Published in final edited form as:

Demography. 2016 December ; 53(6): 1821–1852. doi:10.1007/s13524-016-0520-8.

Child Marriage and Intimate Partner Violence in Rural Bangladesh: A Longitudinal Multilevel Analysis

Kathryn M. Yount[1], **AliceAnn Crandall**[2], **Yuk Fai Cheong**[3], **Theresa L. Osypuk**[4], **Lisa M. Bates**[5], **Ruchira T. Naved**[6], and **Sidney Ruth Schuler**[7]

Kathryn M. Yount: kathryn.yount@emory.edu

[1]Hubert Department of Global Health and Department of Sociology, Emory University, 1518 Clifton Rd, NE, Atlanta, GA, 30322

[2]Department of Health Science, Brigham Young University, Provo, Utah

[3]Department of Psychology, Emory University, Atlanta, GA

[4]University of Minnesota, Minneapolis, MN

[5]Columbia University, Mailman School of Public Health, New York, NY

[6]International Center for Diarrheal Disease Research, Bangladesh, Dhaka, Bangladesh

[7]Independent Consultant, Washington, D.C.

Abstract

Child marriage (before age 18) is a risk factor for intimate partner violence (IPV) against women. Worldwide, Bangladesh has the highest prevalence of IPV and very early child marriage (before age 15). How the community prevalence of very early child marriage influences a woman's risk of IPV is unknown. Using panel data (2013–2014) from 3,355 women first married 4–12 years prior in 77 Bangladeshi villages, we tested the protective effect of a woman's later first marriage (at age 18 or older), the adverse effect of a higher village prevalence of very early child marriage, and whether any protective effect of a woman's later first marriage was diminished or reversed in villages where very early child marriage was more prevalent. Almost one-half (44.5 %) of women reported incident physical IPV, and 68.9 % had married before age 18. The village-level incidence of physical IPV ranged from 11.4 % to 75.0 %; the mean age at first marriage ranged from 14.8 to 18.0 years. The mean village-level prevalence of very early child marriage ranged from 3.9 % to 51.9 %. In main-effects models, marrying at 18 or later protected against physical IPV, and more prevalent very early child marriage before age 15 was a risk factor. The interaction of individual later marriage and the village prevalence of very early child marriage was positive; thus, the likely protective effect of marrying later was negated in villages where very early child marriage was prevalent. Collectively reducing very early child marriage may be needed to protect women from IPV.

Keywords

Bangladesh; Child marriage; Communities; Multilevel analysis; Intimate partner violence

Introduction

Intimate partner violence (IPV) includes physical, sexual, or psychological aggression; stalking; or coercion by a current or former intimate partner (Breiding et al. 2015). IPV against women is a global problem (Devries et al. 2013) and is especially common in South Asia, where other forms of violence against women co-occur (Solotaroff and Pande 2014). Worldwide, South Asia has the highest levels of child marriage (before age 18) (Jain and Kurtz 2007; United Nations (UN) 2000), and Bangladesh has the highest levels of very early child marriage (before age 15) (Erulkar 2013; Solotaroff and Pande 2014).[1] Because child marriage limits the resources at a bride's disposal (Chowdhury 2004), it may influence her early and longer-term empowerment within marriage (Crandall et al. n.d.; Yount et al. n.d.; but see also Crandall et al. 2016).

Across South Asia, child marriage and very early child marriage are known risk factors for IPV (Nasrullah et al. 2014; Oshiro et al. 2011; Rahman et al. 2014; Raj et al. 2010; Santhya 2011; Speizer and Pearson 2011). Child marriage also is geographically patterned within countries (Goli et al. 2015; Kamal 2010), reflecting community-level variation in a collective practice[2] that characterizes certain forms of patriarchal kinship (Kandiyoti 1988). Yet, little is known about whether or how a higher community-level prevalence of very early child marriage influences a woman's risk of experiencing IPV, beyond the risk associated with a woman's individual-level age at first marriage.

We addressed this question in rural Bangladesh using data from a marriage cohort of 3,355 women in 77 villages who were surveyed in 2013 and 2014. We conceptualized the village-level prevalence of very early child marriage as a collective practice that reflects an important historical feature of institutionalized male dominance. If a higher village-level prevalence of very early child marriage reflects social expectations about how women *are* and *should be* treated, this collective practice should be associated with a wife's higher risk of experiencing IPV. Also, a higher village-level prevalence of very early child marriage may modify the association of a woman's own age at first marriage with her risk of IPV. Namely, a woman marrying at age 18 or later may have a higher risk of experiencing IPV in villages where very early child marriage is more prevalent because her behavior deviates from a collective practice reflecting social expectations about how women are or should be treated. If our hypotheses are born out, the collective adoption of later marriage in villages with very early child marriage (Mackie 1996) may be needed to limit backlash against women as the transition in women's age at marriage continues in rural Bangladesh.

[1]We use "early marriage" and "child marriage" interchangeably to refer to first marriage before age 18. We use "very early marriage" and "very early child marriage" interchangeably to refer to first marriage before age 15.

[2]According to Bicchieri et al. (2014), *descriptive norms* are collective practices arising from preferences that are conditional on empirical expectations about what people in the community do. *Social norms* are collective practices arising from preferences that are conditional on normative expectations, or what people should do. We argue on theoretical grounds that very early child marriage historically has been a social norm in Bangladesh; however, we acknowledge that we lack data regarding the underlying expectations on which social norms are conditioned.

IPV and Child Marriage: Prevalence and Consequences

Globally, the reported lifetime prevalence of IPV against women varies, from 0.2 %[3] to more than 70.9 % in 2010 (Devries et al. 2013). In the West, debate persists about gender symmetry in the perpetration of physical and psychological IPV (Straus 2004; Swan et al. 2008); yet, men's physical IPV against women produces substantial adverse effects on women's and children's health (Misch and Yount 2013; Sobkoviak et al. 2011; Yount et al. 2011a; Zureick-Brown et al. 2015). In settings that are poorer and less gender-equitable, women's experience of IPV exceeds that of men (Garcia-Moreno et al. 2006; Kishor and Bradley 2012; Kishor and Johnson 2004).

Women in South Asia report especially high rates of experiencing lifetime IPV (Devries et al. 2013; World Health Organization 2012), with estimates ranging from 53 % to 95 % among married women in Bangladesh (Azziz-Baumgartner et al. 2014; Bangladesh Bureau of Statistics 2013; Hasan et al. 2014; Ziaei et al. 2014). Our study site is rural Bangladesh, so we focus on men's perpetration of IPV against their wives because in this context, marriage is almost universal, and premarital cohabitation is socially proscribed.

A violation of human rights (United Nations 2000) and a form of violence against girls (Solotaroff and Pande 2014), child marriage also remains widespread globally. Between 2000 and 2011, one-third of women ages 20–49 in poorer countries were first married or in a union before age 18, and one in nine were first married or in a union before age 15 (Das Gupta et al. 2014). Child marriage is most common in South Asia (Solotaroff and Pande 2014), where 56 % of women 20–49 years were first married before age 18 (United Nations Children's Fund 2014). Bangladesh has a very high rate of child marriage, at 74 % of women age 20–49 years in 2011, and has the highest rate of very early child marriage globally, at 39 % of women age 20–49 years (National Institute of Population Research and Training (NIPORT) et al. 2013; Solotaroff and Pande 2014; United Nations Children's Fund 2014).

Adolescence is a period of heightened vulnerability and developmental change. Before age 15, girls are not physically or cognitively ready to make safe and consensual decisions about marriage, sexual relations, or reproduction (Dixon-Mueller 2008). In middle adolescence—from age 15 to 17—physical and cognitive readiness still varies widely, depending on the onset and pace of puberty, cognitive maturation, and the risks and responsibilities encountered at the time of marriage and childbearing (Dixon-Mueller 2008). Marrying while physically and cognitively immature may limit a girl's educational opportunities, her social and emotional development, and her health and that of her children (Goli et al. 2015; Innocenti Research Centre 2001; Santhya 2011). Women who marry in childhood more often are underweight (Goli et al. 2015), report unintended pregnancy, experience obstetric complications and maternal death (Fisher et al. 2011; Santhya 2011), have preterm or low birth weight births (Banerjee et al. 2009; Edirne et al. 2010; Kurth et al. 2010; Santhya 2011), and exhibit postnatal depression (Fisher et al. 2011).

[3]The lower estimates suggest that IPV is not inevitable (Yount et al. 2011b) and that methodological issues may influence reporting of IPV (Yount et al. 2014).

Multilevel Influences of Child Marriage on the Risk of IPV

Child marriage is a risk factor for IPV (Nasrullah et al. 2014; Oshiro et al. 2011; Rahman et al. 2014; Raj et al. 2010; Santhay 2011; Speizer and Pearson 2011), yet the potential multilevel influence of child marriage is undertheorized and understudied. In the following subsections, we describe a multilevel framework to explain how very early child marriage—which we argue from theory to be a historical social norm in Bangladesh—and the emerging tendency for individual women to marry in adulthood may jointly influence a woman's risk of experiencing IPV.

Theories of Child Marriage: A Social Norm That Sustains Institutionalized Male Dominance

A *social norm* is a collective practice that people follow based on social expectations about what others do and think should be done (Bicchieri et al. 2014). *Gender norms*, in turn, are collective practices that men and women follow based on social expectations about how other men and women behave or think men and women should behave. In historically patriarchal settings like Bangladesh, gender norms pertaining to child marriage and very early child marriage may reinforce local systems of male dominance and thus could influence men's behavior, including men's behavior with respect to their partners (Campbell 1995; Courtenay 2000; Kimmel and Messner 1989).

In Bangladesh, the collective practice of women's very early child marriage may be understood, on theoretical grounds, as a gender norm that historically has contributed to men's structural dominance in kin groups. Marriage in rural Bangladesh historically has followed the pattern of *classic patriarchy* (Kandiyoti 1988), wherein girls marry at relatively young ages into households that are headed by the husband's' father (e.g., Alam 2007). Although Muslim women legally can choose their spouse, in practice, their fathers or elder brothers often choose (Alam 2007; Baden et al. 1994; Gazi et al. 2013), and legal guardianship of the woman passes from father to husband (Alam 2007). Under classic patriarchy, a new bride is subordinate to the men and more senior women. The division of labor remains gendered, with women working inside the house and men working outside (Alam 2007; Baden et al. 1994; Chowdhury 2009). Thus, according to theories of classic patriarchy, women are socially expected to marry young, to exchange obedience for men's protection (e.g., Alam 2007; Kabeer 1988; Yount and Li 2010), and to respect men's authority to punish disobedience (Feldman 2010; Yount and Li 2010).

For some women, the perceived benefits of classic patriarchy may include the sense of identity and prestige that comes with marriage (Alam 2007) and the eventual authority acquired over daughters-in-law, displacing the hardships of child marriage (Kandiyoti 1988). These perceived benefits may induce some women to internalize these norms (Kabeer 1988; Kandiyoti 1988) and to comply with a system that effectively limits their economic and social resources to those of her marital family, ensuring lifelong dependence on male kin (Kabeer 1988). For other women, the perceived costs of nonconformity or the real lack of alternatives has induced compliance by default (Schuler and Islam 2008; Schuler et al. 2012; Yount et al. 2012). Regardless of the mechanism that induces compliance, such dependence heightens women's social and economic vulnerability should ties with male guardians be severed (Kabeer 2011), further entrenching women's compliance with classic patriarchy.

Thus, historically in Bangladesh, very early child marriage arguably has been a social norm that has sustained men's structural dominance in kin groups.

Despite the high prevalence among women of (very early) child marriage and its noted geographic patterning (Kamal 2010), no studies in Bangladesh have assessed how the village prevalence of very early child marriage may influence the risk that a woman experiences IPV. Evidence from elsewhere also is limited. In Nigeria, the community-level mean age at first marriage among women was negatively associated with a women's lifetime risk of psychological IPV and of any IPV (Antai and Adaji 2012), even when women's mean grades of schooling and other community attributes are controlled for. In Egypt, the adjusted odds of justifying wife hitting or beating were lower among women who lived in communities with an older average age at first marriage (Yount and Li 2010).

Based on social norms theory, we expect that village-level variation in the prevalence of very early child marriage will be associated with variation across villages in the risk of IPV against women. Specifically, adjusting for other village-level attributes, such as the average schooling attainment of women in the same generation, a higher prevalence of very early child marriage should be directly associated with a woman's higher risk of experiencing IPV.

Theories of Child Marriage: A Determinant of Disempowerment Across a Woman's Life Course

In addition to its salience as a historical social norm, child marriage constrains the human, economic, and social resources that a woman brings to her marriage. Comparatively, delaying marriage until adulthood coincides with (1) enhanced schooling attainment (e.g., Blossfeld and Huinink 1991; Blossfeld and Jaenichen 1992; Hango and Le Bourdais 2007; Hirschman 1985; Nobles and Buttenheim 2008; Singh and Samara 1996; Thornton et al. 1995), (2) market work (Blossfeld and Huinink 1991; Nobles and Buttenheim 2008), (3) acquisition of economic assets (Amin and Al-Bassusi 2004), and (4) social networks beyond a woman's kin group (Kabeer 2011). Moreover, delaying marriage until adulthood may facilitate the acquisition of other human resources for empowerment, such as self-esteem, self-efficacy, and a sense of entitlement and rights (Taylor and Pereznieto 2014). As such, a woman's first marriage in adulthood reflects the empowerment resources that she brings to the marriage (Lee-Rife 2010) and partly determines her accrued postmarital empowerment (Crandall et al. 2016; Crandall et al. n.d.; Yount et al. n.d.). Thus, all else being equal, a woman who first marries as an adult (at 18 or older) should have a lower overall risk of experiencing IPV.

In South Asia, child marriage has been associated consistently with a higher risk of IPV against women. In Nepal (Oshiro et al. 2011) and India (Raj et al. 2010; Speizer and Pearson 2011), the adjusted odds of lifetime or current physical or sexual IPV were higher among women marrying before age 18 than those who married at 18 or older. In Pakistan, compared with women marrying in adulthood, those marrying before age 18 had higher adjusted odds of experiencing emotional IPV, physical IPV, and controlling behaviors (Nasrullah et al. 2014). In Bangladesh, marriage before age 18 has been positively associated with physical, but not sexual, IPV (Rahman et al. 2014).

Women's Later Marriage in a Very-Early-Child-Marriage Community and Risk of IPV

In light of this discussion, a relevant question is how a woman's marriage in adulthood (age 18 or older) is associated with her risk of IPV in communities where very early child marriage is more prevalent. Following social norm theory (Bicchieri et al. 2014), a woman's deviation from the gender norm in her community may elevate her risk of experiencing IPV, and evidence from Bangladesh favors this hypothesis. Namely, a woman's short-term participation in microcredit has been associated with a higher risk of IPV in more socially conservative areas, where such participation likely has been seen as deviant; however, such participation was not associated with IPV in less conservative areas (Koenig et al. 2003). With respect to gender norms about age at first marriage, a woman who marries later may challenge the status quo in a community where very early child marriage for women has been the norm.[4] In this case, the expected protective effect of individual-level later marriage may be reduced or even reversed, contributing to violent backlash against the woman.

Alternative Explanations and Other Individual and Community Influences on the Risk of IPV

Our discussion is incomplete without reference to other, mainly economic motivations for the collective practice of very early child marriage. Trends in very early child marriage, alongside other structural changes and continuities, are revealing. In the last 25 years, rates of very early child marriage declined substantially in Bangladesh, such that 17 % of women aged 15–19 years versus 52 % of women aged 45–49 years were first married before age 15 (NIPORT et al. 2013). That said, rates of child marriage have declined more modestly, from 73 % in 1989 to 65 % in 2011 among women aged 20–24 years (NIPORT et al. 2013).

Structural changes alongside these declines were the launch of free and compulsory primary school and free tuition for girls in classes 6–8 (in 1990), as well as the Female Secondary School Stipend Project (FSP), nationalized in 1994 to increase girls' enrollment in secondary school (Schurmann 2009). FSP and, to a lesser extent, free compulsory primary school arguably enhanced schooling attainment, especially for girls (Schurmann 2009). Such increases at the individual and community levels may have spurred declines in very early child marriage and IPV.

Other economic conditions may have served as counteracting forces (Schurmann 2009). In poor families with daughters, parents may continue to perceive dowry as a large financial burden and schooling as a benefit reaped by the husband's household. The lesser dowry and lower costs of schooling incurred by marrying a daughter earlier may be attractive. Thus, the forces of poverty, in addition to social norms theory, may jointly explain the modest declines in overall rates of child marriage (before age 18) in Bangladesh.

On these grounds, our analysis should control for community- and individual-level attributes that may jointly influence a woman's age at first marriage and risk of IPV.[5] Possible

[4]For example, the man may feel more strongly that he needs to "teach" the wife proper subservient behavior (using IPV) because she may have picked up more independent habits. Or the husband may feel he needs to show the community that his power over his wife is absolute, despite her being older and potentially more empowered. The very young bride, in contrast, becomes a child in the new household and, arguably, more gradually learns to comply with gender norms under the tutelege of the in-laws and co-wives.

[5]We do not consider mediators, such as postmarital dowry and household socioeconomic status in adulthood.

community-level confounders would capture village-level measures of women's schooling attainment (Ackerson et al. 2008; Antai and Adaji 2012) and household socioeconomic status (VanderEnde et al. 2015).[6] Potential individual-level confounders would capture adversity in childhood, including growing up in poverty, having parents with less schooling, low personal schooling attainment, and having witnessed father-to-mother IPV (Abramsky et al. 2011; Bates et al. 2004; Erulkar 2013; Hadi 2000, 2005; Koenig et al. 2003; Le et al. 2014; Naved and Persson 2005, 2010; Rahman et al. 2014; Schuler et al. 1996).

Hypotheses

The preceding discussion informs three hypotheses.

Hypothesis 1: A woman who first marries in adulthood (at age 18 or older) will have a lower risk of exposure to IPV.

Hypothesis 2: A woman who lives in a village where the prevalence of very early child marriage is higher will have a higher risk of exposure to IPV.

Hypothesis 3: The village prevalence of very early child marriage will modify the influence of a woman's first marriage in adulthood on her risk of exposure to IPV. All else being equal, the protective effect of first marriage in adulthood on the risk of IPV will be diminished or reversed in a village with a higher prevalence of very early child marriage.

Method

Study Sites and Sample

The study was situated in rural Bangladesh, where 73.0 % of the population resides (NIPORT et al. 2013). Our study sites were 77 villages[7] sampled to be representative of those having at least 200 households. These villages were selected using a stratified, multistage sampling design. Using data from 15- to 19-year-olds in the Bangladesh 2011 census, we stratified districts into four groups, capturing the direction and magnitude of girls' versus boys' school attendance as being (1) *lower* by 9–23 percentage points, (2) *lower* by 4–8 percentage points, (3) *lower* by 0–3 percentage points, and (4) *higher* by 1–9 percentage points. Within each stratum, villages with at least 200 households[8] were selected with probability proportional to size. In each sampled village, households were selected randomly from a complete household enumeration, and one eligible man or women was randomly selected from each sampled household to generate unique samples of male and female respondents. Selecting one individual per household ensured the safety and confidentiality of participants, given the nature of the interview (World Health Organization 2001).

Eligible men were married and were aged 18–54. Women were eligible if they were any age and married in the prior 4–12 years (the "recently" married women's sample) or married and

[6]Community-average household income has not been associated with a woman's risk of experiencing physical IPV in Bangladesh (VanderEnde et al. 2015); however, given its theoretical relevance, we considered it as a control.
[7]The baseline sample included 78 villages; however, one village was lost to follow-up because of flooding.
[8]For villages with more than 500 households, village segments of 200 were selected.

aged 30–49 (the “senior” married women’s sample). Segmentation of the women’s sample ensured an oversampling of recently married women for follow-up and an age distribution of women that would permit analyses of generational differences (not presented here). All respondents completed a baseline interview between June and September 2013, and the subset of recently married women completed a follow-up interview approximately nine months after the baseline.

This analysis used the baseline and follow-up data from recently married women. For this sample, response rates were 94.7 % at baseline (n = 3,902 interviewed) and 86.3 % at follow-up (n = 3,369), with 81.8 % completing both interviews. Our analysis was based on 3,355 recently married women with complete data on variables in the analysis.

Data Collection

The Institutional Review Boards of the International Center for Diarrheal Disease Research, Bangladesh (icddr,b) and FHI 360[9] approved the study, and the survey followed international guidelines for research on IPV (World Health Organization 2001). Before each round of data collection, interviewers received 12 days of didactic and experiential training on gender, violence against women, ethical issues in research on violence, the objectives of the present study, the questionnaire, and strategies for field implementation. Participants and interviewers in the survey were gender-matched to build rapport and to enhance disclosure of sensitive behaviors (World Health Organization 2001).

The recently married woman’s questionnaire included a screening form to confirm age at first marriage as well as modules to assess household standard of living, fertility, and other demographics; empowerment; community social environment; depressive symptoms and tobacco use; attitudes about IPV; marital and natal family IPV; and lifetime, early-marriage, and prior-year exposure to IPV. A subset of these modules, including the one on IPV, was administered at follow-up.

Variables

Individual-Level Outcome: Incidence of Physical IPV—Seven items adapted from the Revised Conflict Tactics Scale (CTS2; Straus et al. 1996) captured a woman’s report of exposure to physical IPV by her husband since the last interview. Sample items included whether he had “slapped or thrown something at her that could hurt her,” “hit her with his fist or with something else that could hurt her,” and “… used a gun, knife, or other weapon against her.” If a woman responded *yes* to any item, she was asked to report the frequency (1–2 times, 3–5 times, more than 5 times) of this behavior since baseline. Similar items have been used in Bangladesh (Naved and Persson 2005) and other lower-income settings (Garcia-Moreno et al. 2006). The ordinal items had adequate internal consistency in this sample (Cronbach’s α = .76). For this analysis, the final outcome was dichotomized, with a positive response to any item coded as 1, and negative responses to all seven items coded as 0.

[9]Information about these organizations is available online (https://www.icddrb.org and https://www.fhi360.org).

Individual-Level Exposure: First Marriage in Adulthood—Our main individual-level exposure variable captured whether a woman's first marriage occurred in adulthood (at age 18 or older). A dichotomous exposure variable for marriage in adulthood was selected for conceptual and empirical reasons. Conceptually, a threshold at age 18 distinguished most clearly women who would be deviating substantially from a norm of very early child marriage in their community. Consistent with theory, preliminary analyses revealed a nonlinear, negative threshold effect for first marriage at age 18 or older. This variable was cluster-mean centered (CMC) and thus is interpreted relative to the mean of each village.

Village-Level Exposure: Prevalence of Very Early Child Marriage—The village prevalence of very early child marriage was measured as the proportion of recently married women in the village who were first married before age 15 years (grand-mean centered (GMC)). To construct this measure, we used information on the age at first marriage from recently married women who completed the marriage-screening module at baseline (n = 3,909). Our choice to create this village-level measure was based on theory (Bicchieri et al. 2014; Kandiyoti 1988) that the collective practice of very early child marriage has been a historical gender norm that has sustained institutionalized male dominance. We used data from only recently married women (as opposed to recently married women *and* senior married women) to construct this measure because of large generational differences in women's age at first marriage and schooling attainment in Bangladesh (NIPORT et al. 2013), so this measure captures the gender norm among women in the same marriage cohort.

Village-Level and Individual-Level Control Variables—At the village level, we controlled for the average completed grades of schooling of recently married women—an important competing collective practice. We also considered controlling for mean village-level household socioeconomic status, but this variable was not associated with IPV and did not alter coefficients of interest (results available on request). At the individual level, we controlled for a recently married woman's characteristics in childhood, including her household socioeconomic status, own completed grades of schooling, and knowledge of father-to-mother physical IPV (yes = 1, 0 otherwise). Tertiles for the lowest, middle, and highest childhood socioeconomic status were created from the score derived from the first component of a principle components analysis of household amenities (e.g., electricity, separate kitchen, flush toilet), household assets (e.g., owned land, owned livestock), father's schooling attainment, mother's schooling attainment, and mother's work for cash or kind. These individual-level control variables were selected because they preceded the woman's age at first marriage and thus were potential confounders of its relationship with the risk of IPV. Finally, we controlled for individual-level demographic attributes and survey design features that may be associated with exposure to the risk of IPV, including age in years, duration of marriage in years (range 4–12), and number of months between baseline and follow-up.[10]

[10]Other individual-level controls capturing postmarital resources of the woman or her household (e.g., her market work, household wealth), were excluded because these arguably mediate the relationship of her age at marriage and IPV.

Main Analysis

As a first step in our analyses, we generated descriptive statistics for all variables, overall and by prevalence of very early child marriage in the village, allowing us to explore the characteristics of recently married women across villages in the lowest (<15 %), middle (15 % to 25 %), and highest (>25 %) tertiles for prevalence of very early child marriage. These statistics also helped to confirm that assumptions about the distributions of variables were met for statistical tests and to identify missing and improbable values for further consideration in sensitivity analyses.

Second, we examined bivariate associations among the covariates and between each covariate and our outcome. As a final step, we used hierarchical generalized linear models with a logit link (Gelman and Hill 2007; Raudenbush and Bryk 2002) to predict a woman's report of physical IPV between baseline and follow-up. These models accommodated the multilevel structure of the data arising from the clustering of recently married women within villages. We fit four two-level logistic models with recently married women as Level 1 units and villages as Level 2 units. In Model 1, to assess the variability of physical IPV across villages, we estimated an unconditional model with no woman- or village-level predictors. In Model 2, we estimated a main-effects multilevel model to test whether a recently married woman's first marriage in adulthood was negatively associated with, and the village-level prevalence of very early child marriage was positively associated with, physical IPV in the prospective period (Hypotheses 1 and 2). In Model 3, we added a cross-level interaction between a woman's first marriage in adulthood and the village-level prevalence of very early child marriage to test whether the protective effects of a woman's marriage at 18 or later were lessened or reversed in villages with a higher prevalence of very early child marriage (Hypothesis 3). The results of Model 3 provided us with a descriptive and graphical illustration of how these two factors interacted across the individual and village levels. To test whether the interaction effect was attenuated or amplified with controls at both levels, we added the covariates in Model 4.

As the cross-level interaction between the Level 1 indicator of first marriage in adulthood and the village-level prevalence of very early child marriage was of interest (Hypothesis 3), we applied cluster-mean or within-group centering to the Level 1 indicator (Enders and Tofighi 2007; Hofmann and Gavin 1998). Such centering removes all between-cluster variation in the indicator and helps ensure that the estimated interaction effects are nonspurious (Enders and Tofighi 2007). Village-level predictors were centered on their grand means to facilitate interpretations of the results.

Sensitivity Analyses

We conducted three sets of sensitivity analyses to assess the robustness of the findings for the models described earlier. First, we compared the results based on the binary measure for individual-level first marriage in adulthood (<18, 18 or older) with those using a continuous measure for age at first marriage in years as well as a trichotomous measure for age at first marriage (Table 4 in the appendix). The trichotomous measure distinguished individual-level marriage in very early childhood (<15 years) from that in early childhood (15–17 years) and adulthood (18 years or older) to test whether setting a single threshold at age 18 for later

marriage captured the point at which a woman might be seen as deviant in a village where very early child marriage was more prevalent.

In a second set of sensitivity analysis, we assessed whether any villages had outlying prevalences for very early child marriage, removed those outlying villages, and then reestimated the multilevel models with each individual-level age-at-first-marriage variable (<18, 18 or older; continuous age in years; <15, 15–17, 18 or older) (Table 5 in the appendix). In a third set of sensitivity analyses, we stratified the sample of recently married women into two marriage cohorts (married 4–8 and 9–12 years ago) and assessed whether the findings of the estimated multilevel models with each variable for age at first marriage (<18, 18 or older; continuous; <15, 15–17, 18 or older) were consistent across cohorts (Table 6 in the appendix).[11] All analyses were performed in Stata 13 (StataCorporation 2013) using generalized linear latent and mixed models (Rabe-Hesketh and Skrondal 2006; Rabe-Hesketh et al. 2004), accounting for survey weights, clustering, and stratification.

Results

Incidence of IPV and Child Marriage Among Recently Married Women

Experiences of physical IPV and child marriage were common among recently married women in our sample (Table 1). Almost one-half (44.5 %) of the women reported exposure to physical IPV between the baseline and follow-up, and a clear dose-response relationship was apparent between the village-level prevalence of very early child marriage and the incidence of physical IPV against women. In villages where very early child marriage was lowest (<15 %), the incidence of physical IPV was 38.9 %; comparatively, this incidence rate was modestly higher (44.1 %) in villages with moderate prevalences of very early child marriage (15 %–25 %), and was highest (51.8 %) in villages with the highest prevalences of very early child marriage (>25 %).

The average age at first marriage was 16.4 years and ranged from 10 to 28 years among recently married women. More than two-thirds (68.9 %) had first married as children (before age 18), and more than one in five (20.4 %) had first married in very early childhood (before age 15). The mean age at first marriage was as low as 15.7 years among recently married women living in villages with the highest prevalences of very early child marriage (>25 %), and was still only 17.0 among those in villages with the lowest prevalences of very early child marriage (<15 %).

Demographic Attributes and Childhood Characteristics of Recently Married Women On average, women in this sample were 24.4 years old, had completed 6.4 grades of schooling, and had been married for just over eight years at baseline (Table 1). As expected, compared with women in villages with the lowest prevalences of very early child marriage (<15 %), those in villages with the highest prevalences of very early child marriage (>25 %) were younger (24.0 vs. 24.8 years), were married longer (8.3 vs. 7.8 years), and had less schooling (6.1 vs. 6.7 grades), on average.

[11]Because we lacked follow-up data for the senior married women, we could not compare results for a wider range of marriage cohorts.

The childhood characteristics of respondents were similarly patterned (Table 1). Overall, women came from families with little schooling and from poor households. Less than one-half of the respondents had fathers (43.5 %) and mothers (30.3 %) who had ever attended school, and mean parental schooling attainments were low, at 3.0 grades for fathers and 1.6 grades for mothers. Only 7.6 % of respondents in childhood had mothers who had worked for cash or kind. As children, few respondents lived in a home with a flushing toilet (1.8 %) or electricity (26.4 %), and most lived in a home with a separate kitchen (82.0 %). A majority of women had families who owned livestock (75.3 %) and land (68.5 %). A minority (13.7 %) of women had knowledge that their father had hit their mother. As expected, compared with women in villages with the lowest prevalences of very early child marriage, those in villages with the highest prevalences had lower levels of paternal schooling (2.3 vs. 3.4 grades), maternal schooling (1.2 vs. 2.0 grades), and maternal work (7.6 % vs. 8.2 %); they also had the highest share of women growing up in the poorest households (52.8 % vs. 39.5 %).

Characteristics of Sample Villages and Bivariate Correlations of Village Characteristics

Table 2 shows the characteristics of sample villages ($N = 77$). On average, approximately 51 recently married women were sampled in each village; this number ranged from 37 to 60, providing large samples of women in each village for the creation of village-level measures. At the village level, the mean incidence of physical IPV between baseline and follow-up was 44.5 %, and this incidence ranged from 11.4 % to 75.0 % across villages. The village-level mean age at first marriage among recently married women was 16.4 years and ranged from 14.8 to 18.0 years across villages. The mean village-level prevalence of very early child marriage was high (20.3 %) and also varied widely, from only 3.9 % to 51.9 % across villages. The mean prevalence of marriage in adulthood was slightly higher (31.2 %) and similarly varied, from 2.2 % to 63.2 %. The mean village-level average schooling attainment for recently married women was 6.4 grades, and the village means ranged from 3.9 to 9.1 grades across villages. Thus, the villages in this sample differed substantially in terms of the main outcome (mean incidence of physical IPV), main village-level exposure (prevalence of very early child marriage), and main village-level control variable (mean completed grades of schooling).

Table 2 also shows bivariate correlations of village-level characteristics for recently married women. Significant correlations in the expected directions were observed between all village-level measures for age at first marriage and incidence of physical IPV, mean completed grades of schooling and incidence of physical IPV, and mean completed grades of schooling and all measures for age at first marriage. These correlations suggest that mean grade of schooling was an important potential village-level confounder and that village-level measures for age at first marriage were potentially important determinants of the incidence of physical IPV.

Multilevel Logistic Regression Model Results

Table 3 presents the results from our main multilevel logistic regression models. The unconditional Model 1 with random effects allowed us to gauge the magnitude of variation in the incidence of physical IPV across villages (village-level variance estimate = 0.43, SE =

0.12). The expected odds of reporting physical IPV between baseline and follow-up for a village with a random effect = 0 was 0.74 (= exp(-0.31)). Thus, 95 % of villages were expected to have odds of physical IPV between 0.55 and 0.98 (= exp(log odds −0.31 ± 1.96(0.15)) or exp(−0.60) to exp{(−0.02)).

In Model 2, we added the predictors of interest: individual-level first marriage in adulthood (CMC) and the village-level mean prevalence of very early child marriage (GMC). All else being equal, marrying in adulthood seems to be protective against experiencing physical IPV (estimate = −0.29, SE = 0.11, $p < .01$, odds ratio = 0.75), reducing on average the odds of IPV by 25 %, as expected (Hypothesis 1). Also as expected (Hypothesis 2), women in villages with a higher prevalence of very early child marriage were more likely to experience physical IPV since baseline (estimate =. 2.01, SE = 0.81, $p < .05$, odds ratio per standard deviation increase = 1.25). After we added the cross-level interaction term between individual-level first marriage in adulthood and village-level prevalence of very early child marriage (Model 3), the cross-level interaction was marginally significant (estimate = 1.76, SE = 1.02, $p < .10$, odds ratio per standard deviation increase in village-level prevalence = 1.19).

In Figure 1, we graphed the relationship between individual-level first marriage in adulthood and the predicted probability of physical IPV at three levels of prevalence for very early child marriage in the village, the mean prevalence of 20.3 %, and 1 standard deviation below and above the mean (at 9.3 % and 31.3 %, respectively). The plot shows that as the village-level prevalence of very early child marriage increased, the slope of the predicted probability of IPV associated with individual-level later age at marriage diminished. The estimates of these relationships, or simple slopes, in logits were −0.444 in a village with 9.3 % prevalence of very early child marriage ($p = .002$), −0.257 in a village with 20.3 % prevalence of very early child marriage ($p = .023$), and −0.069 in a village with 31.3 % prevalence of very early child marriage ($p = .67$, not significant).

To assess the range of village-level prevalence of very early marriage over which the log-odds of physical IPV were statistically different between women whose first marriage occurred before or at adulthood, we estimated the region of significance for the village-level prevalence predictor using the online tool provided by Preacher et al. (2006). This region was estimated to lie between 0 % and 21.9 %, suggesting that the protective effect of a woman’s later first marriage on physical IPV was significant only for relatively low observed values of village-level prevalence of very early child marriage.

In Model 4 of Table 3, individual-level and village-level controls were added to see whether the cross-level interaction effects would be attenuated or amplified. The estimate of the interaction term increased in magnitude and was significant (estimate = 2.03, SE = 0.97, $p < .05$, odds ratio per standard deviation increase in village-level prevalence = 1.25). Again, we prepared a predicted probability of physical IPV plot to visualize the interaction effects between individual-level first marriage in adulthood and village-level prevalence of very early child marriage, controlling for individual- and village-level covariates (Fig. 2).

Figure 2 shows that as village-level prevalence of very early child marriage increased, the relationship of individual-level first marriage in adulthood with physical IPV changed from negative to positive. The estimates of the relationships, moderated by the village-level prevalence of very early child marriage, in logits, were −0.303 in a village with a 9.3 % prevalence of very early child marriage ($p = .037$), −0.087 in a village with a 20.3 % prevalence of very early child marriage ($p = .457$, not significant), and 0.128 in a village with a 31.3 % prevalence of very early child marriage ($p = .442$, not significant). The estimated range of village-level prevalence of very early child marriage over which the log-odds of physical IPV were statistically different between women who first married before adulthood and women first marrying at adulthood was 0.0 % to 11.7 %. Therefore, even after we controlled for covariates, the interaction patterns remained similar: first marriage in adulthood was protective against IPV but only in villages with low prevalence of very early child marriage.

Concerning the influences of the control variables, higher individual schooling attainment CMC, higher village mean schooling attainment GMC, a longer duration of marriage CMC, and high household wealth in childhood were protective against physical IPV. The respondent's knowledge of her father having beaten her mother CMC was a risk factor for exposure to physical IPV. Otherwise, accounting for variables in Model 4, the unexplained variation in physical IPV between baseline and follow-up across villages was reduced from 0.43 to 0.34, a reduction of about 20 %.

Sensitivity Analyses

Results from the three sets of sensitivity analyses are in Tables 4–6 in the appendix. In the first set of sensitivity analyses, the findings from multilevel models that included individual-level continuous age at first marriage (Table 4 in the appendix) were broadly consistent with those in Table 3. Interestingly, the results of the multilevel models that included individual-level trichotomous age at first marriage suggested a protective effect of first marriage at age 15–17 in villages with more prevalent very early child marriage, but still an adverse (albeit nonsignificant) effect for marriage at age 18 or older in villages with more prevalent very early child marriage (Table 4). These patterns suggest that a higher village prevalence of very early child marriage does not dampen the protective effect of first marriage in later childhood (at ages 15–17) but dampens it for women married in adulthood (age 18 or older). Overall, these findings do not refute the idea that marriage in adulthood (age 18 or older) may result in violent backlash in villages with more frequent very early child marriage.

In the second set of sensitivity analyses, dropping one outlying village with more than a 50 % prevalence of very early child marriage did not substantially alter the magnitudes or significance levels of the coefficients for exposure variables of main interest (Table 5, appendix). Finally, in the third set of sensitivity analyses (Table 6, appendix), the directions and magnitudes of the coefficients for all three individual-level age-at-first-marriage variables were broadly consistent across multilevel models that were stratified by marriage cohort.

Discussion

The aim of this analysis was to assess whether marriage in adulthood at the individual level, a higher village-level prevalence of very early child marriage, and their interaction contribute to a woman's risk of experiencing physical IPV. This study addressed multiple limitations in prior multilevel studies of women's exposure to IPV. First, most prior studies have relied on cross-sectional data, with community characteristics measured at the time of the survey and IPV measured for the prior year or a woman's marital lifetime (Koenig et al. 2003, 2006; Linos et al. 2013). Such designs lack appropriate temporal ordering of exposures and outcomes, substantially limiting claims of causality. Second, the geographic scale of communities—such as a village, district, province, or state–has varied greatly, with unclear justification (Salazar et al. 2003). In reality, these geographic levels differ in their cultural or political relevance, and some levels may be more conceptually relevant than those that are selected for analysis out of convenience or data availability. Third, the sample sizes within clusters often are small, resulting in less precise estimates of cluster-level characteristics. Fourth, individual-level analyses of a woman's own early marriage and her risk of exposure to IPV often have not controlled adequately for characteristics of her childhood that may confound this relationship. Finally, studies have not considered the influence of a woman's age at first marriage on her risk of IPV across communities that differ in the prevalence of very early child marriage—a marker of classic forms of patriarchy (Kandiyoti 1988).

Our study of individual and community age at first marriage and exposure to IPV in rural Bangladesh incorporated several design features that addressed the limitations of prior studies. First, our two-wave design following a cohort of married women allowed for a suitable temporal ordering between explanatory variables measured at baseline and the woman's exposure to IPV in the months between baseline and follow-up. This design allowed us to operationalize community-level aggregate variables as more distal determinants than their individual-level component variables, suggesting area-level causes operating alongside—or as precursors to— individual-level causes. Second, our use of villages as a sampling stage allowed us to derive representative population-based estimates for a well-defined and meaningful ―community.‖ Third, we recruited substantial sample sizes of recently married women per village (37–60), enabling us to construct more precise village-level measures. Fourth, our collection of rich individual- and village-level data allowed us to control for important potential confounders at both levels. And, finally, we conceptualized child marriage as a profound life course event for an individual woman as well as a collective practice of communities that historically has served to reinforce men's structural dominance.

Our findings fill critical gaps in theory and knowledge on the multilevel determinants of a woman's exposure to IPV, and generally support our hypotheses. First, as expected (Hypothesis 1), we found a protective, unadjusted relationship at the individual level between marriage in adulthood and physical IPV, corroborating the findings of Rahman and colleagues (2014) for Bangladesh. Second, adding the village-level prevalence of very early child marriage showed that this collective practice was associated with a woman's higher risk of incident physical IPV (Hypothesis 2), above and beyond the individual-level age-of-

marriage association. Third, the protective effect of individual-level marriage in adulthood was evident only in villages with low prevalence of very early child marriage (Hypothesis 3). In general, these findings support the idea that very early child marriage is a historical social norm (Bicchieri et al. 2014). A woman who deviates from the very early marriage norm in her village by marrying in adulthood does not experience its protective effect on the risk of physical IPV. This outcome could be interpreted as a sanction against women who deviate from social expectations with respect to a collective practice that historically has upheld classic patriarchy (Kandiyoti 1988).

Findings with respect to the control variables suggest that other explanatory frameworks are relevant. Qualitative research in three villages suggests that economic motivations for child marriage may coexist. In these villages, some parents would have preferred to keep daughters in school and to marry them at later ages (Schuler et al. 2006), but these parents feared the economic repercussions of such a decision in villages where very early child marriage remained prevalent. Thus, expectations of greater dowry demands for marrying their daughters later led parents to continue child marriage. Understanding the generalizability of these qualitative findings would require survey data on parental expectations about age at marriage and dowry demands. Still, our finding that childhood socioeconomic status was negatively associated with incident IPV suggests that poverty may spur parents to marry daughters earlier, most likely to poor husbands who are more likely to perpetrate IPV.

Some limitations of this analysis, and how we addressed them, are notable. As with any observational study, this analysis has the potential for unmeasured confounding and limited causal inference. Unlike many prior studies, however, we were able to control for several confounders at the individual and village levels. First, we controlled for important conditions in the respondent's childhood, including an eight-item measure for socioeconomic status, history of known parental IPV, and schooling attainment. We also controlled for important demographic and study-design characteristics, such as respondent's age, duration of marriage, and time between baseline and follow-up. Finally, we controlled for an important village-level confounder: namely, the average schooling attainment among recently married women.

A second limitation was possible misreporting of age at first marriage. Using data from the Matlab Health and Demographic Surveillance System (HDSS), Streatfield and colleagues (2015) assessed whether misreporting of age at first marriage was contributing to the apparent persistence of early marriage in Bangladesh. Based on data from a random sample of 1,766 women aged 15–29 who were born in the Matlab HDSS area, these authors found that two-thirds misreported their age at marriage, with 56 % underreporting and 7 % overreporting this age. Among married women aged 20–24, the reported mean age at first marriage was 16.8 years compared with 16.6 years in the 2011 Bangladesh Demographic and Health Survey (NIPORT et al. 2013). However, a cross-check with actual dates of birth in the Matlab HDSS database showed that the true mean age at first marriage was 18.6 years, almost two years higher. According to the authors, the higher dowry demanded of older brides may underlie age misreporting. If the findings from Matlab apply to rural Bangladesh, then the mean age at first marriage among recently married women in our

sample (16.4 years) may be systematically underreported. Such underreporting would, in effect, be a different behavioral response to social and economic expectations favoring early marriage, and the estimated prevalence of very early child marriage is more appropriately interpreted as an injunctive norm (about what women should do) than a descriptive norm (about what women actually do) (Bicchieri et al. 2014). In this case, our results may underestimate the violent backlash against a woman who marries later in a community where women's reported age at first marriage is very young.

A third limitation is the possibility of heterogeneous gender norms about age at first marriage within villages. For example, a norm favoring very early child marriage and a norm favoring marriage in adulthood may coexist in a village. To explore this possibility, we estimated the pairwise correlation between the village-level prevalences of very early child marriage and marriage at age 18 or older. Although this correlation was substantial, at –.68, post-estimation tests did not suggest that the measures were collinear. Thus, we estimated five multilevel models predicting exposure to physical IPV with the (1) village prevalence of marriage at 18 or older (VP-M18+) alone; (2) VP-M18+, individual-level marriage at 18 years or older (IL-M18+), and controls; (3) VP-M18+, IL-M18+, controls, and the interaction of VP-M18+ and IL-M18+; (4) VP-M18+, village-level prevalence of very early child marriage (VP-VECM), IL-M18+, and controls; and (5) VP-M18+, VP-VECM, IL-M18+, controls, and the interactions of VP-M18+ with IL-M18+ and of VP-VECM with IL-M18+. In no model was the village prevalence of marriage at age 18 years or older (VP-M18+) or its interaction with individual-level later marriage significant (results available on request). Therefore, and in light of the theory motivating our original preference for village-level prevalence of very early child marriage, we retained the more parsimonious multilevel models shown in Table 3.

The strengths and limitations of this analysis suggest important next steps for research and interventions. First, this analysis should be replicated in urban Bangladesh and other lower-income settings to see whether the community-level prevalence of very early child marriage operates similarly. Second, the cross-level interactions of other individual and community variables measuring other aspects of women's resources or empowerment should be tested. Third, surveys should be conducted to assess directly whether the collective practice of very early child marriage is a social norm. Surveys could ask respondents, "Do others in your village favor child marriage?" A high percentage of positive responses would suggest that child marriage is a social norm (Bicchieri et al. 2014). In this case, parents would not choose to have their daughter marry later unless others did so because no one would want to be the first to change this behavior (Bicchieri et al. 2014). Change would need to occur collectively (Mackie 1996), thereby establishing a new descriptive norm. Moreover, normative expectations would need to change. In other words, people's personal beliefs that child marriage was good would need to change along with their normative expectations that others thought child marriage was good (Bicchieri et al. 2014).

Programmatically, delaying marriage as a strategy to reduce marital IPV against women should prioritize the collective reduction of very early child marriage in entire villages (Bicchieri et al. 2014; Mackie 1996) to avoid negating the protective effects of later marriage at the individual level. Cluster randomized controlled trials to test how interventions to

increase age at first marriage collectively in entire villages impact a woman's empowerment and IPV in marriage would be an important step to determine causal inference. If child marriage is, at least in part, a social norm, then two village-level interventions may be promising. One intervention might involve public pledges to stop the practice, alongside efforts to explain the ill effects of child marriage, enabling entire villages to abandon child marriage while adopting the idea that child marriage is bad. A second intervention might include cash transfers to daughters' parents in entire villages, conditional on delaying marriage and keeping daughters in school. This approach, with efforts to explain the ill effects of child marriage, would address the economic and normative drivers that may jointly sustain child marriage in Bangladesh. Such interventions may contribute to joint reductions in child marriage and IPV, alleviating the heavy burden of gender-based violence against women in South Asia.

Acknowledgments

This article was drafted when Dr. Crandall was a post-doctoral fellow in the Hubert Department of Global Health at Emory University. We thank Md. Mahfuz Al Mamun for his leadership of the data collection and data management for the survey component of this project. We also thank the field team and the participants, without whom this project would not have been possible. Authors appear in the order of contribution. Kathryn M. Yount developed the idea for this article, supervised the data analysis, drafted most of the paper, and edited for critical content. AliceAnn Crandall performed most of the data analysis, drafted parts of the article, and edited for critical content. Yuk Fai Cheong finalized the data analysis, drafted parts of the article, and edited for critical content. Theresa L. Osypuk, Lisa M. Bates, and Ruchira T. Naved drafted parts of the article, and Sidney Ruth Schuler revised the article for critical content. This work was supported by research Grant 1R01HD061630-01A1 (PI Schuler) and the Hubert Department of Global Health, Rollins School of Public Health, at Emory University.

References

Abramsky T, Watts CH, Garcia-Moreno C, Devries K, Kiss L, Ellsberg M, Heise L. What factors are associated with recent intimate partner violence? Findings from the WHO multi-country study on women's health and domestic violence. BMC Public Health. 2011; 11(1):109. [PubMed: 21324186]

Ackerson LK, Kawachi I, Barbeau EM, Subramanian SV. Effects of individual and proximate educational context on intimate partner violence: A population-based study of women in India. American Journal of Public Health. 2008; 98:507–514. [PubMed: 18235066]

Alam, S. Islam, culture, and women in a Bangladesh village. In: Cornell, VJ., editor. Voices of Islam. Westport, CT: Praeger Publishers; 2007. p. 35-53.

Amin S, Al-Bassusi NH. Education, wage work, and marriage: Perspectives of Egyptian working women. Journal of Marriage and Family. 2004; 66:1287–1299.

Antai D, Adaji S. Community-level influences on women's experience of intimate partner violence and terminated pregnancy in Nigeria: A multilevel analysis. BMC Pregnancy and Childbirth. 2012; 12(1):128. [PubMed: 23150987]

Azziz-Baumgartner E, Homaira N, Hamadani JD, Tofail F, Dahlberg LL, Haque R, Naved RT. The prevalence and impact of intimate partner violence on maternal distress in a community of low-income Bangladeshi and displaced ethnic Bihari mothers: Dhaka, 2008–2009. Violence Against Women. 2014; 20:59–73. [PubMed: 24567536]

Baden, S., Green, C., Goetz, AM., Guhathakurta, M. Background report on gender issues in Bangladesh (BRIDGE Report 26). Brighton, UK: Institute for Development Studies, University of Sussex; 1994.

Banerjee B, Pandey G, Dutt D, Sengupta B, Mondal M, Deb S. Teenage pregnancy: A socially inflicted health hazard. Indian Journal of Community Medicine: Official Publication of Indian Association of Preventive & Social Medicine. 2009; 34:227–231. [PubMed: 20049301]

Bangladesh Bureau of Statistics. Report on Violence Against Women Survey 2011. Dhaka, Bangladesh: Bangladesh Bureau of Statistics; 2013.

Bates LM, Schuler SR, Islam F, Islam MK. Socioeconomic factors and processes associated with domestic violence in rural Bangladesh. International Family Planning Perspectives. 2004; 30:190–199. [PubMed: 15590385]

Bicchieri, C., Jiang, T., Lindemans, JW. A social norms perspective on child marriage: The general framework (Draft report for UNICEF). Philadelphia: Behavioral Ethics Lab, University of Pennsylvania; 2014.

Blossfeld H-P, Huinink J. Human capital investments or norms of role transition? How women's schooling and career affect the process of family formation. American Journal of Sociology. 1991; 97:143–168.

Blossfeld H-P, Jaenichen U. Educational expansion and changes in women's entry into marriage and motherhood in the Federal Republic of Germany. Journal of Marriage and the Family. 1992; 54:302–315.

Breiding, MJ., Basile, KC., Smith, SG., Black, MC., Mahendra, RR. Intimate partner violence surveillance: Uniform definitions and recommended data elements (Version 2.0). Atlanta, GA: Centers for Disease Control and Prevention, National Center for Injury Prevention and Control; 2015.

Campbell CA. Male gender roles and sexuality: Implications for women's AIDS risk and prevention. Social Science & Medicine. 1995; 41:197–210. [PubMed: 7667682]

Chowdhury FD. The socio-cultural context of child marriage in a Bangladeshi village. International Journal of Social Welfare. 2004; 13:244–253.

Chowdhury FD. Theorizing patriarchy: The Bangladesh context. Asian Journal of Social Science. 2009; 37:599–622.

Courtenay WH. Constructions of masculinity and their influence on men's well-being: A theory of gender and health. Social Science & Medicine. 2000; 50:1385–1401. [PubMed: 10741575]

Crandall A, Cheong YF, Yount KM. Women's age at first marriage and economic empowerment in Egypt. (n.d.). Manuscript submitted for publication.

Crandall A, VanderEnde K, Cheong YF, Dodell S, Yount KM. Women's age at first marriage and post-marital agency in egypt. Social Science Research. 2016; 57:148–160. [PubMed: 26973037]

Das Gupta, M., Engelman, R., Levy, J., Luchsinger, G., Merrick, T., Rosen, JE. State of world population 2014: The power of 1.8 billion adolescents, youth and transformation of the future (UNFPA report). New York, NY: United Nations Population Fund; 2014.

Devries KM, Mak JYT, Garcia-Moreno C, Petzold M, Child JC, Falder G, Watts CH. The global prevalence of intimate partner violence against women. Science. 2013; 340:1527–1528. [PubMed: 23788730]

Dixon-Mueller R. How young is "too young"? Comparative perspectives on adolescent sexual, marital, and reproductive transitions. Studies in Family Planning. 2008; 39:247–262. [PubMed: 19248713]

Edirne T, Can M, Kolusari A, Yildizhan R, Adali E, Akdag B. Trends, characteristics, and outcomes of adolescent pregnancy in eastern Turkey. International Journal of Gynecology & Obstetrics. 2010; 110:105–108. [PubMed: 20434724]

Enders CK, Tofighi D. Centering predictor variables in cross-sectional multilevel models: A new look at an old issue. Psychological Methods. 2007; 12:121–138. [PubMed: 17563168]

Erulkar A. Early marriage, marital relations and intimate partner violence in Ethiopia. International Perspectives on Sexual and Reproductive Health. 2013; 39:6–13. [PubMed: 23584463]

Feldman S. Shame and honour: The violence of gendered norms under conditions of global crisis. Women's Studies International Forum. 2010; 33:305–315.

Fisher J, Cabral de Mello M, Izutsu T, Vijayakumar L, Belfer M, Omigbodun O. Adolescent mental health in resource-constrained settings: A review of the evidence of the nature, prevalence and determinants of common mental health problems and their management in primary health care. International Journal of Social Psychiatry. 2011; 57(Suppl. 1):v–vii. 9–116. [PubMed: 21480578]

Garcia-Moreno C, Henrica AFM, Jansen ME, Heise L, Watts CH. Prevalence of intimate partner violence: Findings from the WHO multi-country study on women's health and domestic violence. Lancet. 2006; 368:1260–1269. [PubMed: 17027732]

Gazi, R., Nahar, Q., Kabir, H., Huque, H., Moinuddin, M., El Arifeen, S., Mahbub, A. Child marriage in Bangladesh: Findings from a national survey (Report). Dhaka, Bangladesh: Plan International Bangladesh & icddr,b; 2013.

Gelman, A., Hill, J. Data analysis using regression and multilevel/hierarchical models. Cambridge, UK: Cambridge University Press; 2007.

Goli S, Rammohan A, Singh D. The effect of early marriages and early childbearing on women's nutritional status in India. Maternal and Child Health Journal. 2015; 19:1864–1880. [PubMed: 25656721]

Hadi A. Prevalence and correlates of the risk of marital sexual violence in Bangladesh. Journal of Interpersonal Violence. 2000; 15:787–805.

Hadi A. Women's productive role and marital violence in Bangladesh. Journal of Family Violence. 2005; 20:181–189.

Hango D, Le Bourdais C. Early union formation in Canada: Links with education. European Journal of Population. 2007; 23:339–368.

Hasan T, Muhaddes T, Camellia S, Selim N, Rashid SF. Prevalence and experiences of intimate partner violence against women with disabilities in Bangladesh: Results of an explanatory sequential mixed-method study. Journal of Interpersonal Violence. 2014; 29:3105–2126. [PubMed: 24860077]

Hirschman C. Premarital socioeconomic roles and the timing of family formation: A comparative study of five Asian societies. Demography. 1985; 22:35–59. [PubMed: 4038948]

Hofmann DA, Gavin MB. Centering decisions in hierarchical linear models: Implications for research in organizations. Journal of Management. 1998; 24:623–641.

Innocenti Research Centre. Early marriage: Child spouses. Florence, Italy: United Nations Children's Fund; 2001.

Jain, S., Kurz, K. New insights on preventing child marriage: A global analysis of factors and programs. New Delhi, India: International Center for Research on Women; 2007.

Kabeer N. Subordination and struggle: Women in Bangladesh. New Left Review I. 1988; 168(1):95–121.

Kabeer N. Between affiliation and autonomy: Navigating pathways of women's empowerment and gender justice in rural Bangladesh. Development and Change. 2011; 42:499–528. [PubMed: 21898946]

Kamal SMM. Geographical variations and contextual effect on child marriage in Bangladesh. Pakistan Journal of Women's Studies Alam-e-Niswan. 2010; 17(2):37–57.

Kandiyoti D. Bargaining with patriarchy. Gender and Society. 1988; 2:274–290.

Kimmel, MS., Messner, MA. Men's lives. New York, NY: Macmillan; 1989.

Kishor, S., Bradley, SEK. Women's and men's experience of spousal violence in two African countries: Does gender matter? (DHS Analytical Studies No. 27). Calverton, MD: ICF International; 2012.

Kishor, S., Johnson, K. Profiling domestic violence: A multi-country study. Calverton, MD: ORC Macro; 2004.

Koenig MA, Ahmed S, Hossain MB, Mozumder A. Women's status and domestic violence in rural Bangladesh: Individual-and community-level effects. Demography. 2003; 40:269–288. [PubMed: 12846132]

Koenig MA, Stephenson R, Ahmed S, Jejeebhoy SJ, Campbell J. Individual and contextual determinants of domestic violence in north India. American Journal of Public Health. 2006; 96:132–138. [PubMed: 16317213]

Kurth F, Bélard S, Mombo-Ngoma G, Schuster K, Adegnika AA, Bouyou-Akotet MK, Ramharter M. Adolescence as risk factor for adverse pregnancy outcome in Central Africa – A cross-sectional study. PLoS ONE. 2010; 5(12):e14367. [PubMed: 21188301]

Le MTH, Tran HD, Nguyen HT, Fisher J. Early marriage and intimate partner violence among adolescents and young adults in Viet Nam. Journal of Interpersonal Violence. 2014; 29:889–910. [PubMed: 24366961]

Lee-Rife S. Women's empowerment and reproductive experiences over the lifecourse. Social Science & Medicine. 2010; 71:634–642. [PubMed: 20621752]

Linos N, Slopen N, Subramanian SV, Berkman L, Kawachi I. Influence of community social norms on spousal violence: A population-based multilevel study of Nigerian women. American Journal of Public Health. 2013; 103:148–155. [PubMed: 23153124]

Mackie G. Ending footbinding and infibulation: A convention account. American Sociological Review. 1996; 61:999–1017.

Misch ES, Yount KM. Intimate partner violence and breastfeeding in Africa. Maternal and Child Health Journal. 2013; 18:688–697.

Nasrullah M, Zakar R, Zakar MZ. Child marriage and its associations with controlling behaviors and spousal violence against adolescent and young women in Pakistan. Journal of Adolescent Health. 2014; 55:804–809. [PubMed: 25123525]

National Institute of Population Research and Training (NIPORT), Mitra and Associates, & ICF International. Bangladesh Demographic and Health Survey 2011. Dhaka, Bangladesh and Calverton, MD: NIPORT, Mitra and Associates, and ICF International; 2013.

Naved RT, Persson LA. Factors associated with spousal physical violence against women in Bangladesh. Studies in Family Planning. 2005; 36:289–300. [PubMed: 16395946]

Naved RT, Persson LA. Dowry and spousal physical violence against women in Bangladesh. Journal of Family Issues. 2010; 31:830–856.

Nobles J, Buttenheim A. Marriage and socioeconomic change in contemporary Indonesia. Journal of Marriage and Family. 2008; 70:904–918. [PubMed: 26336321]

Oshiro A, Poudyal AK, Poudel KC, Jimba M, Hokama T. Intimate partner violence among general and urban poor populations in Kathmandu, Nepal. Journal of Interpersonal Violence. 2011; 26:2073–2092. [PubMed: 20587461]

Preacher KJ, Curran PJ, Bauer DJ. Computational tools for probing interactions in multiple linear regression, multilevel modeling, and latent curve analysis. Journal of Educational and Behavioral Statistics. 2006; 31:437–448.

Rabe-Hesketh S, Skrondal A. Multilevel modelling of complex survey data. Journal of the Royal Statistical Society: Series A (Statistics in Society). 2006; 169:805–827.

Rabe-Hesketh, S., Skrondal, A., Pickles, A. GLLAMM manual (Working Paper Series, No. 160). Berkeley: University of California, Berkeley Division of Biostatistics; 2004.

Rahman M, Hoque A, Mostofa G, Makinoda S. Association between adolescent marriage and intimate partner violence: A study of young adult women in Bangladesh. Asia-Pacific Journal of Public Health. 2014; 26:160–168. [PubMed: 21980145]

Raj A, Saggurti N, Lawrence D, Balaiah D, Silverman JG. Association between adolescent marriage and marital violence among young adult women in India. International Journal of Gynecology & Obstetrics. 2010; 110:35–39. [PubMed: 20347089]

Raudenbush, SW., Bryk, AS. Hierarchical linear models: Applications and data analysis methods. Thousand Oaks, CA: SAGE; 2002.

Salazar LF, Baker CK, Prie AW, Carlin K. Moving beyond the individual: Examining the effects of domestic violence policies on social norms. American Journal of Community Psychology. 2003; 32:253–264. [PubMed: 14703261]

Santhya KG. Early marriage and sexual and reproductive health vulnerabilities of young women: A synthesis of recent evidence from developing countries. Current Opinion in Obstetrics and Gynecology. 2011; 23:334–339. [PubMed: 21836504]

Schuler SR, Bates LM, Islam F, Islam MK. The timing of marriage and childbearing among rural families in Bangladesh: Choosing between competing risks. Social Science & Medicine. 2006; 62:2826–2837. [PubMed: 16352384]

Schuler SR, Hashemi SM, Riley AP, Akhter S. Credit programs, patriarchy and men's violence against women in rural Bangladesh. Social Science & Medicine. 1996; 43:1729–1742. [PubMed: 8961417]

Schuler SR, Islam F. Women's acceptance of intimate partner violence within marriage in rural Bangladesh. Studies in Family Planning. 2008; 39:49–58. [PubMed: 18540523]

Schuler SR, Yount KM, Lenzi R. Justification of wife beating in rural Bangladesh: A qualitative analysis of gender differences in responses to survey questions. Violence Against Women. 2012; 18:1177–1191. [PubMed: 23136180]

Schurmann AT. Review of the Bangladesh female secondary school stipend project using a social exclusion framework. Journal of Health, Population, and Nutrition. 2009; 27:505–517.

Singh S, Samara R. Early marriage among women in developing countries. International Family Planning Perspectives. 1996; 22:148–157. 175.

Sobkoviak R, Halim N, Yount KM. Domestic violence and child nutrition in Liberia. Social Science & Medicine. 2011; 74:103–111. [PubMed: 22185910]

Solotaroff, JL., Pande, RP. Violence against women and girls: Lessons from South Asia (South Asia Development Forum report). Washington, DC: World Bank; 2014.

Speizer IS, Pearson E. Association between early marriage and intimate partner violence in India: A focus on youth from Bihar and Rajastha. Journal of Interpersonal Violence. 2011; 26:1963–1981. [PubMed: 20587462]

StataCorporation. Stata Statistical Software (Release 13). College Station, TX: StataCorp.; 2013.

Straus MA. Prevalence of violence against dating partners by male and female university students worldwide. Violence Against Women. 2004; 10:790–811.

Straus MA, Hamby SL, Boney-McCoy S, Sugarman DB. The revised conflict tactics scales (CTS2) development and preliminary psychometric data. Journal of Family Issues. 1996; 17:283–316.

Streatfield PK, Kamal N, Ahsan KZ, Nahar Q. Early marriage in Bangladesh: Not as early as it appears. Asian Population Studies. 2015; 11:94–110.

Swan SC, Gambone LJ, Caldwell JE, Sullivan TP, Snow DL. A review of research on women's use of violence with male intimate partners. Violence and Victims. 2008; 23:301–314. [PubMed: 18624096]

Taylor, G., Pereznieto, P. Review of evaluation approaches and methods used by interventions on women and girls' economic empowerment. London, UK: Overseas Development Institute; 2014.

Thornton A, Axinn W, Teachman J. The influence of school enrollment and accumulation on cohabitation and marriage in early adulthood. American Sociological Review. 1995; 60:762–774.

United Nations. Assessing the status of women: A guide to reporting under the convention on the elimination of all forms of discrimination against women, general recommendation 21. New York, NY: United Nations; 2000.

United Nations Children's Fund. Ending child marriage: Progress and prospects. New York, NY: UNICEF; 2014.

VanderEnde KE, Sibley LM, Cheong YF, Naved RT, Yount KM. Community economic status and intimate partner violence in Bangladesh: Compositional or contextual effects? Violence Against Women. 2015; 21:679–699. [PubMed: 25845617]

World Health Organization. Putting women first: Ethical and safety recommendations for research on domestic violence against women. Geneva, Switzerland: World Health Organization; 2001.

World Health Organization (WHO). Intimate partner violence (Understanding and Addressing Violence Against Women Information Series). Geneva, Switzerland: WHO; 2012.

Yount KM, Crandall A, Cheong YF. Women's age at first marriage and longterm economic empowerment in Egypt. (n.d.). Manuscript submitted for publication.

Yount KM, DiGirolamo A, Ramakrishnan U. Impacts of domestic violence on child growth and nutrition: A conceptual review of the pathways of influence. Social Science & Medicine. 2011a; 72:1534–1554. [PubMed: 21492979]

Yount KM, Halim N, Head S, Schuler SR. A survey experiment of women's attitudes about intimate partner violence against women in Rural Bangladesh. Demography. 2012; 50:333–357.

Yount KM, Halim N, Hynes M, Hillman E. Response effects to attitudinal questions about domestic violence against women: A comparative perspective. Social Science Research. 2011b; 40:873–884.

Yount KM, Li L. Domestic violence against married women in Egypt. Sex Roles. 2010; 63:332–347.

Yount KM, Zureick-Brown S, Salem R. Intimate partner violence and women's economic and non-economic activities in Minya, Egypt. Demography. 2014; 51:1069–1099. [PubMed: 24659089]

Ziaei S, Naved RT, Ekström E-C. Women's exposure to intimate partner violence and child malnutrition: Findings from demographic and health surveys in Bangladesh. Maternal & Child Nutrition. 2014; 10:347–359. [PubMed: 22906219]

Zureick-Brown S, LaVilla K, Yount KM. Intimate partner violence and feeding practices in India: A cross-sectional study. Maternal & Child Nutrition. 2015; 11:792–802. [PubMed: 23795715]

Appendix

Table 4

Multilevel logistic regression models for exposure to physical intimate partner violence (IPV) between baseline and follow-up: Recently married women[a] (RMW, $N = 3,355$), 77 villages in rural Bangladesh, 2013–2014 (substituting age at first marriage = 18 years or older with a continuous age-at-first-marriage variable and a trichotomous age-at-first-marriage variable at individual level)

	Model 1	Model 2	Model 1	Model 2
	Estimated	Estimated	Estimated	Estimated
Intercept	−0.30 * (0.14)	−0.25 † (0.15)	−0.31 (0.14)	−0.25 † (0.15)
Village-Level Variables				
Prevalence of Very Early Child Marriage (VECM) (<15 years), RMW[b]	2.02 * (0.81)	1.30 (0.86)	2.01 * (0.82)	1.30 (0.87)
Individual-Level Variables				
Age at first marriage in years[c,d]	−0.08 *** (0.02)	−0.03 (0.02)		
Age at first marriage (ref. = <15 years)[c,d]				
15–17 years			−0.09 (0.11)	0.03 (0.11)
≥18 years			−0.30 * (0.12)	−0.04 (0.14)
Cross-Level Interaction				
Individual-level age at first marriage[c] × Village-level prevalence of VECM[b]	0.10 (0.14)	0.12 (0.14)		
Individual-level age at first marriage = 15–17[c] × Village-level prevalence of VECM[b]			−2.04 * (0.79)	−2.08 ** (0.77)
Individual-level age at first marriage ≥18[c]× Village-level prevalence of VECM[b]			0.53 (1.01)	0.62 (0.96)
Random Effects				
Estimated	0.38 (0.12)	0.34 (0.12)	0.38 (0.12)	0.34 (0.12)
Controls included	No	Yes	No	Yes

Notes: Control variables were village-level mean schooling attainment, RMW (grand-mean centered), and the following cluster-mean centered individual-level variables: completed grades of schooling, duration of marriage in years, child family socioeconomic status (low, medium, or high), witnessed father beat mother, and months between baseline and follow-up surveys. Standard errors are shown in parentheses.

[a] Married in the prior 4–12 years.

[b] Variable is grand-mean centered.

[c] Variable is cluster-mean centered.

[d] The results of a likelihood ratio test suggest that the relationship between the age at first marriage in years variable and physical IPV does not significantly vary across the population of villages ($\chi^2(2) = 0.02$, $p = .988$). Thus, a more parsimonious random-intercept model was preferred and used for Models 1 and 2.

† $p < .10$;
* $p < .05$;
** $p < .01$;
*** $p < .001$

Table 5

Multilevel logistic regression models for exposure to physical intimate partner violence (IPV) between baseline and follow-up: Recently married women[a] (RMW, $N = 3,308$), 76 villages in rural Bangladesh, 2013–2014 (one outlier village dropped)

	Dichotomous Age at First Marriage Models		Continuous Age at First Marriage Models		Categorical Age at First Marriage Models	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
	Estimated	Estimated	Estimated	Estimated	Estimated	Estimated
Intercept	−0.29* (0.14)	−0.23 (0.15)	−0.29* (0.14)	−0.23 (0.15)	−0.29* (0.14)	−0.24 (0.15)
Village-Level Variables						
Prevalence of Very Early Child Marriage (VECM) (<15 years), RMW[b]	2.36* (0.93)	1.71† (0.92)	2.35* (0.92)	1.70† (0.92)	2.37* (0.94)	1.71† (0.93)
Individual-Level Variables						
Later first marriage (≥18 years) [c,d]	−0.27* (0.12)	−0.10 (0.12)				
Age at first marriage in years[c,d]			−0.08*** (0.02)	−0.03 (0.02)		
Age at first marriage (ref. = <15 years) [c,d]						
15–17 years					−0.09 (0.11)	0.03 (0.11)
≥18 years					−0.31* (0.13)	−0.06 (0.14)
Cross-Level Interaction						
Individual-level later first marriage[c] × Village-level prevalence of VECM[b]	1.39 (1.13)	1.88† (1.07)				
Individual-level age at first marriage[c] × Village-level prevalence of VECM[b]			0.10 (0.16)	0.15 (0.15)		
Individual-level age at first marriage = 15–17 years[c] × Village-level prevalence of VECM[b]					−2.31* (0.96)	−2.21* (0.97)
Individual-level age at first marriage ≥18[c] × Village-level prevalence of VECM[b]					−0.09 (1.10)	−0.22 (0.07)
Random Effects						
Estimated	0.38 (0.12)	0.33 (0.13)	0.38 (0.12)	0.33 (0.13)	0.38 (0.12)	0.33 (0.13)
Controls included	No	Yes	No	Yes	No	Yes

Notes: Control variables were village-level mean schooling attainment, RMW (grand-mean centered), and five cluster-mean centered individual-level variables: completed grades of schooling, duration of marriage in years, child family socioeconomic status (low, medium, or high), witnessed father beat mother, and months between baseline and follow-up surveys. Standard errors are shown in parentheses,

[a] Married in the prior 4–12 years.

[b] Variable is grand-mean centered.

[c] Variable is cluster-mean centered.

[d] The results of a likelihood ratio test suggest that the relationship between the age at first marriage in years variable and physical IPV does not significantly vary across the population of villages ($\chi^2(2) < 0.01$, $p = .998$). Thus, a more parsimonious random-intercept model was preferred and used for Models 1 and 2.

$^{\dagger}p < .10$;

$^{*}p < .05$;

$^{***}p < .001$

Table 6

Multilevel logistic regression models for exposure to physical intimate partner violence (IPV) between baseline and follow-up: Recently married women[a] (RMW), 77 villages in rural Bangladesh, 2013–2014 (stratifying by number of years married: 4–8 years versus 9–12 years)

	Dichotomous Age at First Marriage Models		**Continuous Age at First Marriage Models**		**Categorical Age at First Marriage Models**	
	4–8 Years *n* = 1,808	**9–12 Years *n* = 1,547**	**4–8 Years *n* = 1,808**	**9–12 Years *n* = 1,547**	**4–8 Years *n* = 1,808**	**9–12 Years *n* = 1,547**
	Estimated	**Estimated**	**Estimated**	**Estimated**	**Estimated**	**Estimated**
Intercept	−0.13 (0.16)	−0.42* (0.17)	−0.24 (0.16)	−0.18 (0.22)	−0.25 (0.16)	−0.20 (0.23)
Village-Level Variables						
Prevalence of very early child marriage (VECM) (<15 years), RMW[b]	0.90 (0.99)	1.90† (1.05)	0.93 (0.98)	1.78† (1.06)	0.92 (1.00)	1.83† (1.05)
Individual-Level Variables						
Later age at first marriage (≥18 years)[c,d]	−0.12 (0.12)	−0.03 (0.17)				
Age at first marriage in years[c,d]			−0.02 (0.03)	−0.05 (0.03)		
Age at first marriage (ref. = <15 years)[c,d]						
15–17 years					0.09 (0.11)	−0.03 (0.18)
≥18 years					−0.04 (0.15)	−0.05 (0.21)
Cross-Level Interaction						
Individual-level later first marriage[c] × Village-level prevalence of VECM[b]	2.18† (1.13)	2.25 (1.61)				
Individual-level age at first marriage[c] × Village-level prevalence of VECM[b]			0.23 (0.19)	0.03 (0.22)		
Individual-level age at first marriage = 15–17[c] x Village-level prevalence of VECM[b]					−2.07† (1.21)	−2.00 (1.43)

	Dichotomous Age at First Marriage Models		Continuous Age at First Marriage Models		Categorical Age at First Marriage Models	
	4–8 Years *n* = 1,808	9–12 Years *n* = 1,547	4–8 Years *n* = 1,808	9–12 Years *n* = 1,547	4–8 Years *n* = 1,808	9–12 Years *n* = 1,547
	Estimated	Estimated	Estimated	Estimated	Estimated	Estimated
Individual-level age at first marriage ≥18[c]× Village-level prevalence of VECM[b]					0.79 (1.35)	0.87 (1.89)
Random Effects						
Estimated	0.34 (0.12)	0.44 (0.17)	0.35 (0.13)	0.44 (0.18)	0.35 (0.13)	0.44 (0.18)
Controls included	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Control variables were village-level mean schooling attainment, RMW (grand-mean centered), and five cluster-mean centered individual-level variables: completed grades of schooling, duration of marriage in years, child family socioeconomic status (low, medium, or high), witnessed father beat mother, and months between baseline and follow-up surveys. Standard errors are shown in parentheses.

[a] Married in the prior 4–12 years.

[b] Variable is grand-mean centered.

[c] Variable is cluster-mean centered.

[d] The relationship between age at first marriage and physical IPV did not vary significantly across the population of villages for either marriage cohort ($\chi^2(2) < 0.01$, $p = .998$ for the 4–8 years and $\chi^2(2) < 0.01$, $p < .999$ for 9–12 years cohort). Thus, a more parsimonious random-intercept model was used for Models 1–3.

$^{\dagger}p < .10$;
$^{*}p < .05$;
$^{**}p < .01$;
$^{***}p < .001$

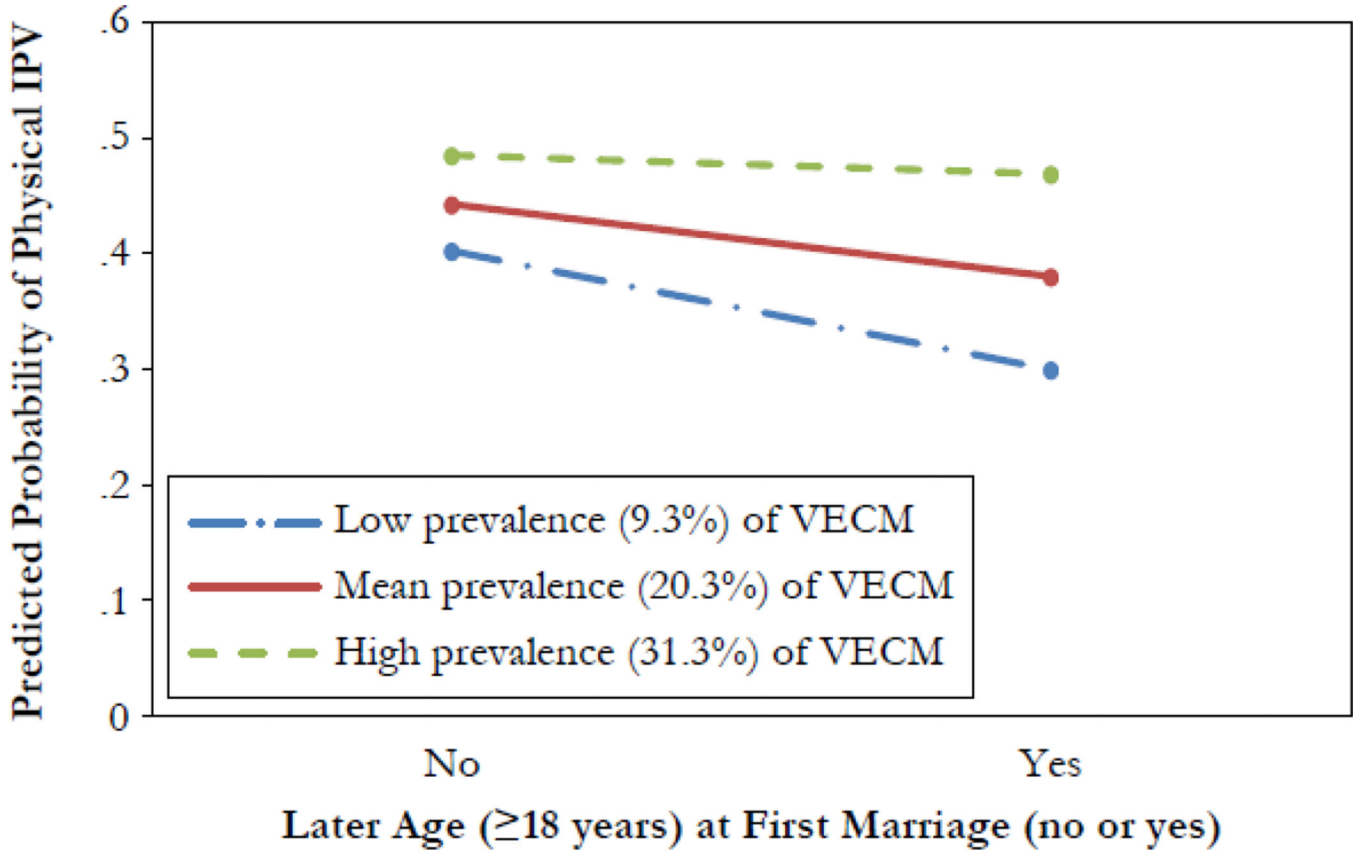

Fig. 1.

Predicted probability of physical intimate partner violence (IPV) by age at first marriage before age 18 versus at 18 years or older (Table 3, Model 3), modified by village-level prevalence of very early child marriage (VECM), rural Bangladesh 2013–2014. The village level prevalence of VECM is determined based on the mean of the village means (or the grand mean) of 20.3 %. Low prevalence is based on 1 standard deviation lower than the mean, or 9.3 %; high prevalence is 1 standard deviation higher than the mean, or 31.3 %

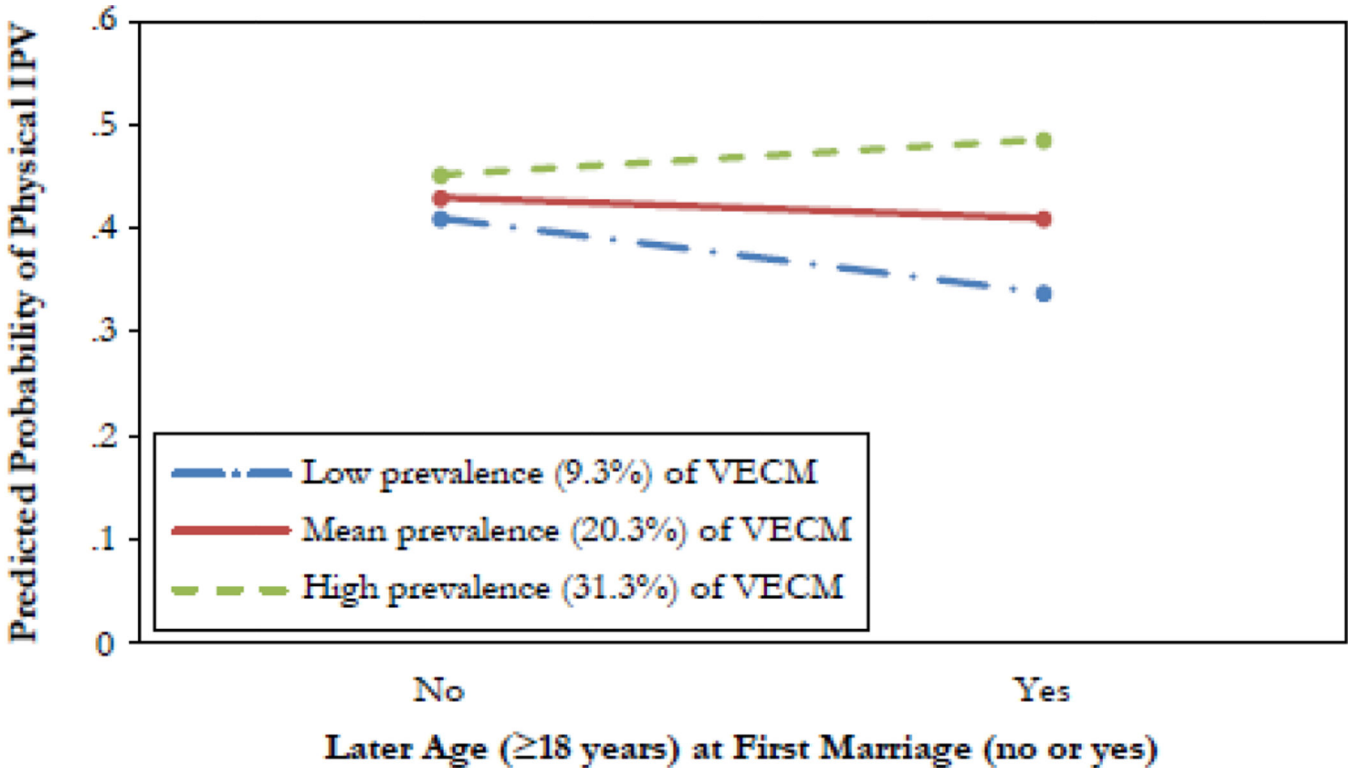

Fig. 2.

Predicted probability of physical intimate partner violence (IPV) by age at first marriage before age 18 versus at age 18 or older (Table 3, Model 4), modified by village-level of very early child marriage, rural Bangladesh 2013–2014. Predicted probabilities are estimated from Table 3, Model 4, which adjusts for confounders. The village-level prevalence of VECM is determined based on the mean of the village means (or the grand mean) of 20.3 %. Low prevalence is based on 1 standard deviation lower than the mean, or 9.3 %; high prevalence is 1 standard deviation higher than the mean, or 31.3 %

Table 1

Characteristics of recently married women (married in the prior 4–12 years): Rural Bangladesh, 2013–2014

	Villages, Overall and by Level of Very Early Child Marriage (VECM)							
	All (*n* = 3,355)		**VECM <15% (*n* = 1,307)**		**VECM 15–25 % (*n* = 1,040)**		**VECM >25% (*n* = 1,008)**	
	Mean or %	**Range**	**Mean or %**	**Range**	**Mean or %**	**Range**	**Mean or %**	**Range**
Experiences of Intimate Partner Violence (IPV) and Age at Marriage								
Incidence of physical IPV from baseline to follow-up (%)[a]	44.5		38.9		44.1		51.8	
Age at first marriage in years (mean)	16.4 (2.2)	10–28	17.0 (2.2)	10–28	16.4 (2.2)	11–28	15.7 (2.2)	10–28
Married before age 15 years (%)	20.4		10.3		19.2		33.9	
Married at ages 15–17 years (%)	48.5		49.2		49.6		46.3	
Married at 18 years or older (%)	31.1		40.4		31.2		19.8	
Respondent's Characteristics								
Duration of marriage in years (mean)	8.1 (2.7)	4–12	7.8 (2.6)	4–12	8.1 (2.7)	4–12	8.3 (2.7)	4–12
Completed grades of schooling (mean)	6.4 (3.3)	0–17	6.7 (3.5)	0–17	6.4 (3.2)	0–17	6.1 (3.3)	0–17
Age in years (mean)	24.4 (3.2)	16–37	24.8 (3.1)	17–36	24.4 (3.2)	17–34	24.0 (3.2)	16–37
Time between surveys in months (mean)	9.3 (0.7)	8–13	9.7 (0.6)	8–12	9.4 (0.8)	8–11	9.4 (0.6)	8–13
Respondent's Childhood/Natal Family Characteristics								
Father ever attended school (%)	43.5		47.3		48.1		34.0	
Father's completed grades of schooling (mean)	3.0 (4.0)	0–17	3.4 (4.2)	0–17	3.1 (3.9)	0–15	2.3 (3.6)	0–17
Mother ever attended school (%)	30.3		36.7		31.2		21.7	
Mother's completed grades of schooling (mean)	1.6 (2.8)	0–16	2.0 (3.0)	0–16	1.7 (2.9)	0–15	1.2 (2.4)	0–12
Mother worked inside or outside home for cash or kind (%)	7.6		8.2		7.0		7.6	
Childhood home had a flushing toilet (%)	1.8		3.6		0.8		0.7	
Childhood home had electricity (%)	26.4		30.6		27.7		20.0	
Childhood home had a separate kitchen (%)	82.0		79.1		84.4		83.0	

	Villages, Overall and by Level of Very Early Child Marriage (VECM)							
	All (*n* = 3,355)		VECM <15% (*n* = 1,307)		VECM 15–25 % (*n* = 1,040)		VECM >25% (*n* = 1,008)	
	Mean or %	Range	Mean or %	Range	Mean or %	Range	Mean or %	Range
Natal family owned land (%)	68.5		67.0		73.7		64.5	
Natal family owned livestock (%)	75.3		73.6		76.8		75.8	
Childhood family socioeconomic status (%)[b]								
Low	43.7		39.5		40.1		52.8	
Medium	22.5		20.6		24.2		23.0	
High	33.8		40.0		35.7		24.2	
Knowledge that father hit mother (%)	13.7		13.0		13.1		15.1	

Note: Standard deviations are shown in parentheses.

[a]On average, the duration between baseline and follow-up was 9.5 months. The range was 8–13 months.

[b]Tertiles of the score from the first principal component of a principal components analysis of household assets (owns land, owns livestock), household amenities (electricity, kitchen in house, and toilet), father's schooling, mother's schooling, and mother's work inside or outside the home for cash or kind.

Table 2

Characteristics of sampled villages and bivariate correlations among village characteristics, $N = 77$: Rural Bangladesh, 2013–2014

	Mean	Range	1	2	3	4	5	6
Number of Eligible Recently Married Women (RMW)[a] per Village	51.1 (5.3)	37–60	1.00					
Incidence of RMW Reporting Physical IPV[b] (%)	44.5 (15.8)	11.4–75.0	−0.04 *	1.00				
Mean Age at First Marriage Among RMW	16.4 (0.8)	14.8–18.0	0.00	−0.33 ***	1.00			
Prevalence of Very Early Child Marriage (VECM) (<15 years) Among RMW	20.3 (11.0)	3.9–51.9	−0.10 ***	0.36 ***	−0.81 ***	1.00		
Prevalence of Later Marriage (≥18 years) Among RMW	31.2 (14.6)	2.2–63.2	0.04 *	−0.28 ***	0.94 ***	−0.68 ***	1.00	
Mean Completed Grades of Schooling Among RMW	6.4 (1.1)	3.9–9.1	−0.19 ***	−0.38 ***	0.37 ***	−0.35 ***	0.26 ***	1.00

Note: Standard deviations are shown in parentheses.

[a] RMW = recently married women (first married in the prior 4–12 years).

[b] Village average incidence of intimate partner violence from baseline to follow-up, with a mean of 9.5 months and a range of 8–13 months.

* $p < .05$;

*** $p < .001$

Table 3

Multilevel logistic regression models for exposure to physical intimate partner violence (IPV) between baseline and follow-up: Recently married women[a] (RMW, N = 3,355), rural Bangladesh, 2013–2014

	Model 1	Model 2	Model 3	Model 4
	Estimated	Estimated	Estimated	Estimated
Intercept	−0.31 * (0.15)	−0.30 * (0.14)	−0.30 * (0.14)	−0.30 * (0.14)
Village-Level Variables				
Prevalence of Very Early Child Marriage (VECM) (<15 years), RMW[b]		2.01 * (0.81)	2.04 * (0.81)	1.36 (0.89)
Mean schooling attainment, RMW[b]				−0.23 ** (0.07)
Individual-Level Variables				
Later first marriage (≥18 years)[c,d]		−0.29 ** (0.11)	−0.26 * (0.11)	−0.09 (0.12)
Completed grades of schooling[c]				−0.12 *** (0.02)
Duration of marriage in years[c]				−0.07 ** (0.02)
Childhood family socioeconomic status (ref. = low)				
Medium[c]				−0.15 † (0.08)
High[c]				−0.22 * (0.11)
Witnessed father beat mother[c]				0.40 ** (0.12)
Months between baseline and follow-up surveys[c]				−0.14 (0.32)
Cross-Level Interaction				
Individual-level later first marriage[c] × Village-level prevalence of VECM[b]			1.76 † (1.02)	2.03 * (0.97)
Random Effects				
Estimated	0.43 (0.12)	0.38 (0.12)	0.38 (0.12)	0.35 (0.12)

Note: Standard errors are shown in parentheses.

[a] Married in the prior 4–12 years.

[b] Variable is grand-mean centered.

[c] Variable is cluster-mean centered.

[d] The results of a likelihood ratio test suggest that the relationship between later first marriage (at age 18 or older) and physical IPV does not significantly vary across the population of villages ($\chi^2(2) < 0.01$, $p = .998$). Thus, a more parsimonious random-intercept model was preferred and used for Models 2–4.

† $p < .10$;

* $p < .05$;

** $p < .01$;

*** $p < .001$