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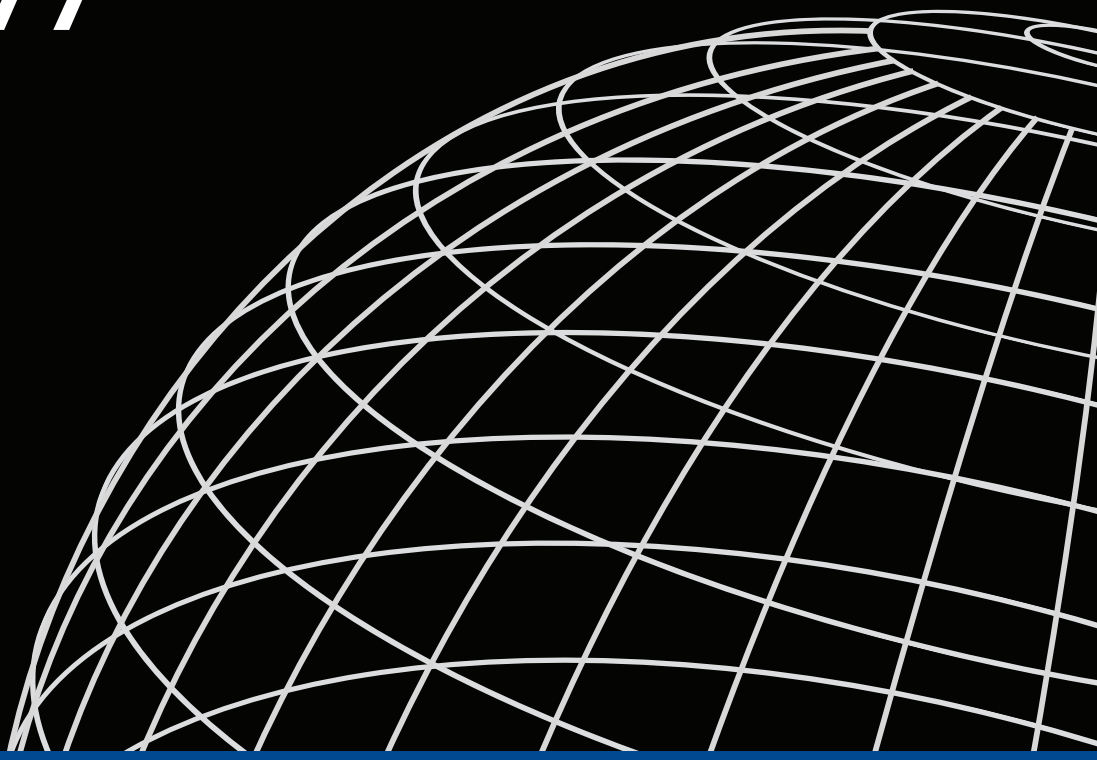
DHS ANALYTICAL STUDIES 77



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Young Women's Empowerment and Fertility Intentions

Kerry L.D. MacQuarrie[1,2]

ICF
Rockville, Maryland, USA

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[1] The DHS Program
[2] Avenir Health

Corresponding author: Kerry MacQuarrie, The DHS Program, 530 Gaither Road, Suite 500, Rockville, MD 20850, USA; phone: +1 301-572-0282; fax: +1 301-407-6501; email: Kerry.MacQuarrie@icf.com

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PREFACE

The Demographic and Health Surveys (DHS) Program is one of the principal sources of international data on fertility, family planning, maternal and child health, nutrition, mortality, environmental health, HIV/AIDS, malaria, and provision of health services.

One of the objectives of The DHS Program is to analyze DHS data and provide findings that will be useful to policymakers and program managers in low- and middle-income countries. DHS Analytical Studies serve this objective by providing in-depth research on a wide range of topics, typically including several countries and applying multivariate statistical tools and models. These reports are also intended to illustrate research methods and applications of DHS data that may build the capacity of other researchers.

The topics in this series are selected by The DHS Program in consultation with the U.S. Agency for International Development.

It is hoped that the DHS Analytical Studies will be useful to researchers, policymakers, and survey specialists, particularly those engaged in work in low- and middle-income countries.

Sunita Kishor
Director, The DHS Program

ABSTRACT

Fertility intentions among young women are important drivers of future fertility trends. Among adults, women's empowerment has been linked to the ability to realize fertility intentions. This study examines associations between young women's empowerment and fertility intentions using data on women age 15-49 from 10 Demographic and Health Surveys. One challenge to assessing empowerment among youth is that most measures of empowerment apply only to adults and, in the case of fertility, married adults. We developed a Youth Empowerment (YE) scale with six domains, suitable for use with youth regardless of marital or school status or age.

This study first describes patterns of YE and two measures of fertility intentions: ideal number of children and use/intention to use contraception. We disaggregate by age group, marital status, and school status since both fertility intention outcomes and empowerment are likely to manifest differently across these groups. The study then uses multivariable regression analysis to assess the association between YE and fertility intentions, controlling for these and other factors.

YE varies by country, measuring lowest in Mali (13% in the highly empowered tercile) and highest in the Philippines (81% in this tercile). YE is lowest among the youngest women (eight of ten countries) and currently married young women (all ten countries). YE is highest among never married women in five countries, but highest among formerly married women in the other five countries examined. Similarly, in five of the countries YE is highest among out-of-school youth, while it is highest among in-school youth in another four countries.

We find a significant, negative bivariate association between young women's empowerment and ideal number of children in all ten study countries, indicating that as women's empowerment increases, ideal number of children decreases. This association remains significant with multivariable analysis in six countries.

Young women's empowerment is significantly positively associated with use of contraception and, among non-users, intention to use contraception in eight of ten countries. After controlling for other factors, these associations remain significant in five and eight countries, respectively. The largest differences are generally between the high YE and medium YE categories. These findings suggest the importance of programmatic and policy interventions that build and maintain young women's empowerment, while also facilitating achievement of their fertility intentions.

Key words: empowerment, youth, contraceptive intentions, fertility intentions

1 BACKGROUND

Fertility intentions can help us understand and better project future fertility trends (Bongaarts and Casterline 2013; Westoff 2010). Fertility ideation among young cohorts especially exercises outsized influence on future fertility trends, for two reasons. First, younger women and girls are less likely to have met or exceeded their desired fertility, in contrast to women in older cohorts, meaning that their intentions are more likely to influence fertility. Secondly, the size of the youth population in many settings means that even relatively minor changes in fertility behavior may have large effects at the population level. This aggregate level influence on fertility trends, therefore, makes studying fertility intentions and subsequent behavior among young women warranted. Understanding the fertility intentions of young people before and as they are entering active reproductive years can also help us better design services and programs to meet their needs.

Current literature finds that at the individual level, fertility intentions and subsequent fertility-related behaviors are indeed linked (Miller, Rodgers, and Pasta 2010; Yeatman, Trinitapoli, and Garver 2020). Women who want fewer or no more children, for example, go on to have fewer children (Bongaarts and Casterline 2013; Cleland, Machiyama, and Casterline 2020). However, the relationship between intentions and actual fertility is imperfect (Cleland, Machiyama, and Casterline 2020; Morgan and Rackin 2010). This is because actual fertility is not only the outcome of preferences for the number, timing, and spacing of children, but depends on the ability of individuals to act on their own preferences, a crucial component of empowerment.

A large and growing evidence base indicates that women's empowerment is related to a range of reproductive health outcomes and fertility behaviors, including the ability to realize fertility intentions (Al-Riyami and Afifi 2003; Mason and Smith 2000; Upadhyay et al. 2014). Women lacking empowerment are more likely to have had more children, closer spacing between pregnancies, and are less likely to use contraception, particularly modern temporary methods for spacing (Al-Riyami and Afifi 2003; DeRose and Ezeh 2010; Kabir et al. 2005; Kishor 2000; Leon 2012; Loll et al. 2019; Upadhyay et al. 2014).

One pathway by which empowerment may influence reproductive and fertility-related behaviors is through shaping attitudes and fertility intentions (Upadhyay and Karasek 2012). Fertility preferences may reflect young women's empowerment and the social norms in their environment, shaping attitudes about, for example, the number of children they find to be ideal or when they should begin childbearing. Further, the sense that youth have of their own ability to act (conscientization) may be expressed in terms of intentions to use contraception in the future, among other behaviors. Nonetheless, little is known about how young women's empowerment influences fertility intentions and behaviors.

One challenge for examining empowerment among youth, however, is that many direct measures of empowerment (i.e., agency (Kabeer 1999)) describe power within dyadic relationships and are applicable only to married adults (Ewerling et al. 2017; Ewerling et al. 2019) or rely on items that are not relevant markers of the adolescent experience, but to older stages of the life cycle, such as the decision to end childbearing (Edmeades et al. 2012; Mason and Smith 2000).

Using nationally representative data in 10 countries for which relevant data are available, this study explores associations between young women's empowerment and two aspects of fertility intentions: ideal number

of children and use/intention to use contraception. Thus, this study aims to fill a critical gap in the existing literature. To facilitate this analysis, the study takes advantage of a newly developed and validated measure of youth empowerment (YE) that is suitable for use with youth, regardless of marriage status (married or unmarried) or school status (in school or out of school). The measure also provides insight into potential differences between younger and older ages across the youth age range of 15-29. This measure will facilitate new analyses among youth with a wider range of outcomes. This study will highlight the programmatic and policy relevance of young women's empowerment for shaping and achieving their fertility intentions.

2 METHODS

2.1 Data

This study uses data on young women from 10 countries for which DHS surveys have been conducted since 2015 with data made publicly available by fall 2020, and whose sample includes all women, rather than samples restricted to ever-married or currently married women. The resulting study surveys are: Ethiopia 2016, Haiti 2016-17, Malawi 2015-16, Mali 2018, Nepal 2016, Nigeria 2018, Philippines 2017, Senegal 2019, Uganda 2016, and Zambia 2018.

This study restricts its analysis to women age 15-29, in keeping with the USAID definition of youth (age 10-29). Sample sizes are presented in Table 1 and range from 4,944 young women in Senegal to 22,538 young women in Nigeria.

Table 1 Surveys and sample sizes

Survey	Weighted # of women age 15-29	Unweighted # of women age 15-29
Ethiopia 2016	9,099	9,246
Haiti 2016-17	8,270	8,282
Malawi 2015-16	14,375	14,343
Mali 2018	6,009	6,084
Nepal 2016	6,984	7,022
Nigeria 2018	22,538	22,470
Philippines 2017	12,789	12,720
Senegal 2019	4,944	5,044
Uganda 2016	11,137	11,072
Zambia 2018-19	7,971	7,965
Total	104,116	104,248

2.2 Analytical Strategy

This study examines two fertility intention outcomes as they relate to young women's empowerment: (1) Ideal number of children and (2) Use and intention to use contraception. This study first describes the levels of, and patterns in, fertility intentions and youth empowerment. Because both fertility intention outcomes and our primary explanatory factor—young women's empowerment—may vary by age, marital status, and school-going status, we disaggregate by these factors.

Next, we present bivariate analysis of the association between our fertility intention outcomes and young women's empowerment, and present the results as group means or cross-tabulations with the results of a chi-square test of independence. Finally, we estimate bivariable and multivariable regression models to assess the association with young women's empowerment, first on its own, and then controlling for other factors that could confound the observed bivariable association between empowerment and fertility intentions. Control variables entered into the adjusted models are age, current marital status, in-school/out-of-school status, urban/rural residence, educational attainment, and household wealth quintile.

All analyses are conducted in Stata/MP 16.1. Data are weighted to account for sampling probability and nonresponse, and *svy* commands are used to adjust for the multi-stage, clustered sampling design of DHS surveys.

2.3 Measures

We used exploratory factor analysis to develop a YE scale from 41 possible items (MacQuarrie 2021). We tested the final YE scale with 22 items in 6 domains (overall Cronbach's α=0.726, eigenvalue=1.1) through confirmatory factor analysis, first across the 10 country samples, and then subsequently within each country, across stratified subsamples of never, formerly, and currently married youth; in-school and out-of-school youth; and young women age 15-19, 20-24, and 25-29. The YE scale proved to be robust across each of these subsamples. The process and results of the development of the YE scale are described in detail elsewhere (MacQuarrie 2021).

The six domains of the YE scale are: (1) Violence attitudes; (2) Digital connectedness: Banking and internet; (3) Work and earnings; (4) Health facility access; (5) Major asset ownership; and (6) Reproductive health knowledge. The six domains thus include both empowerment resources (Kabeer 1999) (e.g., reproductive health knowledge) and injunctive empowerment norms (Yount et al. 2020) (e.g., violence attitudes). See Table 2 below for the items in each of the six domains.

Table 2 Domains and items in the Youth Empowerment scale

Item stem	Response code or unit
Domain 1: Violence attitudes	
Wife beating is justified if[1]:	
Wife goes out without telling husband	no/yes
Wife neglects the children	no/yes
Wife argues with husband	no/yes
Wife refuses to have sex with husband	no/yes
Wife burns the food	no/yes
Domain 2: Digital connectedness: Banking and internet	
Owns a mobile telephone	no/yes
Uses mobile phone for financial transactions	no/yes
Has an account in a bank or other financial institution	no/yes
Use of internet	never; yes but not in last 12 months; yes in last 12 months
Frequency of internet use in last month	not at all; less than once a week; at least once a week; almost every day
Domain 3: Work and earnings	
Currently working (aside from own housework)	no/yes
Worked in last 12 months	no/yes
Earnings	no earnings; in-kind earnings; cash earnings
Domain 4: Health facility access	
The following is a big problem to get medical advice/treatment when sick:	
Getting permission to go	big problem/not a problem
Getting money needed for treatment	big problem/not a problem
Distance to health facility	big problem/not a problem
Not wanting to go alone	big problem/not a problem
Domain 5: Major asset ownership	
Owns house alone or jointly	no/yes
Owns land alone or jointly	no/yes
Domain 6: Reproductive health knowledge	
Knows ovulatory cycle	no/yes
Knows postpartum fecundability	no/yes
Knowledge of contraceptive methods	none; only traditional/folkloric method; modern method

[1] Items in this domain have a negative valence on the overall scale.

We use factor regression scores, which weight each item according to its contribution to the overall construct, to create the YE scale for each country. We construct country-specific YE terciles from these scale scores with approximately one-third of each survey sample in the low empowerment, medium empowerment, and high empowerment categories. This process is similar to the process used to create the household wealth index and quintiles that are standard in DHS surveys (Rutstein and Johnson 2004).

We also construct a pooled YE terciles measure from the scores across all surveys only to facilitate cross-country comparisons. We do this because the country-specific YE measure is a relative measure: what constitutes high empowerment in one country may differ from another country. However, we use the country-specific YE terciles as the key explanatory variable in separate country regressions, since this measure captures the empowerment context for youth within each country.

The first fertility intention outcome, ideal number of children, is based on responses to the question, "If you [could go back to the time you did not have any children and] could choose exactly the number of children to have in your whole life, how many would that be?" We create a continuous variable for all young women who provided a numeric response. The percentage of young women who provided a non-numeric response and are therefore excluded is generally quite small, except in Ethiopia, Mali, and Senegal (Table 3). Non-numeric responses consist of responses such as "god's will" or "don't know". We estimate linear regression models since this outcome is a continuous variable.

Table 3 Percent of respondents age 15-29 providing a non-numeric response to question on ideal number of children

Survey	Percent	N
Ethiopia 2016	7.3	9,246
Haiti 2016-17	0.1	8,282
Malawi 2015-16	0.7	14,343
Mali 2018	9.1	6,084
Nepal 2016	0.6	7,022
Nigeria 2018	2.6	22,470
Philippines 2017	0.9	12,720
Senegal 2019	16.2	5,044
Uganda 2016	1.2	11,072
Zambia 2018-19	2.1	7,965

Our second fertility intention outcome uses two separate measures. Intention to use contraception is a binary variable coded 1 if young women report intending to use contraception in the future and 0 otherwise. Data on intention to use contraception is only collected from women currently not using contraception. We estimate a logistic regression models for this dichotomous outcome on this subsample. Because intention data come only from young women not using contraception, we first estimate logistic regression models for the current use of contraception for the full sample of nonpregnant women. This variable is also a binary measure coded 1 for all women using any method of contraception (traditional or modern, short-acting, long-acting, or permanent). Results on use of contraception precede those on intention to use contraception in this report.

In the following sections, this study first presents patterns in YE and the two selected fertility intention outcomes by marital status, school-going status, and age. It subsequently tests for associations between YE and the two outcomes in multivariable regression analyses that control for these and other socioeconomic factors.

3 RESULTS

3.1 Sample Description

Table 4 displays the characteristics of the 10 analytic samples. The samples are roughly evenly distributed across the three age groups or slightly weighted toward younger respondents age 15-19. The majority of the sample are never married in just three countries Haiti (64%), the Philippines (61%), and Zambia (51%). In the other seven countries, the majority are currently married with 7 in 10 young women in Mali being married.

Except in Nepal and the Philippines, the majority reside in rural areas, ranging from 52% in Senegal to 81% in Malawi. In the Philippines, the sample is evenly divided between rural and urban areas while 62% of young women in Nepal live in urban areas. The samples are roughly evenly distributed across wealth quintiles or somewhat tilted toward the richer and richest quintiles.

Table 4 Characteristics of analytic samples of women age 15-29 (percentages and means)

	Ethiopia	Haiti	Malawi	Mali	Nepal	Nigeria	Philippines	Senegal	Uganda	Zambia
Ideal # of children *(mean)*	3.9	2.6	3.2	5.7	2.0	5.8	2.5	5.2	4.3	4.0
Currently using contraception	22.4	21.5	38.1	14.9	23.0	10.2	21.4	11.6	25.7	29.9
Intends to use contraception (among non-users)	69.8	65.1	79.5	47.3	90.7	46.9	48.4	33.4	69.5	72.5
Age										
15-19	37.2	38.3	36.6	35.0	37.2	37.5	38.3	38.6	38.3	37.6
20-24	30.4	34.4	35.9	31.5	32.2	30.3	32.6	33.5	34.3	34.3
25-29	32.5	27.3	27.5	33.4	30.6	32.2	29.1	28.0	27.4	28.1
Marital status										
Never in union	42.2	64.4	35.1	26.8	36.9	43.2	60.7	48.0	41.0	50.5
Currently in union/living with a man	51.7	32.5	56.4	71.8	62.2	54.8	37.3	49.8	50.8	42.9
Formerly in union	6.1	3.1	8.5	1.4	0.8	2.1	2.0	2.2	8.2	6.6
School status										
Out of school	75.3	54.3	77.4	85.7	71.6	78.4	64.1	72.0	77.4	76.9
Attending school	24.7	45.7	22.6	14.3	28.4	21.6	35.9	28.0	22.6	23.1
Residence										
Rural	75.8	52.7	80.8	72.2	37.7	55.6	50.1	51.5	71.7	52.8
Urban	24.2	47.3	19.2	27.8	62.3	44.4	49.9	48.5	28.3	47.2
Education										
No education	29.9	4.4	5.6	54.5	15.4	30.8	0.4	35.5	3.6	4.4
Primary	46.4	27.9	63.2	15.7	15.6	11.0	8.1	20.6	56.6	38.6
Secondary	16.6	60.4	28.2	27.4	47.7	49.1	56.0	39.5	31.7	52.5
Higher	7.1	7.3	3.0	2.3	21.3	9.2	35.5	4.4	8.1	4.4
Household wealth quintile										
Poorest	15.7	14.4	19.5	15.5	16.8	17.2	17.5	16.6	17.0	17.6
Poorer	18.1	17.3	20.0	18.0	19.6	20.2	18.3	18.0	18.3	17.1
Middle	18.2	19.3	18.6	19.3	20.9	20.3	20.6	19.2	17.9	17.8
Richer	19.1	23.9	18.0	21.4	22.6	21.8	21.8	22.0	19.5	22.6
Richest	28.8	25.1	24.0	25.8	20.1	20.6	21.9	24.1	27.3	24.9
Age at first sex										
Never had sex	38.8	29.0	20.0	17.3	36.8	29.5	53.8	45.8	23.9	22.3
Age <18	38.6	48.8	54.9	64.4	35.0	47.2	16.4	28.6	51.4	56.3
Age ≥18	22.5	22.2	25.2	18.3	28.2	23.4	29.8	24.4	24.7	21.5
Sexually active in last 30 days	71.7	51.6	59.1	71.5	54.7	69.8	63.7	55.8	60.1	56.4
Weighted N	9,099	8,270	14,375	6,009	6,984	22,538	12,789	4,944	11,137	7,971

The majority of young women (54% in Haiti to 78% in Nigeria) are out of school. A plurality has completed primary school in Ethiopia (46%), Malawi (63%), and Uganda (57%), while a plurality of young women has completed secondary or higher education in most of the other countries. In contrast, 55% of young women in Mali have no education. It is important to note, however, that information on educational attainment is censored for a sizable proportion of women, predominantly the youngest women, who are still attending school and whose ultimate level of school completion is yet unknown.

Table 5 shows descriptive statistics on the items that comprise the YE scale. These items show considerable variability across study countries. For example, the level of mobile phone ownership ranges from 33% of young women in Ethiopia to 88% in the Philippines. The proportion with access to cash earnings ranges from 21% in Malawi to 50% in Uganda (where 7 in 10 young women worked in the last 12 months). Acceptance of wife-beating if a woman argues with her husband ranges from 3% in Haiti to 68% in Mali. This variability contributes to our rationale to use a country-specific measure of YE for within-country analyses.

Table 5 Youth empowerment items among analytic sample of women age 15-29

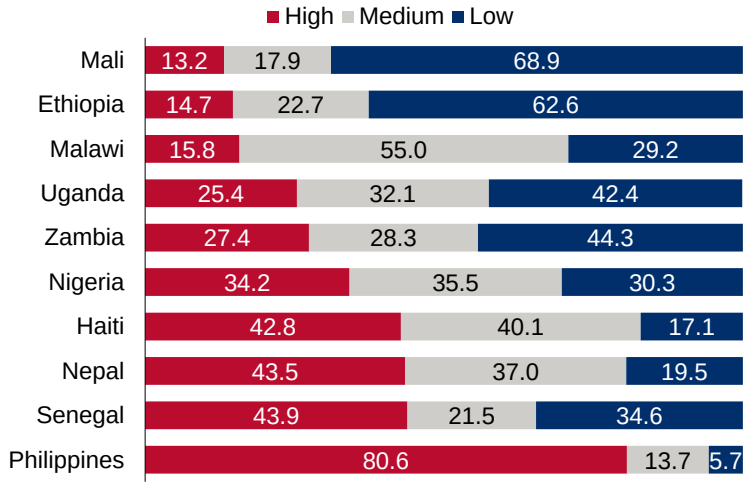
	Ethiopia	Haiti	Malawi	Mali	Nepal	Nigeria	Philippines	Senegal	Uganda	Zambia
Youth empowerment (survey-specific terciles)										
Low	39.6	32.2	35.7	35.6	32.5	32.3	27.1	27.5	31.9	30.4
Medium	34.8	30.9	34.2	34.5	32.2	33.5	34.2	32.6	32.9	33.1
High	25.6	37.0	30.1	29.9	35.4	34.2	38.7	39.9	35.2	36.5
Wife beating is justified if:										
Wife goes out without telling husband	41.7	12.1	8.1	53.0	10.7	22.9	4.7	29.0	31.7	29.8
Wife neglects the children	46.8	11.4	10.5	51.8	25.4	23.2	11.1	30.1	41.1	36.0
Wife argues with husband	40.7	2.6	8.1	67.8	8.6	21.1	3.8	32.3	28.3	36.2
Wife refuses to have sex with husband	34.0	4.5	9.8	62.1	2.9	22.4	3.9	31.5	19.5	34.2
Wife burns the food	38.2	4.7	6.6	23.3	3.3	15.7	2.8	18.9	15.2	24.8
Owns a mobile telephone	32.8	54.9	29.4	59.6	75.0	50.9	88.4	64.7	40.2	48.2
Uses mobile phone for financial transactions	1.6	11.5	8.4	18.2	8.9	12.1	9.8	23.1	29.8	24.7
Has an account in a bank or other financial institution	13.9	9.5	7.4	3.2	29.0	16.8	16.2	3.9	9.5	8.2
Use of internet										
Never	93.0	63.3	92.4	80.7	66.7	80.3	15.7	47.1	87.5	84.5
Yes, not in last 12 months	0.7	2.8	1.0	1.6	1.3	1.8	1.9	1.5	1.5	1.6
Yes, in last 12 months	6.3	33.9	6.6	17.7	32.0	17.9	82.3	51.4	10.9	13.8
Frequency of internet use in last month										
Not at all	94.1	69.1	93.8	82.4	69.3	82.8	18.5	49.3	89.6	86.5
Less than once a week	1.3	4.7	0.8	1.8	3.4	2.9	11.4	10.9	1.8	2.0
At least once a week	2.5	8.9	1.7	5.8	9.6	5.4	24.4	17.7	3.2	4.2
Almost every day	2.1	17.2	3.8	10.0	17.8	8.9	45.7	22.1	5.4	7.3
Currently working	30.4	26.9	54.2	47.3	48.7	52.0	32.7	31.4	64.8	32.9
Worked in last 12 months	46.9	38.4	59.2	51.2	60.3	55.5	41.0	40.6	70.1	39.6
Has earnings										
No earnings	74.8	62.0	76.6	64.0	73.2	57.4	64.3	75.3	46.6	69.4
In-kind earnings	3.0	0.4	2.4	1.2	1.6	1.4	0.4	0.9	3.6	0.8
Cash	22.2	37.6	21.0	34.8	25.2	41.2	35.3	23.8	49.8	29.8
The following is a big problem to get medical advice/treatment when sick										
Getting permission to go	31.7	10.9	16.6	25.1	24.6	11.9	9.8	10.3	6.0	3.9
Getting money needed for treatment	51.8	71.7	50.9	36.6	51.9	44.9	45.2	45.7	41.2	19.2
Distance to health facility	48.9	36.9	54.4	27.0	52.5	25.4	23.2	26.3	35.0	27.3
Not wanting to go alone	42.8	22.6	31.0	19.2	68.8	17.9	25.5	19.1	21.0	13.8
Owns house alone or jointly	34.8	10.1	44.4	25.7	2.3	5.3	13.7	5.8	24.7	21.3
Owns land alone or jointly	27.4	11.6	45.2	25.5	4.1	6.4	5.0	2.7	20.7	16.6
Knows ovulatory cycle	24.5	24.3	15.8	25.8	26.4	21.3	19.5	19.9	20.1	19.0
Knows postpartum fecundability	41.1	38.3	50.6	38.1	63.4	54.4	54.1	27.2	45.2	41.8
Knowledge of contraceptive methods										
None	1.9	0.2	2.6	8.1	0.1	10.0	1.7	11.0	1.4	2.1
Only traditional/folkloric method	0.0	0.0	0.0	0.2	0.0	0.5	0.1	0.1	0.1	0.0
Modern method	98.1	99.8	97.4	91.7	99.9	89.5	98.3	88.9	98.5	97.9
Weighted N	9,099	8,270	14,375	6,009	6,984	22,538	12,789	4,944	11,137	7,971

3.2 Levels and Patterns of Young Women's Empowerment

Figure 1 shows the distribution of YE terciles using the pooled YE scale. Using this comparable measure illustrates the degree to which young women's empowerment varies across study countries. This variation is as substantial as the variation in the component items shown in Table 5. A mere 13% of young women are in the high empowerment tercile in Mali. In Ethiopia and Malawi, these figures are 15% and 16%, respectively. In contrast, 8 in 10 young women (81%) in the Philippines are highly empowered.

All figures in this study display results with countries in order of this relative ranking from least to greatest proportion of high empowerment. We use the country-specific measure of YE terciles for the remainder of this study because we are most interested in within-country empowerment and how it relates to the fertility intention outcomes. The country-specific terciles are, as expected, approximately evenly distributed across country samples (Table 5).

Figure 1 Youth empowerment (pooled terciles) among women age 15-29 by country

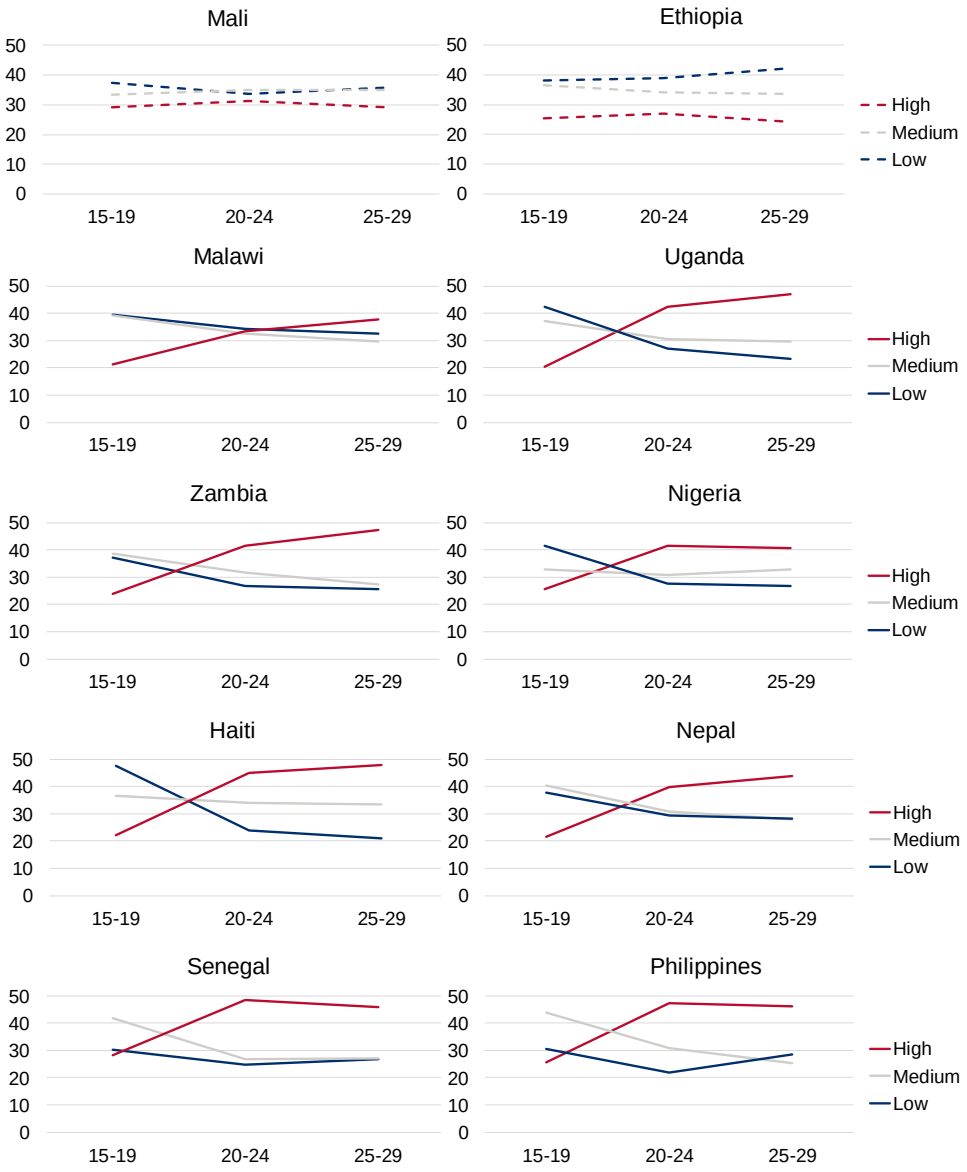


Note: Countries are presented in order of increasing prevalence of the high empowerment category, as depicted in Figure 1.

3.2.1 Young women's empowerment and age

When examined by age, a lower percentage of young women age 15-19 are considered to have high empowerment (using country-specific terciles), whereas the proportions of women age 20-24 and age 25-29 exhibiting high empowerment are relatively equal (Figure 2). As women age, the proportion of women with low and medium empowerment decreases. This pattern does not hold in Ethiopia and Mali where women in each age group have similar levels of high empowerment (24%-27% and 29%-31%, respectively). These are the only two countries where differences by age group are not statistically significant, as indicated in Figure 2 by the dashed lines.

Figure 2 Youth empowerment by age

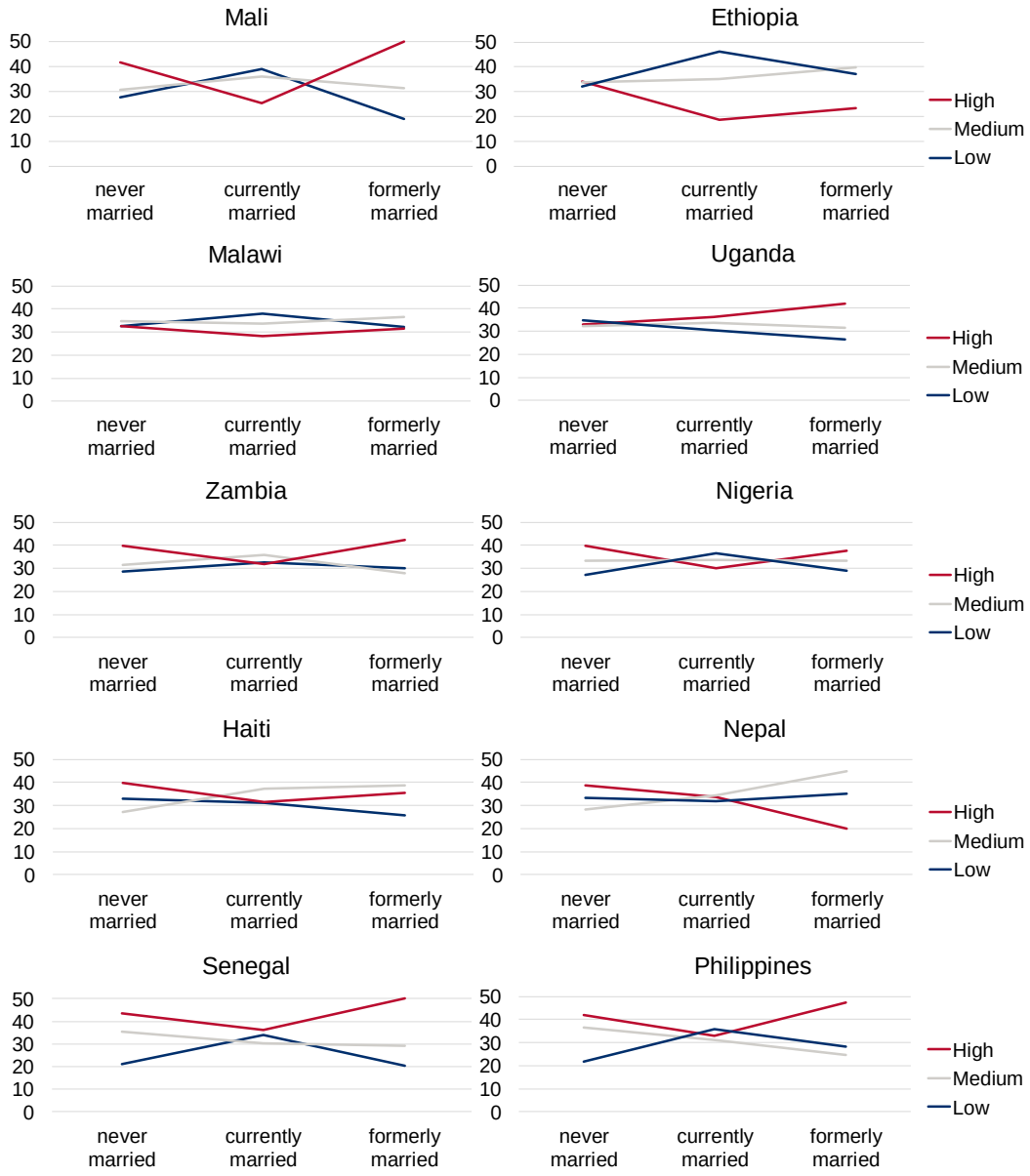


Note: Countries are presented in order of increasing prevalence of the high empowerment category, as depicted in Figure 1. Solid line = statistically significant difference ($p<0.05$); dashed line = no such difference.

3.2.2 Young women's empowerment and marital status

Young women's empowerment varies significantly with marital status in all 10 study countries ($p<0.001$). Young women's empowerment is lowest among currently married youth, as shown in Figure 3. It is highest among never married young women in five countries: Ethiopia, Haiti, Malawi, Nepal, and Nigeria. However, it is highest among formerly married young women in Mali, the Philippines, Senegal, Uganda, and Zambia, though differences between never and formerly married women are not typically large.

Figure 3 Youth empowerment by marital status



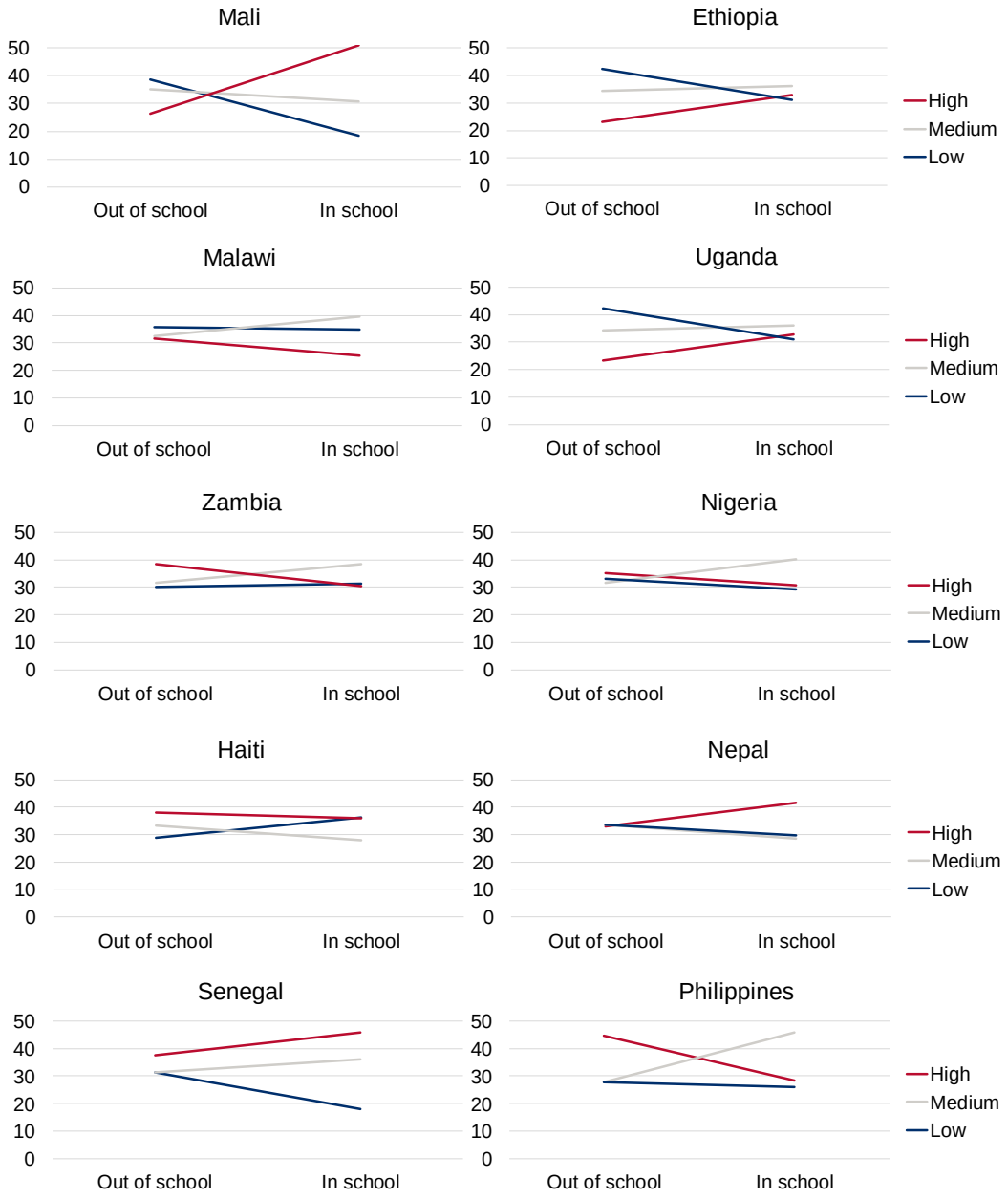
Note: Countries are presented in order of increasing prevalence of the high empowerment category, as depicted in Figure 1. Solid line = statistically significant difference ($p<0.05$); dashed line = no such difference.

3.2.3 Young women's empowerment and school status

Figure 4 displays YE scale terciles (country-specific) by school-going status. Young women's empowerment is significantly associated with school status in all 10 countries; however, the direction of the association is not always consistent. Out-of-school young women have higher levels of empowerment and in-school youth have lower levels in five countries: Haiti, Malawi, the Philippines, Uganda, and Zambia. The opposite is true in Ethiopia, Mali, Nepal, and Senegal where in-school youth have higher levels of empowerment and young women out of school are commonly in the low empowerment tercile. Nigeria shows a different pattern altogether—one that is not linear. A higher percentage of in-school youth

are in both the lowest empowerment tercile and the high empowerment tercile compared to out-of-school youth. However, in-school young women in Nigeria are more likely to have medium empowerment than out-of-school youth (40% vs 32%).

Figure 4 Youth empowerment among women age 15-29 by school status

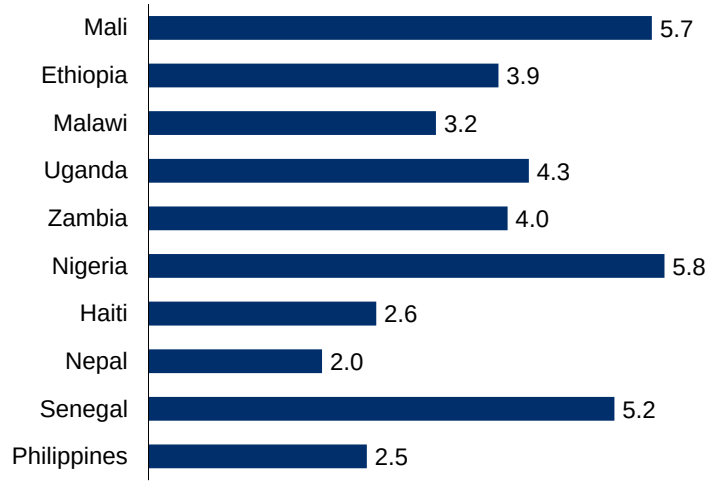


Note: Countries are presented in order of increasing prevalence of the high empowerment category, as depicted in Figure 1. Solid line = statistically significant difference ($p<0.05$); dashed line = no such difference.

3.3 Levels and Patterns of Ideal Number of Children

As Figure 5 indicates, the mean ideal number of children ranges from a low of two children in Nepal to nearly six children in Mali and Nigeria among those women reporting a numeric value.

Figure 5 Mean ideal number of children among women age 15-29 by country

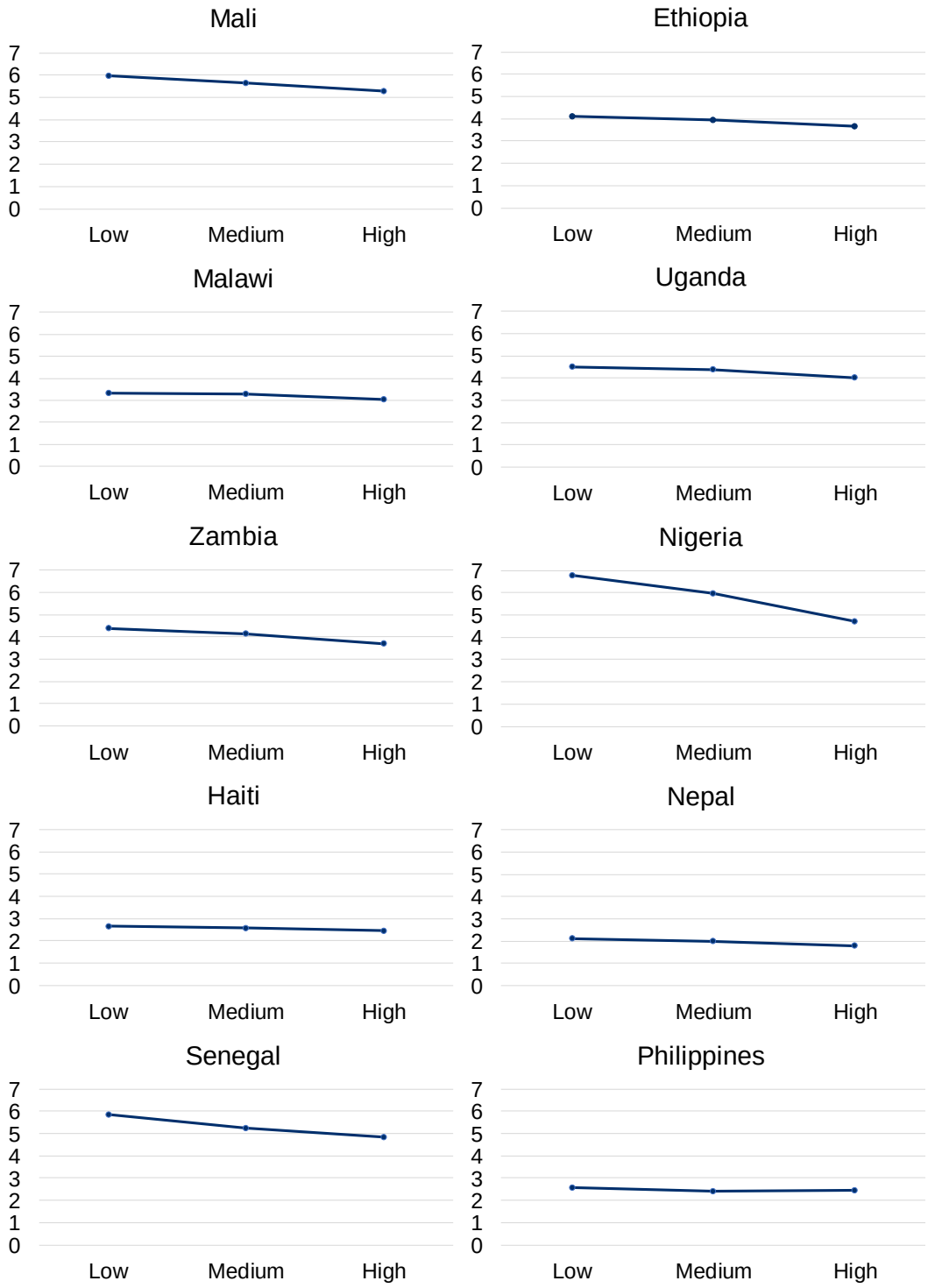


Note: Countries are presented in order of increasing prevalence of the high empowerment category, as depicted in Figure 1.

3.3.1 Ideal number of children and young women's empowerment

In all 10 study countries we see a consistent, statistically significant decline in ideal number of children as YE scale increases (Figure 6). Typically, the largest difference in ideal number of children is between the highest YE tercile as compared to those in the low or medium YE terciles. The Philippines and Senegal are exceptions to this general pattern. In these two countries, the difference between the low and medium terciles is larger than between the medium and high terciles. The largest differences are in Nigeria, where young women in the low empowerment tercile prefer, on average, 6.8 children compared to 4.7 children in the high empowerment tercile ($p<0.001$), followed by Senegal where there is a difference of 1 child between these groups ($p<0.001$).

Figure 6 Mean ideal number of children among women age 15-29 by levels of youth empowerment

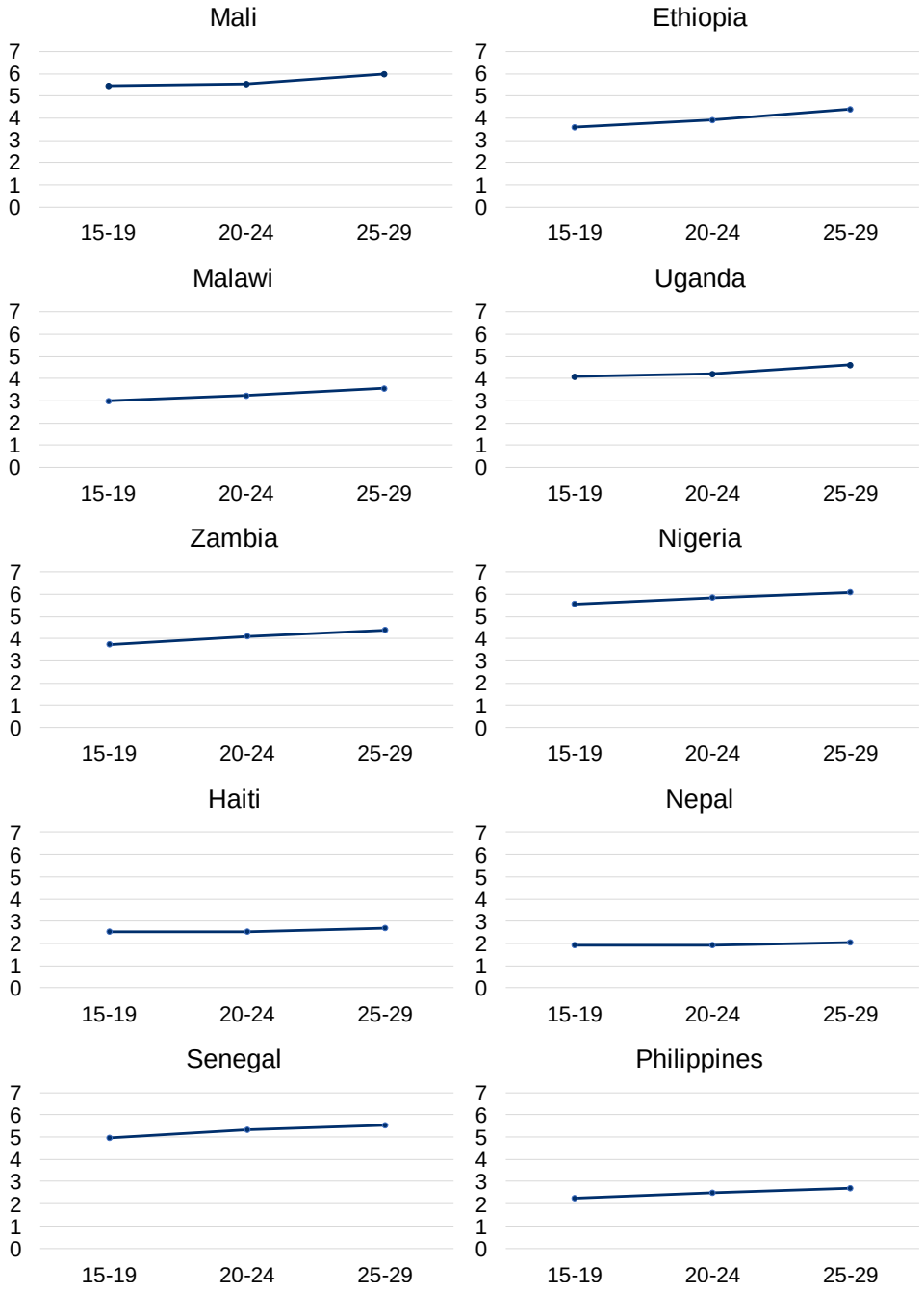


Note: Countries are presented in order of increasing prevalence of the high empowerment category, as depicted in Figure 1. Solid line = statistically significant difference ($p<0.05$); dashed line = no such difference.

3.3.2 Ideal number of children and age

Figure 7 shows the mean ideal number of children by age group. Differences across age groups are significant in all 10 study countries, with the preferred number of children increasing with age. In Mali and Nepal, differences are only significant (and in Nepal, slight) between those age 25-29 compared to either of the younger age groups. The differences are most sizable in Ethiopia (0.8 of a child, $p<0.001$) and Zambia (0.7 of a child, $p<0.001$).

Figure 7 Mean ideal number of children by age

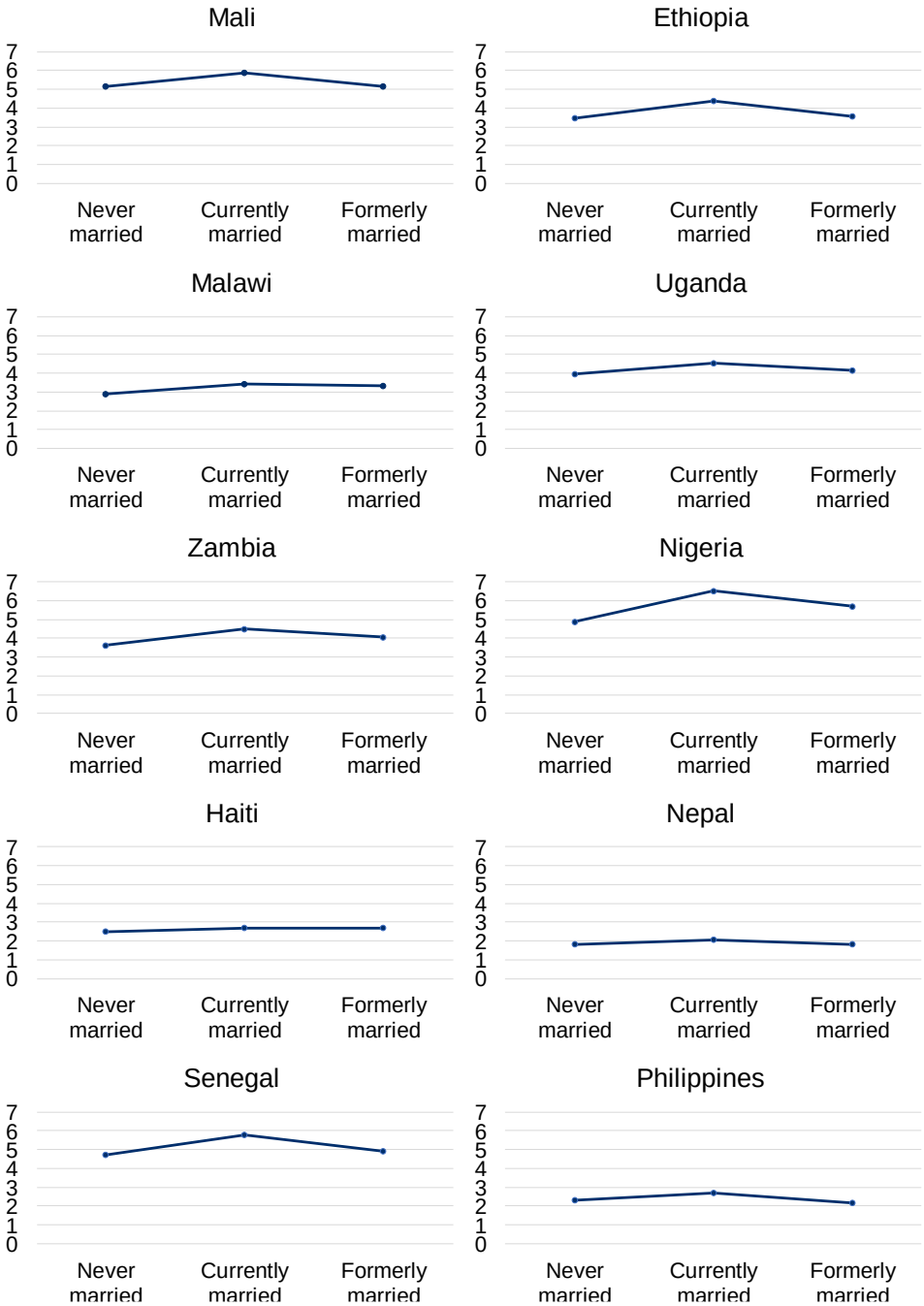


Note: Countries are presented in order of increasing prevalence of the high empowerment category, as depicted in Figure 1. Solid line = statistically significant difference ($p<0.05$); dashed line = no such difference.

3.3.3 Ideal number of children and marital status

Figure 8 indicates that the mean ideal number of children varies with marital status in all countries. The preferred number of children is consistently highest among currently married women. In six countries (Haiti, Mali, Nepal, Nigeria, the Philippines, and Senegal) these differences are the only significant differences, whereas differences between never and formerly married women are not significant.

Figure 8 Mean ideal number of children among women age 15-29 by marital status

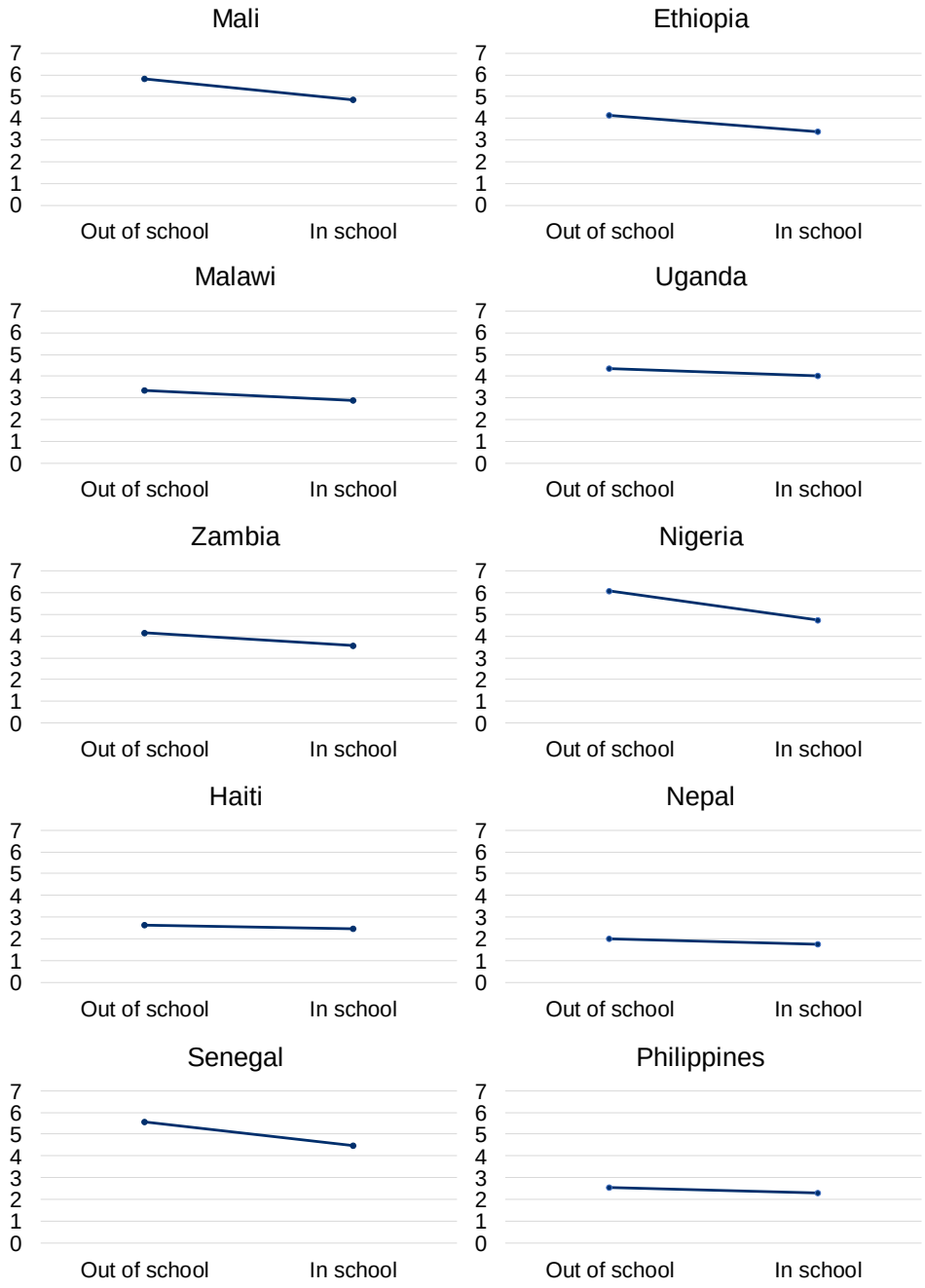


Note: Countries are presented in order of increasing prevalence of the high empowerment category, as depicted in Figure 1. Solid line = statistically significant difference ($p<0.05$); dashed line = no such difference.

3.3.4 Ideal number of children and school status

The mean ideal number of children is consistently and significantly higher among young women who are out of school than among those attending school. These differences are most narrow in Haiti (0.1 of a child, p<0.001) and widest in Nigeria (1.4 children, p<0.001).

Figure 9 Mean ideal number of children among women age 15-29 by school status



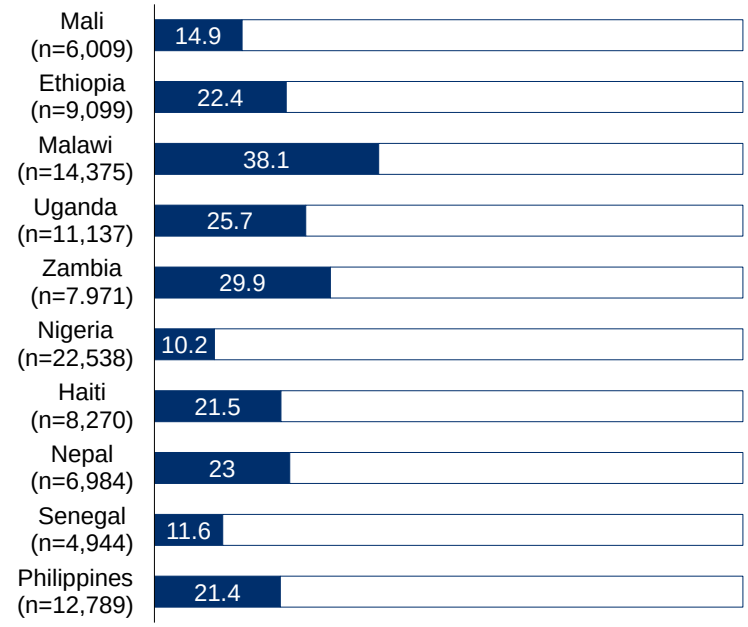
Note: Countries are presented in order of increasing prevalence of the high empowerment category, as depicted in Figure 1. Solid line = statistically significant difference (p<0.05); dashed line = no such difference.

3.4 Levels and Patterns of Use and Intention to Use Contraception

Current use of any contraception is displayed in Figure 10. For half the study countries, the percentage of young women who currently use contraception is in the low 20s. Current contraceptive use among young women is lowest in Nigeria (10%) and Senegal (12%) and highest in Malawi (38%).

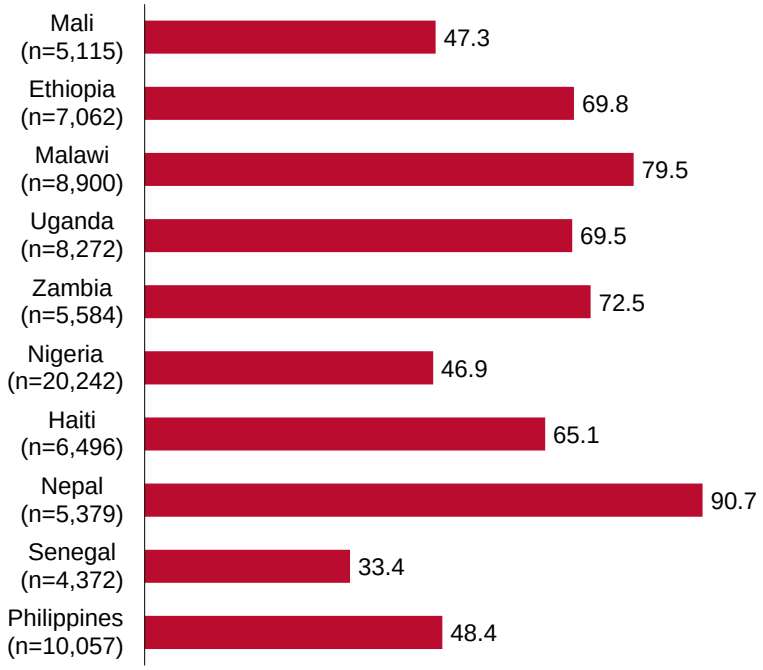
Figure 11 displays intention to use contraception among non-users. Comparing Figures 10 and 11 reveals that intention to use contraception among non-users exceeds current contraceptive use in all study countries, and ranges from one third of young non-users in Senegal to 91% of non-users in Nepal. For more than half of the countries, 60% or more of non-users intend to use contraception.

Figure 10 Percentage currently using contraception among women age 15-29 by country



Note: Countries are presented in order of increasing prevalence of the high empowerment category, as depicted in Figure 1.

Figure 11 Percentage intending to use contraception among non-users age 15-29 by country

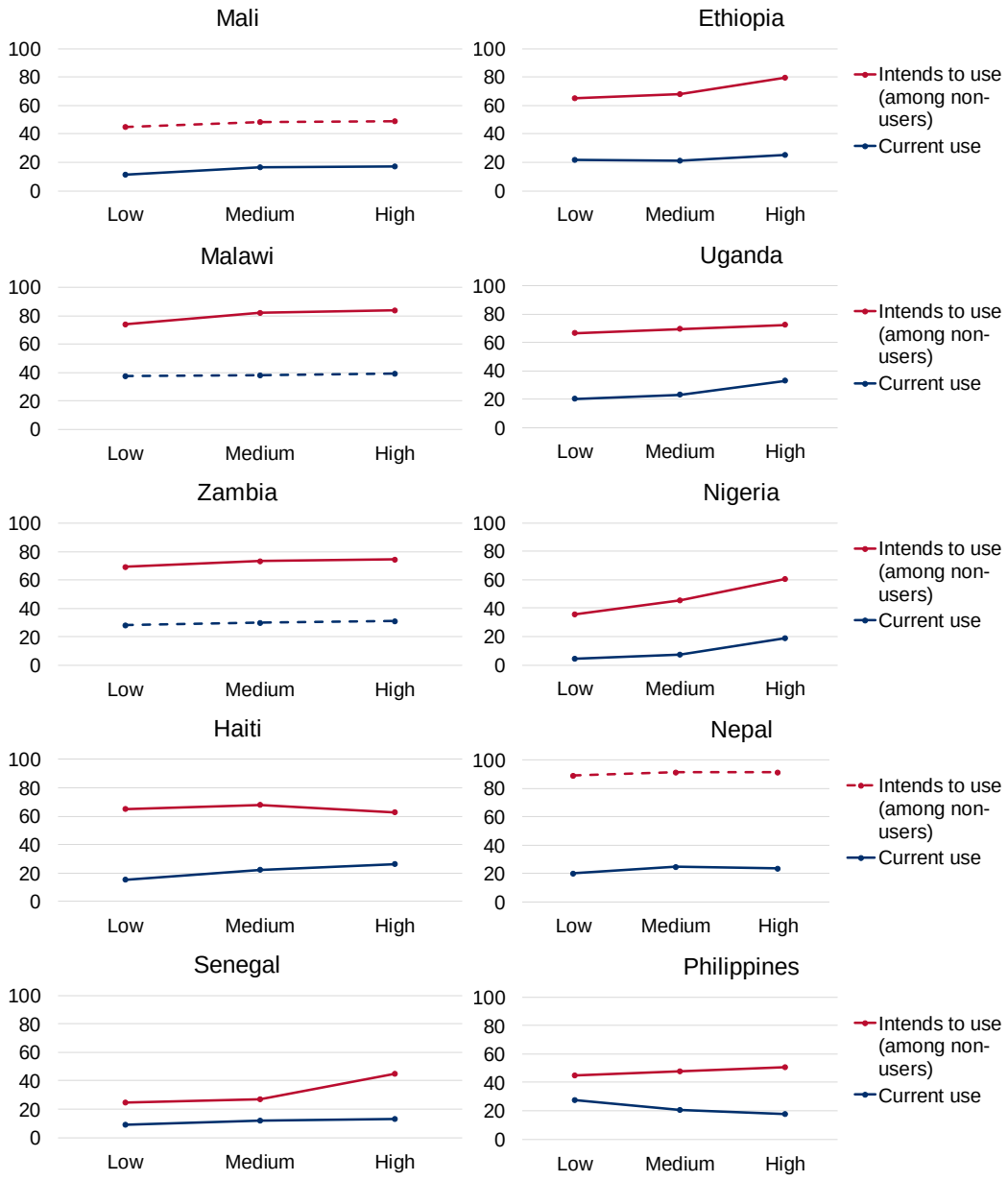


Note: Countries are presented in order of increasing prevalence of the high empowerment category, as depicted in Figure 1.

3.4.1 Current use, intention to use contraception, and young women's empowerment

Contraceptive use (blue) and intention to use (red, among non-users) both vary significantly with levels of young women's empowerment in 8 of 10 surveys (Figure 12). These contraceptive outcomes generally increase with increasing levels of the YE scale. There is no significant bivariate association with YE and current contraceptive use in Malawi or Zambia, nor with YE and intention to use in Mali and Nepal (indicated by dotted lines). Figure 12 suggests a negative association between higher empowerment and current contraception use in the Philippines, contrasting with the general pattern elsewhere. Additionally, in Haiti the pattern appears to be nonlinear, with current contraceptive use among medium empowered women (68%) exceeding that among high empowered women (63%). The largest differences in current contraceptive use across the three levels of empowerment are seen in Nigeria (over 16 points), Uganda (13 points), and Haiti (nearly 11 points). The largest differences in intention to use across the empowerment levels are in Nigeria (25 points), Senegal (20 points), and Ethiopia (over 14 points).

Figure 12 Current use of contraception and intention to use contraception among non-users age 15-29 by levels of youth empowerment

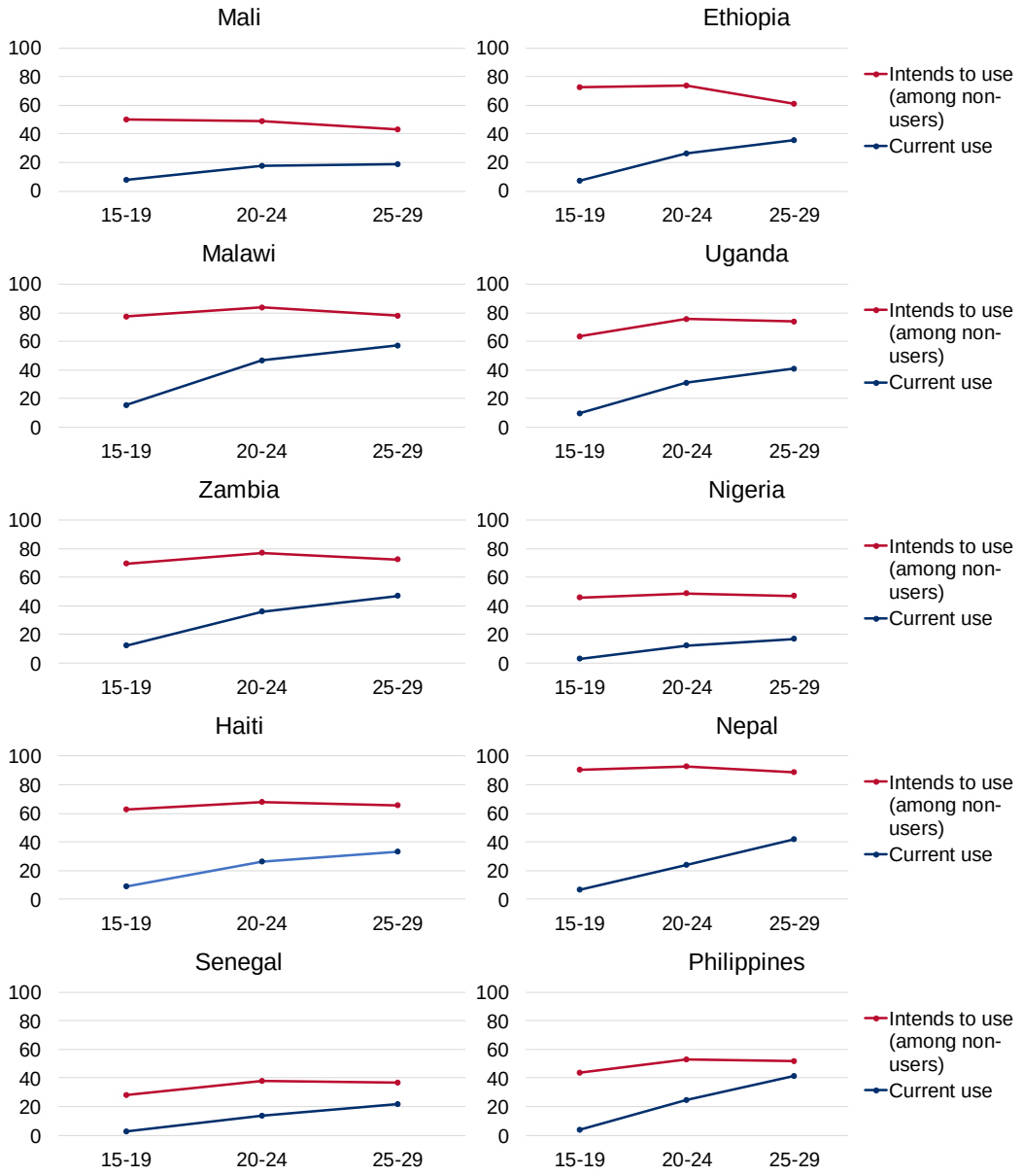


Note: Countries are presented in order of increasing prevalence of the high empowerment category, as depicted in Figure 1. Solid line = statistically significant difference ($p<0.05$); dashed line = no such difference.

3.4.2 Current use, intention to use contraception, and age

There is a consistent, significant, positive association between current contraceptive use and age as shown in Figure 13. The steepest increases across age groups are seen in Malawi, the Philippines, and Nepal ($p<0.001$). In Mali, the differences are less dramatic, but still sizable (11 percentage points, $p<0.001$).

Figure 13 Current contraceptive use and intention to use contraception among non-users by age



Note: Countries are presented in order of increasing prevalence of the high empowerment category, as depicted in Figure 1. Solid line = statistically significant difference ($p<0.05$); dashed line = no such difference.

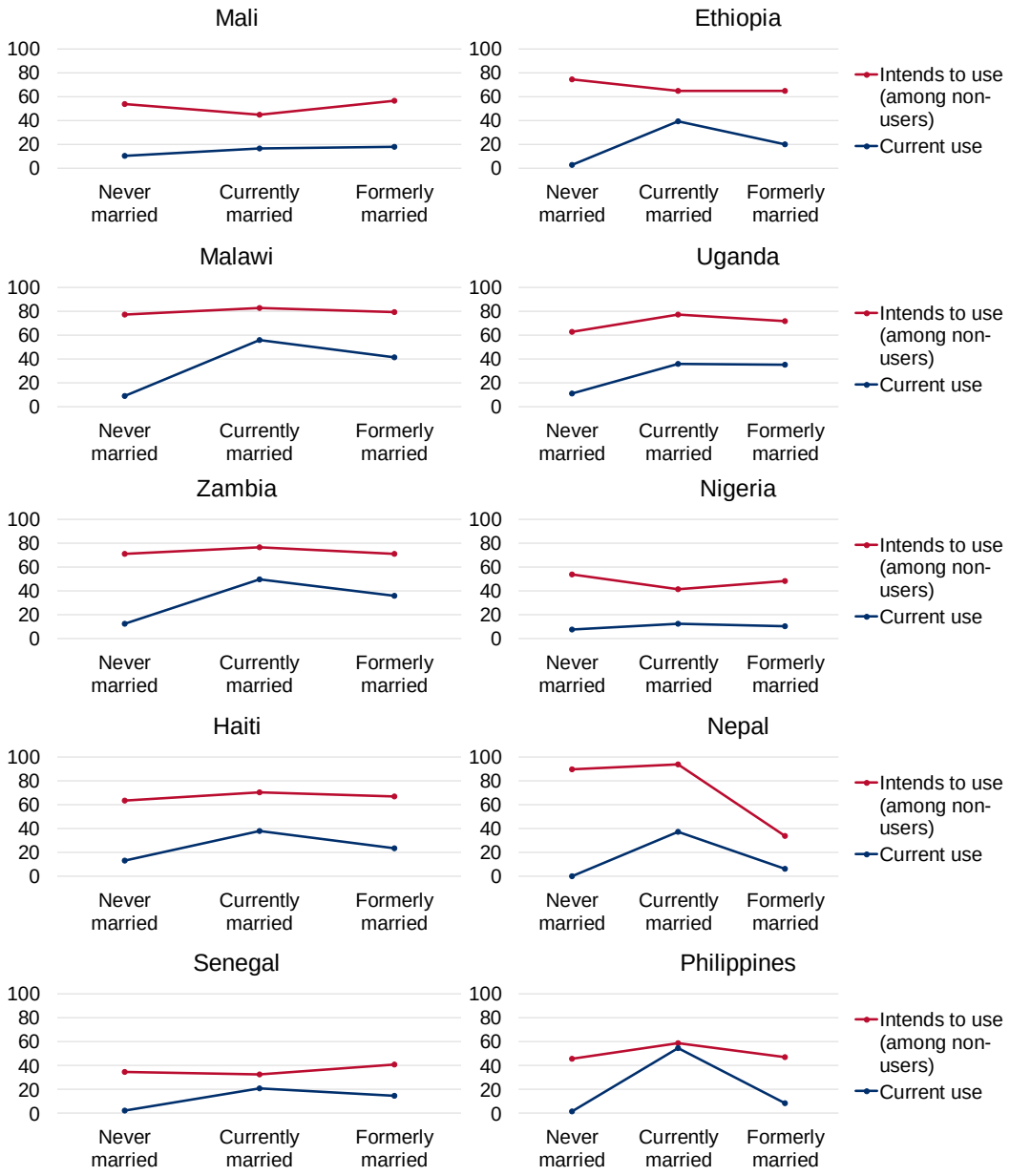
Though not as regular a pattern as seen across countries with current use, the patterns in intention to use contraception vary significantly with age in all study countries. In nine countries there is a peak in intention to use contraception in the middle age group (age 20-24). In five of these countries intention to use is lowest

among the youngest age group (Haiti, Nigeria, the Philippines, Senegal, Uganda, Zambia), while in Ethiopia and Nepal they are lowest in the age 25-29 age group. In Malawi, intention to use is almost equal between the 20-24 and 25-29 age groups. In Mali, intention to use contraception decrease with age.

3.4.3 Current use, intention to use contraception, and marital status

Current contraceptive use and intention to use contraception both vary significantly with marital status in all study countries, as seen in Figure 14.

Figure 14 Current contraceptive use and intention to use contraception among non-users by marital status



Note: Countries are presented in order of increasing prevalence of the high empowerment category, as depicted in Figure 1. Solid line = statistically significant difference ($p<0.05$); dashed line = no such difference.

Current contraceptive use is highest among currently married women in nine countries, but highest among formerly married women in Mali. In Uganda, current use is at similar levels for married and formerly married women. Use among never married young women lags and ranges from <1% in Nepal to 13% in Haiti. The largest gaps in current use between never and currently married women are seen in Malawi (46 percentage points, $p<0.001$) and the Philippines (53 percentage points, $p<0.001$).

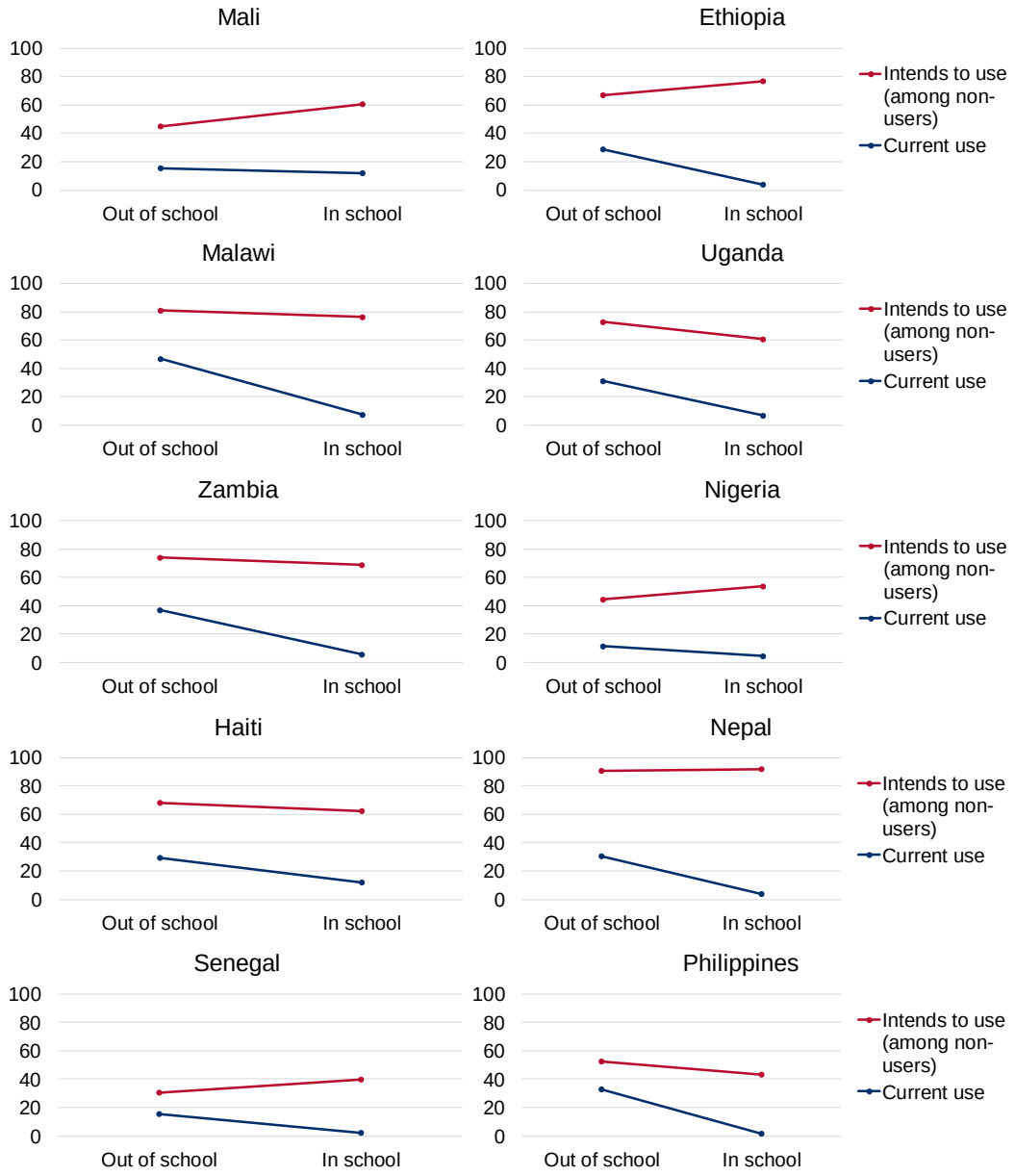
In terms of intention to use contraception among non-users, the differences are generally much smaller across marital statuses and there is more variation in these patterns than is the case for current use. Intention to use contraception is highest among currently married young women in six countries, among formerly married young women in Mali, Senegal, and Uganda, and among never married young women in Ethiopia. The difference in intention to use contraception between marriage categories is largest in Nepal where 34% of formerly married young women report intention to use, compared with 93% of currently married and 89% of never married young women who intend to use.

3.4.4 Current use, intention to use contraception, and school status

Figure 15 shows that current contraceptive use is consistently higher among out-of-school young women compared with young women attending school. These differences are statistically significant in all 10 study countries.

Intention to use contraception is associated with school status in all countries but Nepal, where the apparently slightly higher intention to use among in-school young women is not statistically significant. The patterns vary by country, with intention to use contraception higher among in-school young women in Ethiopia, Malawi, Mali, Nigeria, and Senegal, but higher among out-of-school young women in Haiti, Philippines, Uganda, and Zambia.

Figure 15 Current contraceptive use and intention to use contraception among non-users by school status



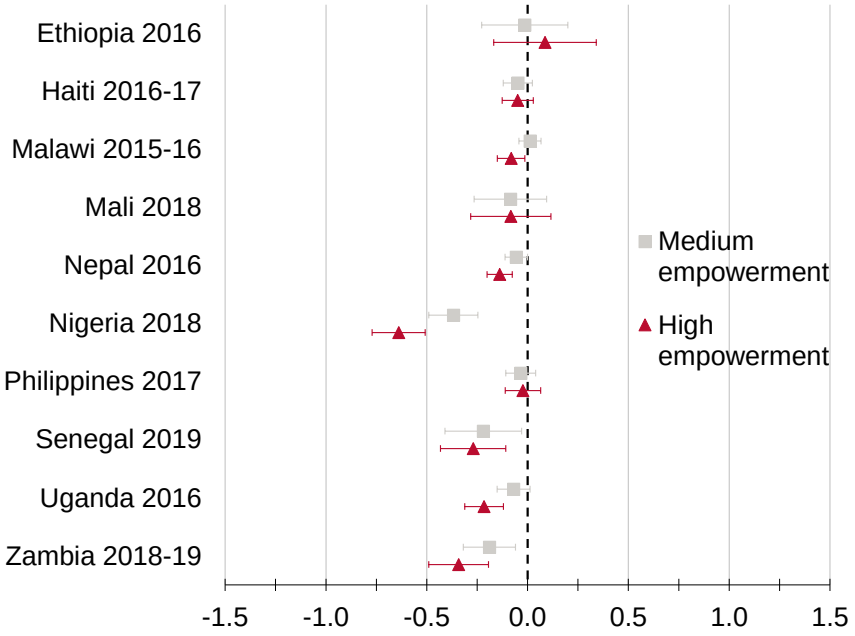
Note: Countries are presented in order of increasing prevalence of the high empowerment category, as depicted in Figure 1. Solid line = statistically significant difference ($p<0.05$); dashed line = no such difference.

3.5 Associations of Ideal Number of Children with Young Women's Empowerment

The bivariate analysis displayed in Figure 6 indicates that young women's empowerment is associated with ideal number of children in all 10 study countries. These associations remain significant in 6 countries in the multivariable models shown in Figure 15 (Malawi, Nepal, Nigeria, Senegal, Uganda, Zambia), though no longer significant in Ethiopia, Haiti, Mali, and the Philippines.

Figure 16 shows the coefficients and 95% confidence intervals for youth empowerment (ref=low empowerment) from multivariable linear regressions on the fertility intention outcome ideal number of children. These models control for age group, marital status, and school status, as well as educational attainment, residence, and household wealth. Full model details can be found in Appendix Table 1.

Figure 16 Youth empowerment coefficients for ideal number of children from separate linear multivariable regression models among women age 15-29



Models control for: age, marital status, residence, educational attainment, and household wealth.
Reference = Low empowerment

Note: Countries are presented in order of increasing prevalence of the high empowerment category, as depicted in Figure 1. Solid line = statistically significant difference ($p<0.05$); dashed line = no such difference.

In Figure 16 we can see how the ideal number of children for young women in medium and high empowerment terciles compares to women in the low empowerment tercile, indicated by the dashed line at point 0.0. Young women in the medium YE tercile want between 0.06 (Nepal, $p<0.05$) and 0.37 (Nigeria, $p<0.001$) fewer children than those in the low tercile, and young women in the high YE tercile want between 0.08 (Malawi, $p<0.01$) and 0.64 (Nigeria, $p<0.001$) fewer children compared to those with low YE (reference), controlling for other factors. In five countries, young women's ideals in both the medium and high empowerment categories differ from the low empowerment group. However, in Malawi, only the high empowerment group has significantly lower ideal number of children.

3.6 Other Associations with Ideal Number of Children

We deemed age, marital status, and school status to be important factors to control for since we want to isolate the effect of YE from that of these other factors on our fertility intention outcomes. Yet, these factors may also be independently associated with ideal number of children, net of young women's level of empowerment. Full model results presented in Appendix Table A1 indicate that, controlling for YE and other factors, increasing age is generally associated with a preference for a greater number of children, with differences most apparent in the oldest youth age group (age 25-29).

Young women who are currently married also exhibit a greater ideal number of children compared to never married young women. There is no consistent association between school status and ideal number of children in the multivariable models; however, increasing education is consistently associated with a preference for fewer children. Household wealth is typically associated with a lower ideal number of children, but the pattern is not always linear across wealth quintiles.

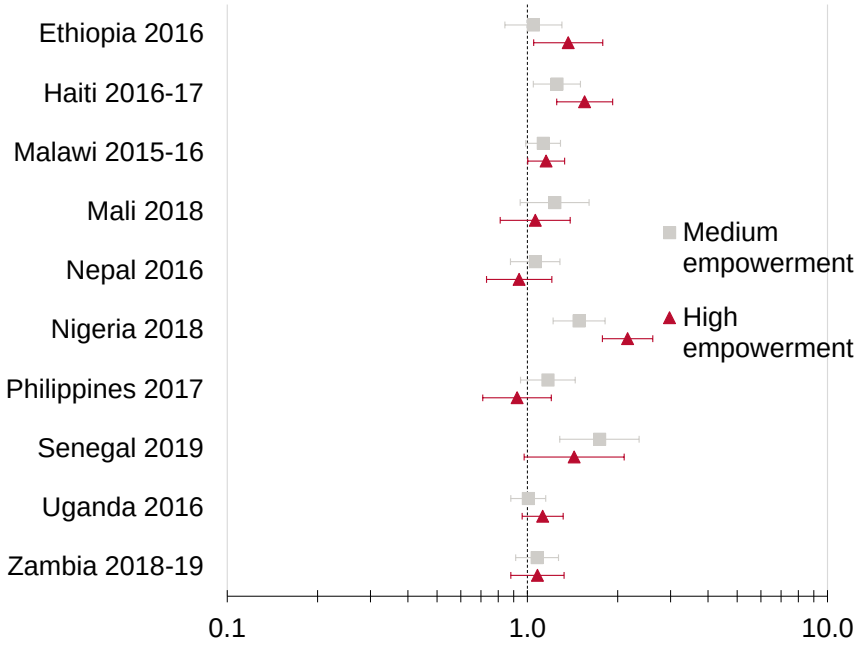
3.7 Associations of Use and Intention to Use Contraception with Young Women's Empowerment

3.7.1 Current contraceptive use and young women's empowerment

The association of young women's empowerment with contraceptive use, observed in eight countries in bivariate analysis, holds in multivariable models in five countries: Ethiopia, Haiti, Malawi, Nigeria, and Senegal. Figure 17 shows the odds ratios and 95% confidence intervals for youth empowerment from multivariable logistic regressions on the outcome current contraceptive use. The odds of current contraceptive use for young women in medium (gray) and high (red) empowerment terciles is shown in comparison to women in the low empowerment tercile, indicated by the dashed line of base odds at point 1.0. Full model details are presented in Appendix Table 2.

The odds of using contraception are between 1.13 (Malawi) and 1.74 (Senegal) times higher among youth with medium empowerment than youth with low YE, and between 1.16 (Malawi) and 2.16 (Nigeria) times higher among youth in the high empowerment tercile as compared to those in the low empowerment tercile. These results indicate that, generally, the odds of contraceptive use increase with increasing levels of empowerment, with the largest effect appearing among the high empowerment group.

Figure 17 Youth empowerment odds ratios for current contraceptive use from separate logistic multivariable regression models among women age 15-29



Models control for: age, marital status, residence, educational attainment, and household wealth.
Reference=Low empowerment

Note: Countries are presented in order of increasing prevalence of the high empowerment category, as depicted in Figure 1.

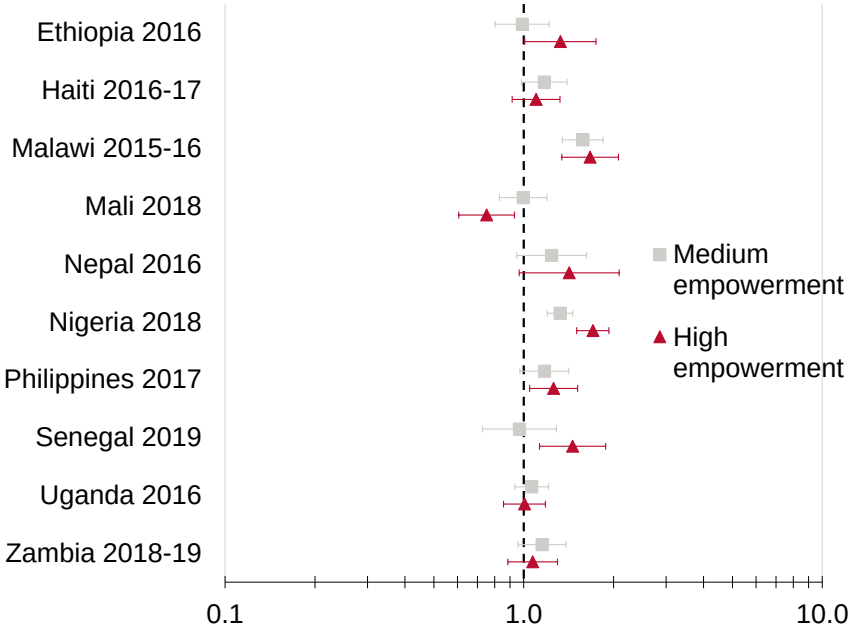
3.7.2 Other associations with current contraceptive use

Results of the complete models (Appendix Table A2) show that increasing age, being currently married, or being formerly married are each consistently associated with increased odds of currently using contraception. Being in school is generally negatively associated with current use of contraception whereas educational attainment is generally positively associated with current use of contraception. The education/school status findings do not hold in Haiti and Nepal. In the five countries where it is statistically significant, young women in rural areas have lower odds of contraceptive use compared with their counterparts in urban areas.

3.7.3 Intention to use contraception and young women's empowerment

Among contraceptive non-users, the association of young women's empowerment with intention to use contraception remains statistically significant in multivariable models in eight countries (Figure 18). Uganda and Zambia are the exceptions, showing this association in bivariate analysis only.

Figure 18 Youth empowerment odds ratios for intention to use contraception (among non-users) from separate logistic multivariable regression models among women age 15-29



Models control for: age, marital status, residence, educational attainment, and household wealth.
Reference=Low empowerment

Note: Countries are presented in order of increasing prevalence of the high empowerment category, as depicted in Figure 1.

The odds of the intention to use contraception are between 1.17 (Haiti and the Philippines) and 1.58 (Malawi) times higher among those in the medium empowerment tercile than low tercile, and between 1.26 (Philippines) and 1.70 (Nigeria) times higher among those with high empowerment compared with low empowerment. In Mali, the direction reverses and young women with high empowerment have 25% lower odds (OR=0.075) of intending to use contraception than those with low empowerment. Interestingly, the bivariate relationship in Mali and Nepal did not appear to be significant, but emerged as significant in multivariable analysis. This suggests that one or more control variables may play a moderating or mediating role in the positive association in Nepal and negative association in Mali.

3.7.4 Other associations with intention to use contraception

The odds of intending to use contraception are consistently greater with increasing levels of education (Appendix Table A3). However, the associations with school status are variable. Young women who are in school have higher odds of intending to use contraception than out-of-school youth in Nepal and Senegal, but lower odds in Uganda and Zambia; there are no statistical associations in six countries. Currently married women have higher odds of intending to use contraception than do never married women in seven countries, as do formerly married women in three countries.

In four countries, older young women have greater odds of intending to use contraception (compared with those age 15-19). Differences between age groups are significant for both groups age 20-24 and 25-29 in two countries (Nigeria and Senegal) and only for those age 20-24 in two countries (Haiti and Uganda). In two other countries (Malawi and Nepal), young women age 25-29 have lower odds of intending to use contraception than women age 15-19. In sum, age, marital status, and education/school status exhibit more variable associations with this outcome than does YE.

4 DISCUSSION AND CONCLUSIONS

4.1 Discussion

This study presents an innovative method for measuring youth empowerment, one that applies to young women regardless of age, marital status, or school status (MacQuarrie 2021). This is a methodological improvement over previous empowerment measures which, even among those purporting to be tailored for youth, are frequently relevant only for married women (Breakthrough Research 2021; Moreau et al. 2020; Rettig, Fick, and Hijmans 2020). This advance helps us to analyze fertility intentions for a broad swath, rather than a narrow and selective subset, of young people.

This study provides evidence that youth empowerment is negatively associated with ideal number of children (10 out of 10 study countries). A similar finding has been found among adults (Atake and Ali 2019; El-Zeini 2008; Upadhyay and Karasek 2012; Upadhyay et al. 2014; Woldemicael 2009). Understanding the determinants of young people's ideal number of children has received less attention than have other aspects of adolescent sexual and reproductive health and behaviors. One available multi-country study suggests that unmarried young women hold a preference for fewer children than do their married counterparts, though results by age were mixed (MacQuarrie 2014). Another study points to the enduring role of education (sometimes used as a crude proxy for empowerment) in shaping preferences for fewer children (Behrman 2015). Here, we show that controlling for education and marital status, YE remains associated with ideal family size among young women in six countries.

This study further identified a positive association between youth empowerment and young women's intention to use contraception in the future (in 8 out of 10 study countries). This finding is consistent with a study in Pakistan that found, among young married women, marriage decision-making power was associated with intention to use contraception (Hamid, Stephenson, and Rubenson 2011). It also comports with results from a study among adult women that found perceived self-efficacy to be associated with intention to use contraception in Kenya and Nigeria (Babalola et al. 2015).

The association between youth empowerment and current use of contraception is weaker, but present in 5 out of 10 study countries. This link has been established among adult women's empowerment and contraceptive use in a variety of settings (e.g., DeRose and Ezeh 2010; Kabir et al. 2005; Kishor 2000; Leon 2012; Nadeem et al. 2021; Woldemicael 2009). It is not fully clear why the link between empowerment and contraceptive use should be weaker and less universal among youth than among adult women. A study among young women in Ghana found that reproductive autonomy decision-making, but not reproductive autonomy communication, was associated with contraceptive use (Loll et al. 2019). While we cannot rule out issues with measurement of empowerment—or the dimensions of empowerment that we measure—one likely explanation is that there are sufficiently high numbers of young women, at all levels of the empowerment scale, who are not in the types of sexual relationships that would make contraceptive use salient, obscuring the extent of the association between empowerment and contraceptive use. The effect of empowerment on contraceptive use may well be conditioned on young women having a sexual partner and desiring to avoid pregnancy in the short term. For example, one study in Nigeria restricted to married young women and using a measurement of empowerment specific to this subpopulation found that empowerment was associated with greater use of contraception (Breakthrough Research 2021).

These findings support the importance of programmatic and policy interventions to foster gender equity and to build and maintain young women's empowerment as a mechanism towards achieving their fertility intentions. However, it is equally important to ensure that young women are able to realize their intentions, whatever they are, regardless of their levels of empowerment in other domains.

4.2 Limitations

This study has several limitations to note. First, the YE scale is restricted to data that were available in DHS surveys for all youth. The development of this measure took, by necessity, a data-driven approach rather than a conceptually driven approach (MacQuarrie 2021). The resulting scale may weakly measure—or miss entirely—some domains that are nonetheless salient expressions of youth empowerment (Yount, Peterman, and Cheong 2018). For example, it is missing household decision-making items because these items are only available for married women, even though youth may face more constraints on such decision-making than other members of the household. For adolescents, particularly unmarried adolescents, who may be subject to adult authority, such decision-making items need to include other actors beyond the spouse/partner and the respondent as possible locus of control (Gage 2000). Further, it also excludes any measures regarding decisions to stay in school, pursue an education, or when and whom to marry, although these are key life decisions for many young women (Sandøy et al. 2016).

This study shares a limitation common to many studies of youth populations. Accurately measuring educational attainment is difficult where our observed measure is truncated for part of the sample. Some youth, particularly 15-, 16-, and 17-year-olds, may go on to complete secondary school, but are categorized as having completed primary only, because they are still in school due to their age at the time of the survey. We attempt to correct for this by also including a measure of in-school or out-of-school status. This increases our confidence that we are accurately estimating the association between young women's empowerment and our fertility intention outcomes. We do not take the extra step of entering interaction terms between educational attainment and school status because we treat them as control variables. We are less concerned with the association of education on our outcomes than with the confounding effect their omission would have on the observed association of youth empowerment with our outcomes.

There is a small possibility that young women's fertility intentions are not correctly classified according to the measures used in this study. The risk of incorrect classification may be greatest among young people for whom any childbearing is anticipated only in the distant future rather than the immediate or short-term future (Yeatman, Sennott, and Culpepper 2013). Young women who are not now in a sexual relationship, or immediately foresee a sexual relationship, may not currently articulate a future intention to use contraception, though they may do so in the future. School-age girls who are preoccupied with present concerns such as their education, friendships, and life in their natal home may not have crisply articulated visions for their adult lives, including their desired family size. They may disproportionately report zero or a non-numeric response as their ideal number of children if the concept does not have immediate salience. While such misclassification, if present, would create additional "noise", the risk of any systemic bias to statistical inference is low, so long as such responses do not vary systematically with respondents' empowerment or its predictors. We suggest that the ways in which young women understand and articulate fertility preferences is an area ripe for further research.

Finally, a common limitation to any cross-sectional data is that we assess correlations but cannot infer causation. These data have been presented as if young women's empowerment influences their fertility intentions. Nonetheless, we cannot rule out the reverse direction, that holding certain fertility intentions leads to empowerment. Nor can we rule out selection/confounding effects in the scenario that one's ideal number of children or intention to use contraception and empowerment are caused by the same set of factors.

4.3 Conclusion

This study presents a novel and effective method for measuring empowerment among young women. We find young women's empowerment is largely negatively associated with ideal number of children (six countries) and positively associated with intention to use contraception (eight of ten countries) after controlling for other factors. The association between young women's empowerment and current use of contraception is weaker but present in five of ten countries. These findings suggest the importance of programmatic and policy interventions that build and maintain young women's empowerment as a mechanism for both shaping fertility intentions and helping young women achieve them.

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APPENDIX TABLES

Appendix Table A1. Factors associated with ideal number of children among women age 15-29. Coefficients (95% confidence intervals) from separate multivariable linear regression models.

Variables	Ethiopia 2016	Haiti 2016-17	Malawi 2015-16	Mali 2018	Nepal 2016
Youth empowerment tercile (ref: low)					
Medium	-0.014	-0.048	0.012	-0.085	-0.056 **
	(-0.228 - 0.200)	(-0.121 - 0.024)	(-0.043 - 0.067)	(-0.265 - 0.094)	(-0.112 - -0.000)
High	0.087	-0.049	-0.082 **	-0.083	-0.138 ***
	(-0.168 - 0.341)	(-0.126 - 0.028)	(-0.150 - -0.014)	(-0.282 - 0.116)	(-0.201 - -0.076)
Age (ref: 15-19)					
20-24	0.022	0.050	0.185 ***	-0.029	-0.099 ***
	(-0.199 - 0.243)	(-0.014 - 0.114)	(0.114 - 0.256)	(-0.195 - 0.137)	(-0.159 - -0.040)
25-29	0.286 **	0.240 ***	0.519 ***	0.264 ***	-0.082 **
	(0.011 - 0.561)	(0.144 - 0.336)	(0.441 - 0.596)	(0.075 - 0.453)	(-0.149 - -0.014)
Marital status (ref: never married)					
Currently married	0.447 ***	0.038	0.227 ***	0.255 **	0.122 ***
	(0.246 - 0.649)	(-0.037 - 0.113)	(0.152 - 0.302)	(0.051 - 0.459)	(0.059 - 0.185)
Formerly married	-0. 297 *	0.040	0.068	-0.201	-0.174
	(-0.635 - 0.041)	(-0.184 - 0.265)	(-0.029 - 0.165)	(-0.647 - 0.244)	(-0.455 - 0.107)
Attended school during current school year (ref: out of school)					
In school	-0.087	0.037	0.055	-0.157	-0.051 *
	(-0.324 - 0.151)	(-0.035 - 0.108)	(-0.020 - 0.129)	(-0.384 - 0.070)	(-0.106 - 0.004)
Residence (ref: urban)					
Rural	-0.007	-0.011	0.218 ***	0.194	0.102 ***
	(-0.354 – 0.339)	(-0.088 - 0.066)	(0.140 - 0.296)	(-0.052 - 0.441)	(0.032 - 0.172)
Completed education (ref: no schooling)					
Primary	-0.503 ***	-0.194 **	-0.246 ***	-0.057	-0.131 ***
	(-0.769 - -0.237)	(-0.384 - -0.005)	(-0.355 - -0.137)	(-0.265 - 0.152)	(-0.230 - -0.033)
Secondary	-0.631 ***	-0.239 **	-0.501 ***	-0.324 ***	-0.403 ***
	(-0.917 - -0.345)	(-0.432 - -0.047)	(-0.621 - -0.381)	(-0.499 - -0.150)	(-0.504 - -0.303)
Higher	-0.644 ***	-0.399 ***	-0.732 ***	-0.894 ***	-0.448 ***
	(-0.971 - -0.316)	(-0.610 - -0.189)	(-0.904 - -0.560)	(-1.228 - -0.560)	(-0.554 - -0.342)
Household wealth quintile (ref: poorest)					
Poorer	-0.928 ***	-0.147 ***	-0.045	0.142	0.082 **
	(-1.314 - -0.542)	(-0.251 - -0.042)	(-0.115 - 0.025)	(-0.159 - 0.443)	(0.011 - 0.153)
Middle	-0.889 ***	-0.308 ***	-0.085 **	-0.187	0.132 ***
	(-1.264 - -0.513)	(-0.424 - -0.192)	(-0.164 - -0.005)	(-0.455 - 0.081)	(0.052 - 0.212)
Richer	-0.943 ***	-0.380 ***	-0.106 **	-0.525 ***	0.097 **
	(-1.350 - -0.536)	(-0.502 - -0.258)	(-0.187 - -0.025)	(-0.800 - -0.249)	(0.021 - 0.173)
Richest	-1.050 ***	-0.409 ***	-0.191 ***	-0.639 ***	0.069
	(-1.496 - -0.603)	(-0.539 - -0.279)	(-0.284 - -0.098)	(-0.949 - -0.329)	(-0.018 - 0.156)
Observations	8,432	8,263	14,268	5,572	6,983

95% confidence intervals in parentheses

Continued…

*** p<0.01, ** p<0.05, * p<0.1

Appendix Table A1. Continued

Variables	Nigeria 2018	Philippines 2017	Senegal 2019	Uganda 2016	Zambia 2018-19
Youth empowerment tercile (ref: low)					
Medium	-0.368 ***	-0.034	-0.220 **	-0.069 *	-0.189 ***
	(-0.490 - -0.246)	(-0.108 - 0.040))	(-0.410 - -0.029)	(-0.151 - 0.013)	(-0.319 - -0.060)
High	-0.639 ***	-0.023	-0.270 ***	-0.216 ***	-0.342 ***
	(-0.771 - -0.508)	(-0.111 - 0.065)	(-0.432 - -0.108)	(-0.312 - -0.120)	(-0.490 - -0.194)
Age (ref: 15-19)					
20-24	0.021	0.182 ***	0.210 **	0.127 ***	0.294 ***
	(-0.090 - 0.133)	(0.096 - 0.267)	(0.030 - 0.389)	(0.048 - 0.206)	(0.176 - 0.412)
25-29	0.119 *	0.338 ***	0.152	0.449 ***	0.530 ***
	(-0.014 - 0.251)	(0.238 - 0.438)	(-0.083 - 0.387)	(0.346 - 0.551)	(0.395 - 0.666)
Marital status (ref: never married)					
Currently married	0.611 ***	0.271 ***	0.367 ***	0.306 ***	0.462 ***
	(0.500 - 0.723)	(0.196 - 0.346)	(0.157 - 0.576)	(0.208 - 0.404)	(0.349 - 0.575)
Formerly married	0.064	-0.238 **	-0.229	-0.082	0.000
	(-0.229 - 0.357)	(-0.445 - -0.031)	(-0.663 - 0.206)	(-0.212 - 0.049)	(-0.168 - 0.169)
Attended school during current school year (ref: out of school)					
In school	0.023	0.130 **	-0.157	0.092 *	0.040
	(-0.089 - 0.135)	(0.030 - 0.230)	(-0.362 - 0.048)	(-0.013 - 0.197)	(-0.079 - 0.158)
Residence (ref: urban)					
Rural	0.058	0.039	0.476 ***	0.101	0.186 ***
	(-0.074 - 0.191)	(-0.034 - 0.112)	(0.263 - 0.689)	(-0.024 - 0.226)	(0.051 - 0.321)
Completed education (ref: no schooling)					
Primary	-1.002 ***	-0.058	-0.322 ***	-1.135 ***	-0.043
	(-1.169 - -0.835)	(-0.613 - 0.496)	(-0.526 - -0.119)	(-1.527 - -0.743)	(-0.300 - 0.214)
Secondary	-1.757 ***	-0.198	-0.696 ***	-1.364 ***	-0.211
	(-1.913 - -1.601)	(-0.781 - 0.384)	(-0.899 - -0.494)	(-1.757 - -0.971)	(-0.471 - 0.050)
Higher	-1.840 ***	-0.046	-0.825 ***	-1.550 ***	-0.551 ***
	(-2.051 - -1.630)	(-0.630 - 0.537)	(-1.165 - -0.486)	(-1.949 - -1.151)	(-0.856 - -0.246)
Household wealth quintile (ref: poorest)					
Poorer	-0.253 ***	-0.274 ***	-0.300 **	-0.175 ***	-0.029
	(-0.431 - -0.074)	(-0.371 - -0.177)	(-0.553 - -0.046)	(-0.302 - -0.049)	(-0.181 - 0.123)
Middle	-0.511 ***	-0.318 ***	-0.574 ***	-0.130 *	-0.267 ***
	(-0.690 - -0.331)	(-0.424 - -0.212)	(-0.900 - -0.248)	(-0.263 - 0.003)	(-0.425 - -0.108)
Richer	-0.831 ***	-0.334 ***	-0.465 ***	-0.311 ***	-0.362 ***
	(-1.033 - -0.629)	(-0.446 - -0.222)	(-0.788 - -0.141)	(-0.454 - -0.167)	(-0.541 - -0.182)
Richest	-1.209 ***	-0.256 ***	-0.653 ***	-0.478 ***	-0.541 ***
	(-1.413 - -1.006)	(-0.383 - -0.129)	(-0.975 - -0.331)	(-0.642 - -0.313)	(-0.742 - -0.340)
Observations	21,957	12,626	4,179	10,921	7,787

95% confidence intervals in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix Table A2. Factors associated with current contraceptive use among women age 15-29. Odds ratios from separate multivariable logistic regression models (95% confidence intervals in parentheses).

Variables	Ethiopia 2016	Haiti 2016-17	Malawi 2015-16	Mali 2018	Nepal 2016
Youth empowerment tercile (ref: low)					
Medium	1.047	1.254 **	1.129 *	1.233	1.062
	(0.842 - 1.303)	(1.046 - 1.503)	(0.988 - 1.290)	(0.947 - 1.605)	(0.878 - 1.284)
High	1.368 **	1.551 ***	1.155 **	1.062	0.939
	(1.050 - 1.783)	(1.252 - 1.923)	(1.003 - 1.331)	(0.812 - 1.389)	(0.731 - 1.207)
Age (ref: 15-19)					
20-24	1.242 *	2.225 ***	1.915 ***	2.028 ***	1.546 ***
	(0.963 - 1.602)	(1.769 - 2.800)	(1.649 - 2.223)	(1.588 - 2.589)	(1.201 - 1.991)
25-29	1.314 **	2.331 ***	2.392 ***	2.333 ***	2.741 ***
	(1.024 - 1.686)	(1.800 - 3.018)	(2.047 - 2.796)	(1.810 - 3.008)	(2.144 - 3.503)
Marital status (ref: never married)					
Currently married	28.300 ***	3.111 ***	6.237 ***	1.329 *	639.900 ***
	(19.920 - 40.200)	(2.585 - 3.745)	(5.122 - 7.596)	(0.976 - 1.812)	(154.000 - 2,660.000)
Formerly married	9.922 ***	1.398 *	3.499 ***	1.221	68.350 ***
	(6.036 - 16.310)	(0.962 - 2.032)	(2.759 - 4.438)	(0.611 - 2.440)	(9.289 - 503.000)
Attended school during current school year (ref: out of school)					
In school	0.570 **	0.967	0.616 ***	0.634 ***	1.038
	(0.363 - 0.893)	(0.761 - 1.229)	(0.475 - 0.798)	(0.463 - 0.867)	(0.744 - 1.448)
Residence (ref: urban)					
Rural	0.680 *	0.638 ***	0.844 **	0.957	0.799 **
	(0.436 - 1.061)	(0.508 - 0.802)	(0.718 - 0.991)	(0.697 - 1.313)	(0.661 - 0.967)
Completed education (ref: no schooling)					
Primary	1.143	1.045	1.257 **	1.146	1.034
	(0.922 - 1.418)	(0.775 - 1.410)	(1.015 - 1.557)	(0.876 - 1.498)	(0.812 - 1.317)
Secondary	1.262	1.026	1.254 *	2.380 ***	1.208 *
	(0.931 - 1.712)	(0.748 - 1.406)	(0.960 - 1.640)	(1.860 - 3.045)	(0.986 - 1.479)
Higher	1.782 ***	1.141	1.123	2.792 ***	1.179
	(1.182 - 2.687)	(0.735 - 1.772)	(0.741 - 1.701)	(1.666 - 4.676)	(0.910 - 1.527)
Household wealth quintile (ref: poorest)					
Poorer	1.649 ***	0.867	1.166 **	0.880	0.998
	(1.191 - 2.283)	(0.690 - 1.090)	(1.008 - 1.349)	(0.596 - 1.301)	(0.783 - 1.272)
Middle	2.159 ***	1.284 *	1.108	1.466 **	0.803 *
	(1.521 - 3.066)	(0.983 - 1.677)	(0.948 - 1.294)	(1.030 - 2.087)	(0.622 - 1.037)
Richer	2.787 ***	1.031	1.024	1.980 ***	0.903
	(2.017 - 3.851)	(0.759 - 1.401)	(0.863 - 1.215)	(1.342 - 2.922)	(0.692 - 1.180)
Richest	2.534 ***	0.839	0.894	1.572 *	1.420 **
	(1.621 - 3.961)	(0.588 - 1.196)	(0.733 - 1.092)	(0.994 - 2.487)	(1.044 - 1.933)
Observations	9,246	8,282	14,343	6,084	7,022

95% confidence intervals in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Continued…

Appendix Table A2. Continued

Variables	Nigeria 2018	Philippines 2017	Senegal 2019	Uganda 2016	Zambia 2018-19
Youth empowerment tercile (ref: low)					
Medium	1.487 ***	1.171	1.739 ***	1.007	1.077
	(1.218 - 1.816)	(0.949 - 1.444)	(1.283 - 2.358)	(0.881 - 1.151)	(0.914 - 1.270)
High	2.158 ***	0.924	1.431 *	1.125	1.081
	(1.778 - 2.619)	(0.710 - 1.202)	(0.975 - 2.101)	(0.961 - 1.316)	(0.881 - 1.326)
Age (ref: 15-19)					
20-24	3.264 ***	2.564 ***	2.855 ***	1.967 ***	1.667 ***
	(2.659 - 4.006)	(1.892 - 3.475)	(1.886 - 4.323)	(1.622 - 2.386)	(1.365 - 2.036)
25-29	4.356 ***	2.720 ***	3.566 ***	2.651 ***	2.001 ***
	(3.436 - 5.524)	(1.984 - 3.727)	(2.439 - 5.214)	(2.176 - 3.229)	(1.615 - 2.479)
Marital status (ref: never married)					
Currently married	1.467 ***	43.040 ***	7.992 ***	2.521 ***	4.013 ***
	(1.241 - 1.734)	(29.020 - 63.830)	(5.220 - 12.230)	(2.126 - 2.988)	(3.298 - 4.883)
Formerly married	0.993	3.187 ***	4.288 ***	2.351 ***	2.135 ***
	(0.620 - 1.590)	(1.633 - 6.219)	(2.042 - 9.003)	(1.897 - 2.913)	(1.585 - 2.875)
Attended school during current school year (ref: out of school)					
In school	0.690 ***	0.614 **	0.524 **	0.513 ***	0.317 ***
	(0.556 - 0.856)	(0.388 - 0.972)	(0.311 - 0.882)	(0.396 - 0.664)	(0.243 - 0.413)
Residence (ref: urban)					
Rural	1.121	0.971	0.675 **	0.911	0.933
	(0.968 - 1.300)	(0.817 - 1.154)	(0.500 - 0.912)	(0.770 - 1.078)	(0.769 - 1.133)
Completed education (ref: no schooling)					
Primary	2.847 ***	4.078 ***	1.512 **	1.658 ***	1.893 ***
	(2.214 - 3.660)	(1.563 - 10.640)	(1.101 - 2.078)	(1.206 - 2.278)	(1.447 - 2.476)
Secondary	3.731 ***	5.161 ***	1.588 ***	2.245 ***	2.194 ***
	(3.029 - 4.597)	(1.952 - 13.640)	(1.184 - 2.129)	(1.606 - 3.137)	(1.644 - 2.928)
Higher	3.430 ***	5.021 ***	1.926 *	2.327 ***	2.154 ***
	(2.623 - 4.485)	(1.888 - 13.350)	(0.990 - 3.746)	(1.587 - 3.413)	(1.340 - 3.464)
Household wealth quintile (ref: poorest)					
Poorer	1.326 *	1.039	0.898	1.553 ***	1.023
	(0.968 - 1.818)	(0.847 - 1.274)	(0.617 - 1.305)	(1.298 - 1.857)	(0.839 - 1.248)
Middle	1.892 ***	0.843	1.129	1.545 ***	1.273 **
	(1.430 - 2.503)	(0.663 - 1.072)	(0.704 - 1.809)	(1.272 - 1.877)	(1.043 - 1.554)
Richer	2.384 ***	0.809	1.027	1.828 ***	1.166
	(1.777 - 3.197)	(0.603 - 1.086)	(0.607 - 1.737)	(1.484 - 2.251)	(0.901 - 1.510)
Richest	2.438 ***	0.719 **	0.901	1.775 ***	0.935
	(1.767 - 3.364)	(0.523 - 0.988)	(0.520 - 1.561)	(1.401 - 2.248)	(0.684 - 1.278)
Observations	22,470	12,719	5,043	11,072	7,965

95% confidence intervals in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix Table A3. Factors associated with intention to use contraception (among non-users) among women age 15-29. Odds ratios from separate multivariable logistic regression models (95% confidence intervals in parentheses).

Variables	Ethiopia 2016	Haiti 2016-17	Malawi 2015-16	Mali 2018	Nepal 2016
Youth empowerment tercile (ref: low)					
Medium	0.989	1.171 *	1.577 ***	0.995	1.240
	(0.802 - 1.218)	(0.982 - 1.397)	(1.347 - 1.845)	(0.829 - 1.195)	(0.947 - 1.624)
High	1.327 **	1.100	1.668 ***	0.751 ***	1.419 *
	(1.008 - 1.747)	(0.915 - 1.322)	(1.341 - 2.075)	(0.606 - 0.931)	(0.965 - 2.087)
Age (ref: 15-19)					
20-24	1.203	1.150 *	1.051	1.032	1.002
	(0.947 - 1.528)	(0.980 - 1.350)	(0.875 - 1.262)	(0.869 - 1.226)	(0.692 - 1.450)
25-29	0.790 *	0.981	0.683 ***	0.903	0.635 *
	(0.620 - 1.006)	(0.770 - 1.251)	(0.552 - 0.845)	(0.747 - 1.092)	(0.391 - 1.032)
Marital status (ref: never married)					
Currently married	1.180	1.160	1.609 ***	0.942	2.784 ***
	(0.934 - 1.491)	(0.932 - 1.443)	(1.308 - 1.980)	(0.769 - 1.154)	(2.063 - 3.757)
Formerly married	1.032	1.024	1.272 *	1.329	0.104 ***
	(0.695 - 1.530)	(0.683 - 1.535)	(0.956 - 1.694)	(0.735 - 2.403)	(0.053 - 0.204)
Attended school during current school year (ref: out of school)					
In school	1.043	0.861	0.888	1.044	1.364 *
	(0.818 - 1.330)	(0.708 - 1.048)	(0.734 - 1.074)	(0.820 - 1.327)	(0.965 - 1.927)
Residence (ref: urban)					
Rural	1.167	0.969	0.813	0.729 *	1.263
	(0.844 - 1.611)	(0.761 - 1.233)	(0.628 - 1.053)	(0.528 - 1.006)	(0.886 - 1.801)
Completed education (ref: no schooling)					
Primary	2.327 ***	1.259	1.773 ***	1.341 ***	1.168
	(1.868 - 2.899)	(0.907 - 1.749)	(1.364 - 2.306)	(1.100 - 1.636)	(0.797 - 1.711)
Secondary	3.186 ***	1.173	2.735 ***	1.713 ***	1.995 ***
	(2.317 - 4.380)	(0.841 - 1.636)	(1.971 - 3.797)	(1.407 - 2.086)	(1.325 - 3.004)
Higher	3.454 ***	0.985	2.253 ***	2.575 ***	2.765 ***
	(2.371 - 5.033)	(0.635 - 1.528)	(1.377 - 3.686)	(1.540 - 4.305)	(1.663 - 4.596)
Household wealth quintile (ref: poorest)					
Poorer	2.048 ***	0.961	0.865	1.055	0.854
	(1.508 - 2.782)	(0.738 - 1.250)	(0.696 - 1.075)	(0.810 - 1.374)	(0.580 - 1.259)
Middle	2.220 ***	0.847	0.853	1.361 **	0.637 **
	(1.602 - 3.076)	(0.643 - 1.117)	(0.672 - 1.084)	(1.040 - 1.783)	(0.418 - 0.970)
Richer	1.876 ***	0.811	0.821	1.384 **	0.726
	(1.336 - 2.634)	(0.584 - 1.126)	(0.647 - 1.042)	(1.017 - 1.882)	(0.469 - 1.123)
Richest	1.960 ***	0.607 ***	0.678 ***	1.605 **	0.369 ***
	(1.366 - 2.812)	(0.439 - 0.841)	(0.507 - 0.908)	(1.096 - 2.351)	(0.234 - 0.583)
Observations	7,494	6,560	8,861	5,278	5,392

95% confidence intervals in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Continued…

Appendix Table A3. Continued

Variables	Nigeria 2018	Philippines 2017	Senegal 2019	Uganda 2016	Zambia 2018-19
Youth empowerment tercile (ref: low)					
Medium	1.322 ***	1.172 *	0.967	1.063	1.152
	(1.198 - 1.460)	(0.971 - 1.414)	(0.727 - 1.286)	(0.933 - 1.211)	(0.957 - 1.387)
High	1.704 ***	1.259 **	1.457 ***	1.006	1.071
	(1.505 - 1.928)	(1.046 - 1.515)	(1.129 - 1.881)	(0.856 - 1.183)	(0.885 - 1.297)
Age (ref: 15-19)					
20-24	1.220 ***	1.064	1.278 **	1.194 *	1.130
	(1.103 - 1.350)	(0.810 - 1.398)	(1.037 - 1.574)	(0.993 - 1.437)	(0.937 - 1.362)
25-29	1.216 ***	0.881	1.416 ***	1.011	0.830
	(1.096 - 1.350)	(0.671 - 1.156)	(1.120 - 1.790)	(0.829 - 1.233)	(0.665 - 1.037)
Marital status (ref: never married)					
Currently married	0.838 ***	1.710 ***	1.480 ***	1.810 ***	1.500 ***
	(0.755 - 0.931)	(1.414 - 2.068)	(1.180 - 1.856)	(1.537 - 2.131)	(1.138 - 1.978)
Formerly married	0.945	1.038	1.514	1.386 **	1.131
	(0.752 - 1.186)	(0.684 - 1.573)	(0.789 - 2.905)	(1.045 - 1.839)	(0.780 - 1.640)
Attended school during current school year (ref: out of school)					
In school	1.012	0.842	1.234 *	0.788 ***	0.779 **
	(0.914 - 1.120)	(0.676 - 1.048)	(0.960 - 1.586)	(0.671 - 0.925)	(0.621 - 0.977)
Residence (ref: urban)					
Rural	0.885 **	1.067	0.552 ***	0.907	1.206
	(0.795 - 0.985)	(0.892 - 1.277)	(0.415 - 0.734)	(0.758 - 1.084)	(0.917 - 1.588)
Completed education (ref: no schooling)					
Primary	1.587 ***	2.882 ***	1.293 *	2.166 ***	1.412 **
	(1.392 - 1.809)	(1.353 - 6.143)	(0.980 - 1.705)	(1.609 - 2.914)	(1.038 - 1.921)
Secondary	2.154 ***	4.382 ***	1.866 ***	3.136 ***	2.307 ***
	(1.903 - 2.437)	(2.055 - 9.343)	(1.505 - 2.314)	(2.258 - 4.354)	(1.649 - 3.226)
Higher	2.903 ***	5.651 ***	3.633 ***	3.429 ***	2.520 ***
	(2.405 - 3.504)	(2.596 - 12.300)	(1.795 - 7.350)	(2.216 - 5.307)	(1.496 - 4.246)
Household wealth quintile (ref: poorest)					
Poorer	1.135 *	0.990	0.978	0.943	1.290 **
	(0.991 - 1.299)	(0.817 - 1.199)	(0.747 - 1.281)	(0.797 - 1.116)	(1.024 - 1.625)
Middle	1.226 ***	1.034	1.185	0.979	1.689 ***
	(1.059 - 1.419)	(0.827 - 1.293)	(0.831 - 1.691)	(0.818 - 1.172)	(1.308 - 2.179)
Richer	1.092	0.754 **	0.950	1.162	1.073
	(0.921 - 1.295)	(0.593 - 0.961)	(0.661 - 1.365)	(0.969 - 1.394)	(0.776 - 1.484)
Richest	1.039	0.713 ***	1.068	0.824 *	1.373 *
	(0.857 - 1.259)	(0.566 - 0.898)	(0.733 - 1.557)	(0.662 - 1.027)	(0.948 - 1.989)
Observations	20,265	9,985	4,421	8,334	5,602

95% confidence intervals in parentheses
*** p<0.01, ** p<0.05, * p<0.1