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Social support and intimate partner violence in rural Pakistan: A longitudinal investigation of the bi-directional relationship

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A B S T R A C T

A large body of cross-sectional evidence finds strong and consistent associations between social support and intimate partner violence (IPV). However, the directionality of this relationship has not been firmly established due to a dearth of longitudinal evidence. Using cohort study data collected over a 3 year period from 945 women in rural Pakistan, we investigated the longitudinal relationship between IPV and social support. Friend and family social support was measured with the Multidimensional Perceived Social Support Scale, and IPV was measured with questions adopted from the World Health Organization's Violence Against Women Instrument, which was used to construct a measure of IPV severity. We estimated longitudinal associations in linear regression models that controlled for women's educational level, age at marriage, age, household composition, household assets, depressive symptoms, and Adverse Childhood Experiences. We found evidence of a bi-directional, mutually re-enforcing relationship that showed unique associations by type of social support. Specifically, we found that high social support from family, though not friends, decreased IPV severity 1 year later, and that higher IPV severity led to reductions in both friend and family social support 1 year later. Results suggest that interventions involving family members could be especially effective at reducing IPV in this context, and – given that low social support leads to many adverse health outcomes – results suggest that IPV can result in secondary harms due to diminished social support. In summary, our study confirms a bi-directional relationship between IPV and social support and suggests that IPV interventions that integrate social support may be especially effective at reducing IPV and mitigating secondary harms.

1. Introduction

Intimate partner violence (IPV), defined as "any behavior within an intimate relationship that causes physical, psychological, or sexual harm to those in the relationship" (Heise & Garcia Moreno, 2002), is highly prevalent throughout the world, with an estimated 30% of women experiencing physical or sexual abuse by an intimate partner in her lifetime (Devries et al., 2013). IPV can have substantial negative effects on health and well-being and is linked with many adverse outcomes for women, including poor general health, chronic pain, post-traumatic stress disorder, depression, and suicide (Campbell, 2002).

Low social support may be an additional consequence of IPV – or alternatively a risk factor for IPV – yet the directionality of this relationship is not well-established. While consistently associated with each other in cross-sectional research (Al-Modallal, 2012; Awwad et al., 2014; Belay, Astatkie, Emmelin, & Hinderaker, 2019; Carlson, McNutt, Choi, & Rose, 2002; Coker, Watkins, Smith, & Brandt, 2003; Creech et al., 2021; Daoud, Sergienko, O'Campo, & Shoham-Vardi, 2017; Dias et al., 2019; Farid, Saleem, Karim, & Hatcher, 2008; Farris & Fenaughty, 2002; Fernbrant, Emmelin, Essén, Östergren, & Cantor-Graae, 2014; Gielen, O'Campo, Faden, Kass, & Xue, 1994; González Cases et al., 2014; Hayashi, Patterson, Semple, Fujimoto, & Stockman, 2016; Hou, Cerulli, Wittink, Caine, & Qiu, 2018; Islam, Mazerolle, Broidy, & Baird, 2021; Jackson et al., 2015; Kapadia, Saleem, & Karim, 2010; Katerndahl, Burge, Ferrer, Becho, & Wood, 2013; Kirst, Lazgare, Zhang, & O'Campo, 2015; Lanier & Maume, 2009; Lee & Lee, 2018; Lövestad & Krantz, 2012; Millett, Seay, & Kohl, 2015; Naeem, Irfan, Zaidi, Kingdon, & Ayub, 2008; Navarrete, Nieto, & Lara, 2021; Nguyen et al., 2018; Nybergh, Taft, Enander, & Krantz, 2013; Ogbonnaya, Wanyenze, Reed, Silverman, & Kiene, 2020; Othman, Yuen, Mohd Zain, & Abdul Samad, 2021; Ragavan, Culyba, Shaw, & Miller, 2020; Ribeiro et al., 2017; Schultz, Walls, & Grana, 2021; Sigalla et al., 2017; Spangenberg, Wobil,

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Betts, Wiesner, & Gold, 2016; Thananowan & Vongsirimas, 2016; Umubyeyi, Persson, Mogren, & Krantz, 2016; Vives-Cases et al., 2011, 2014; Watson-Singleton et al., 2020; Woerner & Sullivan, 2019), few longitudinal studies exist (Escribà-Agüir et al., 2013; Goodman, Dutton, Vankos, & Weinfurt, 2005; Staggs, Long, Mason, Krishnan, & Riger, 2007), and these few studies have reached mixed conclusions. Understanding the directionality of this relationship has implications for the design of more effective strategies to intervene upon IPV (e.g., if low social support is a risk factor for IPV, interventions that strengthen support networks may be more effective at reducing IPV), or mitigating secondary harms as a result of abuse (e.g., if IPV leads to low social support, increasing social support among IPV survivors may protect against adverse health consequences due to low support, such as depression and poor physical health (Ozbay et al., 2007)).

In this study, we help clarify the directionality of the relationship between IPV and social support in one setting, rural Pakistan. Using information from a cohort study that collected detailed social support and IPV information over a 3 year period, we estimate longitudinal associations in both directions: IPV as a predictor of low social support, and low social support as a predictor of IPV.

1.1. Intimate partner violence and social support: a bi-directional and mutually reinforcing relationship?

Social support is a multi-dimensional concept that includes many types of support offered by partners, family members, friends, helping professionals (e.g., physicians, therapists), coworkers, and community members (Cohen, Underwood, & Gottlieb, 2000). Dimensions of social support include the availability of someone to provide acceptance and sympathy (emotional support) (Cohen et al., 2000; Cohen & Wills, 1985), tangible help if needed, such as lending money or childcare (instrumental support) (Cohen et al., 2000; Cohen & Wills, 1985), information relevant for solving problems or accessing resources (informational support) (Cohen et al., 2000; Cohen & Wills, 1985), and help with decision-making, such as advice on the best course of action or feedback (appraisal support) (Berkman & Krishna, 2014). The number of people in a person's support network and the quality of support offered by them in each dimension shape a person's level of social support. Each type of social support can affect health through different pathways (Cohen et al., 2000).

Many potential mechanisms link IPV with reductions in different types of social support. Social isolation is one of the tactics commonly utilized by IPV perpetrators, which manifests as controlling whom the victim sees and talks to, what information they have access to, where they go, and more generally limiting outside involvement (Jewkes, 2002; Pence & McMahon, 2008). By removing social interaction and interfering with relationships with family and friends, abusers undermine the means for their victim to resist violence or leave the relationship (Dutton & Goodman, 2005). Furthermore, anticipated stigma or fear of social rejection as a consequence of abuse may be a barrier to disclosing abuse and may inhibit help-seeking (Overstreet & Quinn, 2013), leading to further isolation.

Low social support may also causally increase women's risk of experiencing IPV. Women with weak support networks may not receive adequate feedback about the suitability of potential partners, which may increase risk of starting unsafe relationships. For women who have been exposed to IPV, low social support may exacerbate IPV severity. Social support can be an important resource that buffers against various adverse and challenging life events (Dahlem, Zimet, & Walker, 1991), and social support may protect from future violence and its escalation through protective interventions from family and friends, by facilitating instrumental support (e.g., lending money, transportation) to help women leave abusive relationships, or by offering new strategies to mitigate violence (Goodman et al., 2005). Accordingly, one study found that among women seeking help with an abusive partner, those who reported higher levels of instrumental support (e.g., someone to help with daily chores or care for children) were twice as likely to cooperate with criminal prosecution of the abuser compared with women who had low levels of instrumental support (Goodman, Bennett, & Dutton, 1999). Among women who wish to exit an abusive relationship, strong emotional support networks may facilitate leaving by enhancing women's appraisal of their own capacity to respond to stressors (Cohen & Wills, 1985; Lazarus & Folkman, 1984).

1.2. The need for longitudinal evidence

Research investigating the relationship between social support and IPV is composed primarily of cross-sectional studies. This work finds a strong and consistent association between IPV and social support (Al-Modallal, 2012; Awwad et al., 2014; Belay et al., 2019; Carlson et al., 2002; Coker et al., 2003; Creech et al., 2021; Daoud et al., 2017; Dias et al., 2019; Farid et al., 2008; Farris & Fenaughty, 2002; Fernbrant et al., 2014; Gielen et al., 1994; González Cases et al., 2014; Hayashi et al., 2016; Hou et al., 2018; Islam et al., 2021; Jackson et al., 2015; Kapadia et al., 2010; Katerndahl et al., 2013; Kirst et al., 2015; Lanier & Maume, 2009; Lee & Lee, 2018; Lövestad & Krantz, 2012; Millett et al., 2015; Naeem et al., 2008; Navarrete et al., 2021; Nguyen et al., 2018; Nybergh et al., 2013; Ogbonnaya et al., 2020; Othman et al., 2021; Ragavan et al., 2020; Ribeiro et al., 2017; Schultz et al., 2021; Sigalla et al., 2017; Spangenberg et al., 2016; Thananowan & Vongsirimas, 2016; Umubyeyi et al., 2016; Vives-Cases et al., 2011, 2014; Watson--Singleton et al., 2020; Woerner & Sullivan, 2019), yet the directionality of this association is not well-established; some cross-sectional studies infer that IPV leads to reductions in social support (Al-Modallal, 2012; Awwad et al., 2014; Carlson et al., 2002; Coker et al., 2003; Farris & Fenaughty, 2002; Fernbrant et al., 2014; Jackson et al., 2015; Katerndahl et al., 2013; Spangenberg et al., 2016; Thananowan & Vongsirimas, 2016; Watson-Singleton et al., 2020; Woerner & Sullivan, 2019), whereas other studies infer that low social support puts women at greater risk of IPV (Belay et al., 2019; Daoud et al., 2017; Dias et al., 2019; Farid et al., 2008; Hayashi et al., 2016; Islam et al., 2021; Kapadia et al., 2010; Kirst et al., 2015; Lanier & Maume, 2009; Lee & Lee, 2018; Millett et al., 2015; Naeem et al., 2008; Navarrete et al., 2021; Nguyen et al., 2018; Nybergh et al., 2013; Ogbonnaya et al., 2020; Ragavan et al., 2020; Ribeiro et al., 2017; Schultz et al., 2021; Sigalla et al., 2017; Umubyeyi et al., 2016; Vives-Cases et al., 2011, 2014). The need for longitudinal evidence to tease out the directionality of this relationship is frequently acknowledged in the literature (Dias et al., 2019; Fernbrant et al., 2014; González Cases et al., 2014; Kirst et al., 2015; Lövestad & Krantz, 2012; Nguyen et al., 2018; Wright, 2012), although longitudinal evidence is rare.

We are aware of three longitudinal studies on this topic (Escribà-Agüir et al., 2013; Goodman et al., 2005; Staggs et al., 2007), all of which originate from high-income countries. These studies suggest a potential bi-directional relationship between social support and IPV. Two studies investigated exposure to social support and risk of IPV. The first study, conducted in Spain, found that higher levels of affective social support (e.g., support showing love and affection) during the first trimester of pregnancy predicted lower levels of psychological abuse in the postpartum period (Escribà-Agüir et al., 2013), and a second study originating from the US found that women who reported higher levels of perceived social support were at lower risk of experiencing abuse one year later (Goodman et al., 2005).

A third study, conducted in the US, investigated the bi-directional relationship between perceived emotional and instrumental social support (combined into one measure) and women's experiences of IPV in the same dataset (Staggs et al., 2007). This study found that higher levels of IPV frequency led to lower levels of social support one year later. However, counter to the author's hypothesis, the study did not find evidence of a bi-directional relationship: low social support did not predict higher levels of IPV frequency one year later. The lack of an observed association may have been due to combining different types of

IPV and social support into summary measures, which may obscure relationships between specific types of support and abuse.

1.3. Social support and intimate partner violence in Pakistan: the importance of context

While mechanisms linking social support and IPV may operate similarly across a range of settings, the nature and strength of these relationships may differ across contexts due to contextual factors. Pakistan has a few contextual features that may affect the relationship between IPV and social support. First, leaving an abusive relationship, one of the major IPV prevention strategies in high-income countries such as the US, may not be feasible in this setting. Ending marriages for any reason, including abuse, is highly stigmatized and accordingly divorce is very uncommon (National Institute of Population Studies (NIPS) [Pakistan] and ICF, 2019). In addition, few women have formal employment (National Institute of Population Studies (NIPS) [Pakistan] and ICF, 2019), and thus they may not possess the financial resources to leave abusive relationships. Women who choose to end an abusive relationship despite these barriers face additional challenges. Although several legislative efforts to criminalize IPV have been pursued at both the national and regional levels since 2009, including as recently as 2021, implementation is uneven and there is widespread consensus that enforcement of laws criminalizing domestic violence is extremely limited. As a result, survivors of domestic violence have limited access to services or legal recourse. Second, family is intricately involved in marriage in Pakistan. For example, a study in the Bhimper District in southern Pakistan found that 88% of marriages were "traditionally arranged," such that parents or elders played a key role in identifying the marital partner (Jabeen & Malik, 2014), and extended family co-habitation is very common, resulting in family members being enmeshed within the functioning of a couple's marriage, including in the rearing of grandchildren (Chung et al., 2020). Qualitative research finds that women especially value and find strength from social support from her husband, and his sisters and mother, and are more hesitant about seeking support from peers (Rowther et al., 2020).

This high level of family involvement, coupled with limited options to end an abusive marriage through divorce (Andersson et al., 2010), suggests that family support could be an important resource to reduce the severity of abuse and mitigate its consequences, even if the abuse is not eliminated completely because women are likely to remain in the same union. If family members are aware of abuse, they may intervene on a woman's behalf (Naeem et al., 2008), especially if the abuse is severe and therefore non-normative. Family support may be especially protective against aspects of IPV that are seen and known by others (e.g., physical abuse resulting in visible injuries) and less protective against abuse acts that are hidden (e.g., sexual abuse acts). Thus, in such settings, family support may be instrumental in reducing IPV, but not eliminating it, and may be more impactful on some types of IPV over others. In addition, extended family co-habitation and the close proximity of non-familial neighbors also means that social isolation as a tactic of abuse may not be as salient as in high-income country settings. Therefore, women in this context may be less likely to report lower social support as a result of IPV, or there may be differential impacts on sources of support. For these reasons, the present study considers different types of IPV and captures not only the occurrence of IPV but also its severity, and it also investigates family and friend support separately.

2. Methods

2.1. Study population

This study was conducted in Kallar Syedan, one of the seven rural subdistricts of Rawalpindi in Pakistan. Kallar Syedan has a population of approximately 200,000 people, and households typical consist of extended family member cohabitation. Most families are reliant on subsistence farming and financial support from adult male earnings from work in the armed forces, government, or semiskilled or unskilled labor in urban centers. The subdistrict is representative of a typical low-socioeconomic rural area of Pakistan, which has male and female literacy rates of 62% and 39%, respectively, and infant mortality of ~68 per 1000 live births (National Institute of Population Studies (NIPS) [Pakistan] and ICF, 2019). Similar to many parts of the world, IPV in rural Pakistan is common. Approximately 30% of women report experiencing IPV in their lifetime (National Institute of Population Studies (NIPS) [Pakistan] and ICF, 2019). Emotional abuse is the most common type of reported abuse, followed by physical abuse (National Institute of Population Studies (NIPS) [Pakistan] and ICF, 2019).

We used data from the Bachpan cohort study, which collected extensive longitudinal information about IPV, social support, and related factors (e.g., depression, wealth, Adverse Childhood Experiences) from women living in a rural district of Pakistan. The Bachpan cohort study emerged from a cluster-randomized trial designed to test the effect of a community-based intervention to address high rates of observed depression among women during pregnancy (Sikander, Ahmad, Atif, et al., 2019). Additional details about the intervention are described elsewhere (Sikander, Ahmad, Atif, et al., 2019; Sikander, Ahmad, Bates, et al., 2019). Due to a dearth of longitudinal data from LMIC settings, this dataset offers a unique opportunity to assess the directionality of the relationship between IPV and social support.

Pregnant women aged 18 or older in their third trimester who were registered with local community health workers (i.e., Lady Health Workers) were invited to participate in the study and were screened for depression using the nine item Patient Health Questionnaire (Kroenke, Spitzer, & Williams, 2001). Women who screened positive for depression (i.e., had a score of 10 or greater on the Patient Health Questionnaire) were eligible to be enrolled in the trial, and one of every three women who did not screen positive for depression were invited to enroll in a comparator, non-treatment group. The study enrolled 1154 women, approximately half who screened positive for depression (n = 570) and half who did not (n = 584), from 40 village clusters (geographically distinct areas composed of multiple villages) (Sikander, Ahmad, Bates, et al., 2019). Enrolled women completed extensive in-person structured interviews at baseline, and at 3, 6, 12, 24 and 36 months. However, social support and IPV information was not collected every survey round, and therefore in this study we use women's responses at 24 (n = 903) and 36 (n = 889) months post-partum. Women who did not complete interviews at 24 months were recontacted at 36 months, and therefore our analytic sample included 945 women who completed an interview at either 24 or 36 months. In this study, we consider interviews completed at 24 months Time 1 and interviews completed at 36 months Time 2.

2.2. Study measures

2.2.1. Social support

Social support was measured with the Multidimensional Perceived Social Support Scale (MSPSS) (Dahlem et al., 1991; Zimet, Dahlem, Zimet, & Farley, 1988), which includes 12 items about perceived support from friends, family, and "significant others." Items measure perceptions of emotional support (e.g., I get the emotional help and support I need from my family), instrumental support (e.g., I can count on my friends when things go wrong), and informational support (e.g., my family is willing to help me make decisions). We used the items pertaining to friend support and family support (4 each), and excluded items related to "significant other" support because of ambiguity in how this phrase was interpreted by respondents in this context. For each item, potential responses can range from strongly disagree (1) to strongly agree (5). We summed women's responses to each item, resulting in a potential score range of 4–20 for each type of support, and we then rescaled scores so that they could potentially range from 0 to 10.

Low scores indicate low social support, and high scores indicate high social support. Validation studies indicate the MSPSS has good psychometric properties among Pakistani adults (Akhtar et al., 2010; Tonsing, Zimet, & Tse, 2012).

2.2.2. Intimate partner violence

We measured intimate partner violence (IPV) with questions adopted from the World Health Organization's Violence Against Women Instrument (Garcia-Moreno, Jansen, Ellsberg, Heise, & Watts, 2005). The instrument captures sexual, psychological, and physical abuse by asking women if they experienced specific acts of abuse (e.g., husband threatened to divorce you) and the frequency of each of these acts in the past 12 months. Based upon feedback from the study team who were experts in the local context, we modified, excluded, or added items from the original instrument, resulting in 4 questions about physical abuse, 9 questions about psychological abuse, and 3 questions about sexual abuse. While the original World Health Organization instrument used non-specific frequencies (e.g., "few" or "many"), we modified categories so that they corresponded to specific counts in the past year (i.e., none, 1–2 times, 3–5 times, 6–10 times, 11–20 times, over 20 times). This adaptation to include specific response options is consistent with other examples in the literature (Esie, Osypuk, Schuler, & Bates, 2019; Ludermir, Lewis, Valongueiro, de Araújo, & Araya, 2010; Shamu, Zarowsky, Roelens, Temmerman, & Abrahams, 2016).

Our research question was motivated by a desire to fully and comprehensively capture IPV severity. Accordingly, we measured IPV severity with confirmatory factor analysis (CFA), which is a strategy that allows for a nuanced, multi-dimensional measure of IPV and can estimate summary scores for complex latent concepts. CFA estimates the strength of each abuse item in predicting overall IPV severity (e.g., coefficient estimates) and also integrates women's responses to the frequency of each item (e.g., none, 1–2 times, etc.). Thus, this approach estimates IPV severity by weighting each abuse item and integrating the frequency of each.

We conceptualized IPV as a latent variable with three distinct domains – physical, psychological, and sexual abuse – that informed an overall measure of IPV. Our measurement model was estimated in Mplus 7.4 (Muthen & Muthen, 1998-2015) using robust weighted least squares CFA, which is a type of CFA that models categorical and dichotomous indicators (Kline, 2011). In instances of item missingness (i.e., if women answered some, but not all, the questions about IPV severity), Mplus estimated missing values as a function of the observed variables (Muthen & Muthen, 1998-2015), which occurred in 2% of women at Time 1, and 3% of women in Time 2. Our final measurement model included all considered IPV items, except for one physical abuse item (i.e., used a knife, gun, or other weapon against you) because endorsement of this item was exceedingly rare and measurement models that included this item would not converge. We used the same measurement model and the same coefficient values across survey waves to estimate severity scores for each type of abuse (i.e., physical, sexual, psychological), as well as an overall abuse severity score. Our final measurement model fit the data well (Comparative Fix Index = 0.988; Tucker Lewis Index = 0.986; RMSEA = 0.030). Coefficients estimates for each item, as well as domain-specific loadings used to calculate an overall IPV severity score, are shown in Table 1. To make the range of scores the same between IPV and social support equivalent, we rescaled the estimated IPV severity scores so that scores for overall IPV, as well as domain-specific IPV scores, ranged from 0 to 10. A score of 0 indicates a woman did not experience any IPV, and a score of 10 indicates the highest level of IPV severity experienced in our sample.

2.2.3. Potential confounding variables

Women were asked about factors that we hypothesize may be related to IPV severity and social support, including women's educational level, age at marriage, age, household composition (i.e., nuclear, extended or joint family co-habitation, multiple families), total number of living children, total number of living sons, treatment arm, household assets, depressive symptoms, and Adverse Childhood Experiences (ACEs). All variables were measured with single questions except for household assets, depressive symptoms, and ACEs. Household assets, measured with questions about ownership of household items (e.g., radio, bicycle), household amenities (e.g., source of drinking water, type of toilet), and materials used to construct home (e.g., materials of exterior walls), were summarized using principle component analysis (Maselko et al., 2018). Scores were standardized to have a mean of 0, with positive scores denoting higher asset scores and negative scores denoting lower asset scores. Depressive symptoms were measured with the Urdu version of the 9-item Patient Health Questionnaire, which has been psychometrically validated in this study population (Gallis et al., 2018). ACEs were measured with the Adverse Childhood Experience – International Questionnaire (World Health Organization, 2012), which captures 12 categories of ACEs (e.g., incarcerated household member, experienced bullying, physical neglect by parents/guardians, etc.) which we used to create a summary score (range: 0–12).

Information about socio-demographic factors (i.e., assets, educational attainment, treatment arm, age at marriage) was measured upon the time of enrollment (Time 0); total number of living children and total number of living sons at Time 1 (to account for potential confounding by son preference); depressive symptoms, family structure, and age were measured at each survey round (Times 0, 1, and 2); and ACEs information was collected at Time 2.

Table 1
Standardized coefficients for confirmatory factor analysis (CFA) model measuring intimate partner violence severity.

Domain		Item	
Name	coefficient	Description	coefficient
Physical abuse	0.950	Slapped you or thrown something at you that could hurt you; pushed you or shoved you; or pulled your hair	0.915
		Choked or burnt you on purpose	0.831
		Threatened to use a gun, knife or other weapon against you	0.874
Psychological abuse	0.983	Insulted you or made you feel bad about yourself, or belittled or humiliated you in front of other people	0.833
		Done things that scared or intimidated you on purpose	0.813
		Threatened to hurt you or someone you care about	0.766
		Called you ugly or said something else negative about your appearance	0.761
		Destroyed something belonging to you on purpose	0.740
		Threatened to take another wife	0.866
		Threatened to abandon you or send you back to your natal family	0.915
		Threatened to divorce you	0.863
		Said you were not able to please him sexually	0.713
Sexual abuse	0.827	Physically force you to have sexual intercourse when you did not want to	0.827
		Had sexual intercourse when you did not want to because you were afraid of what your husband might do	0.874
		Did your husband ever force you to do something sexual that you found degrading or humiliating	0.895

*standardized estimates were estimated using the "stdy" option in Mplus.
**variance of latent variable intimate partner violence fixed to 1.

2.3. Statistical analysis

We used linear regression models to estimate the longitudinal relationship between IPV severity and social support. All models estimated a 12-month lagged association between our investigated exposure and outcome (e.g., effect of IPV measured at Time 1 on social support at Time 2) and estimated standard errors clustered at the village cluster level (n = 40). All analyses were conducted in Stata 16.1 (StataCorp, 2019).

Adjusted models controlled for factors measured at Times 0, 1 and 2. We controlled for household asset score, educational level, and age at marriage at Time 0 because this information was only collected upon enrollment. We controlled for age, family structure, total number of living children, total number of living sons, and treatment arm at Time 1, and we controlled for interviewer at Time 2 to account for potential interviewer effects in the measurement of our outcomes, especially in the disclosure of IPV. In addition, to protect against potentially over-adjusting for factors that may simultaneously confound relationships and be in the causal pathway due to bi-directional relationships, we controlled for depressive symptoms score at Time 0 and adjusted for baseline level of our investigated outcome at Time 0 (e.g., when investigating the effect of IPV severity at Time 1 on friend support at Time 2, we adjusted for friend support at Time 0). This approach maximizes the longitudinal data and allows us to rigorously discern the directionality of relationships.

A few women did not complete surveys at Time 1 (5%) or Time 2 (6%), and among women who completed surveys, IPV information was missing for some women at Time 1 (7%) and Time 2 (12%). There was also some missing information for other study variables (<7% for all variables). We imputed missing values for all variables using an iterative Markov Chain Monte Carlo procedure that assumed a multivariate normal distribution (specifically, the Data Augmentation algorithm) (Tanner & Wong, 1987). Our imputation model included control variables used in our main analyses (household asset score, educational level, age, age at marriage, family structure, treatment arm, interviewer, total number of living children, total number of living sons), as well as friend support, family support, and depressive symptom scores from all waves of data (i.e., Times 0, 1, and 2). For analyses investigating the overall effect of IPV severity, our imputation model also included IPV severity scores for all waves of data, and for analyses investigating specific types of IPV severity (i.e., physical, psychological, or sexual abuse) we included these specific types of abuse from all survey waves in our models. Using these specifications, for each analysis we imputed 10 datasets, which were then used to estimate our main models of interest in 10 separate regressions, and then the estimated coefficients and standard errors from the 10 regressions were pooled.

3. Results

Table 2 shows baseline characteristics of women. Women had a mean age of 29 years and approximately half had less than a secondary education (53%). Households were predominantly composed of joint or extended family members (66%). Women reported higher levels of family support than friend support: out of a potential score ranging from 0 to 10, women reported a mean score of 6.3 for family support and 4.6 for friend support (Appendix 1 shows frequencies of each social support item used to derive summary measures). Regarding IPV, women reported similar levels of IPV severity for the three types of abuse. Appendix 2 shows the frequencies of all IPV items used to derive these summary measures, which indicates that the most common abuse act was being insulted, made to feel bad, belittled, or humiliated (28%), followed by having sexual intercourse when she did not want to due to fear of what her husband might do (24%). The subset of women included in our analytic sample (n = 945) were similar to those enrolled at baseline who were lost to follow-up (n = 209) in key socio-demographic indicators, including age, educational attainment, family structure, and household asset score (Appendix 3).

Table 2
Baseline characteristics of study participants (n = 903).

	Percent or mean (SD)
Age (years)	28.7 (4.5)
Household asset score	0.0 (1.6)
Age at marriage (years)	21.9 (3.6)
Total number of living children	2.6 (1.3)
Total number of living sons	1.3 (1.0)
Educational attainment	
None	14.7
Primary (grades 1–5)	19.3
Middle (grades 6–8)	18.8
Secondary (grades 9–10)	25.3
Higher secondary (grades 11–12)	9.7
Tertiary (>12)	12.2
Household structure	
Nuclear	22.0
Joint/extended	66.0
Multiple households	12.0
Depressive symptom score[a]	8.4 (6.7)
Adverse Childhood Experiences (count)[b]	1.4 (1.5)
Perceived social support score[c]	
Family	6.3 (2.6)
Friends	4.6 (2.9)
Intimate partner violence severity[d]	
Physical abuse	1.6 (2.1)
Psychological abuse	1.5 (2.0)
Sexual abuse	1.7 (2.2)

[a] Measured with the Urdu version of the Patient Health Questionnaire (potential score range: 0–27).
[b] Potential range: 0–10.
[c] Potential range: 0–10; higher scores denote more support.
[d] Potential range: 0–10; higher scores denote higher severity.

Table 3 shows the longitudinal association between IPV severity and changes in friend and family support one year later. In models that imputed missing data and controlled for potential confounding factors, higher IPV severity resulted in reductions in both family (mean change

Table 3
Effect of a 1 unit increase in intimate partner violence (IPV) severity (B, 95% CI) on social support 1 year later.

	Family support[a]		Friend support[b]	
	Unadjusted	Adjusted	Unadjusted	Adjusted
Overall IPV severity	−0.24 (−0.33, −0.14)*	−0.14 (−0.23, −0.04)*	−0.33 (−0.46, −0.20)*	−0.18 (−0.31, −0.05)*
Physical abuse	−0.22 (−0.31, −0.13)*	−0.12 (−0.22, −0.03)*	−0.31 (−0.43, −0.18)*	−0.15 (−0.30, −0.01)*
Psychological abuse	−0.25 (−0.35, −0.15)*	−0.15 (−0.25, −0.05)*	−0.35 (−0.48, −0.21)*	−0.19 (−0.34, −0.04)*
Sexual abuse	−0.21 (−0.30, −0.12)*	−0.12 (−0.20, −0.03)*	−0.28 (−0.41, −0.16)*	−0.15 (−0.27, −0.02)*
Sample size	795	945	795	945

Notes: 1) all model included a 12 month lag between exposure (social support) and outcome (IPV), and 2) adjusted models used a multiple imputation procedure to impute missing data.
*p < 0.05.
[a] Adjusted models controlled for interviewer, household asset score, educational level, age, age at marriage, family structure, treatment arm, friend support, Adverse Childhood Experiences, depressive symptom score, total number of living children, total number of living sons, and family support.
[b] Adjusted models controlled for interviewer, household asset score, educational level, age, age at marriage, family structure, treatment arm, family support, Adverse Childhood Experiences, depressive symptom score, total number of living children, total number of living sons, and friend support.

= −0.14, 95% CI: −0.23, −0.04) and friend support (mean change = −0.18, 95% CI; −0.31, −0.05), which corresponds to approximately a 0.06 standard deviation unit reduction in both friend and family support. The magnitude of reduction in friend and family support was generally similar for both overall IPV severity, as well as for physical, psychological, and sexual abuse. Models without imputed data showed similar results, although effect estimates were slightly stronger (Appendix 4).

Table 4 shows the longitudinal association between friend and family support and changes in IPV severity 1 year later. In models that imputed missing data and controlled for potential confounding factors, higher levels of family support were associated with reductions in IPV severity (mean change = −0.09, 95% CI: −0.13, −0.04), which corresponds to approximately a 0.04 standard deviation unit reduction in IPV severity. In addition to overall IPV severity, we also found similar reductions in physical abuse, psychological abuse, and sexual abuse due to greater familial social support. While we found a relationship between friend support and reductions in IPV severity 1 year later in unadjusted models, upon adjusting for potential confounding factors and imputed missing data this relationship was null for overall IPV severity, as well as for physical, psychological, and sexual abuse. Analyses that did not impute missing data (Appendix 5) show virtually identical results to the results that imputed missing data.

4. Discussion

Many studies have noted the need for longitudinal evidence to tease out the directionality of the relationship between social support and IPV (Dias et al., 2019; Fernbrant et al., 2014; González Cases et al., 2014; Kirst et al., 2015; Lövestad & Krantz, 2012; Nguyen et al., 2018; Wright, 2012). Our study helps fill this research gap using longitudinal data from rural Pakistan, which to our knowledge is the first study to investigate quantitatively the directionality of this relationship in a LMIC setting. We found evidence of a bi-directional relationship, whereby IPV severity led to reductions in both friend and family social support, and social support from family, though not friends, decreased IPV severity. This confirms what cross-sectional research in LMIC settings has postulated: that social support and IPV have a mutually re-enforcing, bi-directional relationship.

We found that higher IPV severity led to reductions in both family and friend support, which is consistent with evidence indicating that IPV perpetrators may limit women's social contact (Jewkes, 2002; Pence & McMahon, 2008) and women experiencing abuse may socially isolated due to anticipated stigma or fear of social rejection (Overstreet & Quinn, 2013). This finding aligns with longitudinal evidence from the US indicating that higher levels of IPV frequency led to lower levels of perceived general social support (measured as having "enough people" in their lives to fulfill specific support needs)(Staggs et al., 2007). However, the MSPSS, the measure used in this study to ascertain social support, does not allow for differentiation between perceived or appraised social support and reported behaviors (e.g., numbers or frequency of contacts). As a result, the diminished social support associated with IPV in this study may be due less to increased physical isolation and more so to a deterioration in the subjective assessment of social support. This may be particularly salient with regards to family support, given the high prevalence of extended marital family cohabitation, meaning it is both less feasible for women to be physically separated from family and it is more likely that family may be aware of the presence of abuse. Therefore, their failure to intervene may worsen women's estimation of their support. However, the fact that IPV severity is also associated with reduced friend support suggests that at least some degree of social withdrawal and/or physical isolation may also be operative.

We found that family support, but not friend support, reduced IPV severity. Extant longitudinal evidence of this relationship, conducted in Spain and the US, indicates higher levels of general perceptions of social support reduced IPV (Escribà-Agüir et al., 2013; Goodman et al., 2005). Our study extends the knowledge base by investigating the distinct, independent effect of friend and family support in an LMIC setting. We hypothesized that family support may be an important protective resource against IPV in certain LMIC settings due to family member's involvement in the daily functioning of a marriage, which may facilitate opportunities to intervene upon a woman's behalf, and our results provide evidence in support of this hypothesis. Regarding friend support, we found that support from friends did not reduce IPV severity. In this setting, connections with friends were less strong than connections with family, as evidenced by the lower levels of support from friends (mean score for friend support = 4.6; mean score for family support = 6.3), and therefore friend support may be less of a resource for women experiencing IPV than family support. In addition, in this setting friends may not have the social capital to effectively intervene upon a woman's behalf, which would be the main way to mitigate IPV, given how highly uncommon divorce is in this setting. However, contrary to what we expected, we did not find that friend or family support was more protective against physical abuse, which we believe may be more easily detected than psychological and sexual abuse. In our study, physical, sexual, and psychological abuse were highly correlated ($r > 0.85$ for all types of abuse), and women rarely experienced one form of abuse in isolation. Thus, these three types of abuse may be too enmeshed to tease out the effect of one form of abuse independent of the others. Future research could investigate the mechanisms by which family support protects against IPV, such as by investigating specific types of support (e.g., emotional or instrumental support) or specific actions that family members take to support women experiencing abuse.

By scaling both social support and IPV severity to have the same score range, we were able to roughly compare the magnitude of associations in both directions. We found that IPV severity led to larger reductions in social support, compared with the magnitude of effect of social support on reductions in IPV severity. Interestingly, our search of the literature revealed that the majority of cross-sectional studies in LMIC settings infer a relationship in the opposite direction, that high

Table 4
Effect of a 1 unit increase in social support (*B*, 95% CI) on intimate partner violence (IPV) severity 1 year later.

	Sample size	Overall IPV	Physical abuse	Psychological abuse	Sexual abuse
Family support[a]					
Unadjusted	747	−0.18 (−0.23, −0.13)*	−0.18 (−0.24, −0.13)*	−0.17 (−0.23, −0.12)*	−0.14 (−0.20, −0.09)*
Adjusted	945	−0.09 (−0.13, −0.04)*	−0.08 (−0.13, −0.03)*	−0.08 (−0.12, −0.03)*	−0.07 (−0.12, −0.02)*
Friend support[b]					
Unadjusted	747	−0.09 (−0.13, −0.05)*	−0.09 (−0.14, −0.05)*	−0.09 (−0.13, −0.05)*	−0.08 (−0.12, −0.04)*
Adjusted	945	0.00 (−0.05, 0.05)	−0.01 (−0.05, 0.04)	0.00 (−0.05, 0.04)	−0.01 (−0.05, 0.03)

Note: all model included a 12 month lag between exposure at time 1 (social support) and outcome at time 2 (IPV severity), and used a multiple imputation procedure to impute missing data.
*$p < 0.05$.
[a] Adjusted models controlled for interviewer, household asset score, educational level, age, age at marriage, family structure, treatment arm, friend support, Adverse Childhood Experiences, depressive symptom score preceding exposure, total number of living children, total number of living sons, and IPV severity preceding exposure.
[b] Adjusted models controlled for interviewer, household asset score, educational level, age, age at marriage, family structure, treatment arm, family support, Adverse Childhood Experiences, depressive symptom score preceding exposure, total number of living children, total number of living sons, and IPV severity preceding exposure.

levels of social support may lead to reductions in IPV (specifically, we found and 13 studies that investigated low social support as a predictor of IPV (Belay et al., 2019; Daoud et al., 2017; Farid et al., 2008; Islam et al., 2021; Kapadia et al., 2010; Lee & Lee, 2018; Naeem et al., 2008; Navarrete et al., 2021; Nguyen et al., 2018; Ogbonnaya et al., 2020; Ribeiro et al., 2017; Sigalla et al., 2017; Umubyeyi et al., 2016), and 4 studies that investigated IPV as a predictor of low social support (Al-Modallal, 2012; Awwad et al., 2014; Spangenberg et al., 2016; Thananowan & Vongsirimas, 2016)). Our work highlights that IPV may have an under-acknowledged role in reducing social support in LMIC settings, and that cross-sectional data may be inadequate to tease out the directionality of these relationships. Given robust evidence linking low social support with poor physical and mental health (Reblin & Uchino, 2008), the impact of IPV exposure on social support has important implications for increased risk of negative health sequelae among women experiencing IPV, and may be an important focus of interventions to mitigate these secondary harms.

Our findings have implications for efforts to confront IPV in low-income settings such as Pakistan where divorce is highly uncommon and extended family members are involved in a couples' daily activities. In our study, we found that the type of support predicted reductions in IPV; namely, family support may be an important, yet overlooked resource to mitigate current abuse and to prevent future abuse acts, whereas support from friends may not prevent abuse. Accordingly, IPV prevention and mitigation strategies that incorporate family involvement, such as psychosocial and community-based interventions, may be especially effective. In addition, third party intervention strategies, which rely upon community members to intervene when they witness abuse, have gained popularity recently. Such interventions may be especially effective if they include or emphasize third party intervention from extended family members.

Our work has some limitations. First, our measure of social support did not capture all nuances of support. Most notably, the measure did not differentiate if family support came from the natal or marital family. Strong support from natal family may be an especially important factor protecting women from IPV, which could be a fruitful area of future research. Relatedly, our measure of support was a summary measure of different types of support (e.g., emotional, instrumental, etc.), and we were not able to tease out if one type of support was more protective. And, as noted above, this measure does not allow for differentiation between perceptions or appraisals of support and objective behaviors. Second, our study was conducted among women during pregnancy and the post-partum period. Women's risk of violence may be unique during this period, and thus the relationships our work uncovered may not be generalizable beyond this period of women's lives. Third, while our study assessed the directionality of the relationship between social support and IPV through robust confounder control and lagged exposures, causal conclusions about this relationship should be interpreted cautiously: it is possible that not all relevant factors were controlled for in the analysis, which may bias study results. Finally, it is important to recognize that the limited scope of this paper does not account for the multiple socio-cultural factors and processes, including social norms, that impact IPV, social support, and their bi-directional relationships. Qualitative investigation of these dynamics would be an importation contribution to enhance understanding of the nature of these relationships.

Despite these limitations, our paper has a number of strengths. Our study collected comprehensive longitudinal data, which allowed us to explicitly test the directionality of relationships and to control for a large set of potential confounding factors, many of which have not been controlled for in prior studies. In particular, adverse childhood experiences (ACEs) is a major risk factor for experiencing IPV as an adult (Bensley, Van Eenwyk, & Wynkoop Simmons, 2003; Coid et al., 2001; Fergusson, Boden, & Horwood, 2008; Fritz, Slep, & O'Leary, 2012; Hetzel-Riggin & Meads, 2011; Renner & Whitney, 2012; Stith SM, Middleton, Busch, Lundeberg, & Carlton, 2000; Widom, Czaja, & Dutton, 2014) and is also independently associated with perceived social support in adulthood (Jones, Nurius, Song, & Fleming, 2018; Karatekin & Ahluwalia, 2020; Pepin & Banyard, 2006; Schumm, Briggs-Phillips, & Hobfoll, 2006; Sperry & Widom, 2013; Vranceanu, Hobfoll, & Johnson, 2007). However, information about ACEs exposure is often not available in studies of IPV, especially in low-resource settings, and accordingly is rarely controlled for in studies. In addition to comprehensive confounder control, we measured IPV severity with a nuanced measure that integrated many abuse acts and the frequency of those acts, which improves upon the majority of extant research that dichotomizes IPV. In contexts such as Pakistan where terminating an abusive relationship may not be possible, social support may be most effective at reducing, but not eliminating abuse, and our measurement approach can more fully capture reductions in severity. The longitudinal nature of our study, coupled with a nuanced measure of IPV severity and robust confounder adjustment, can substantially contribute to knowledge about the nature and directionality of the relationship between IPV and social support.

In summary, we found a bi-directional, mutually re-enforcing relationship between IPV and social support among Pakistani women, whereby high social support from family reduced IPV severity, and that high IPV severity led to reductions in both friend and family social support. Our study has implications for the design of interventions to mitigate secondary harms as a consequence of experiencing IPV and reveals that support from family may be an important resource for reducing IPV in low-income settings.

Author statement

Robin A. Richardson: Conceptualization, Methodology, Formal Analysis, Writing – Original draft preparation; Sarah C. Haight: Literature review, Writing – Reviewing and editing; Ashley Hagaman – Writing – Reviewing and editing; Joanna Maselko: Funding acquisition, Investigation, Writing – Reviewing and editing; Siham Sikander: Investigation, Project Administration, Writing - Reviewing and editing; Lisa M. Bates: Supervision, Conceptualization, Methodology, Writing – Reviewing and editing.

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Declaration of competing interest

None.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ssmph.2022.101173.

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