

Gender Equality, Norms, and Health 2



Gender norms and health: insights from global survey data

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Despite global commitments to achieving gender equality and improving health and wellbeing for all, quantitative data and methods to precisely estimate the effect of gender norms on health inequities are underdeveloped. Nonetheless, existing global, national, and subnational data provide some key opportunities for testing associations between gender norms and health. Using innovative approaches to analysing proxies for gender norms, we generated evidence that gender norms impact the health of women and men across life stages, health sectors, and world regions. Six case studies showed that: (1) gender norms are complex and can intersect with other social factors to impact health over the life course; (2) early gender-normative influences by parents and peers can have multiple and differing health consequences for girls and boys; (3) non-conformity with, and transgression of, gender norms can be harmful to health, particularly when they trigger negative sanctions; and (4) the impact of gender norms on health can be context-specific, demanding care when designing effective gender-transformative health policies and programmes. Limitations of survey-based data are described that resulted in missed opportunities for investigating certain populations and domains. Recommendations for optimising and advancing research on the health impacts of gender norms are made.

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See **Comment** pages 2367, 2369, 2371, 2373, and 2374

This is the second in a **Series** of five papers about gender equality, norms, and health

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Introduction

Gender equality is a fundamental human right, reflected in the UN's Sustainable Development Goal (SDG) 5, and a necessary means to achieve other SDGs, including SDG 3, to "ensure healthy lives and promote well-being for all".^{1,2,3} Mixed-methods studies document the consequences of gender inequality for women's and men's health.^{4–6} However, quantitative data and methods are underdeveloped to precisely estimate these consequences and study how gender norms contribute to health inequities. Nonetheless, existing survey-based data can provide important insights into pathways from gender norms to health.

Gender norms are the spoken and unspoken rules of societies about the acceptable behaviours of girls and boys, women and men—how they should act, look, and even think or feel. Gender norms are perpetuated and challenged in families, communities, schools, workplaces, institutions, and the media.^{4,5,7–9} These expectations start early and powerfully shape individuals' attitudes, opportunities, experiences, and behaviours, with important health consequences throughout the life course.¹⁰

Quantifying the effect of gender inequalities on health is challenging, partly because differences related to sex (eg, biological factors, including chromosomal, hormonal, and biomechanical) and gender (eg, culturally-defined constructs associated with being female or male) are intertwined.^{11–14} Globally, women outlive men by 2–4 years on average, but girls and women have a higher burden of some disabilities and morbidities.^{2,15–18} These differences cannot be explained by sex alone, as shown in the 2016 Global Burden of Disease data.¹⁹ Building on work²⁰ by Snow and colleagues, we identified 15 causes of disability-adjusted life-years (DALYs) that

Key messages

- Existing survey-based data can be harnessed to generate new evidence of the influence of gender norms on health and wellbeing. Using proxy measures for gender norms, we found evidence that: (1) gender norms intersect with other social factors to impact health over the life course; (2) gender-normative influences by parents and peers start early and can have multiple short-term and long-term health consequences that differ for girls and boys; (3) non-conformity and transgression of gender norms can trigger harmful sanctions; and (4) gender norms are often context-specific, demanding a deeper understanding to design effective gender-transformative policies and programmes.
- Analyses of existing survey-based data can perpetuate biases in the study of gender norms and health: (1) reliance on sex-disaggregated data can result in misclassification of gender and ignores transgender and non-binary identities; (2) datasets include rich gender-related attitude data or health-related data, but rarely both; (3) data are scarce or non-existent for who enforces norms, how they are enforced, or what sanctions transgressors of norms might face; (4) global datasets are generally not powered to study how gender norms intersect with strata of other social determinants of health (eg, wealth, religion, and ethnicity) and are not balanced for gender by various demographic characteristics; and (5) questions are often unbalanced by sex of the respondent (eg, only women are asked about child health and care) and phrasing of questions frequently uncover underlying gender biases in research.
- Future quantitative measures for gender norms would benefit from qualitative research on the origins, preservation, and shifts in gender norms and their links with health outcomes.
- Data on all facets of gender, including data for gender minorities, are necessary in future surveys with the above limitations addressed. To achieve these goals, collaborations are needed at multiple levels: (1) across disciplines to provide a conceptual bridge for effective use of data that aligns around an evidence-based research agenda; (2) between domain experts and gender scholars, survey designers and analysts, and community partners and policy makers to generate data systems that will enable studying health at the intersection of gender and other social determinants; and (3) across global data collection organisations to set standards for measuring gender, gender norms, and key demographic characteristics.

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See Online for appendix

most disproportionately affect women and girls or men and boys globally (figure 1). The female-to-male DALY ratio of more than 40:1 from breast cancer is primarily sex-driven, whereas the approximately 3:1 female-to-male DALY ratio from eating disorders reflects gender-related factors.⁴ Road traffic injuries are more frequent in men than in women, explaining nearly 4% of male all-cause age-standardised DALYs, and reflecting male gender norms pertaining to driving, risk-taking, and alcohol use.²¹ Sex and gender also intersect with other social factors to impact DALY ratios. For example, considering differential exposures within gendered occupations,¹⁰ women are more vulnerable to infection with Ebola virus (from nursing) in countries with a low Socio-demographic Index (SDI) and men to pneumoconiosis (from mining) in countries with high SDIs.^{11,22}

From more than a dozen case studies involving secondary analyses of existing global, national, and subnational datasets, we selected six to discuss here (figure 2), on the basis of conceptual and practical considerations (the selection process is described in the appendix). Conceptually, we aimed to study a range of gendered pathways to health for which evidence exists, as framed in paper 1 of this Series.¹⁰ Our analyses were informed by feminist sociological theories on how gender norms contribute to shaping an unequal gender system that can be harmful to both women and men, boys and girls.^{13,23–25} We sought to include pathways across the life course, from different geographical settings, and for diverse mental and physical health-related outcomes, despite challenges in data quality and operationalising gender norms. Following the case studies, we reflect on the limitations of the data and the opportunities they present, concluding with recommendations for optimising research on the health impacts of gender norms.

Gendered pathways to health

In our analyses, we relied on sex-disaggregated data, recognising that sex and gender typically are conflated in surveys.^{26,27} Additionally, existing survey data do not systematically measure gender norms, so we created proxies by aggregating individual-level data to the average or median values of data from influential social or reference groups (eg, peers). With the exception of case studies 2 and 3, we aggregated gendered behaviours (what women or girls and men or boys do) or attitudes (what people believe women or men should do) to the level of a community, community cluster, or school. We then tested different pathways from gender norms to health and health-related outcomes. When data were sufficient, we tested how gender interacted with other analytical categories (eg, wealth or religion) in shaping health-related social disadvantages. In case studies 1 and 5, we contrasted aggregated behaviours of, or attitudes toward, male and female individuals to investigate what these differences show about gender norms and their implications for health. In case studies 5

and 6, we used variation between groups to test whether differences in individual health were associated with the strength of the gender-normative environment. In case studies 4 and 6, we contrasted individual behaviour with that of groups to assess whether non-conformity with, or transgression of, gender norms are associated with individual health. Finally, in case study 5, we contrasted group-level attitudes (what people should do) with the corresponding behaviours (what people actually do) to evaluate whether the discordance between them is associated with individual health. Only in case studies 2 and 3 did we use individual-level data for the tested norm, taking advantage of normative questions about what individuals believed others thought of them to investigate gender differences and test whether a person's belief in what others think of them is associated with their health.

For each case study discussed, we link the case to a gendered pathway and include key literature; describe the data, proxy measure for a given gender norm, and analytic approach; and present key results and insights. The case studies are arranged by life stage.

Case study 1: care-seeking for childhood illness in Ethiopia

Restrictive gender norms can affect young children's health. For example, when girls are seen as a lesser financial asset than boys, parents might invest less in girls' health and education,^{28–31} reflected in differences in access to care for common childhood illnesses.³² We used geospatial information available from the Ethiopian Demographic and Health Survey³³ in 2011 to examine differences in care-seeking for girls and boys aged below 5 years (3161 children in 544 villages) and to test the hypothesis that these differences vary by geographic and sociodemographic contexts within the country.^{34,35} Care-seeking was defined as medical care sought from a certified medical practitioner for symptoms of pneumonia, fever, or diarrhoea (available disease indicators) in the two weeks preceding the survey visit.

We aggregated individual care-seeking behaviour using geospatial hierarchical cluster analysis,³⁶ identifying spatially proximal clusters of communities with significantly higher (hot spots) and lower (cold spots) care-seeking than the national average, separately for girls, boys, and the differential (number of boys minus girls; appendix). We created a gender norms proxy of gender preference in care-seeking by assigning a yes or no indicator for differential care-seeking to all surveyed communities. We tested whether key community-level characteristics (eg, socio-economic status, dominant religion, and vaccination coverage) predicted this proxy measure.

Hot and cold spots were mapped separately for girls and boys (figure 3). Sex-specific maps were overlaid with spatial distributions of increasingly wealthy or Muslim households in communities (see appendix for factor selection). Clusters of hot or cold spots for girls and for

boys appear in the same geographic areas, except for a cluster of hot spots for boys in the east, for which there is no equivalent for girls and where communities were

found to be wealthier and the majority of households there were Muslim. Using adjusted logistic regressions of sex-specific hot spots, we found that Muslim-majority

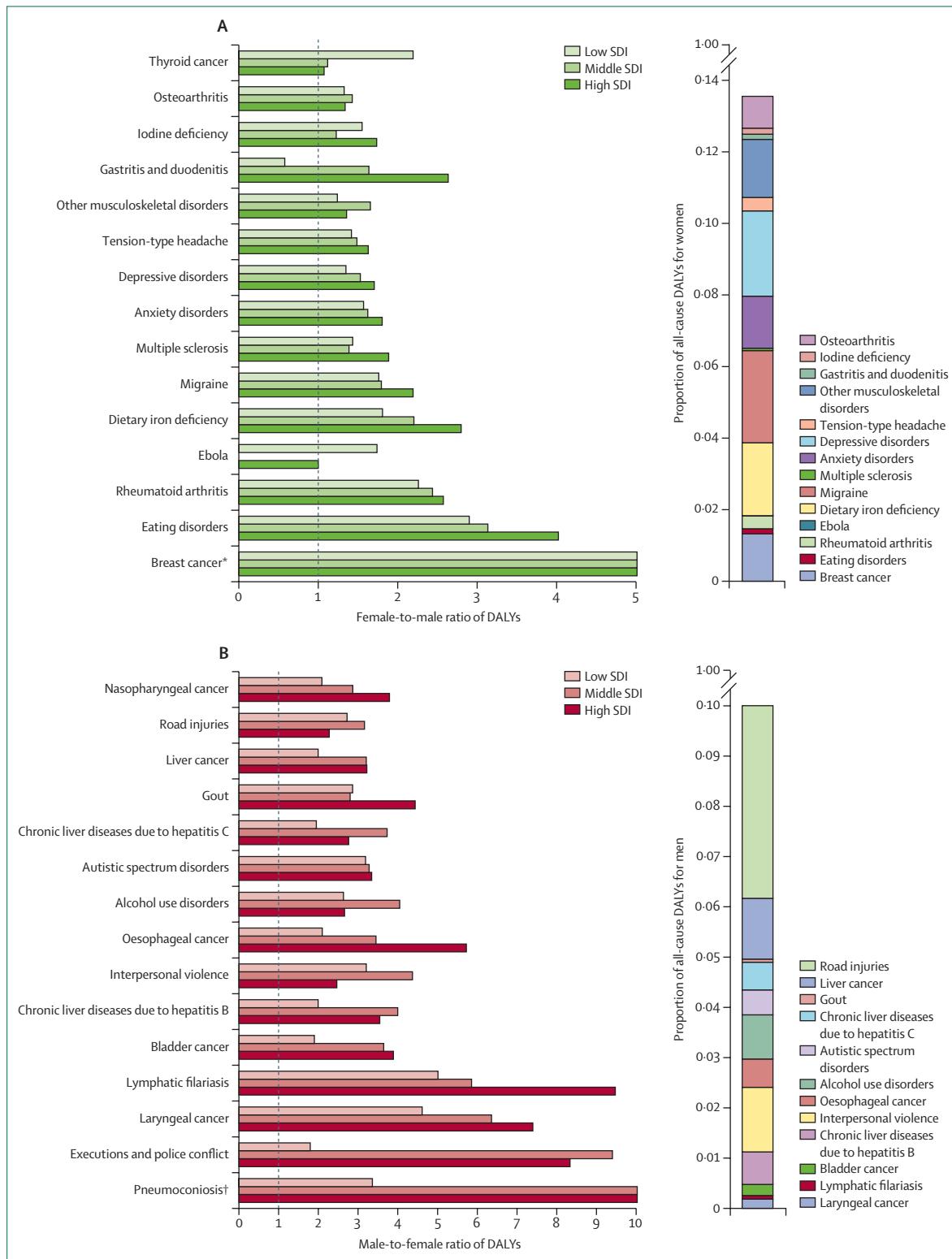


Figure 1: Ratios of age-standardised DALYs by sex for different diseases grouped by SDI

(A) Female-to-male ratio.
(B) Male-to-female ratio.

SDI is comprised of average income per person, educational attainment, and total fertility rate. Countries with low-to-middle and middle-to-high SDI are excluded for ease of data visualisation. The proportions of male all-cause DALYs for nasopharyngeal cancer (0.001), executions and police conflict (<0.001), and pneumoconiosis (<0.001) were excluded from the right panel also for ease of visualisation. DALY=disability-adjusted life-year.

SDI=sociodemographic index.

*The breast cancer ratio is 43.4 (low SDI), 40.1 (middle SDI), and 80.8 (high SDI).

†The pneumoconiosis ratio is 3.36 (low SDI), 13.8 (middle SDI), and 12.0 (high SDI).

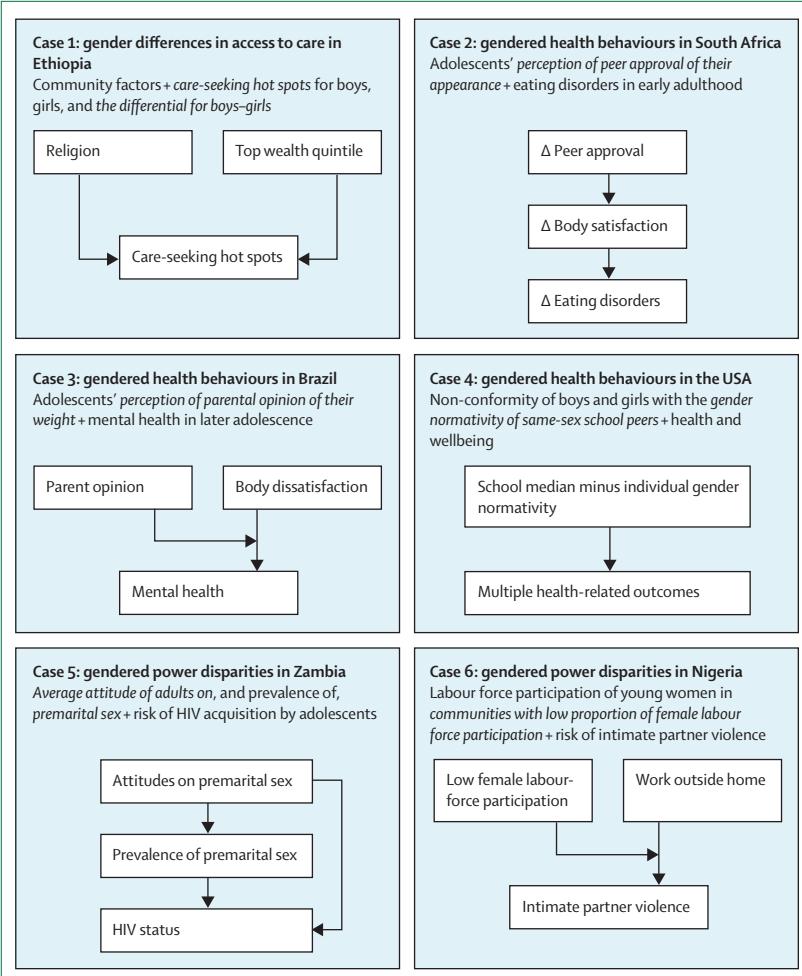


Figure 2: Summary of case studies of gendered pathways to health

Gendered differences in behaviour, power disparities, and access to health care comprise different pathways between gender norms and health-related outcomes, as described in paper 1 of this Series.¹⁰ The proxies for gender norms we used in our case-study analyses are shown in italics. The diagrams represent the hypotheses we tested and indicate a temporal-causal direction between parameters, although most of the data were cross-sectional and thus insufficient to unequivocally establish causality. Arrow-on-arrow representations show effect modification.

For Statistics South Africa see
<http://www.statssa.gov.za/>

(>50% of households) communities had increased odds of being care-seeking hot spots for boys, but decreased odds for girls, compared with communities in which fewer than 50% of households were Muslim (appendix). Differential care-seeking hot spots favouring boys had a very large and significant association with Muslim-majority communities, compared with those where Muslims were a minority (odds ratio [OR]=18·2, 95% CI 8·12–40·7, $p<0\cdot0001$; appendix). Differential care-seeking favouring boys was also associated with mostly wealthy (>50% of households) communities, but the association was weaker and not significant ($OR=2\cdot67$, 95% CI 0·95–7·46, $p=0\cdot062$). We found no clear evidence for interaction between wealth and religion on care-seeking hot spots.

These findings suggest that, unlike previous reports,^{38–40} poverty did not drive lower care-seeking for

girls in Ethiopia. Our findings, however, are consistent with reports of son preference in other contexts.^{41,42} Notably, preferential care-seeking for boys in Ethiopia was very strongly associated with Muslim-majority communities. Evidence of care-seeking in favour of boys in geographically focused communities, regardless of socioeconomic status, suggests that equal access to care is insufficient in achieving gender equality and highlights the importance of local contextual variation when addressing gender norms in programming and policy.

Case studies 2 and 3: adolescent weight control and mental health in South Africa and Brazil

Gender norms learned in the family^{7,43–45} are later reinforced or challenged in the community, at school, and by the media.^{9,10} Evidence suggests that internalisation of gender norms and their influence on health-related behaviours might be especially powerful during adolescence,^{7–9,45–47} when important biological and psychological changes occur and many health-related behaviours are adopted.^{48,49} We examine pathways through which normative pressures from parents and peers might contribute to gendered health behaviours and differential health outcomes in adolescents. We discuss two complementary studies together, as they offered unique data on individuals' perceptions of norms regarding body image.

Case 2

Known manifestations of weight concerns (eg, eating disorders) are highly gendered globally, primarily affecting girls.^{4,50,51} We used prospective cohort data from South Africa (Birth-to-20)⁵² to examine how early normative pressures from peers affected later weight control behaviours of adolescents and how this association differed by sex and social context. The data are mostly from Black children (as defined by Statistics South Africa, South Africa's national statistical service; n=3273) born in Soweto, Johannesburg in the early 1990s during a period of rapid urbanisation⁵² and the simultaneous emergence of eating disorders in Black girls.⁵³

The gender norms measure was the perceptions that adolescent boys and girls had of their peers' approval of their appearance (measured on a scale of 0=never to 4=always for the question "People my own age like my looks"). Adjusted linear regression models used sex-disaggregated data from ages 13, 17, and 22 years⁵² to test associations between perception and risk of developing an eating disorder (measured by the Eating Attitudes Test with three subscales: dieting, bulimia, and oral control such as displaying self-control around food, in which high scores mean increased risk).⁵⁴ Body satisfaction score (regarding one's own weight and appearance, where a high score means increased satisfaction) was an intermediary factor (figure 2 and appendix).

In girls, increased perceived approval of their appearance by peers from age 13 years to 17 years was associated with increased body satisfaction, controlling

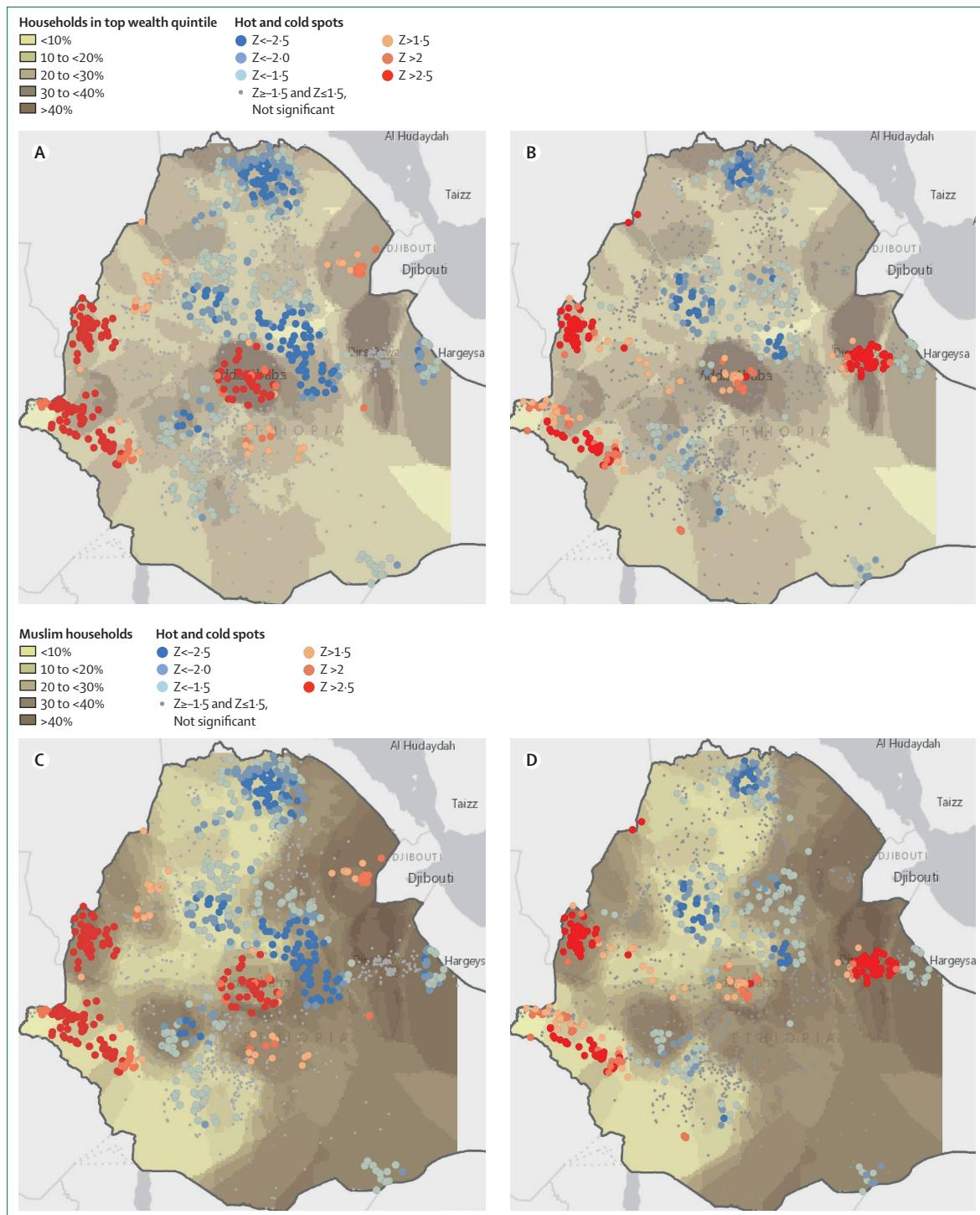


Figure 3: Care-seeking hot and cold spots in Ethiopia by sex, overlaid with distributions of proportion of wealthy (A, B) or Muslim (C,D) households. Hot (red) and cold spots (blue) are clusters of communities with significantly higher and lower care-seeking than the national average for girls (A, C) and boys (B, D) aged up to 5 years (appendix). Maps in (A) and (B) are overlaid with the spatial distribution of the percentage of households in the communities in the top wealth quintile for the country. Maps in (C) and (D) are overlaid with the spatial distribution of the percentage of Muslim households in the communities. The spatial distribution is displayed using kriging, a method for interpolating spatial data.³⁷

for change in body-mass index (BMI), over the same period ($\beta=2.57$, 95% CI 1.41 to 3.73, $p<0.0001$). An increase in body satisfaction, in turn, was associated with decreased dieting risk score by age 22 years ($\beta=-0.048$, 95% CI -0.088 to -0.008, $p=0.019$; appendix). This effect translated into a significant indirect association between perceived peer approval and dieting ($\beta=-0.124$, 95% CI -0.008 to -0.240, $p=0.036$). Similar trends were seen for bulimia and oral control scores (appendix) and trends were consistent across strata of household wealth. The direct association between perceived approval and eating disorder risk was small and not significant.

Body satisfaction in boys was also influenced by perceived peer opinion, but the overall risk of eating disorders was not consistently influenced, with wealth in the boy's family having a moderating role (appendix). For boys in poorer households, increased perception of their peers' approval over time was associated with a reduction in dieting scores, and this association was markedly reversed for boys in richer households.

These results show the importance of peer-mediated body dissatisfaction for dieting behaviours in girls, and intersectionality of normative expectations with wealth in boys, perhaps reflecting a broader influence of media in wealthier households. Findings suggest that interventions aiming to reduce harmful weight-control behaviours in adolescents should engage peer networks in challenging unhealthy norms of body appearance.

Case 3

What children believe to be their parents' judgments of their weight, communicated through either words or actions (eg, weight-based teasing), is associated with body dissatisfaction⁵⁵ and has, in turn, been linked to adverse mental health outcomes. We examine the influence of normative pressure from parents in Brazil, where urban culture places high value on body appearance and is accepting of weight control behaviours.⁵⁶

The data⁵⁷ from Brazil are from a birth cohort (n=5249) from the city of Pelotas in 1993. We tested the role of perceived parental opinion of the weight of adolescent boys and girls aged 11 years (thin, normal, or fat) as a moderator of the effect of body dissatisfaction at age 15 years (feeling fatter or thinner than ideal) on mental health at age 18 years. Mental health was measured using the Self-Reporting Questionnaire⁵⁸ screening tool (high scores indicate poor mental health). We restricted the analytic sample to girls (n=1309) and boys (n=1113) with normal BMI (based on WHO's criteria⁵⁹ for age-standardised Z scores ranging from -2 SD to +1 SD) at age 11, so that our proxy for gender norms, perceived parental opinion for boys or girls, was unlikely to reflect genuine parental health concerns about overweight or underweight status (appendix).

We found that 7% of girls and 6% of boys with normal BMI reported that their parents thought they were fat at

age 11, whereas 43% of boys compared with 37% of girls reported that their parents thought they were thin. Using sex-disaggregated regression analysis, we found some evidence for an interaction between perceived parental opinion about weight at age 11 and body dissatisfaction at age 15. Girls who thought they were fatter than ideal at age 15 had significantly poorer mental health at age 18 than those who were satisfied with their bodies, but only if, at age 11, they had reported that their parents thought they were fat ($\beta=3.08$, 95% CI 1.05–5.11, $p=0.003$). By contrast, for girls who believed that their parents thought they were normal or thin at age 11, feeling fatter than ideal at age 15 was not associated with increased Self-Reporting Questionnaire scores (appendix). We did not observe a similar pattern in boys, suggesting that parental opinion about body image affects the mental health of boys and girls differently. Thus, perceived parental opinion about weight appears to be a determining factor in whether the mental health of girls desiring to be thin is affected.

The long-term contribution of normative parental influences to the later mental health of girls in Brazil suggests that it has a more powerful influence than previously thought. These findings further emphasise the importance of multi-level interventions across influential groups, such as parents and teachers, to temper socially-driven health inequities.

Case study 4: school peer influences on adolescent health in the USA

In addition to pressure to conform to perceived ideals of body image, pressure to conform to dominant gender norms in schools can also have profound effects on the mental health of adolescents.^{60–62} Negative social sanctions for transgressing such norms are particularly salient in this age group, when children seek to establish their identity through group membership.^{9,63} Sanctions can include bullying or ostracism by peers and scolding or punishment by caretakers or teachers.⁷ In this case study, we examine a pathway to risky health behaviours and poor outcomes due to non-conformity to gender norms in schools.

We used data⁶⁴ from the US National Longitudinal Study of Adolescent to Adult Health, a nationally representative sample of adolescents aged 11–18 years during the 1994–95 school year (n=20745), randomly selected from 80 paired middle and high schools. The dataset does not include questions on gender-specific attitudes, but is rich in behavioural and health-related data. Following the work of Fleming and colleagues,⁶⁵ we created a gender normativity measure for each student using a set of factors found to discriminate between binary sex assignment in the survey (appendix). For the proxy of gender norms, sex-specific individual scores were aggregated to the median of same-sex school-level peers. We tested non-conformity to dominant gender norms, expressed as the difference between an

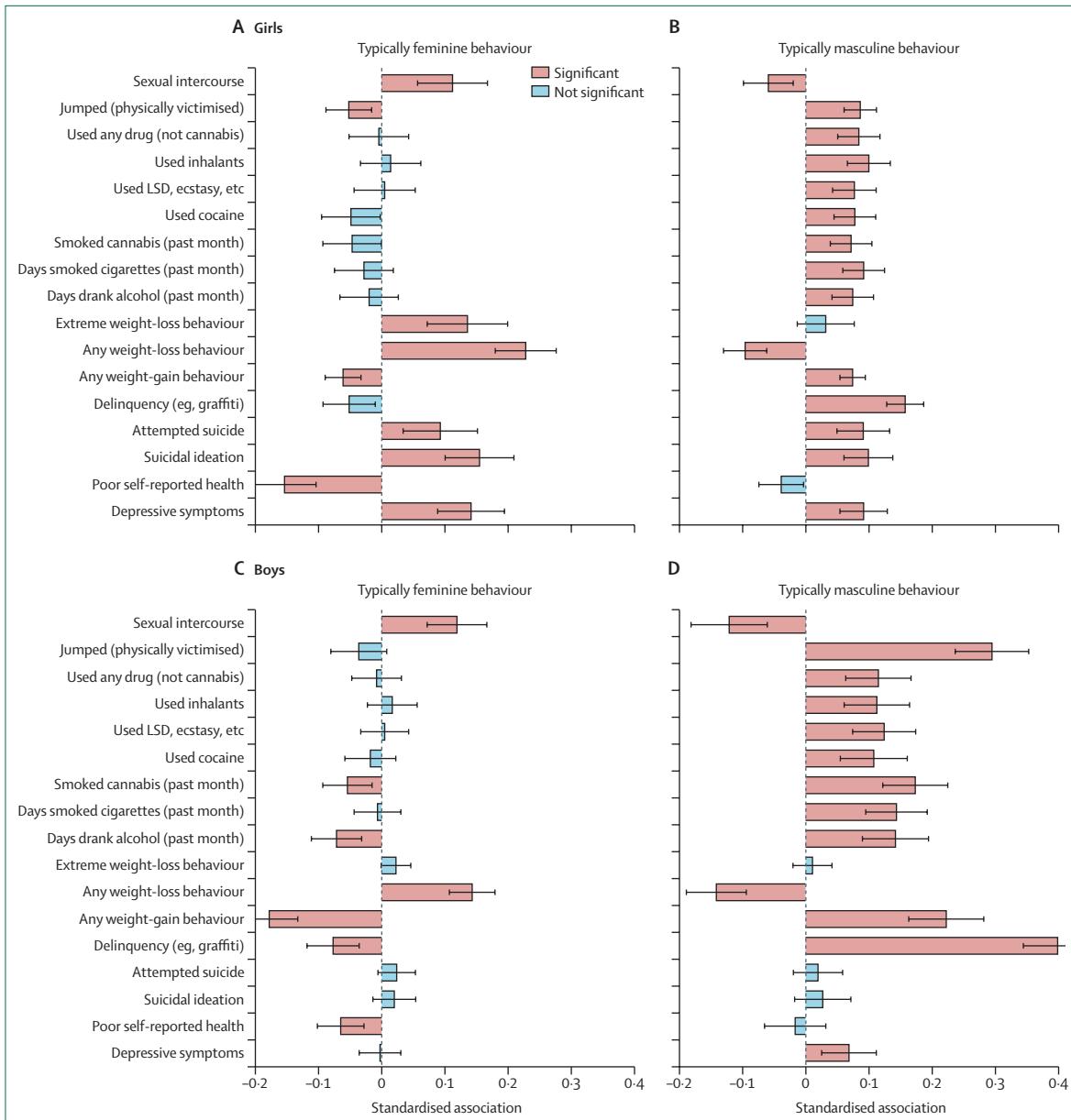


Figure 4: Estimated effects of non-conformity to gender norms or positive and negative differences between individual estimated gender normativity and the median for same-sex school peers on health outcomes and health-related behaviours in US students

The analysis was done with sex-stratified piecewise linear regressions (knot at zero) with separate effect estimates for typically feminine and typically masculine behaviours compared with the median for the school, controlling for an individual's own gender normativity, birth year, race, and school-fixed effects.

Effect estimates are standardised so that their magnitudes can be compared across outcomes (eg, an SD increase of 1 in the difference [or non-conformity] measure is associated with a 0.399 SD increase in delinquent behaviour in boys). Error bars represent 95% CIs. Red bars are significant at $\alpha=0.01$ ($0.05/5$) for an appropriate Bonferroni correction on the basis of a parallel analysis of all outcomes in the full sample (boys and girls in all schools). The correction suggested that there are five principal components underlying this set of health-related outcomes. LSD=lysergic acid diethylamide.

individual's estimated gender normativity and the median of their same-sex school peers, on health.

For each outcome, we used piecewise linear regressions stratified for sex to estimate the separate effects of more typically feminine and more typically masculine behaviours, compared with the median of each school and controlling for an individual's own gender normativity,

birth year, race or ethnicity, and school-fixed effects (figure 4, appendix). Multiple health-related outcomes were associated with non-conformity to gender norms. Boys and girls who reported more typically masculine behaviours than their same-sex peers were significantly more likely to report risky behaviours, for example engaging in delinquent behaviour ($\beta=0.158$, 95% CI

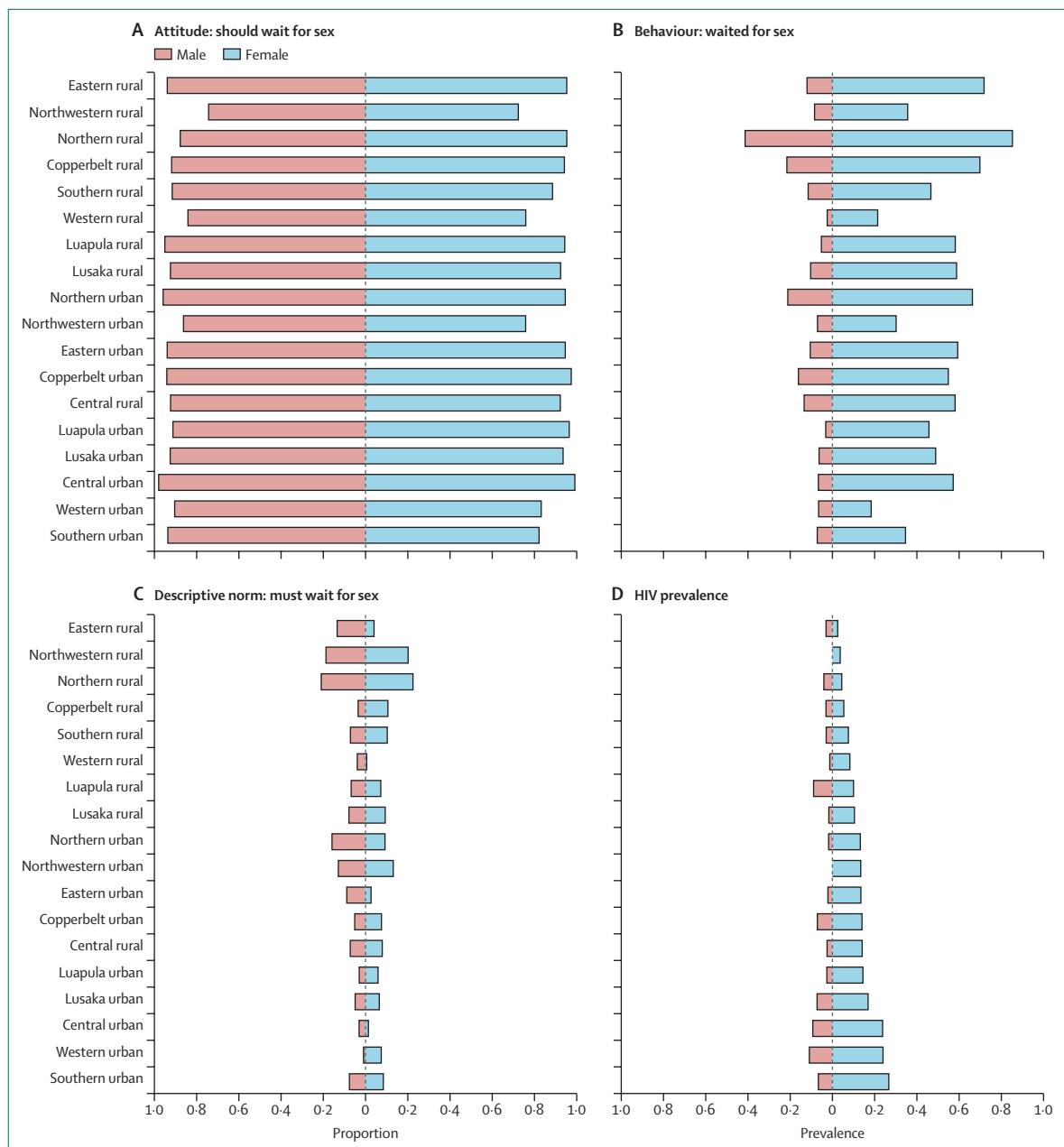


Figure 5: Differences by sex between Zambian urban and rural regions for 2007 in the proportion of people who showed discordance between sex-related attitudes and behaviours or outcomes

Differences between adult men and women aged 25–49 years in their (A) attitude (should wait for sex), (B) behaviour (waited for sex), and (C) descriptive norm towards premarital sex (must wait for sex). Differences between (D) prevalence of HIV infection in adolescent men and women aged 15–24 years. Aggregated responses were sex-stratified: men's responses about men's attitudes and behaviours, and women's responses about women's attitudes and behaviours. The data are based on our estimates from the 2007 Zambian Demographic and Health Survey.

0·128–0·187, $p<0·0001$ for girls and $\beta=0·399$, 95% CI 0·345–0·454, $p<0·0001$ for boys). Conversely, boys and girls who reported more typically feminine behaviours were more likely to report weight-loss behaviours ($\beta=0·228$, 95% CI 0·180–0·276, $p<0·0001$ for girls and $\beta=0·143$, 95% CI 0·107–0·179, $p<0·0001$ for boys). Girls were more likely to report increased depressive

symptoms and ideation and attempts at suicide with increasing difference in either direction (more typically masculine or feminine) from the median gender normativity score of their peers. Results were similar when controlling for household socioeconomic status (appendix).

In summary, US students at the extremes of a gender-normative measure relative to other students in their

school could experience multiple health-related effects. Negative sanctions from peers dominant for gender norms might be one of the paths through which these associations operate. Our results highlight the need to address stigma and negative behavioural and mental health consequences associated with gender non-conformity in schools.

Case study 5: premarital sex and HIV status in Zambia

Sub-Saharan Africa has the highest prevalence of HIV infection globally, with new cases concentrated in adolescents⁴⁸ and disproportionately in girls.^{31,66} Gender norms and power imbalances play key roles in acquiring HIV,^{67–69} as they impact, for instance, the access and use of condoms.^{67,68} In the USA, embarrassment might prevent adolescents from receiving information on HIV, seeking contraception, using condoms, or accessing care.^{70,71}

We examined a gendered pathway to HIV infection in adolescents in Zambia that acts through community expectations of appropriate sexual behaviour.^{72,73} In settings where social norms against premarital sex exist, we hypothesised that youth engaging in premarital sex would refrain from talking about it (with peers, parents, or health professionals), thus reducing their ability to learn about and access protection against HIV infection and increasing their acquisition risk. We also hypothesised that this restriction would have a greater impact on girls than boys, partly because of double standards^{10,74} regarding appropriate sexual behaviour.

We analysed data for adolescent women ($n=1669$) and men ($n=1285$) aged 15–24 years from the 2007 Demographic and Health Survey in Zambia,⁷⁵ one of six countries providing survey information on HIV status and having balanced questions about expectations of premarital sex (appendix). The proxy for gender norms was the attitudes of adult (ages 25–49 years) women and men toward premarital sex, obtained by aggregating sex-specific data to 18 regional and urban–rural strata. We tested the effect of adult non-compliance with norms on premarital sex, expressed as the discordance between adult attitudes and their behaviours (believing premarital sex to be wrong, but engaging in it), on the risk of HIV acquisition in adolescents.

Attitudes toward premarital sex did not vary substantially by sex or region in Zambia and were conservative: more than 80% of adults disapproved of premarital sex in most regions (figure 5). Attitudes and behaviours were mostly discordant for men (most disapproved of premarital sex but were estimated to have engaged in it on the basis of their age at first marriage or union and first self-reported sexual intercourse), whereas women were more likely to be concordant (most disapproved of premarital sex and refrained from it). Adult women's perceptions of what most other women did (descriptive norms of high perceived prevalence of premarital sex) were discordant with their own behaviours (lower prevalence of premarital

sex). There was also substantial heterogeneity in the prevalence of HIV infection in adolescents (15–24 years) across Zambia (range 3–27%), disproportionately affecting young women in urban regions.

At the regional level, an increasing proportion of adult women (25–49 years) who refrained from premarital sex was associated with reduced HIV prevalence in adolescent women (Pearson's correlation, $p=-0.43$, $p=0.077$), but conservative attitudes were not. Importantly, discordance between the attitudes and behaviours of adult women was strongly correlated with the prevalence of HIV infection in adolescent women ($p=0.63$, $p=0.005$), explaining an additional 20% of the variation in the latter age group's HIV status over behaviour alone. Furthermore, using sex-stratified Poisson regressions, we found that a 10% increase in discordance in adult women or adult men was associated with a 27% ($RR=1.27$, 95% CI 1.11–1.45, $p=0.001$) or 28% ($RR=1.28$, 1.05–1.56, $p=0.015$) increase in individual relative risk of HIV infection for adolescent women, when controlled for demographic and regional factors (appendix). Risks were similar for adolescent men but were not significant.

These results show that non-compliance with gender norms can harm health, in this example through increased risk of HIV infection, with potentially fatal consequences. Considering sexual double standards,^{10,74} young women particularly might avoid seeking information, negotiating condom use, or seeking care to minimise the risks that premarital sex poses, as they might anticipate increased disapproval relative to men. Efforts to protect women from harm associated with sexual activity should consider the normative environment in which the sexual relationships of adolescents take place.

Case study 6: women working outside the home and intimate partner violence in Nigeria

Gender norms intersect with power as adolescents move into early adulthood,^{5,7,8,47,76} with unequal power relations shaping, and being shaped by, gender inequalities and restrictive gender norms.^{10,13} Those in power benefit from, and seek to uphold, the existing social order by (consciously or unconsciously) sanctioning non-compliers.^{77,78} We examine a pathway through which gendered power disparities can generate punishment (privately, at home) for women who violate the gender order by working outside the home.

Evidence is mixed on whether female participation in the labour force increases^{79–82} or reduces^{83,84} women's risk of violence from their intimate partner in contexts of low gender equality, as such violence mostly takes place in private. In countries where most women work, participation in the labour force can be protective for women, but it might be a risk factor for intimate partner violence in countries where most women do not.^{84,85} We tested whether women who work outside the home are at increased risk of intimate partner violence relative to women who do not in two types of Nigerian communities:

communities where few women work outside the home and communities where female employment is more normative.

We used data from the 2014 cluster-sample design Violence against Children Survey⁸⁶ on experience of intimate partner violence for female youth ($n=1633$, ages 13–24 years; appendix) during the year before the survey. The estimate of female participation in the labour force was based on self-reported work outside the home in the week before the survey. We used intraclass correlation coefficients to detect that female employment was clustered at the community level for girls but not boys, with sufficient heterogeneity across communities to test our hypothesis. Assuming equal economic opportunities for work across communities, a low proportion of young women who work outside the home was our proxy for gender norms, reflecting restrictive norms around women's physical and economic mobility and opportunities to earn income. Communities were then classified as either high (assumed absence of restrictive norms) or low (assumed presence of norms sanctioning working outside the home) in female labour-force participation, on the basis of a data-driven cutoff point of 28% (based on a one-third and two-third split by community types) of female respondents being employed. Results were robust to different cutoff points (data not shown).

There were no significant differences between the two community types in overall past-year exposure of women to sexual or physical intimate partner violence (7·3% [SD 1·16] in communities with high female employment and 7·9% [1·50] in those with low female employment, adjusted Wald test $p=0·733$). Using logistic regression controlled for age, marital status, and school attendance at any point, we found that women who worked in communities where female employment was uncommon had significantly higher odds of experiencing intimate partner violence in the year before the survey compared with non-working women [$OR=2·38$, 95% CI 1·29–4·39, $p=0·006$]. However, in communities where female employment was common, women's risk of intimate partner violence did not differ by working status (appendix).

The increased risk of exposure to intimate partner violence for working women in communities where female employment was low suggests that some male partners might use violence to punish women for transgressing gender norms on work and the perceived threat to their masculine role as breadwinner or power-holder. Although early transgressors of restrictive norms might experience intimate partner violence as a consequence, they might also initiate long-term changes of norms in ways that improve employment opportunities and health for future generations.⁸⁷ We examine elsewhere the implications of gender norms on female employment and women's health across geocultural contexts and time (unpublished).

Our findings have important implications for interventions at the intersection of gender equality and global health and development—for example, for efforts to empower women through employment or microfinance of small women-led businesses. When instituting such empowerment programmes, the risks of harm to those encouraged to challenge restrictive gender norms must be anticipated. Strategies to prevent and mitigate harm also need to be implemented to effectively reduce gender inequalities and health inequities.

Opportunities and challenges

Our case studies provide practical opportunities to gain novel insights into links between gender norms and a wide range of health outcomes—beyond the common focus on sexual and reproductive health, violence, and HIV—using a variety of analytic tools applied to existing survey-based data. For example, geospatial clustering in case study 1 showed that there is regional variation in gender norms where sex intersected with religious affiliation to produce large inequities in the seeking of health care, a finding that analysis at the individual level might miss. Clustering communities together overcame the challenge of small sample numbers (ie, precision) when estimating group-level behaviours for communities with few sick children. This innovative approach to identifying gender inequalities could be extended to other health-related indicators and countries.

The inclusion of a targeted question in case studies 2 and 3 on what adolescents thought their peers and parents thought of them was useful to estimate the early normative influence of key social groups on the health of children by their gender and in their socioeconomic environment. Similarly targeted questions could be easily added to future surveys. In case study 4, the construction of a gender normativity index enabled us to use a dataset rich in measures of gender-related behaviours to study how non-conformity with gender norms in school might harm individual health. This novel approach could be generalised to datasets such as the Global School-Based Student Health Survey⁸⁸ to expand the investigation of this topic in diverse contexts.

The measure of discordance between group-level and sex-specific attitudes and behaviours related to premarital sex in case study 5 went against the common practice of using only attitudes or only behaviours as proxies for gender norms. Contrasting other matched attitude-behaviour pairs in this way could generate additional new insights into gendered pathways to health, as we have shown for the acquisition of HIV. Finally, case study 6 shows how intraclass correlation coefficients, which are typically used to estimate effective sample size in clustered study designs, can be reinterpreted to identify clustering of behaviours sufficient to study within-country variation in gender norms. By contrasting individual behaviour with that of the group, the risk of

non-conformity with, or transgression of, gender norms to individual health can be studied.

Nevertheless, we encountered multiple data limitations, including our reliance on sex-disaggregated data to study gender. In the past decade, global health leaders have increasingly recommended the incorporation of gender-related measures into data systems.^{12,89–95} A comprehensive UN report on gender statistics recommended that data should be systematically stratified for sex; measure gender facets, including norms and relations; reflect the diverse identities of women and men, capturing multidimensional aspects of their lives; and be free of gender stereotypes and biases.⁹⁴ Although these guidelines provide a useful framework for collecting gender-sensitive data, none of the 17 publicly available data sources we investigated (appendix) were designed accordingly. The substitution of a binary sex indicator for gender in sex-disaggregated data represents a missed opportunity to study gender and health along a continuum of lived experiences and might have introduced important misclassification biases in our analyses.

Moreover, many datasets did not combine gender-related attitudes or behaviours with health outcomes to allow for the study of the pathways between them. Even when both were available, data were often missing for certain demographic groups or world regions. For example, Demographic and Health Surveys represent only low-income and middle-income countries and data were often missing for men (eg, on questions on child care), women (eg, on questions on some sexual practices), or certain age groups (eg, children aged 6–14 years and women aged over 49 years), which can bias data interpretation. In some cases, the available proxy for gender norms in the dataset was perhaps too distal from the health outcome of interest, or confounded by intermediate factors, to detect an association (eg, between attitudes around intimate partner violence and childhood malnutrition based on data that are available in the Demographic and Health Surveys).⁹⁶

Additional data limitations included the inability to stratify cohorts by subgroups because of scarcity or absence of indicators (eg, missing race or ethnicity information) and small sample sizes. Attempts to disaggregate national survey data to subnational levels or across socioeconomic strata decreased statistical power, limiting our capacity to precisely estimate the impacts of intersecting disadvantage of gender with other social determinants of health.

Notably, we found survey questions that belied gender-biased assumptions in their construction. For example, we used the rich attitudinal data in the World Values Survey⁹⁷ to investigate adult self-rated health and gender norms on employment. However, the question on employment status cannot account for cross-cultural differences in the meaning of self-employment and includes the gender-biased term housewife as one of the response categories in the English version of the questionnaires. 43 of 46 surveys back-translated to

English used a phrase or word similar to housewife (21 of 24 languages and 33 of 36 countries), as opposed to a gender-neutral description (appendix). Such variation made the category probably biased and unreliable for cross-national comparisons. Additionally, phrasing of attitudinal questions, such as “Do you strongly agree... or strongly disagree? When a mother works for pay, the children suffer.” communicates the stereotype that a mother’s role is at home as a caregiver and that the father’s employment-related absence is inconsequential for young children. It is also unclear whether the question refers to a situation in which both or only one parent works. Furthermore, questions phrased with the terms wife or husband suggest that the questions only apply to married couples in heterosexual unions.

Finally, women and men might answer survey questions on the basis of gendered expectations of what they think they should say rather than on their own lived experiences, particularly around such gender-charged topics as sexual behaviour or eating disorders. Potentially biased responses might have led us to reproduce current, potentially biased understandings of gendered behaviour and health risk, while missing important groups likely to be negatively (or positively) affected by gender norms.

Combined, these data limitations hindered our investigation of how and by whom norms are enforced and the differential impacts of their violation across the life course and world regions. Paper 1 of the Series¹⁰ argued that gender biases can be manifested and reinforced by research methodologies. Although publicly available survey data provided many opportunities for testing hypotheses about gender norms and health, care is required to avoid introducing or perpetuating bias when constructing and using proxies for gender norms from these data.

Research agenda

In future research, we join many others in advocating for collecting survey-based data on all facets of gender, including data for gender minorities.^{12,89–95} We also advocate for balanced survey data in which men and women are equally represented across age groups and are asked the same unbiased attitudinal and behavioural questions to enable gender-comparative research. Considering that efforts on data collection are constrained by economic resources, we recognise that choices must be made when designing surveys but that each choice confers trade-offs that should be analysed from an intersectional perspective that includes gender. If certain domains are assumed to be unimportant (eg, child care provided by men) and hence not measured, then we will not be able to assess or affect change.⁹⁸ Data that reflect society not only as it is, but also as we aspire for it to be, are critical for monitoring progress on SDGs. Identifying and better measuring current and evolving gender norms across cultures, life stages, and areas of society will allow for more robust study of gender norms and health.

In addition to more gender-sensitive data, more research is required on gendered pathways to health, including integrating qualitative research to establish the origins, preservation, and shifts in gender norms. The collection of harmonised and consistent data across contexts and over time (eg, standards for measuring gender and gender norms across global surveys), combined with longitudinal methods, would allow for cross-national comparisons, assessments of cohort effects and causal impact, and monitoring the evolution of gender norms. Methods that overlay different types of data, such as survey-based and geospatial data, could use external factors (eg, climate change and economic shocks) to identify locations of gender-based discrimination. Machine learning algorithms and natural language processing could offer novel approaches to eliminating gender-related biases coded in large existing datasets.

We also advocate for enhanced collaborations across the humanities and social and health sciences to provide conceptual bridges for effective use of data according to an evidence-based research agenda. Representation from domain experts and gender scholars, survey designers and analysts, and community partners and policy makers will allow for the creation of data systems that enable studying health at the intersection of gender and other social determinants (eg, race, religion, and social class). Identifying mechanisms for safely sharing and analysing survey datasets is crucial for safeguarding privacy while enabling new opportunities to study this intersectionality in global health research.

Finally, the impact of gender norms can be highly context-specific, such that generalisations around gender norms can be counterproductive, misleading, or even harmful. Ecological studies (eg, with national indicators of gender inequality), although informative for hypothesis generation, belie the complexity and importance of local factors that influence the relationship between gender norms and health. A deep understanding of sociocultural contexts, aided by qualitative research, is required to design effective prevention and mitigation strategies for socially-driven health inequities. Ongoing monitoring must be in place to identify, support, and protect those who challenge restrictive gender norms and existing gender-based power differentials. Public health programmes and policies that are locally relevant and globally active are central to achieving both gender equality and health. Progress can be accelerated through improved qualitative and quantitative data collection, analysis, and interpretation that accounts for the pervasive role of gender norms in shaping human health and wellbeing.

Contributors

GLD was the principal investigator of the grant supporting the work on the Series, and implemented the multiple data partnerships for the case studies. GLD, AMW, BC, and VM created the framework for the manuscript and collaborated with SA, IM-G, PL, EH, IS, LS, CGV, RB, AJDB, BWD, DB, RG, JMN, HBS, LMR, SAN, TDN, SC, NH, KMCC, and MRC to construct the case studies and supporting material.

Steering Committee of *The Lancet* Series on Gender Equality, Norms, and Health

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Declaration of interests

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