Women's experiences of economic coercion and depressive symptoms in Matlab, Bangladesh

Zara Khan [a], Yuk F. Cheong [b], Stephanie S. Miedema [c], Ruchira T. Naved [d], Kathryn M. Yount [a,c,*]

[a] Hubert Department of Global Health, Emory University, 1518 Clifton Rd NE, Atlanta, GA, 30322, USA
[b] Department of Psychology, Emory University, 36 Eagle Row, Suite 270, Atlanta, GA, 30322, USA
[c] Department of Sociology, Emory University, 1555 Dickey Drive, Tarbutton Hall Room 225, Atlanta, 30322, Georgia
[d] Health Systems and Population Studies Division, International Centre for Diarrhoeal Disease Research, Bangladesh (icddr,b), GPO Box 128, Dhaka, 1000, Bangladesh

A B S T R A C T

Prior studies of the association between intimate partner violence (IPV) and depressive symptoms have typically excluded economic coercion (EC), a prevalent form of IPV worldwide. Here, we used structural equation models (SEM) to estimate the association of EC with depressive symptoms, with and without adjustment for physical/ psychological/sexual IPV, among women in rural Matlab, Bangladesh. Data were collected from cross-sectional surveys with married women 15-49 years, conducted between November 2018 and January 2019. Prior-week depressive symptoms were measured using the 10-item Centre for Epidemiologic Studies Depression short-form. Lifetime EC was assessed using a bi-dimensional, 36-item scale developed in Matlab. Lifetime physical/ sexual/psychological IPV was assessed using the 20-item WHO Domestic Violence module. Covariates were age, age at marriage, and schooling; partner's schooling; and household wealth. Among 929 women, lifetime experience of EC ranged from 41.9% (control over access to work, schooling, and training) to 50.0% (control over use/maintenance of economic resources), while any lifetime physical/psychological/sexual IPV was 89.5%. Coercion involving the use and maintenance of economic resources had a significant, adjusted association with depressive symptoms (standardized coefficient = 0.491, p<0.001, R^2=0.221). The standardized association of any physical/psychological/sexual IPV with depressive symptoms, adjusted for covariates and cluster sampling, was 0.346 (p <0.001, R^2=0.143). When further adjusted for the two measures of EC, the association was attenuated and non-significant (0.049, p = 0.817). These findings suggest that EC is prevalent, significantly associated with depressive symptoms, and attenuates the association of other forms of IPV with depressive symptoms. Addressing EC with other forms of IPV may be necessary to reduce depressive symptoms in exposed women.

1. Introduction

Depression is ranked by the WHO as the leading cause of disability globally and among women, who experience depression more often (5.1%) than do men (3.6%) (Friedrich, 2017; WHO, 2017). More than 80% of the non-fatal burden of depression occurs in low- and middle-income countries (LMICs) (WHO, 2017), where mental health-care infrastructure often is underdeveloped and underfunded. Depression risk in LMICs may be influenced by social factors, such as poverty and income inequality, as well as man-made and natural disasters, including armed conflict (Rathod et al., 2017). Discrimination and social norms against women and members of religious, ethnic, and other

minority groups may increase the burden of depressive disorders in these populations (Rathod et al., 2017). Globally, women are more likely than men to experience adverse life events strongly associated with the onset of depressive episodes, such as prenatal and postnatal stress, physical and sexual abuse, and intimate partner violence (IPV) (Ogbo et al., 2018).

Bangladesh is among the leading contributors to the burden of depressive disorders in South Asia, with an age-standardized depressive disorders prevalence of 4.4% (Ogbo et al., 2018). Among women of reproductive age (15–49 years), the prevalence was 5.8%, higher than that among women globally and among women across LMICs (IHME, 2017). In Bangladesh, IPV is prevalent, with half of ever-married women

---

reporting lifetime physical IPV (49.6%) and over one in four reporting lifetime psychological IPV (28.7%) and sexual IPV (27.3%) (Bangladesh Bureau of Statistics et al., 2016). In 2015, among ever-married women, 24.2% reported psychological IPV, 20.8% reported physical IPV, and 13.3% reported sexual IPV, in the prior 12 months (Bangladesh Bureau of Statistics et al., 2016). Compared to urban areas of Bangladesh, lifetime physical, psychological, and sexual IPV is more prevalent in rural areas, affecting three in four ever-married women (74.8%) (Bangladesh Bureau of Statistics et al., 2016).

Prior studies among women have established a positive association between commonly measured forms of IPV and depressive symptoms. In a systematic review of 13 studies, Devries et al. found odds of depressive symptoms 1.97 times higher among women who had experienced IPV (2013); in a systematic review of 37 studies, Beydoun et al. calculated that 9%–28% of the proportion of major depressive disorder, elevated depressive symptoms, and postpartum depression among women is attributable to lifetime exposure to IPV (2012). However, both reviews rely overwhelmingly on data from high-income countries. We conducted a thorough conceptual review of the literature on women's experiences of intimate partner violence (IPV) and depressive symptoms in LMICs, with a focus on Bangladesh. Between July 15, 2019 and August 31, 2019, we searched PubMed and Google Scholar to identify peer-reviewed English-language publications with the title or abstract keywords "depression", "depressive symptoms", "mental health", and "intimate partner violence" and related terms, such as "domestic violence". In rural Vietnam, women's prior-year exposure to physical and/or sexual IPV increased odds of reporting sadness or depression by 4.5 times (Vung et al., 2009). In Nepal, women with a higher probability of exposure to IPV experienced a higher count of depressive symptoms, and those who had a high probability of experiencing all forms of IPV had a mean weighted symptom count 2.3 times that of those who had a low probability of experiencing any form of IPV (Clark et al., 2019). In Ethiopia, prior-year physical IPV, severe and mild emotional IPV, and high spousal control of women all were statistically significantly associated with a past-year depressive episode (Deyessa et al., 2009).

This literature has focused on physical and sexual forms of IPV; other common forms of IPV are less well studied. Economic coercion (EC) is a form of IPV, which encompasses any coercive behaviours by an intimate partner aimed at controlling the abilities to acquire, use, and maintain economic resources (Adams et al., 2008; Yount et al., 2016; Postmus et al., 2020; Yount et al., n.d.). Perpetrators of EC keep their partners financially dependent and socially isolated (Postmus et al., 2020), and examples of EC behaviors include actively minimizing access to savings and assets (Braaf & Meyering, 2011) and barring a partner from participating in education and/or the workforce (Breckenridge et al., 2014). EC is an important contributor to the "totality of violence" experienced in intimate partnerships (Cook & Parrott, 2009; Dutton & Goodman, 2005; Yount et al., 2016), and women's experiences of EC and other forms of IPV often co-occur (Sanders, 2015; Yount et al., 2016). Existing population-based estimates of EC range from 28% in Northern Vietnam (Yount et al., 2016) to 53% in Bangladesh (Bangladesh Bureau of Statistics 2016). Recently, using the first validated instrument for the measurement of EC in LMICs, the lifetime prevalence of any EC was estimated at 62.3% in Matlab, Bangladesh (Yount et al., n.d.).

In Bangladesh, on balance, prior empirical studies of the association between IPV and depressive symptoms among women have focused on the pregnancy and postpartum periods (Azad et al., 2019; Black et al., 2007; Gausia et al., 2009; Islam et al., 2017a; Islam et al., 2017b; Kabir et al., 2014; Silverman et al., 2007; Surkan et al., 2016). These studies have demonstrated positive associations. As fertility rates in Bangladesh continue to decline (IHME, 2017) and the pregnancy and postpartum periods constitute an increasingly smaller fraction of a woman's lifespan, there is compelling motivation to study the factors that contribute to women's depressive symptoms outside of these periods. Among the few studies in Bangladesh of the influence of IPV on depressive symptoms among women outside of these periods, Esie et al. found a dose-response relationship between the severity of each of psychological, physical, and sexual forms of IPV and the risk of a major depressive episode in a sample of married, non-pregnant women in rural Bangladesh (2019).

Parvin et al. have previously described pathways between various forms of partner violence (physical, sexual, economic, and emotional), workplace violence, and depressive symptoms among female garment workers in Dhaka City (2018). The authors did not find a significant effect of any prior-year IPV on depressive symptoms; instead, IPV was found to significantly increase women's experiences of workplace violence and work-related stress, resulting in the development of depressive symptoms. The non-direct effect of any prior-year IPV on depressive symptoms, in contrast to findings of Esie et al., may relate to differences in the earning status of garment workers and rural women (most of whom do not earn an income); the nature of workplace violence for those who work; and differences in EC experienced by women who work in the formal sector versus women who do not

Here, we examined the relationships of EC with depressive symptoms, accounting for other forms of IPV, using cross-sectional survey data from 929 married women 15–49 years in rural Matlab, Bangladesh. We hypothesize that EC, a form of IPV, will be associated positively with depressive symptoms. This may occur because of the well-documented, deleterious effects of trauma and violence on mental health (Stylianou, 2018). It also may occur indirectly; for instance, EC suppresses women's ability to make autonomous decisions regarding financial resources, including decisions about healthcare, and this may increase susceptibility to depression and other health conditions (Yount et al., n.d.). We also hypothesize a high correlation of EC with other forms of IPV, with women experiencing high levels of EC similarly experiencing high levels of other IPV forms. This analysis aims to provide a more comprehensive picture of how various co-occurring forms of partner violence and coercion contribute to women's experiences of depressive symptoms. To the best of our knowledge, this is the first study to assess the independent association of EC and depressive symptoms, net of other forms of IPV, in a LMIC.

2. Methods

2.1. Study design and participants

The Institutional Review Boards of Emory University and the International Centre for Diarrhoeal Diseases, Bangladesh (icddr,b) reviewed and approved the study protocol. Survey data were collected in the rural Matlab sub-district of Bangladesh as part of *Measuring economic coercion against wives in Bangladesh*, a mixed-methods study to develop and validate a comprehensive scale to measure exposure to EC (Yount et al., n.d.). The Matlab sub-district is located 55 km southeast of the capital, Dhaka. The population of Matlab is approximately 500,000 and 88% Muslim. Though most households have diverse sources of income, the main sources are remittances (33%), business (24%) and services (21%); despite gains, Matlab remains a relatively poor setting, and about 49% of households own no agricultural land ("Registration of health and demographic events 2016, Scientific Report No. 138," 2018). The mean age at first marriage for women is 19.1 years ("Registration of health and demographic events 2016, Scientific Report No. 138," 2018).

Eligible study participants were married women 15–49 years living with their husbands, a sample that reflects societal expectations for formal marital unions and includes younger women, who are at higher risk of IPV in Bangladesh (Rahman et al., 2014). The sample was drawn from a random sample of 30 of the 142 villages included in the Matlab Health and Demographic Surveillance System (HDSS), maintained by the icddr,b. The HDSS infrastructure enabled cost-effective sampling for this study. In each selected village, 44 households with one or more eligible participant were selected. One eligible participant was randomly selected per household to ensure privacy. Fieldwork was

conducted between November 2018 and January 2019.

Nine hundred and thirty of 1,019 eligible women were interviewed, for a response rate of 91%. Study participants completed a 12-module questionnaire that covered topics including their household assets/ amenities and household member demographics; family and demographic background; husbands' demographic background; economic activities; assets owned by their households and by them individually; household borrowing behaviours; depressive symptoms; group membership and social support; various forms of agency, including attitudes about gender and IPV against women; exposure to EC; and exposure to psychological, physical, and sexual IPV. One participant was missing outcome data and was excluded from analysis, leading to a final analytic sample size of 929.

2.2. Outcome

Prior-week depressive symptoms were captured using a shortened form of the Center for Epidemiologic Studies Depression (CES-D) scale (Zhang et al., 2012). The 10-item short form has been used previously in Bangladesh (Wagg et al., 2019) and has been validated among this sample of women. Participants were asked how often they experienced each of 10 items associated with depression, including feeling fearful, feeling lonely, and experiencing restless sleep. Response options were on a 4-point ordinal scale, ranging from *rarely or none of the time/less than 1 day a week* (0), *some or a little of the time/1–2 days a week* (1), *moderate amount of time/3–4 days a week* (2), to *most or all of the time/5–7 days a week* (3). Following confirmatory factor analysis (CFA), the item *"I felt hopeful about the future"* was dropped because it did not load adequately (CFA results available upon request). Nine items were retained.

Because the original, 20-item CES-D scale and the 10-item CES-D short form version are screening tools, not diagnostic tools (Radloff, 1977; Weismann et al., 1977), we interpreted the measured outcome specifically as *depressive symptoms* and not depression, which requires clinical diagnosis. To the best of our knowledge, the diagnostic validity of the CES-D-10 has not been established in Bangladesh. In the few studies from China and the United States, cut-offs for the CES-D 20 have ranged widely, from 8 to 16 (Weismann et al., 1977; Irwin et al., 1999; Cheng & Chan, 2005; Björgvinsson, et al., 2013), while in South Africa, optimal cut-offs varied from 11 to 13 across the three major language groups (Baron et al., 2017). Modelling depressive symptoms as a continuous latent variable allowed us to avoid the use of a cut-off score that may have been inappropriate for the context of Bangladesh. Moreover, modelling the outcome as a latent variable accounted for measurement errors and covariance between items.

2.3. Exposure

Lifetime experience of EC was assessed using the validated 36-item Economic Coercion Scale (ECS-36) (Yount et al., n.d.). This bi-dimensional model for EC captured access to work, schooling, and training (14 items modelled as latent variable "EC1") as well as control over use and maintenance of economic resources (22 items modelled as latent variable "EC2"). To capture variation in EC and EC in totality, both measures of EC included items that are less and more severe. Example EC1 items included "Has your husband or partner ever disallowed you to go to your work, school or training, or do any home-based income earning activity?" and "Has your husband or partner ever demanded that you quit your job, schooling or training?" Example EC2 items included "Has your husband or partner ever refused to give you money to buy food, clothes or other necessities, even when he had the money?" and "Has your husband or partner ever beaten you up if you challenged his financial decisions?" Participants indicated whether they had ever experienced *(yes/no)* each item. In descriptive analyses, for each measure of EC, an overall score greater than 1 indicated ever-experience of the measure. Each measure of EC was modelled as a continuous latent variable in the SEM analysis.

2.4. Covariates

Lifetime experience of physical, sexual, and/or psychological IPV was assessed using a set of 20 questionnaire items developed by the World Health Organization (García-Moreno et al., 2005). Women indicated whether they had ever-experienced each of the 20 items *(1=yes/0=no)*. For descriptive analyses, women who replied "yes" to at least one item were categorized as having ever-experienced any physical, sexual, and/or psychological IPV. Given our aim of assessing the independent contribution of EC to depressive symptoms, adjusting for other forms of IPV, we used a unidimensional model for other forms of IPV, as did Parvin et al. (2018). The unidimensional model was validated through CFA (model fit: root mean square error of approximation 0.09; comparative fit index 0.92; Tucker–Lewis index 0.91). The 20 items were used to construct a latent variable for any physical, sexual, and/or psychological IPV ("any IPV").

Potential confounders of the associations between EC, IPV, and depressive symptoms included the respondent's age and schooling level, partner's schooling level, and household socioeconomic status (SES) (Abramsky et al., 2011; Esie et al., 2019; Islam et al., 2017b). Age, schooling level, and partner's schooling level were modelled as continuous variables. For household SES, a principal components analysis (PCA) was conducted following Demographic Health Survey guidelines, and the score derived from the first principal component was retained (Rutstein, 2015).

2.5. Analysis

To examine the sample characteristics and the rates of the outcome and exposure variables and covariates, descriptive analyses were performed using STATA version 16 (College Station, TX). Factor scores were generated for prior-week depressive symptoms, and distributions of the exposure and covariates were compared across tertiles of the CES-D9 factor-score (lower, middle, and higher.) Chi-square tests were used to test independence of assocations between categorical variables. Mean differences for continuous variables were tested using one-way ANOVA or t-tests.

For all statistical tests, structural equation models (SEM) were estimated to explore the paths from EC and other forms of IPV to depressive symptoms, allowing latent variables for EC and IPV to be correlated. Variables included in the model were based on theory, empirical studies, and bivariate analyses in the study sample. Models for the associations of EC with depressive symptoms were estimated with and without covariates, and standardized coefficients were reported. Path models were fitted using maximum likelihood missing value (mlmv) estimation to model all available data. The comparative fit index (CFI >0.95), Tucker-Lewis Index (TLI >0.95), and root mean square error of approximation (RMSEA <0.05) were used to assess model fit (Barrett, 2007). All SEM analyses were conducted with *MPlus* version 8 (Muthén & Muthén, 1998–2017). All analyses were adjusted for the cluster sampling design.

2.6. Role of funding source

The funders of the study had no role in study design, data collection, data analysis, data interpretation, or writing of the report. The lead authors and senior author had full access to all the data in the study and were responsible for the final review of the manuscript. All authors approved the final version of the manuscript before submission for publication.

3. Results

3.1. Sample description

Among study participants (N = 929), the mean factor score for prior-

week depressive symptoms was 0.16 (SE 0.07), with scores ranging from -2.10 to -1.10 for the lower tertile, -1.00 to 0.88 for the middle tertile, and 0.88 to 6.30 for the higher tertile (Table 1). On average, women in the higher tertile more often experienced EC than did women in the lower tertile. While 49.5% of women in the higher tertile reported ever experiencing coercion in accessing work, schooling, and training (EC1), 29.3% of women without symptoms reported the same. Over half of women in the higher tertile reported ever experiencing coercion surrounding the use or maintenance of economic resources (EC2) (66.0%), compared to 33.4% of women in the lower tertile. Lifetime experience of any physical, sexual, and/or psychological IPV also differed by experience of any prior-week depressive symptoms, with 86.6% of the lower tertile and 93.2% of the higher tertile reporting any lifetime experience.

Co-occurrence of EC and IPV also was assessed. A higher percentage of women in the higher tertile experienced both forms of EC (40.5%) than did women in the lower tertile (17.0%). Women in the higher tertile also reported experiencing at least one instance of all forms of violence (i.e. both forms of EC, along with physical, sexual, and/or psychological IPV) more than twice as often than did women in the lower tertile (38.5% and 16.7%, respectively).

On average, women in the higher tertile of depressive symptoms were older, had less formal schooling, and had partners with less formal schooling. The mean age of women in the higher tertile reporting any depressive symptoms was 35.9 years, compared to 33.7 years for women in the lower tertile. A lower percentage of women in the higher tertile

(46.6%) than women in the lower tertile (59.4%) had completed six or more years of schooling. Similarly, compared to women in the lower tertile, women in the higher tertile less often had partners who had completed six or more years of formal schooling (53.4% versus 43.7%). While 71.2% of women in the higher tertile lived in relatively lower- or moderate-wealth households, a lower percentage of women in the lower tertile (63.0%) had similar wealth status. The mean age at first marriage, which did not vary across tertiles, was 17.0 years for the overall sample.

Table 2 reports mean factor scores for depressive symptoms by lifetime experiences of coercion/violence. Women who had experienced EC1, EC2, or both EC1 and EC2 had statistically significantly higher mean factor scores for depressive symptoms than women who reported no experiences of violence and/or coercion. Further, women who had any lifetime experience of physical, sexual, and/or psychological IPV (whether alone, in combination with EC1 or EC2, or in combination with EC1 and EC2) had statistically significantly higher mean depressive symptoms scores.

3.2. Latent-variable structural equation model results

3.2.1. Correlations of EC and other forms of IPV

Fig. 1 depicts all paths modelled with the structural equations. Fig. 1a depicts the correlations between all measured forms of IPV (EC, physical IPV, sexual IPV, and psychological IPV). The correlation between both forms of EC (i.e. coercion in accessing work, schooling, and

Table 1
Descriptive characteristics of the study sample by prior-week depressive symptoms (factor score tertiles), married women ages 15–49 years in Matlab sub-district, Bangladesh (N = 929).

	Total (n = 929)		Prior-week depressive symptoms Overall mean: 0.16 (SE 0.07)						
			Lower (Range: -2.10, -1.10) n = 335		Middle (Range: -1.00, 0.88) n = 285		Higher (Range: 0.88, 6.30) n = 309		
	%	Mean (SE)[a]	%	Mean (SE)	%	Mean (SE)	%	Mean (SE)	p
Age in years		35.0 (0.4)		33.7 (0.5)		35.4 (0.5)		35.9 (0.4)	**0.01**
15-19	2.9		4.5		2.5		1.6		
20-24	10.8		12.8		11.9		7.4		
25-29	13.0		15.8		11.6		11.3		
30-34	19.7		19.1		18.3		21.7		
35-39	18.5		16.7		18.6		20.1		
40-44	19.2		18.8		19.0		19.7		
45-50	15.9		12.2		18.3		18.1		
Age at first marriage		17.0 (0.1)		17.1 (0.2)		16.9 (0.2)		17.0 (0.2)	0.64
Under 15	18.4		13.4		19.7		22.7		
15-19	65.1		70.5		64.9		59.6		
20-24	13.9		13.1		13.0		15.5		
25-29	2.2		2.1		2.4		1.9		
30+	0.4		0.9		-		0.3		
Highest class completed		6.1 (0.3)		6.5 (0.2)		6.1 (0.2)		5.6 (0.2)	0.07
No education	15.0		14.6		13.3		16.8		
1–5 years of education	32.4		26.0		35.4		36.6		
≥6 years of education	52.6		59.4		41.2		46.6		
Partner highest class completed		6.0 (0.3)		6.6 (0.3)		6.3 (0.3)		5.3 (0.3)	**<0.01**
No education	19.7		17.0		17.9		24.3		
1–5 years of education	30.6		29.6		30.2		32.0		
≥6 years of education	49.7		53.4		41.9		43.7		
Household wealth index									0.15
Lower income	34.1		31.9		33.7		36.9		
Moderate income	32.0		31.0		30.5		34.3		
Higher income	33.9		37.0		35.8		28.8		
Lifetime experiences of coercion/violence									
Coercion in accessing work, schooling, or training (EC1)	41.9		29.3		48.4		49.5		**<0.01**
Coercion in use/maintenance of economic resources (EC2)	50.0		33.4		51.9		66.0		**<0.01**
EC1 with EC2	30.0		17.0		34.0		40.5		**<0.01**
Physical/sexual/psychological partner violence (IPV)	89.5		86.6		88.8		93.2		**0.02**
EC1 with physical/sexual/psychological IPV	38.5		26.6		43.9		46.6		**0.02**
EC2 with physical/sexual/psychological IPV	47.4		31.3		49.8		62.5		**<0.01**
All forms of violence	28.7		16.7		32.3		38.5		**<0.01**

[a] All reported standard errors adjusted for cluster sample design.

Table 2
Mean prior-week depressive symptoms (factor scores) by lifetime experiences of coercion/violence, married women ages 15–49 years in Matlab sub-district, Bangladesh (N = 929).

Lifetime experiences of coercion/violence	None		Any		p
	N	Mean depressive symptoms (SE)[a,b]	N	Mean depressive symptoms (SE)	
Coercion in accessing work, schooling, or training (EC1)	540	−0.08 (0.09)	389	0.48 (0.09)	**<0.01**
Coercion in use/ maintenance of economic resources (EC2)	465	−0.31 (0.10)	464	0.62 (0.10)	**<0.01**
EC1 with EC2	650	−0.08 (0.09)	279	0.70 (0.10)	**<0.01**
Physical/sexual/ psychological partner violence (IPV)	98	−0.36 (0.16)	831	0.22 (0.07)	**<0.01**
EC1 with physical/ sexual/ psychological IPV	571	−0.06 (0.09)	358	0.51 (0.09)	**<0.01**
EC2 with physical/ sexual/ psychological IPV	489	−0.27 (0.10)	440	0.63 (0.10)	**<0.01**
All forms of violence	662	−0.06 (0.09)	267	0.69 (0.10)	**<0.01**

[a] All reported standard errors adjusted for cluster sample design.
[b] Factor scores for prior-week depressive symptoms range from -2.1 (lowest) to 6.3 (highest).

training, and coercion involving the use or maintenance of economic resources) was moderate (0.55). The correlation between EC in accessing work, schooling, and training (EC1) and any IPV was low (0.39), while the correlation between EC involving the use or maintenance of economic resources (EC2) and any IPV was high (0.76).

3.2.2 Fully-adjusted models with economic coercion, other forms of IPV, and depressive symptoms.

In a model adjusted for all covariates but no measure of EC (Fig. 1b), lifetime experience of physical, sexual, and/or psychological IPV was significantly, positively associated with prior-week depressive symptoms (estimate 0.346, SE 0.038, p<0.001). When both measures of EC were added to this model (Fig. 1c), lifetime experience of physical/ sexual/psychological IPV no longer had a significant association with prior-week depressive symptoms. In this model, economic coercion involving control over the use and maintenance of economic resources (EC2) was significantly associated with prior-week depressive symptoms, with a coefficient of 0.491 (SE 0.093, p<0.001).

4. Discussion

The high prevalence of depressive symptoms among women in our sample reaffirmed previous findings in rural Bangladesh (Bangladesh Bureau of Statistics et al., 2016; IHME, 2017; Ogbo et al., 2018). Further, our study demonstrated that EC is a prevalent form of IPV against women in Matlab. EC often co-occurred with physical, psychological, and/or sexual forms of IPV, contributing substantively to the totality of violence that women in Matlab experience.

EC involving control over the use and maintenance of economic resources had a significantpositive association with women's prior-week depressive symptoms when adjusting for covariates, including other forms of IPV. This finding indicates that researchers who are not
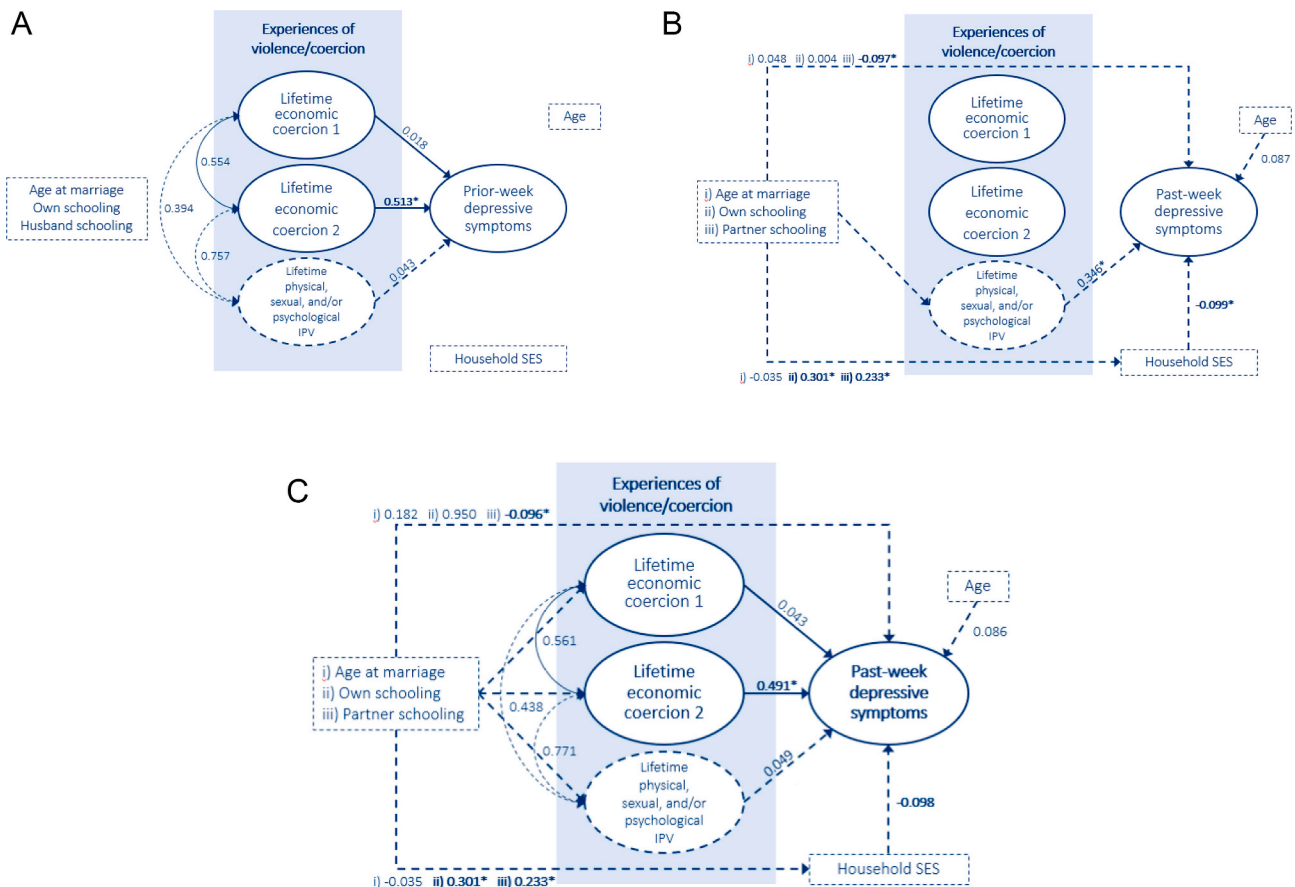
Fig. 1. Path models of the associations between economic coercion, other forms of IPV,and depressive symptoms.

systematically measuring women's experiences of EC are likely obtaining overestimates of the association between otherforms of IPV and depressive symptoms. Unbiased estimates are imperative to advancing our understanding of the myriad ways in which violence against women (VAW) affects women's health and to develop effective interventions for ending VAW. To this end, violence-specific surveys and multi-purpose surveys with violence modules should include validated questions on EC (Yount et al., n.d.), and future analyses of the psychological and physical health consequences of IPV, especially in LMICs where EC is prevalent, should include measures of EC.

Our study relied on a bi-dimensional measure of economic coercion, which allowed us to discern the associations of different forms of economic coercion with depressive symptoms. While coercive control over the use and maintenance of economic resources (EC2) had a statistically significant adjusted association with depressive symptoms, coercion involving access to work, schooling, and travel (EC1) did not. Items included in the latter form of coercion (such as "picking fights to prevent a partner from going to school or work") may be less severe than those that comprise the former form of coercion (such as "making a partner fear the consequences if they asked for money").

In Islamic countries, women are entitled to retain their financial resources (Chowdhury, 2016), and denial of this religious right by a partner may contribute to the observed association between women's exposure to EC2 and their depressive symptoms. Meanwhile, because compliance with rigid gender roles and constraints on women's activity are common in this setting (Yount et al., n.d.), women may tolerate coercion involving access to work, schooling, and travel without experiencing depressive symptoms. The lack of association may reflect normative expectations among women with respect to their access to work, schooling and travel; that is, women who live in restrictive environments may not expect to have choices to go to work, school, outside, so their effective coping around these constraints may protect against adverse influences on their mental health and wellbeing.

Because the data were cross-sectional, we were unable to ascertain the temporal sequence between the exposure and outcome. To mitigate this limitation, we used lifetime measures for the variables economic coercion, IPV, and prior-week depressive symptoms. However, there also is evidence in the literature to suggest a reverse causal path where depressive symptoms may increase the risk of IPV. For instance, in a qualitative study of women in Matlab, participants reported feeling at risk of physical violence if their depressive symptoms made them incapable of carrying out household chores (Selim, 2010).

Another limitation in our analysis was the lack of data for other potential confounders or modifiers of the associations between IPV and EC and depressive symptoms. For example, the model did not consider social support, which may buffer the effects of violence on depressive symptoms (Zukauskiene et al., 2019). Other unmeasured variables that likely affect the association between violence and depressive symptoms is adverse childhood experiences and witnessing or experiencing violence in the childhood home. Our inability to adjust for these potential confounders may have biased our estimates away from the null.

While our prevalence estimates are not generalizable beyond Matlab, Bangladesh, we anticipate that our finding of a significant association between EC and depressive symptoms may be replicated in LMIC settings where EC is common. As women's economic opportunities continue to expand in Bangladesh and other LMICs, programming should aim to prevent women's exposure to EC alongside other forms of IPV.

Credit Author Statement

Zara Khan: Formal analysis; Methodology; Writing - original draft; Visualization (Figures). **Fai Cheong:** Methodology; Supervision; Writing - review & editing. **Stephanie Miedema:** Methodology; Supervision; Writing - review & editing. **Ruchira Naved:** Methodology; Supervision; Project administration; Writing - review & editing. **Kathryn Yount:** Conceptualization; Methodology; Software (REDCap data system); Resources (instrumentation); Data Curation (range/consistency checks); Writing - Review & Editing; Visualization (Figures); Supervision; Project administration; Funding acquisition

Data sharing

Study data in this paper, including anonymised individual participant data, will be made available upon publication to members of the scientific and medical community for non-commercial use only. Requests should be made to the corresponding author.

Ethics approval

The Institutional Review Boards of Emory University (IRB00097428) and the International Centre for Diarrheal Diseases Research, Bangladesh (icddr,b) (PR17077) reviewed and approved the study protocol.

Declaration of competing interest

The authors have no conflicts of interest to report.

Acknowledgments

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ssmph.2020.100641.

References

Abramsky, T., Watts, C. H., Garcia-Moreno, C., Devries, K., Kiss, L., Ellsberg, M., et al. (2011). 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, 11*, 109.

Adams, A. E., Sullivan, C. M., Bybee, D., & Greeson, M. R. (2008). Development of the scale of economic abuse. *Violence Against Women, 14*, 563–588.

Azad, R., Fahmi, R., Shrestha, S., Joshi, H., Hasan, M., Khan, A. N. S., et al. (2019). Prevalence and risk factors of postpartum depression within one year after birth in urban slums of Dhaka, Bangladesh. *PloS One, 14*, Article e0215735.

Bangladesh Bureau of Statistics, & Statistics, & Division, I.. (2016). *Report on violence against women (VAW) survey 2015*.

Baron, E. C., Davies, T., & Lund, C. (2017). Validation of the 10-item centre for epidemiological studies depression scale (CES-D-10) in Zulu, Xhosa and Afrikaans populations in South Africa. *BMC psychiatry, 17*(1), 6.

Barrett, P. (2007). Structural equation modelling: Adjudging model fit. *Personality and Individual Differences, 42*, 815–824.

Beydoun, H. A., Beydoun, M. A., Kaufman, J. S., Lo, B., & Zonderman, A. B. (2012). Intimate partner violence against adult women and its association with major depressive disorder, depressive symptoms and postpartum depression: a systematic review and meta-analysis. *Social science & medicine, 75*(6), 959–975.

Björgvinsson, T., Kertz, S. J., Bigda-Peyton, J. S., McCoy, K. L., & Aderka, I. M. (2013). Psychometric properties of the CES-D-10 in a psychiatric sample. *Assessment, 20*(4), 429–436.

Black, M. M., Baqui, A. H., Zaman, K., McNary, S. W., Le, K., Arifeen, S. E., … Black, R. E. (2007). Depressive symptoms among rural Bangladeshi mothers: implications for infant development. *Journal of Child Psychology and Psychiatry, 48*(8), 764–772.

Breckenridge, J., Walden, I., & Flax, G. (2014). *Staying home leaving violence evaluation: Final report* (pp. 1–149). Sydney, Australia: Gendered Violence Research Network, UNSW.

Cheng, S. T., & Chan, A. C. M. (2005). *The Center for Epidemiologic Studies Depression Scale in older Chinese: thresholds for long and short forms. International journal of geriatric psychiatry, 20,* 465–470.

Chowdhury, F. D. (2016). *Islam and women's income: Dowry and law in Bangladesh.* Taylor & Francis.

Clark, C. J., Cheong, Y. F., Gupta, J., Ferguson, G., Shrestha, B., Shrestha, P. N., & Yount, K. M. (2019). Intimate partner violence in Nepal: Latent patterns and association with depressive symptoms. *SSM-Population Health, 9,* 100481.

Cook, S., & Parrott, D. (2009). Exploring a taxonomy for aggression against women: Can it aid conceptual clarity? *Aggressive Behavior: Official Journal of the International Society for Research on Aggression, 35,* 462–476.

Devries, K. M., Mak, J. Y., Bacchus, L. J., Child, J. C., Falder, G., Petzold, M., … Watts, C. H. (2013). Intimate partner violence and incident depressive symptoms and suicide attempts: a systematic review of longitudinal studies. *PLoS medicine, 10* (5).

Deyessa, N., Berhane, Y., Alem, A., Ellsberg, M., Emmelin, M., Hogberg, U., & Kullgren, G. (2009). *Intimate partner violence and depression among women in rural Ethiopia: a cross-sectional study. Clinical practice and epidemiology in mental health, 5* (1), 8.

Dutton, M. A., & Goodman, L. A. (2005). Coercion in intimate partner violence: Toward a new conceptualization. *Sex Roles, 52,* 743–756.

Esie, P., Osypuk, T. L., Schuler, S. R., & Bates, L. M. (2019). Intimate partner violence and depression in rural Bangladesh: Accounting for violence severity in a high prevalence setting. *SSM-population health, 7,* 100368.

Friedrich, M. J. (2017). Depression is the leading cause of disability around the World. *Journal of the American Medical Association, 317.*

García-Moreno, C., Jansen, H., Ellsberg, M., Heise, L., & Watts, C. (2005). *WHO multi-country study on women's health and domestic violence against women* (Vol. 204, pp. 1–18). Geneva: World Health Organization.

Gausia, K., Fisher, C., Ali, M., & Oosthuizen, J. (2009). Antenatal depression and suicidal ideation among rural Bangladeshi women: a community-based study. *Archives of women's mental health, 12*(5), 351.

IHME. (2017). *GBD compare.* Seattle, WA: IHME, University of Washington.

Irwin, M., Artin, K. H., & Oxman, M. N. (1999). *Screening for depression in the older adult: criterion validity of the 10-item Center for Epidemiological Studies Depression Scale (CES-D). Archives of internal medicine, 159*(15), 1701–1704.

Islam, M. J., Broidy, L., Baird, K., & Mazerolle, P. (2017). Intimate partner violence around the time of pregnancy and postpartum depression: The experience of women of Bangladesh. *PloS One, 12,* Article e0176211.

Islam, M. J., Mazerolle, P., Broidy, L., & Baird, K. (2017). Exploring the prevalence and correlates associated with intimate partner violence during pregnancy in Bangladesh. *Journal of Interpersonal Violence,* Article 0886260517730029.

Kabir, Z. N., Nasreen, H. E., & Edhborg, M. (2014). Intimate partner violence and its association with maternal depressive symptoms 6-8 months after childbirth in rural Bangladesh. *Global Health Action, 7,* 24725.

Muthén, L. K., & Muthén, B. O. (1998-2017). *Mplus user's guide.* Los Angeles, CA: Muthén & Muthén.

Ogbo, F. A., Mathsyaraja, S., Koti, R. K., Perz, J., & Page, A. (2018). The burden of depressive disorders in South Asia, 1990-2016: Findings from the global burden of disease study. *BMC Psychiatry, 18,* 333.

Parvin, K., Al Mamun, M., Gibbs, A., Jewkes, R., & Naved, R. T. (2018). The pathways between female garment workers' experience of violence and development of depressive symptoms. *PloS one, 13*(11).

Postmus, J. L., Hoge, G. L., Breckenridge, J., Sharp-Jeffs, N., & Chung, D. (2020). Economic abuse as an invisible form of domestic violence: A multicountry review. *Trauma, Violence, & Abuse, 21*(2), 261–283.

Radloff, L. S. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied psychological measurement, 1*(3), 385–401.

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

Rathod, S., Pinninti, N., Irfan, M., Gorczynski, P., Rathod, P., Gega, L., et al. (2017). Mental health service provision in low-and middle-income countries. *Health Services Insights, 10,* 1178632917694350.

Registration of health and demographic events 2016, Scientific Report No 138. (2018). *Dhaka: Health and demographic surveillance system–matlab.*

Rutstein, S. O. (2015). *Steps to constructing the new DHS wealth index.* Rockville, MD: ICF International.

Sanders, C. K. (2015). Economic abuse in the lives of women abused by an intimate partner: A qualitative study. *Violence Against Women, 21,* 3–29.

Selim, N. (2010). *Cultural dimensions of depression in Bangladesh: A qualitative study in two villages of Matlab.*

Silverman, J. G., Gupta, J., Decker, M. R., Kapur, N., & Raj, A. (2007). Intimate partner violence and unwanted pregnancy, miscarriage, induced abortion, and stillbirth among a national sample of Bangladeshi women. *BJOG: An International Journal of Obstetrics and Gynaecology, 114,* 1246–1252.

Stylianou, A. M. (2018). Economic abuse experiences and depressive symptoms among victims of intimate partner violence. *Journal of family violence, 33*(6), 381–392.

Surkan, P. J., Sakyi, K., Strobino, D. M., Mehra, S., Labrique, A., Ali, H., et al. (2016). Depressive symptoms in mothers after perinatal and early infant loss in rural Bangladesh: A population-based study. *Annals of Epidemiology, 26,* 467–473.

Vung, N. D., Ostergren, P. O., & Krantz, G. (2009). Intimate partner violence against women, health effects and health care seeking in rural Vietnam. *European Journal of Public Health, 19*(2), 178–182.

Wagg, A., Chowdhury, Z., Galarneau, J. M., Haque, R., Kabir, F., MacDonald, D., … Cherry, N. (2019). Exercise intervention in the management of urinary incontinence in older women in villages in Bangladesh: a cluster randomised trial. *The Lancet Global Health, 7*(7), e923–e931.

Weissman, M. M., Sholomskas, D., Pottenger, M., Prusoff, B. A., & Locke, B. Z. (1977). Assessing depressive symptoms in five psychiatric populations: a validation study. *American journal of epidemiology, 106*(3), 203–214.

WHO. (2017). *Depression and other common mental disorders: Global health estimates.* World Health Organization.

Yount, K. M., Cheong, F. C., Miedema, S.S., & Naved, R. T. (n.d.). Development and Validation of the Economic Coercion Scale (ECS-36) in Rural Bangladesh.

Yount, K. M., Krause, K. H., & VanderEnde, K. E. (2016). Economic coercion and partner violence against wives in Vietnam: a unified framework? *Journal of interpersonal violence, 31*(20), 3307–3331.

Zhang, W., O'Brien, N., Forrest, J. I., Salters, K. A., Patterson, T. L., Montaner, J. S., et al. (2012). Validating a shortened depression scale (10 item CES-D) among HIV-positive people in British Columbia, Canada. *PloS One, 7,* Article e40793.

Zukauskiene, R., Kaniusonyte, G., Bergman, L. R., Bakaityte, A., & Truskauskaite-Kuneviciene, I. (2019). The role of social support in identity processes and posttraumatic growth: A study of victims of intimate partner violence. *Journal of Interpersonal Violence,* 886260519836785.

Braaf, R., & Meyering, I. B. (2011). Seeking security: promoting women's economic wellbeing following domestic violence.