Does access to medicines differ by gender? Evidence from 15 low and middle income countries

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\begin{abstract}
Objective: To examine gender differences in access to prescribed medicines in 15 lower and middle income countries.

Methods: The proportion of consultations with at least one prescription for women in three age groups (<15, 15–59, 60+ years) with acute respiratory infections (ARI), depression and diabetes in routine audits was compared to the expected proportion calculated from WHO Global Burden of Disease estimates. Newer oral hypoglycaemic medication prescribing was also analysed. Differences reported by country, age group, and condition.

Findings: 487,841 consultations examined between January 2007 and September 2010 in low (\(n = 1\)), lower middle (6), and upper middle income (8) countries. No country favoured one gender exclusively, but gender differences were common. Taking the 15 countries together, only diabetes treatment revealed a significant difference, with women being treated less often than expected (\(p = 0.02\)). No consistent differences found across countries grouped by World Bank income category, WHO region or Global Gender Gap Index. Overall, women had equal access to newer oral hypoglycaemics.

Conclusion: Gender differences in access to prescribed medicines for three common conditions are common, but favour neither gender consistently. This challenges prevailing hypotheses of systematic disparities in access to care for women. Evidence about gender disparities should influence policy design.

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1. Introduction

Gender has been defined as the “socially constructed roles, behaviours, activities and attributes that a given society considers appropriate for men and women” [1]. Gender equity is a concern in many social and economic domains, including health. Indicators measuring mortality rates, household allocation of resources for medical care, and allocation of food and education all point to the presence of gender inequity in many parts of the world, with South Asian countries often highlighted as showing strong evidence of bias against women [2–4].

In relation to the provision of health care, gender equity is generally taken to mean meeting the health needs of men and women in an equitable way, including equitable access to health services given need [5]. Gender differences in health have been well documented. For example, the World Bank recently reported skewed sex ratios at birth that favour males, excess female mortality in infancy and early childhood, high maternal mortality, and excess female mortality due to HIV/AIDS [6]. However,
information on the effect of gender on access to medicines is sparse. In 2005, Baghdadi speculated that “[t]here are not enough data to conclude that [obstacles to care] lead to lower use of medicines among women, but based on available evidence this seems likely” [1].

A recent gender-stratified assessment of the management of chronic conditions in seven countries reinforces this view. It indicated less effective management of blood glucose, blood pressure, and hypercholesterolemia among women with diabetes in four low and middle income countries [7]. Another recent prospective study of the use of medications for secondary prevention for cardiovascular disease in urban and rural communities in 16 low, middle and high income countries (LMICs) concluded that fewer women than men took medicines in all settings [8]. The aim of the present study was to determine whether these gender differences are typical in low and middle income countries (LMICs), across different diseases and in settings with high levels of out of pocket payments.

2. Materials and methods

2.1. Data source and environment

We used data collected routinely by IMS Health [9] (IMS) on consultations by contracted general practitioners and specialists in 15 LMICs (Table 1, Supplementary information). In each country, IMS designs a sampling frame to represent the national distribution of prescribers, recruiting doctors across a range of regions and specialties. We used data collected between January 2007 and September 2010, with a mean of 12 quarters of data per country (range 4–15). Data were aggregated across this time period to create a large sample of physicians, consultations and prescriptions.

Eligible consultations were those during which at least one medicine was prescribed. In the study countries, physicians agreed to record data on every consultation within a pre-determined week per quarter or semester. Physicians recorded the patient’s sex, age, diagnoses, and medications prescribed as free text. IMS codes diagnoses according to the ICD-10 classification [10] and classifies prescribed medications according to the European Pharmaceutical Research Association (EphMRA) Anatomical Therapeutic Classification (ATC) system [11].

Consultations in the LMICs studied tend to be paid from different sources and physicians frequently provide care in both the public and private sectors. In our sample of prescribers and consultations (Table 1, Supplementary information), the median percentage of doctors who had recorded a private consultation for at least one of the three conditions studied was 77% (interquartile range 69%–83%, data available for 10 of 15 countries). The median percentage of consultations for the three conditions studied (depression, diabetes, or acute respiratory infection) paid for out of pocket or through private insurance was 67% (interquartile range 25%–81%). Data from the WHO National Health Accounts (Table 2, Supplementary information) also indicate that private payment for medicines predominates in the study countries, with private pharmaceutical expenditure constituting a median of 74% (interquartile range 61%–90%) of the total pharmaceutical expenditure [12].

2.2. Study conditions

Based on ICD-10 codes used in the World Health Organisation (WHO) burden of disease report [13], we selected consultations from the IMS database for patients diagnosed as having depression, diabetes, or acute respiratory infection, three conditions commonly treated in outpatient settings in all countries.

Diabetes represents a significant and growing health burden, particularly in South Asian countries [14] where gender differences are thought to be more prevalent than elsewhere [3–5]. Significant and potentially avoidable differences in mortality rates between men and women with diabetes have also been reported in at least one country [15]. Nevertheless, there is a severe shortage of gender-specific data on the global diabetes epidemic in lower and middle income countries [16].

Like diabetes, depression represents a significant cause of morbidity and is forecast to become the foremost cause of disability in under-developed countries by the year 2020 [17].

We included consultation data for acute respiratory infections as an example of a common acute condition. Gender differences in access to outpatient treatment have been demonstrated in nine middle income countries (including five of the study countries) [3].

2.3. Country, consultation and patient categorisations

We used World Bank income categories available as of July 2008, the approximate midpoint of the data collection period, to classify countries. We report on one low income country (Pakistan), six lower middle income countries (Colombia, Indonesia, Peru, Philippines, Thailand, and Tunisia) and eight upper middle income countries (Argentina, Brazil, Lebanon, Mexico, Poland, South Africa, Turkey, and Venezuela). We also classified countries according to WHO region and according to the 2010 Global Gender Gap Index rank (GGGI) [18]. Country GGGI ranks were divided into quartiles and countries allocated to the appropriate quartile (Table 2, Supplementary information).

Consultations for diabetes and depression were included if the physician had recorded both a relevant diagnosis and prescribing of a drug from a relevant ATC category (A10, drugs used to treat diabetes or N6, psycho-analectics, excluding anti-obesity preparations, respectively). Consultations for acute respiratory infections were included on the basis of the relevant diagnosis only; drug type was not used to filter the treated consultations due to the very wide range of classes of drugs that were being used in this condition. Consultations meeting these criteria are termed “eligible consultations.” We divided eligible consultations into three patient age categories corresponding to those used in the WHO Global Burden of Disease (GBOD) estimates (0–14, 15–59, 60+).
2.4. Outcome measures

2.4.1. Gender differences in eligible consultations

We compared the expected numbers of eligible consultations for women with the observed numbers in each country, condition, and age group.

To calculate expected numbers of eligible consultations, we used the 2004 gender, age, and diagnosis-specific GBOD estimates [19] for each country. These are expressed as Disability Adjusted Life Years (DALYs). The estimates take into account the numbers of men and women in each country. The total burdens reported of each of the study diseases for men and women were converted to percentages. These percentages were used to calculate the expected proportions of eligible consultations for men and women in each country, diagnosis, and age group. Table 3 in the Supplementary information illustrates the method used.

Using the IMS data, we then calculated the observed numbers of eligible consultations for women and men by diagnosis and age group. Finally, the gender-specific proportions of observed eligible consultations were compared to the expected proportions based on GBOD, as calculated above.

Only the results for women are shown, since a higher than expected proportion of consultations for women indicates a corresponding lower proportion of consultations for men, and vice versa.

2.4.2. Type of medicines prescribed for diabetes

In addition to overall access to medicines, women and men may differ in their degree of access to newer, generally more expensive, medicines. To explore this potential difference, we examined the types of medicines prescribed for diabetes, which were grouped into four categories – insulins, newer oral agents (dipeptidyl peptidase-4 inhibitors, gliptins, glitazones, and glucagon-like peptide-1 analogues), traditional oral agents (alpha-glucosidase inhibitors, biguanides, sulphonylureas), and other. We calculated the expected numbers of eligible consultations with prescriptions for newer antidiabetic medications for women, based on the observed proportion of all eligible consultations for diabetes during which newer medicines were prescribed.

2.5. Statistical analysis

We depict graphically the direction and magnitude of differences between observed and expected numbers of eligible consultations for women. We used the Sign Test to test for consistency in direction of these differences at a condition and country group level [20]. We used the Chi-square one sample test to compare observed and expected outcomes at country, condition and age group levels, with cells containing fewer than 100 observations excluded.

3. Results

Across 15 countries and three target conditions, we analyzed 487,841 consultations with a total of 855,476 medications prescribed by at least 8234 physicians per semester. Table 4 (Supplementary information) shows the numbers of doctors recording one or more eligible consultations for each condition, the number of eligible consultations by country for each condition and the numbers of drug items prescribed.

3.1. Gender differences by country

Fig. 1A–C presents the difference between the observed versus expected proportions of eligible consultations for women by age group and country for each of the three conditions.

In the group of 15 countries as a whole, the proportion of eligible consultations for women with diabetes was significantly ($p=0.02$) lower than expected; this difference was driven primarily by differences in the oldest age group (60+). There were no consistent differences between observed and expected proportions for depression ($p=0.36$) or acute respiratory infections ($p=0.88$). In the latter case, however, in the youngest age group in 10 out of 15 countries, boys received a disproportionate share of prescriptions and in the 15–59 year age group, women received more prescriptions than expected.

At country level, we also see the direction of gender difference change with age for other conditions. For example, women 15–59 years old in Colombia with diabetes had a disproportionate share of eligible consultations, while those over 60 years had a lower than expected share. Likewise in Pakistan, women over 60 years are treated less frequently than expected for diabetes, while women age 15–59 were treated more frequently than expected.

Fig. 2 summarizes the distribution of differences in between the observed and expected number of eligible consultations (expressed as a percentage of the expected number) by gender across all conditions and age groups combined. No country favours men or women exclusively, but no country is without any gender difference. Overall, observed proportions of eligible consultations were significantly lower than expected for women in 48 tests of difference, significantly higher in 33 tests and not different from expected in 27. Nine countries have greater numbers of these significant differences in proportions that favour men, while two countries have a greater number favouring women and four countries have an equal number of significant differences for each gender. South Africa, Turkey and Pakistan show the greatest difference in favour of men, while Argentina and Poland the greatest difference in favour of women.

3.2. Gender differences by country grouping

No consistent results favouring men or women were seen when data were aggregated according to World Bank country income category or WHO Region (data not shown). In lower middle income countries, observed proportions of eligible consultations were significantly higher than expected for men in 15 comparisons, for women in 12 cases, and not different in 14 cases. The results for upper middle income countries were 28, 19 and 13 respectively. Observed proportions of eligible consultations were similar to expected across all three categories for the WHO Americas region, and in the three countries of the Eastern
A  Depression

![Graph A: Depression](image)

B  Diabetes

![Graph B: Diabetes](image)

C  Acute Respiratory Infection

![Graph C: Acute Respiratory Infection](image)

Fig. 1. Differences between observed and expected numbers of treated consultations for women (expressed as a percentage of the expected number). Positive numbers indicate that the observed is higher than expected. 0–14 year old data are excluded from depression and diabetes graphs due to small numbers. Higher than expected rates for women indicate lower than expected rates for men, and vice versa.

Mediterranean, observed proportions were significantly higher for men in 12 cases, for women in seven cases and not different in two cases. Other regions that contained data from one or two countries only are not shown.

Although differences in favour of both men and women existed in each GGGI quartile, countries with wider gaps on the GGGI (in Quartiles 3 or 4) had a greater percentage of comparisons significantly in favour of men compared to those with narrower gender gaps (in Quartiles 1 or 2), 53% versus 37% respectively (data not shown). Visual inspection of Fig. 1A–C indicates that there is no common pattern of gender differences among countries with a higher or lower percentage of doctors or consultations treating private patients. For example, Poland and Turkey have similarly low proportions of private consultations (1% and 5%, respectively) but different patterns of gender differences.

### 3.3. Gender differences in type of prescribed medicines for diabetes

Differences in prescribing of new oral hypoglycaemics were not statistically significant ($p = 0.44$) for women compared to men in the 15–59 and 60+ year categories. Consultations for the 0–14 age group were excluded because of too few observations. At a country level, only Brazil showed statistically significant differences favouring the use of the newer drugs in men ($p = 0.01$) and older traditional oral hypoglycaemics in women ($p = 0.04$) in the same age group (15–59) (data not shown).

### 4. Discussion

This study suggests that gender differences in access to care and medicines are more complex than previously thought. Women in different health systems did not consistently have less access to care, as defined by eligible consultations with physicians where at least one prescription was written. Overall, the pattern of gender differences in consultations tends to be country, age- and condition-specific. Other studies of prescribing practice also indicate that discrimination against women at the physician level is not a consistent feature. A recently published study of physician behaviour in 6 low income countries in Africa and in Afghanistan suggests that in health facilities, men and women are treated similarly [21]. In all seven countries, doctors spent the same amount of time with patients, asked the same questions and completed the same number of examinations, regardless of the sex of the patient. A comparison of rates of infection and the use of antiretrovirals across a number of countries found over-representation of treated women in Thailand and Argentina, similar rates in Brazil and under-representation in India [22]. In addition, a recent analysis of 2002 World Health Survey (WHO) data from 53 countries found that women with arthritis, asthma or depression reported treatment more frequently than men, and that reported treatment access for angina, diabetes, and schizophrenia did not differ significantly between men and women [23].

Studies such as these seem to highlight a greater complexity of gender differences in use of medicines than had

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been assumed based on studies focused on gender differences in literacy, economic and political power, and health. Our study emphasizes that men can also be disadvantaged with respect to medicines prescribing for common conditions in different settings of care. This points to the continuing need for real-world evidence about gender-related differences in patterns of medicines prescribing and use within countries for patient groups defined by disease and age.

Our study has important limitations. IMS data represent a particular segment of the population, namely, those who have access to a physician and who were prescribed a medicine. In Colombia and Thailand, at least, it has been asserted that the majority of the people with diabetes do not use medications for blood glucose control [7]. In seven upper middle countries, 48% of people eligible for treatment for secondary prevention of cardiovascular disease did not take a drug and in four lower middle income countries, this proportion was 67.5%. Gender differences in terms of access to consultations where no prescription is written may be different to that which is described here, although the proportion of total consultations for the three diagnoses studied where a prescription was not provided was low (projected data 2008–2011, 13 country median 1.2%, range (0.04%–3.52%). Likewise there may be gender differences in terms of access to a physician or to care although a recent analysis of the World Health Survey conducted by the WHO in 2002 and 2003 in 70 countries indicates that there is, once again, no consistent pattern in differences in access to care by gender [23].

IMS also does not capture care provided outside of the physician practice setting. In addition IMS data in most countries are collected from samples of doctors that constitute a small proportion (<1%) of prescribers. While doctors that provide data to IMS are sampled by geographic area and specialty to represent each country’s care providers, it is possible that they are not fully representative.

IMS data do not record deprivation, caste, ethnicity or other social markers, and they provide no information about the history or severity of the disease. Such information has been shown to explain much of the observed variation in the use of surgery or other treatments by gender for cardiovascular disease in the UK and Canada [24,25] and higher rates of obesity have been postulated to explain higher rate of insulin prescribing for women in Bahrain [26]. In a study among children in India on differences in diet and immunisations, gender was found to have little explanatory power (~2%) and maternal literacy (25%) and region (60%) better explained vaccination inequality between boys and girls [27]. In the absence of information on patient characteristics other than age and gender in the IMS data, we may thus over or underestimate gender differences. Other data will be needed to meet the WHO recommendation for a “more systematic examination of how gender intersects with economic inequality, racial or ethnic hierarchy, caste domination, differences based on sexual orientation, and a number of other social markers in the social patterning of health” [11].

We used the GBOD estimates as the benchmark for estimating the expected number of consultations. GBOD estimates do not take account of user-induced or supplier-induced demand. Individuals of either gender may present for treatment more often than the burden of disease estimates would lead one to expect, and physicians who focus on particular diseases may attract a larger proportion of men or women. In addition the population that has access to care for a specific condition may not reflect the gender mix of the total population with that condition. For these reasons, GBOD may not predict consultation rates accurately by gender. In addition, GBOD estimates in some of the study countries are derived from mortality data taken from other countries (for example Indonesia, Lebanon, Pakistan and Tunisia) or in the case of unipolar depression, from a systematic review of 56 countries rather than all countries. However, to bias our results, inaccuracies in GBOD estimates would need to differ between women and men.

These limitations notwithstanding, our results suggest that donors and policy makers should not assume that inequities in medicines access affect women only. Medicines access may be inequitable for both men and women, and inequities may differ by age and condition. Policy makers should also bear in mind that physician prescribing is only one step for accessing medicines; dispensing and use patterns may also differ by gender. Gender mainstreaming policies and programmes should therefore seek to meet men’s and women’s need at different steps on the pathway to effective treatment.

5. Conclusions

This is the first study which uses prescribing data from doctors known to be working predominantly or partly in the private sector in fifteen LIMICs to assess gender differences in access to and type of prescribed medicines. Gender differences in access to medicines do occur but the pattern is not consistent. Future research should assess the impact of other social determinants known to cause variation in access to care that interact with gender, as well as inequities in the quality of care for both men and women within countries.

Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at http://dx.doi.org/10.1016/j.healthpol.2013.01.016.

References


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