OPEN ACCESS

Intersectional community correlates of married women's experiences of male intimate partner physical violence in Bangladesh: a cross-sectional study

Laila Rahman [1], Janice Du Mont [1,2], Patricia O'Campo [1,3,4], Gillian Einstein [1,2,5,6]

► Additional material is published online only. To view please visit the journal online (http://dx.doi.org/10.1136/jech-2019-212295).

[1]Dalla Lana School of Public Health, University of Toronto, Toronto, Ontario, Canada
[2]Women's College Research Institute, Women's College Hospital, Toronto, Ontario, Canada
[3]Centre for Urban Health Solutions, St. Michael's Hospital, Toronto, Ontario, Canada
[4]Li Ka Shing Knowledge Institute, St. Michael's Hospital, Toronto, Ontario, Canada
[5]Department of Psychology, University of Toronto, Toronto, Ontario, Canada
[6]Department of Gender Studies, Linköping University, Linköping, Sweden

Correspondence to
Laila Rahman, Dalla Lana School of Public Health, University of Toronto, Toronto, ON M5T 3M7, Canada;
laila.rahman@mail.utoronto.ca

Received 18 February 2019
Revised 19 July 2019
Accepted 19 October 2019

To cite: Rahman L, Du Mont J, O'Campo P, *et al*. *J Epidemiol Community Health* Epub ahead of print: [*please include* Day Month Year]. doi:10.1136/jech-2019-212295

ABSTRACT

Background In Bangladesh, little is known about community-level factors shaping married women's experiences of male intimate partner physical violence (MIPPV); it is also unknown if these factors interact with each other. We examined the (1) association between four residential community characteristics defined by the attributes of ever married women in those communities–younger age, lower education, higher participation in earning an income and poverty; and (2) two-way interactions between these community-level MIPPV correlates.

Methods We used a cross-sectional sample comprising 14 557 currently married women who were living with their spouses from 911 Bangladeshi communities. Data were collected during 13–22 August 2015. Conflict Tactics Scale-2 measured the outcome–women's current MIPPV experiences; and multilevel logistic regression models predicted this outcome.

Results Four community characteristics including higher proportions of women's earning an income and achieving higher education were not associated with their increased likelihood of experiencing MIPPV. However, women living in *higher earning participation, higher educated* communities were significantly more likely to experience MIPPV than those in *lower earning participation, higher educated* communities (predicted probability, p=0.30, 95% CI 0.26 to 0.34 vs p=0.24, 95% CI 0.22 to 0.25).

Conclusion This is the first study to examine interactions between women's community-level MIPPV correlates in Bangladesh. Although we did not find support for the relationship between women's most intersectional community-level locations and MIPPV, we did find a currently invisible vulnerable intersectional location: *higher earning participation, higher educated* communities. Bangladeshi violence against women prevention policies and programmes, therefore, need to engage with these particular communities to tackle head on male responses to these locations to reduce MIPPV.

INTRODUCTION

Women's experiences of male intimate partner physical violence (MIPPV) is a critical social, human rights and public health concern in Bangladesh and around the globe.[1 2] MIPPV occurs when a man perpetrates physically violent acts against an intimate partner.[3] In Bangladesh, one-fifth of married women experienced MIPPV in the past year.[4] Reducing MIPPV is, therefore, a critical Sustainable Development Goal (SDG) for Bangladesh.[5]

Women who experience MIPPV have diverse individual-level and community-level social locations.[6 7] The importance of examining the association between community-level factors and MIPPV has been emphasised since mid-1990s[8]; however, most studies have included women's individual but not their community-level locations.

When community locations have been studied, they reveal important risks for MIPPV. However, the risk of a given community location depends on the characteristics of a community. For example, in Bangladesh, women living in communities where higher proportions of young women are married, and married women are lower educated, earn an income and poor may be most exposed to MIPPV in Bangladesh. Communities where higher proportions of young women are married point to a classic patriarchal setting where a young bride begins her married life with her husband's family, headed by a male.[9] In this setting, a young woman with limited mobility and gender division of household chores are unlikely to pursue education and employment, sealing her fate if married into a poor family. As such, Bangladeshi women who marry early[10] as well as those who live in villages with high prevalence of marriage at a very early age have shown to be more likely to experience MIPPV.[11]

Communities where greater proportions of women have lower levels of education represent neighbourhoods that may also place women at risk of MIPPV. Such communities offering a high-level of tolerance for MIPPV might condone and promote MIPPV.[12–14] However, higher educated communities may provide women with infrastructure and supportive environments for furthering women's education, condoning, and ultimately, reducing MIPPV.[12–14] As such, community-level women's education was found to be a protective factor for MIPPV against women in Bangladesh and India[12 13]; however, other studies in these countries found no such effect.[15 16] Although the Bangladeshi, regional-level study that found no effect, it showed an inverse association between community-level female literacy and MIPPV in one of two districts.[15]

In some parts of the world, communities in which a higher proportion of women earn an income are assumed to be conducive to women's empowerment. For example, in Tanzania, with stronger social support, women experienced less MIPPV.[17] However, in other parts of the world, if women's engagement in earning is perceived as breaking the gender norm of economic dependence, then, that may trigger MIPPV as a result of *male backlash*.[18] Employment status inconsistency between the spouses and male extraction of financial resources from their spouses may also generate such violence.[18 19] As such, community-level women's income earning has been found to be a risk factor for MIPPV in Kyrgyzstan,[20] while this factor is yet to be examined in Bangladesh.

The effect of community-level poverty on MIPPV has been studied in both low-income and high-income countries.[21 22] It is assumed that, in low-income countries, lower human and economic development 'create[s] situations of socioeconomic distress, creating dissatisfaction, stress and rage'[21] (p. 43), increasing the likelihood of MIPPV.[21] However, a systematic review found the relationship between neighbourhood poverty/lower standard of living and MIPPV inconclusive.[22] Neighbourhood low income in Canada,[23] and the USA,[8] is a risk factor for MIPPV, while in Moldova,[20] it is a protective factor. A regional-level study found no such association in Bangladesh[24] as well as national-level studies in India,[14] Kyrgyzstan,[20] Tajikistan,[20] Tanzania[17] and Ukraine.[20] Reasons for variation across these locations may lie in the variation in their samples and economic disparities that face these nations.

Thus, when examining whether disadvantaged community-level locations create conditions that affect MIPPV against women, it is important to realise that what might be a disadvantaged location in one country might not be one in another country.

In addition, an intersectional theoretical lens,[25] which advocates for a problematisation of the unique experiences of individuals who are in the intersections of multiple disadvantages, suggests a higher MIPPV risk in individuals and communities that suffer from multiple intersectional disadvantages.[7] Although intersectionality has emerged as an important theory, the effects of women's intersectional community-level locations on MIPPV are not known.

To better understand the above disadvantaged community-level risky locations described above for MIPPV in Bangladesh, and interactions between these factors, we analysed the latest nationally representative survey—The Bangladesh Violence Against Women Survey 2015 (BVAWS2015).[4] We examined: (1) the association between four residential community characteristics defined by attributes of ever married women who lived in those communities–younger age, lower education, higher participation in earning an income and poverty; and (2) the two-way interactions between these community correlates on currently married women's (CMW's) current MIPPV experiences.

Based on the above literature, we hypothesised that CMW in communities where higher proportions of women are (1) younger age (<30 years), (2) lower educated (<5th grade), (3) income earning and (4) poor would have higher probabilities of experiencing MIPPV than those in communities where higher proportions of women are (1) older (>30 years), (2) better educated (≥5th grade education), (3) non-income earning and (4) non-poor, respectively (online supplementary table S1). Drawing on intersectionality theory, we also hypothesised that women in intersection of any two disadvantaged locations would have a higher probability of experiencing MIPPV than those in one and two advantaged locations (online supplementary table S2). Women in single disadvantaged locations would have a similar probability; and women in a given disadvantaged location would have a higher probability than those in two advantaged locations (online supplementary table S2). Online supplementary figure S1 shows a conceptual framework of the relationships between women's different community-level and intersectional community-level social locations and MIPPV.

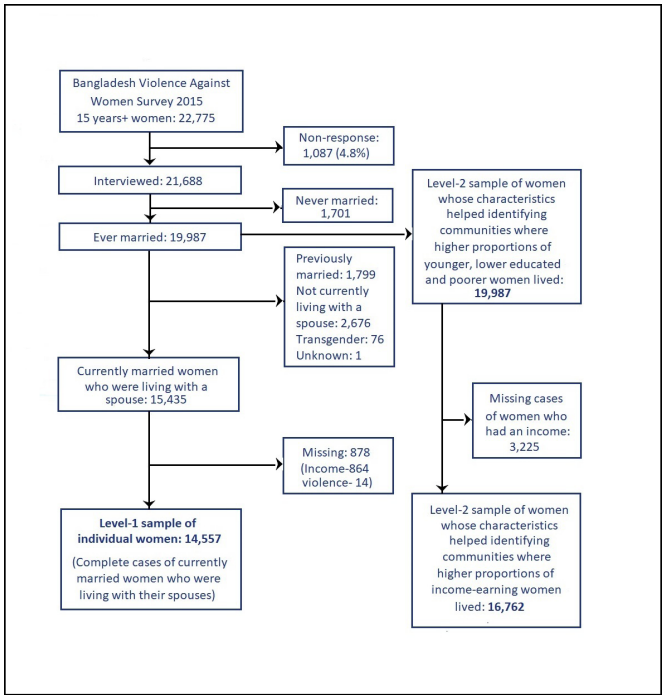

Figure 1 Flow chart of the individual-level and community-level women samples in Bangladesh.

METHODS

Data

Using the BVAWS2015,[4] we analysed a subsample of 14 557 currently married, 15 years and older, women living with their husbands during data collection (figure 1). This nationally representative, cross-sectional survey, conducted during 13–22 August 2015, used a stratified two-stage cluster sampling design. Trained, women interviewers recruited participants from their households in 911 primary sampling units (PSUs) or residential communities. Like other studies,[13 15 20] a larger sample of ever married women of at least 16 762 women (figure 1) were used to define community characteristics to avoid the same source bias. The income variable had missing values, but as this 'missingness' did not vary across outcome and other independent variables, we conducted complete case analyses.[26]

Measures

Outcome variable

In the survey, MIPPV was measured by using the physical assault subscale of the Revised Conflict Tactics Scale-2 (CTS2).[4 27] Online supplementary file: appendix S1 lists the items of this modified CTS2 scale. MIPPV was coded as 1 for a positive response to any of these items and 0 if otherwise. Alpha for these items 0.71, which indicated adequate validity.[28]

Community-level exposure variables

To test our hypotheses, we constructed four community-level, binary variables for women's community-level social locations. These variables included residential communities in which higher proportions of ever married women had: (1) younger age (<30

years), (2) lower level of education (<5th grade), (3) earned an income and (4) lived in poverty (lowest wealth quintile). Online supplementary file: appendix S2 provides a description of how these four community-level exposure variables were generated.

Individual-level control variables

Based on the previous literature,[13 15 29–32] we considered the following control variables: women's individual-level locations–younger age (<30 years vs ≥30 years), lower level of education (<5th grade vs ≥5th grade), participation in earning an income (an income vs no income), living in poverty (the poorest wealth quintile vs poor to the richest wealth quintiles), religion (Muslim vs non-Muslim) and geographical location (rural vs urban), and their husband's individual-level locations of younger age and lower level of education. A decision to keep them as controls was made based on the change that they brought to the effect size in the full main effect model.

Data analysis

We first finalised control variables by measuring over 10% changes that they brought to the effect size with the Karlson Holm Breen method.[33] We then carried out univariate analyses to describe the outcome and independent variables. Before running two-level fixed-effect multilevel analyses[34] with individuals at level 1 and communities at level 2, we ran a null model (model 1). Nesting explained 16.98% of the variance, thus we opted for multilevel models.

To test our first hypothesis, we ran main effect models with women's four primary community-level locations individually (models 2–5) and simultaneously (model 6). To test our second hypothesis, we first measured the effects of women's various intersectional locations on MIPPV by running six models, each with one of the six cross-product terms of two-way combinations between the four disadvantaged community-level social locations (models 7–12). The final model (model 13) included every cross-product term. Considering the six dual intersections of these four disadvantaged community-level locations led to 24 intersectional locations (online supplementary file: table S2). Reporting on comparisons across all these locations would involve reporting on 36 comparisons (6 intersections × six comparisons for each intersectional location). To avoid data

Table 1 Individual women and residential community characteristics in Bangladesh (Bangladesh violence against women survey 2015; weighted n=32 697 808; unweighted n=14 557, community n=911)

Individual-level characteristics/social locations	% of women	95% CI	Weighted N
1. Younger age			
Younger age (<30 years)	34.1	33.0 to 35.1	11 136 843
Older age (≥30 years)	65.9	64.9 to 67.0	21 560 965
2. Lower level of education			
Lower education (<5th grade)	49.2	47.9 to 50.6	16 091 353
Higher education (≥5th grade)	50.8	49.4 to 52.1	16 606 456
3. Earns an income			
Yes	19.1	17.7 to 20.6	6 239 795
No	80.9	79.4 to 82.3	26 458 013
4. Lives in poverty			
Yes	23.0	21.5 to 24.5	7 505 118
No	77.0	75.5 to 78.5	25 192 690
5. Male intimate partner physical violence experience			
Yes	25.1	23.8 to 26.5	8 210 002
No	74.9	73.5 to 76.2	24 487 806

Residential community characteristics	% of women	95% CI	Community N	Weighted N
1. Higher proportions of women are younger than 30 years of age				
Yes	17.7	15.0 to 20.8	167	5 793 374
No	82.3	79.2 to 85.0	744	26 904 434
2. Higher proportions of women have below fifth grade of education				
Yes	16.6	14.0 to 19.6	134	5 424 159
No	83.4	80.4 to 86.0	777	27 273 650
3. Higher proportions of women earn an income				
Yes	13.8	11.4 to 16.7	109	4 510 847
No	86.2	83.3 to 88.6	802	28 186 961
4. Higher proportions of women live in poverty				
Yes	16.9	14.2 to 20.0	120	5 542 255
No	83.1	80.0 to 85.8	791	27 155 553
Total			911	32 697 808

Note: community characteristics 1, 2 and 4 were defined by women's characteristics (younger age <30 years; lower level of education below the fifth grade; and living in a poor household) of 19 987 (unweighted) ever-married 15 years or older women who lived in 911 communities. Community characteristic 3 was created using 16 762 (unweighted) ever-married women 15 years or older. Mean plus 1 SD cut-off points were calculated to mark communities where higher proportions of women had the relevant characteristics.

Table 2 Multilevel logistic regression estimates (coefficients (95% CI)) of women's community-level locations of their male intimate partner physical violence) experiences in the past year (Bangladesh violence against women survey 2015; weighted n=32 697 808; unweighted n=14 557, community n=911)

Residential community characteristics	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Higher proportions of women *are younger than 30 years of age*		−0.02 (−0.21 to 0.18)				−0.02 (−0.22 to 0.18)
Higher proportions of women *have below fifth grade of education*			−0.01 (−0.24 to 0.22)			−0.02 (−0.26 to 0.21)
Higher proportions of women earn an income				0.10 (−0.14 to 0.34)		0.10 (−0.14 to 0.34)
Higher proportions of women live in poverty					0.04 (−0.19 to 0.27)	0.04 (−0.19 to 0.27)
Random effects, between community variance (95% CI)	0.67 (0.55 to 0.83)	0.65 (0.53 to 0.79)	0.65 (0.53 to 0.79)	0.64 (0.53 to 0.79)	0.65 (0.53 to 0.79)	0.64 (0.52 to 0.79)
Intraclass correlation (SE)	0.17 (0.02)	0.16 (0.01)	0.16 (0.01)	0.16 (0.01)	0.16 (0.01)	0.16 (0.01)
Akaike Information Criterion	21 800 000	21 500 000	21 500 000	21 500 000	21 500 000	21 500 000

1. N includes currently married women, 15 years or older, who were living with their husbands during the survey in 2015.
2. Communities indicate primary sampling units (PSUs). Minimum, maximum and average number of observations per PSU are 6, 24, and 16, respectively.
3. Basic dataset related information: (A) type of survey and dataset: nationally representative, cross-sectional dataset covering all the then seven divisions of Bangladesh; (B) design: stratified two-stage cluster survey design; (C) year for the survey: 2015; (D) sample: 22 775; successfully interviewed: 21 688 women and girls of 15 years and older; of them, 19 987 respondents were ever-married and 1701 were never married; (E) response rate: 95.2%; (F) survey administrator and owner of the dataset: Bangladesh Bureau of Statistics (BBS), Government of Bangladesh. BBS conducted this survey following the safety and ethical guidelines.[4]
4. Mean variance adaptive Gauss–Hermite quadrature integration method[34] has been used. Unstructured covariance structure estimated all variances and covariances.
5. Model 1 is the null model. Models 2–6 have accounted for women's individual-level younger age, lower level of education, earning an income, living in poverty, religion, rural location and their husband's younger age and lower level of education.

dredging and unnecessary multiple comparisons, we conducted post hoc, Bonferroni adjusted, pairwise comparisons only between the intersectional locations relevant to significant interactions found in the final model.

We used Stata V.15.1 *melogit* with the first and second level weights of women and households.[35] The first-level survey weights were scaled by community following the Rabe-Hesketh & Skrondal's scaling method 1.[36] Stata's *margins* was used to calculate women's probability of experiencing MIPPV and *pwcompare* with Bonferroni adjustment to contrast women's vulnerable and privileged locations.[35] As all variance inflation factors remained below 10, multicollinearity was not detected in the data.[37]

RESULTS

Women's characteristics (women's individual-level social locations)

More than one-third of the sample (unweighted n=14 557) of currently married, 15 years or older women were less than 30 years of age, and almost half of the sample had education levels below the fifth grade (table 1). Approximately one in five women earned an income; one in four lived in poverty; and one in four had experienced MIPPV (prevalence rate 25.1%, 95% CI 23.8 to 26.5; table 1).

Community characteristics (women's community-level social locations)

A little over one in six women lived in communities where higher proportions of women were younger than 30 years of age and lived in poverty (17.7% and 16.9%, respectively). One in six (16.6%) women lived in communities where higher proportions of women had below primary level of education, while almost one in seven (13.8%) lived in neighbourhoods where higher proportions of women earned an income (table 1).

Association between community characteristics and MIPPV

Contrary to our first hypothesis, multilevel logistic regression analyses revealed no association between women's four standalone community-level characteristics/locations, which included communities where higher proportions of women were: (1) younger than 30 years, (2) educated below a primary level, (3) participated in earning an income and (4) poor, and their likelihood of experiencing MIPPV (table 2).

Association between two-way intersectional community characteristics and MIPPV

Results of multilevel logistic regression models, which adjusted for women's standalone community-level social locations and control variables, showed statistically significant association for MIPPV only between intersections of 'education, income' and 'income, poverty' (table 3, models 10 and 12). In the final model, only the two-way interaction between education and income was significant (table 3, model 13). Post hoc comparisons of the predicted probabilities to test our second hypothesis revealed that the women in *higher earning participation, higher educated* communities had significantly higher probability of MIPPV than those in *lower earning participation, higher educated* communities (predicted probability, p=0.30, 95% CI 0.26 to 0.34 vs p=0.24, 95% CI 0.22 to 0.25; figure 2; locations C vs D). As expected, we did not find any difference between two single disadvantaged locations: *lower education–lower earning participation* and *higher education–higher earning participation* communities (figure 2; locations B vs C).

DISCUSSION

This is the first study, to our knowledge, to examine the association between Bangladeshi women's community-level intersectional locations and MIPPV. Although we did not find support for the relationship between MIPPV and most of the intersectional locations, our analysis revealed a complex and interactive

relationship between women's community-level earning and education.

Contrary to our expectation, we did not find support for our first hypothesis. CMW living in younger, lower educated, higher earning participation, and poor communities do not have higher probabilities of experiencing MIPPV than those in older, higher educated, lower earning participation, and non-poor communities, respectively. We found that in Bangladesh, unlike studies from the USA[8] and Canada (high-income countries),[23] but like a previous study in Bangladesh[24] that used regional-level data, and those from India and Tanzania (low-income countries),[14 17] after adjusting for individual-level poverty, neighbourhood poverty does not influence women's MIPPV. This might be due to the fact that in low-income nations, neighbourhood poverty does not operate similarly to that in high-income nations.[24] Not finding any standalone effect of women's community-level younger age, lower level education, income earning and poverty on women's MIPPV suggests that the relationship between these structural community-level factors and MIPPV is more complex. It is possible that they might be mediated by other pathways such as community-level social norm of women's *normative empowerment*.[38 39] Normative empowerment occurs when women's empowerment is viewed as normal in the community, women have employment and ability to exit marriage and bystanders intervene when women experience violence.[39] However, we have not examined community norms in this study.

We did find very limited support for our second hypothesis. Contrary to our expectation, only one out of six interactions, the interaction between community-level education and earning an income on women experiencing MIPPV was significant. In this intersectional relationship, we did not find women in any two disadvantaged locations to have higher probabilities of experiencing MIPPV than those in one and two advantaged locations. As expected, we found that women in single disadvantaged locations have similar probabilities of experiencing MIPPV. Interestingly, women in one disadvantaged location, *higher earning participation, higher educated* communities had higher probabilities of experiencing MIPPV than those in dual advantaged, *lower earning participation, higher educated* communities. This seems paradoxical since communities in which higher proportions of women participate in earning an income and pursue higher education are assumed to protect women against MIPPV because these resources are thought to give them bargaining power.[18] The fact that women have higher probabilities of experiencing MIPPV at these intersecting locations may be due to these communities belonging to *classic patriarchal belt* societies[9 40]

Table 3 Multilevel logistic regression estimates (coefficients (95% CI)) of women's community-level colocations of their male intimate partner physical violence (MIPPV) experiences in the past year (Bangladesh violence against women survey 2015; weighted n=32 697 808; unweighted n=14 557, community n=911)

Residential community characteristics	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12	Model 13
A. Higher proportions of women are younger than 30 years of age	−0.05 (−0.25 to 0.16)	0.01 (−0.20 to 0.22)	0.04 (−0.18 to 0.25)				0.02 (−0.21 to 0.24)
B. Higher proportions of women have below fifth grade of education	−0.04 (−0.29 to 0.20)			0.13 (−0.12 to 0.38)	0.00 (−0.25 to 0.25)		0.07 (−0.20 to 0.34)
C. Higher proportions of women earn an income		0.13 (−0.13 to 0.39)		0.28* (0.02 to 0.54)		0.22† (−0.04 to 0.49)	0.38** (0.10 to 0.67)
D. Higher proportions of women live in poverty			0.10 (−0.17 to 0.36)		0.06 (−0.19 to 0.31)	0.14 (−0.11 to 0.39)	0.19 (−0.11 to 0.48)
1. Younger, lower educated communities (A × B)	0.25 (−0.45,.94)						0.47 (−0.17 to 1.10)
2. Younger, higher earning participation communities (A × C)		−0.16 (−0.74 to 0.42)					−0.21 (−0.78 to 0.36)
3. Younger, poorer communities (A × D)			−0.27 (−0.78 to 0.25)				−0.27 (−0.78 to 0.24)
4. Lower education, higher earning participation communities (B × C)				−0.78** (−1.37 to −0.20)			−0.71* (−1.30 to −0.11)
5. Lower education, poor communities (B × D)					−0.07 (−0.64 to 0.50)		0.01 (−0.57 to 0.58)
6. Higher earning participation, poor communities (C × D)						−0.65* (−1.22 to −0.10)	−0.46 (−1.02 to 0.10)
Random effects, between community variance (SE)	0.65 (0.53 to 0.79)	0.64 (0.52 to 0.79)	0.64 (0.52 to 0.79)	0.63 (0.52 to 0.78)	0.65 (0.53 to 0.79)	0.63 (0.52 to 0.78)	0.62 (0.51 to 0.77)
Intraclass correlation (SE)	0.16 (0.01)	0.16 (0.01)	0.16 (0.01)	0.16 (0.01)	0.16 (0.01)	0.16 (0.01)	0.16 (0.01)
Akaike Information Criterion	21 500 000	21 500 000	21 500 000	21 500 000	21 500 000	21 500 000	21 400 000

1. Texts in brackets indicate the two-way interaction between letter-numbered community-level variables.
2. All models have been adjusted for women's individual-level younger age, lower level of education, earning an income, living in poverty, religion, rural location and their husband's younger age and lower level of education variables.
*P<0.05; **p<0.01.
†P<0.10.

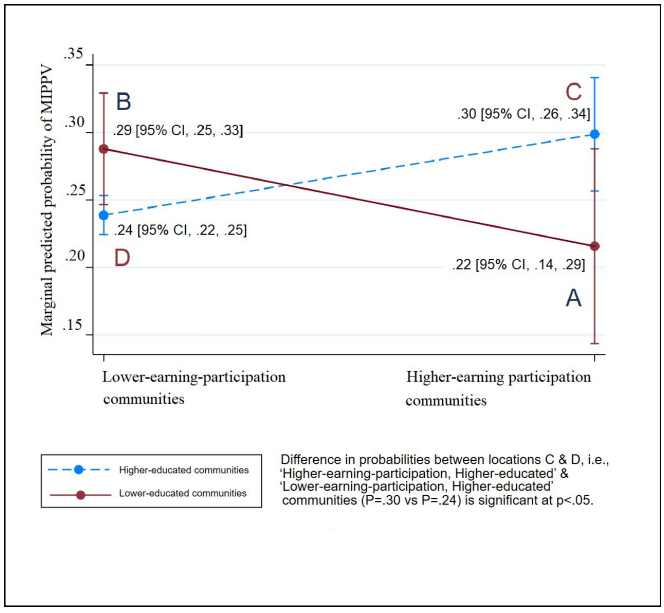

Figure 2 Currently married women's predicted probabilities of experiencing male intimate partner physical violence (MIPPV) across their intersectional community locations in Bangladesh (weighted n=32 697 808; unweighted n=14 557 nested within 911 communities) using multilevel logistic regression model 13 (table 3). See online supplementary file: table S2 for all hypothesised relationships between women's community-level intersectional locations and MIPPV.

that restrict women's work outside home.[40] In these locations, although women's wage work might be viewed as alright when it is necessary to combat poverty, it is otherwise seen as detrimental to family honour and status.[9] In such societies, there may be *male backlash*[18 40] because men are threatened by women collectively breaking out of their gender role. Interestingly, as the Bangladeshi patriarchal system has been gradually evolving, there is evidence suggesting that some men may no longer feel threatened by women's higher education as long as they are not income earning; education might be interpreted as personal improvement, not aimed at threatening patriarchal relations.[40] Therefore, while together higher education and earned income trigger MIPPV, higher education without earning income does not. It is also possible that *higher earning participation, higher educated* communities are undergoing a social transformation, causing instability in family relationships, leading to conflict and MIPPV. Thus, when women's empowerment is viewed as transgressive, it may increase violence.[39]

Our results suggest that *higher earning participation, higher educated* communities need to be prioritised for effective structural interventions. Women's development, labour and education policies and programmes need to enhance women's collective opportunities for education and employment and devise strategies to combat the male backlash that women in these communities may face. One such intervention might be generating *normative empowerment*,[39] leading the community to view women's empowerment as normal and promoting bystander intervention when violence occurs. Creating a women empowerment friendly environment (eg, HERrespect project for garments workers in Bangladesh),[41] increasing earning opportunities for women and men[42] and working with men and women to reduce *harmful masculinity* harnessing positive masculinities (eg, Stepping Stones and Creating Futures projects in South Africa[42]) might be effective. Therefore, communities need not only achieve gender equality in employment and education, but also create women empowerment friendly environment.

This study has several strengths and limitations. We have drawn on intersectionality theory and used multilevel analysis of the most recent, nationally representative, large survey data to examine the association between women's intersectional community-level locations and MIPPV in Bangladesh. Instead of looking at individual-level locations alone, we accounted for these multiple locations to examine the properties of women's communities. Although we did not find support for most of our hypothesised relationships between women's intersectional locations and their experiencing MIPPV, a complex relationship between women's community-level earning and education has revealed a currently invisible intersectional community-level location: *higher earning participation, higher educated* communities. Weaknesses are that cross-sectional data allowed only examination of association, not causation and that communities are defined by PSUs that might not reflect true boundaries of neighbourhoods.[20] However, prior studies have also used PSUs, as they represent small geographic areas.[12–14 16 17 20] In addition, we have used a larger sample to define community characteristics to avoid the same source bias.[20] Because we found very limited evidence for the effect of women's different intersectional community-level locations, future studies will look at the cross-level interactions to examine how women's individual-level locations interact with their community-level locations. Although the CTS2 has limitations, it is considered gold standard.[1] Finally, as we have used a nationally representative survey data and different

What is already known on this subject

- In Bangladesh, married women's individual-level social locations of younger age, lower level of education, earning an income and poverty are well-known risk factors for their experiencing male intimate partner physical violence (MIPPV). However, the effects of their community-level locations are less understood, and the association between women's intersectional community-level locations and MIPPV is not known. Because community-based interventions are considered more effective, it is critical to examine community characteristics that might prevent MIPPV.

What this study adds

- This study revealed an intersectional community location that is currently invisible in the violence against women literature. Interestingly, women living in communities where higher proportions of women who are higher educated and participate in earning an income are more likely to experience MIPPV than those in *lower earning participation, higher educated* communities, indicating a male backlash. Therefore, Bangladeshi violence against women prevention programmes needs to prioritise these communities and create conditions for men to welcome women's empowerment through higher education and earning an income. Future studies should examine the processes of reconstructing masculinities in these communities to address the male backlash to pre-emptively stop MIPPV against women.

countries have different responses to intersectional locations, our findings might be limited only to Bangladesh and similar settings.

CONCLUSION AND POLICY IMPLICATIONS

Reducing MIPPV is a critical SDG for achieving gender equality and human rights in Bangladesh.[4 5] Despite the government's, community's and women's rights groups' commitment to stop violence against women and girls, the national MIPPV prevalence rate remains high.[4] Although we did not find any support for our first hypothesis and very limited support for our second hypothesis, this study sheds light on a currently invisible women's intersectional location: women living in *higher earning participation, higher educated* communities have a higher likelihood of MIPPV. Therefore, these neighbourhoods should be prioritised and met with appropriate policies and interventions. As women development, labour and educational policies and violence against women prevention programmes are poised to invest more in women's collective opportunities for education and employment, they need to pre-emptively address the male backlash. Although we have not examined norms in this study, previous literature[39] indicates that changing community norms might prevent male backlash. Therefore, multisectoral and intersectoral women programmes need to prioritise creating the conditions that encourage communities to view women's empowerment as normal while simultaneously have them join the fight against MIPPV.

Twitter Laila Rahman @laila0987

Acknowledgements Bangladeshi women and girls who participated in the survey deserve our special thanks. We acknowledge the Bangladesh Bureau of Statistic (BBS) for making the survey data available. Md. Karamat Ali was instrumental in our acquiring the data, and Tahid Islam provided important insights on the survey. Members of the Einstein Laboratory of Cognitive Neuroscience, Gender, and Health at the University of Toronto deserve special thanks for their thoughtful comments on this project.

Contributors LR conceived of the study, acquired and analysed the data and wrote the first draft of the manuscript. PO guided the statistical analyses; PO and JDM directed the hypothesis testing and closely reviewed the statistical tables and figures. GE supervised the study and provided intellectual input to the study including ethics approval and data acquisition. GE and JDM critically edited and revised manuscript drafts. All authors contributed to the conceptual framework, interpretation of results and finalising the manuscript.

Funding LR's work is supported by the Canadian Institutes of Health Research, the Frederick Banting and Charles Best Canada Graduate Scholarship. JDM's work is supported in part by the Atkinson Foundation. GE's work is supported by The Wilfred and Joyce Posluns Chair in Women's Brain Health and AgingAgeing (Canadian Institutes of Health Research, The Ontario Brian Institute and The Wilfred and Joyce Posluns Fund).

Disclaimer The views expressed in this article are those of the authors and do not reflect those of the authors' affiliated and sponsored institutes.

Competing interests None declared.

Patient consent for publication Not required.

Ethics approval The University of Toronto gave an ethics review exemption to this secondary, deidentified, cross-sectional survey data analysis project. BBS collected the primary data by conducting the Bangladesh Violence Against Women Survey 2015. BBS reported to have received informed consent before conducting interviews and carried out the survey according to the United Nations and WHO's violence against women ethics guidelines.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement Data may be obtained from a third party and are not publicly available.

ORCID iDs
Laila Rahman http://orcid.org/0000-0001-8117-8481
Janice Du Mont http://orcid.org/0000-0002-4851-1104
Patricia O'Campo http://orcid.org/0000-0003-4549-7324
Gillian Einstein http://orcid.org/0000-0002-0770-5471

REFERENCES

1 Devries KM, Mak JYT, García-Moreno C, *et al*. The global prevalence of intimate partner violence against women. *Science* 2013;340:1527–8.
2 Johnston HB, Naved RT. Spousal violence in Bangladesh: a call for a public-health response. *The Journal of Health, Population and Nutrition* 2008;26:366–77.
3 Krantz G, Garcia-Moreno C. Violence against women. *J Epidemiol Community Health* 2005;59:818–21.
4 Bangladesh Bureau of Statistics. *Report on violence against women survey 2015 Dhaka*. Bangladesh, 2016.
5 Government of the People's Republic of Bangladesh. *Eradicating poverty and promoting prosperity in a changing world: voluntary national review*. Dhaka, Bangladesh, 2017.
6 Heise LL. Violence against women: an integrated, ecological framework. *Violence Against Women* 1998;4:262–90.
7 Kelly UA. Theories of intimate partner violence: from blaming the victim to acting against injustice: intersectionality as an analytic framework. *Advances in Nursing Science* 2011;34:E29–51.
8 O'Campo P, Gielen AC, Faden RR, *et al*. Violence by male partners against women during the childbearing year: a contextual analysis. *Am J Public Health* 1995;85:1092–7.
9 Kandiyoti D. Bargaining with patriarchy. *Gender & Society* 1988;2:274–90.
10 Rahman M, Hoque MA, Mostofa MG, *et al*. Association between adolescent marriage and intimate partner violence: a study of young adult women in Bangladesh. *Asia-Pacific Journal of Public Health* 2014;26:160–8.
11 Yount KM, Crandall A, Cheong YF, *et al*. Child marriage and intimate partner violence in rural Bangladesh: a longitudinal multilevel analysis. *Demography* 2016;53:1821–52.
12 Ackerson LK, Kawachi I, Barbeau EM, *et al*. Effects of individual and proximate educational context on intimate partner violence: a population-based study of women in India. *Am J Public Health* 2008;98:507–14.
13 Amin S, Khan TF, Rahman L, *et al*. Mapping violence against women in Bangladesh: A multilevel analysis of demographic and health survey data. *From Evidence to Policy: Addressing Gender-Based Violence against Women and Girls in Bangladesh*. *Dhaka, Bangladesh: icddr,b* 2013.
14 Boyle MH, Georgiades K, Cullen J, *et al*. Community influences on intimate partner violence in India: women's education, attitudes towards mistreatment and standards of living. *Soc Sci Med* 2009;69:691–7.
15 Koenig MA, Ahmed S, Hossain MB, *et al*. Women's status and domestic violence in rural Bangladesh: individual- and community-level effects. *Demography* 2003;40:269–88.
16 Koenig MA, Stephenson R, Ahmed S, *et al*. Individual and contextual determinants of domestic violence in North India. *Am J Public Health* 2006;96:132–8.
17 Vyas S, Heise L. How do area-level socioeconomic status and gender norms affect partner violence against women? Evidence from Tanzania. *Int J Public Health* 2016;61:971–80.
18 Chin Y-M, backlash M. Male backlash, bargaining, or exposure reduction?: women's working status and physical spousal violence in India. *J Popul Econ* 2012;25:175–200.
19 Franklin CA, Menaker TA. Feminism, status inconsistency, and women's intimate partner victimization in heterosexual relationships. *Violence Against Women* 2014;20:825–45.
20 Ismayilova L. Spousal violence in 5 transitional countries: a population-based multilevel analysis of individual and contextual factors. *Am J Public Health* 2015;105:e12–22.
21 Beyer K, Wallis AB, Hamberger LK. Neighborhood environment and intimate partner violence: a systematic review. *Trauma Violence Abuse* 2015;16:16–47.
22 VanderEnde KE, Yount KM, Dynes MM, *et al*. Community-Level correlates of intimate partner violence against women globally: a systematic review. *Soc Sci Med* 2012;75:1143–55.
23 Kirst M, Lazgare LP, Zhang YJ, *et al*. The effects of social capital and neighborhood characteristics on intimate partner violence: a consideration of social resources and risks. *Am J Community Psychol* 2015;55:314–25.
24 VanderEnde KE, Sibley LM, Cheong YF, *et al*. Community economic status and intimate partner violence against women in Bangladesh: compositional or contextual effects? *Violence Against Women* 2015;21:679–99.
25 Crenshaw KW. Demarginalizing the intersection of race and sex: a black feminist critique of antidiscrimination doctrine, feminist theory, and antiracist politics. *University of Chicago Legal Forum* 1998;14:538–54.

26 Allison PD. *Missing data*. Thousand Oaks, CA: Sage, 2002.
27 Straus MA, Hamby SL, Boney-McCoy S, *et al*. The revised conflict tactics scales (CTS2): development and preliminary psychometric data. *Journal of Family Issues* 1996;17:283–316.
28 Cortina JM. What is coefficient alpha? an examination of theory and applications. *J Appl Psychol* 1993;78:98–104.
29 Bates LM, Schuler SR, Islam F, *et al*. Socioeconomic factors and processes associated with domestic violence in rural Bangladesh. *Int Fam Plan Perspect* 2004;30:190–9.
30 Naved RT, Persson LA. Factors associated with spousal physical violence against women in Bangladesh. *Stud Fam Plann* 2005;36:289–300.
31 Sambisa W, Angeles G, Lance PM, *et al*. Prevalence and correlates of physical spousal violence against women in slum and nonslum areas of urban Bangladesh. *J Interpers Violence* 2011;26:2592–618.
32 Sambisa W, Angeles G, Lance PM, *et al*. Physical and sexual abuse of wives in urban Bangladesh: husbands' reports. *Stud Fam Plann* 2010;41:165–78.
33 Kohler U, Karlson KB, Holm A. Comparing coefficients of nested nonlinear probability models. *Stata J* 2011;11:420–38.
34 Liu X. Applied ordinal logistic regression using Stata: from single-level to multilevel modelling. *Sage* 2016.
35 StataCorp. *Stata survey data reference manual: release 15*. College Station, TX: StataCorp, 2017.
36 Rabe-Hesketh S, Skrondal A. Multilevel modelling of complex survey data. *J Royal Statistical Soc A* 2006;169:805–27.
37 Kutner MH, Nachtsheim CJ, Neter J. *Applied linear regression models*. McGraw-Hill Irwin, 2004.
38 Kiss L, Schraiber LB, Heise L, *et al*. Gender-based violence and socioeconomic inequalities: Does living in more deprived neighbourhoods increase women's risk of intimate partner violence? *Soc Sci Med* 2012;74:1172–9.
39 Schuler SR, Nazneen S. Does intimate partner violence decline as women's empowerment becomes normative? *perspectives of Bangladeshi women World Development* 2018;101:284–92.
40 Littrell RF, Bertsch A. Traditional and contemporary status of women in the patriarchal belt. *Equality, Diversity and Inclusion: An International Journal* 2013;32:310–24.
41 Al Mamun M, Parvin K, Yu M, *et al*. The HERrespect intervention to address violence against female garment workers in Bangladesh: study protocol for a quasi-experimental trial. *BMC Public Health* 2018;18:512.
42 Gibbs A, Jewkes R, Sikweyiya Y, *et al*. Reconstructing masculinity? A qualitative evaluation of the stepping stones and creating futures interventions in urban informal settlements in South Africa. *Cult Health Sex* 2015;17:208–22.