the quality of these services between urban and rural areas, public and private facilities or across regions.

We undertook sensitivity tests using smaller and larger radius catchment areas to observe whether inclusion or exclusion of service users from closer and further locations affect the level of poverty and the inequalities in care quality. We found no significant differences in poverty or in quality of care (Figure A4). We also checked whether our findings were consistent if one uses a different socioeconomic indicator—level of education of the mother rather than community or household-level poverty indicator. This test shows that there is no significant disparity in quality of ANC and FP care with the level of educational status.

Why Low Quality of ANC and FP Services?

There are many possible reasons for lack of adherence to ANC and FP guidelines. Providers may fail to adhere to the service guideline or the actions they know they need to perform (know-do-gap) due to negligence, low level
of motivation, lack of sufficient training on the guidelines, or lack of supportive supervision and monitoring or lack of clinical evaluation. There are also other elements of quality of care, such as availability of basic infrastructure, supplies and equipment—that were not assessed in this study—that might affect the level of adherence of service provision to clinical guidelines. For example, having a separate room for ensuring client privacy and confidentiality, or uninterrupted access to clean water to wash hands before and after examination affects quality of care. Overall facility readiness—which is 55% in Ethiopia—is, therefore, another factor that is likely to be associated with the level of quality of care. Finally, the measure of quality in this study captured only the proportion of recommended clinical actions provided to patients; other important components of quality—such as administrative processes and cost of care—were not assessed or included in the quality indices.

**Equitably Poor Quality?**

One explanation for why there are no socioeconomic inequalities in quality of care is the fact that the overall quality of maternal care is low, possibly for some of the reasons highlighted above, which implies there is no significant difference in the levels of quality between the least and most deprived areas. Secondly, since the federal government has standard allocations for financing and human resource allocation by facility type, public facilities in least and most deprived areas catchment areas may have similar levels of funding and number of health workers and other health inputs irrespective of the volume or quality of health output, which might provide little incentive for providers to invest in quality improvement initiatives. Thirdly, this might reflect similarities in quality of inputs (e.g., number and level of training and qualification of health workers) that the health system uses in service delivery. Nevertheless, further investigation is important to fully understand the drivers of low quality of care in Ethiopia.

**Why Disparities in Coverage and Health Outcomes Then?**

Despite the apparent uniformity in quality of care—between regions, level of poverty, and urban vs. rural areas—documented in this analysis, the levels of service utilization (such as institutional delivery, and utilization of family planning services) and health outcomes (including fertility rates, maternal and newborn mortality rates) between these groups are significantly different. Hence, further investigation is important to understand the root causes of differences in health utilization and outcomes between different groups. It is also important to recognize that some disparities in health outcomes could be caused by factors outside the health systems, for example, because of disparities in level of education. There could still be disparities in health utilization and outcomes among different groups, even when there is equal access to the same quality of healthcare at the same cost and distance, implying the need for multi-sectoral approach in addressing inequity. Finally, it is important to note that this study does not assess the quality of other key indicators of maternal care—such as labor and delivery—which are important determinants of maternal and child outcomes.

**Limitations of Study**

One limitation of this study is that our MPI—which was constructed using DHS-collected wealth indicators—measures the deprivation rate of facility catchment areas using only the households sampled in the DHS, not necessarily that of individuals who were observed using ANC or FP services in the SPA+ survey. To validate the relationship between quality and MPI, we undertook a sensitivity analysis using educational status of mothers who were observed during the SPA+ while using ANC and FP services as a proxy for MPI, and we found consistent results with the distribution of ANC and FP quality when using MPI of the catchment area (see Figure A5).

The assumption of the 2- and 10-km catchment areas, respectively, for an urban- and rural-based facility may not be the true catchment area of the sampled facilities, since facilities are not always located at the center of their catchment areas (and since DHS location data has a random error that might displace points 2 to 10 km). Additionally, some clients (up to 30% in NHA survey) sometimes opt to travel more distance or bypass the nearest facility to seek care elsewhere. These behaviors are not accounted for in this analysis. To test the sensitivity of our assumed catchment population on the results, we changed facility catchment areas to smaller and larger catchment radiiuses (1- and 5-km radius in urban and 5- and 15-km radius in rural areas)—which may add/drop poorer or richer communities to the catchment population. The result again is consistent with our initial findings, that is, there is no significant variation in the level of quality of care between poor and non-poor communities.

Finally, our quality indices were based on data from observations, which are prone to measurement errors. Another study that measured inequalities in ANC quality—based on women’s self-report of the content of
ANC consultations—showed that the poorest women in Ethiopia were substantially less likely to report having their blood pressure checked and their urine and blood analyzed during ANC consultations compared to the richest women.\textsuperscript{22} This implies that further work is needed to determine why inequalities based on self-reports and observations of care differ. Furthermore, more studies are needed that account for facility- and community-level characteristics that determine quality and health seeking as well as equity in quality of care.

**Conclusion**

The overall quality of ANC and FP services in Ethiopia is low, and we did not find significant disparity in the quality of these services across socioeconomic status or geography. This implies that the health system needs to focus on ensuring that providers are aware of and following the appropriate clinical guidelines and standards for women’s reproductive health services in all regions and types of facility. Furthermore, measuring other elements of quality, such as availability, functionality, and utilization of inputs and infrastructure, may uncover different findings on the equity of quality of care, and should be undertaken to supplement our findings.

**Disclosure of Potential Conflicts of Interest**

No potential conflict of interest was reported by the author(s).

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**Contributors**

GD, TG and MEK designed the study. ED and GD compiled the data and undertook the analyses. ED SH, YA, CA, BY, and PB contributed to the interpretation of results. GD wrote the first draft of the manuscript. All authors reviewed, contributed to, and approved the final manuscript.

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Appendices

Table A1. Weighted family planning and antenatal care visits by location, ownership, facility type, and region in Ethiopia SPA+, 2014.

| Categories | Number of observations by region | Number observed | % (column) | Number observed | % (column) |
|------------|---------------------------------|----------------|------------|----------------|------------|
| **Number of observations by region** | | | | | |
| Addis Ababa | 78 | 7.5 | 249 | 15.2 |
| Afar | 4 | 0.4 | 17 | 1.1 |
| Amhara | 357 | 34.3 | 365 | 22.2 |
| Benishangul Gumz | 26 | 2.5 | 44 | 2.7 |
| Dire Dawa | 9 | 0.9 | 13 | 0.8 |
| Gambella | 4 | 0.4 | 8 | 0.5 |
| Harari | 6 | 0.6 | 7 | 0.5 |
| Oromia | 275 | 26.4 | 495 | 30.2 |
| SNNP | 148 | 14.2 | 230 | 14 |
| Somali | 2 | 0.2 | 34 | 2.1 |
| Tigray | 132 | 12.7 | 178 | 10.9 |
| National | 1,042 | 100 | 1,640 | 100 |
| **Number of observations by facility location** | | | | | |
| Rural | 512 | 49.1 | 652 | 39.8 |
| Urban | 530 | 50.9 | 988 | 60.2 |
| Total | 1,042 | 100 | 1,640 | 100 |
| **Number of observations by facility type** | | | | | |
| Hospital | 211 | 20.3 | 622 | 38.0 |
| Health center | 735 | 70.5 | 929 | 56.7 |
| Health post | 61 | 5.8 | 63 | 3.8 |
| Clinic | 35 | 3.4 | 26 | 1.6 |
| Total | 1,042 | 100.0 | 1,640 | 100 |
| **Number of observations by facility ownership** | | | | | |
| Public | 998 | 95.8 | 1542 | 94.0 |
| Private | 44 | 4.3 | 98 | 6.0 |
| Total | 1,042 | 100 | 1,640 | 100 |

*Family planning; ** Antenatal care
Figure A1. Dimensions and Indicators of Poverty for Multidimensional Poverty Index.

Figure A2. List of FP clinical actions and % performed.
Figure A3. List of ANC clinical actions and % performed.

Figure A4. Sensitivity test using larger catchment area (5 and 15 km radius).
Figure A5. Sensitivity test using educational status of service users.