## ORIGINAL RESEARCH

# Validation of alternative indicators of social support in perinatal outcomes research using quality of the partner relationship

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### Abstract

**Aim.** To test alternatives to the current research and clinical practice of assuming that married or partnered status is a proxy for positive social support.

**Background.** Having a partner is assumed to relate to better health status via the intermediary process of social support. However, women's health research indicates that having a partner is not always associated with positive social support.

**Design.** An exploratory post hoc analysis focused on posttraumatic stress and childbearing was conducted using a large perinatal database from 2005–2009.

**Methods.** To operationalize partner relationship, four variables were analysed: partner ('yes' or 'no'), intimate partner violence ('yes' or 'no'), the combination of those two factors, and the woman's appraisal of the quality of her partner relationship via a single item. Construct validity of these four alternative variables was assessed in relation to appraisal of the partner's social support in labour and the postpartum using linear regression standardized betas and adjusted $R$-squares. Predictive validity was assessed using unadjusted and adjusted linear regression modelling.

**Results.** Four groups were compared. Married, abused women differed most from married, not abused women in relation to the social support, and depression outcomes used for validity checks. The variable representing the women's appraisals of their partner relationships accounts for the most variance in predicting depression scores.

**Conclusions.** Our results support the validity of operationalizing the impact of the partner relationship on outcomes using a combination of partnered status and abuse status or using a subjective rating of quality of the partner relationship.

**Keywords:** intimate partner violence, measurement of social support, nursing, partner relationships, perinatal health outcomes, postpartum depression, social support, women's health research

# Introduction

Broadly speaking, intimate partnership is considered an important source of social support, and social support is generally considered to be an asset. Social support and a strong social network multiply the sources of social support and have been associated with health benefits (Heitman 2004, Teufel-Shone 2006, Banti *et al.* 2009). Globally, it is common in maternity care research to use the variable of having a partner or being married as a proxy indicating social support, with the underlying assumption that this is a positive factor. Consistent with contemporary nursing theories (e.g. Hartrick 1995) and social ecological theories (e.g. Bronfenbrenner 1992), family, across cultures, is considered a factor that affects health for better or for worse. Advances in multicultural and violence-related women's health research now provide ample reasons to question the assumption that women with partners are better off than those without. For example, single women may have less stress than married women as they do not need to care for a partner or experience resentment about the lack of equity about the burden of household work (Schwartz & Lindley 2009). In addition, women experiencing violence in their intimate partner relationships face stress, injury, fear, isolation, and coercive control equivalent to domestic captivity (Herman 1992). In studies focused on partner relationships or violence, investigators usually embed detailed measures of these factors. However, in most maternity care or childbearing-focused health outcomes research, it does not appear that researchers have incorporated the knowledge that a partner may sometimes be a liability into their statistical modelling.

# Background

## Social support

An abundance of literature relates to the concept of social support. Social support is considered a meta-construct and as such, it has no single, simple definition. Most definitions of social support are based on the underlying assumptions that support is given to one in need of support, and that support is positive (Tilden & Nelson 1999). Cobb (1976) defined social support as 'information leading a person to believe that he/she is cared for and loved, esteemed and valued, and/or that he/she belongs to a network of communication & mutual obligation' (p. 18).

House and Kahn (1985) described the most widely accepted components of social support that include emotional support, appraisal support, informational support, and instrumental support. Emotional support includes trust, concern, love, and listening. Appraisal support is feedback that builds self-confidence and self-esteem. Informational support is advice, suggestions, and directions. Finally, instrumental support includes labour, money, time, services, and tangible aid. Other frameworks have slightly different definitions (e.g. Caplan 1974, Cobb 1976, and Kahn & Antonucci 1980), but the four-factor framework of House & Kahn predominates in empirical studies.
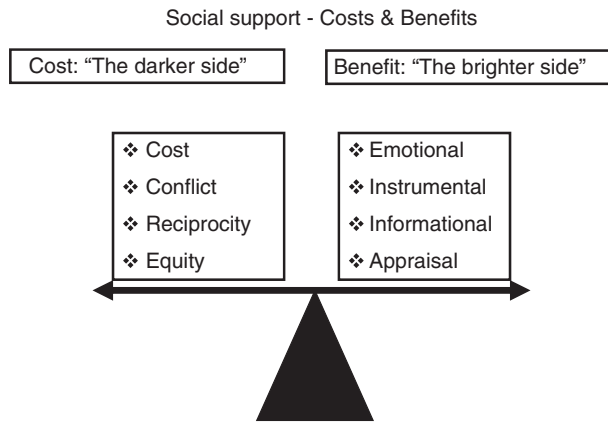
## Health benefits of social support

Social support and its relationship to positive health outcomes has been a subject of study for many years. Researchers have examined the impact of social support on cardiovascular health in men and women (Heitman 2004), condom use in adolescents (Harper *et al.* 2004), violence prevention in youth (Canty-Mitchell & Zimet 2000), and obesity prevention in adults and children (Baturka *et al.* 2000, Teufel-Shone 2006). A positive linear relationship has been noted between emotional support and emotional adjustment to stressful life events, such as birth of an infant (Lin & Peek 1999).

## The darker side of social support

In general, the emphasis in research is on how positive, higher levels of 'received' social support affect outcomes. We refer to this as focusing on 'the bright side' of social support. What is critical to note is that there are instances when levels of received social support are not only lower (i.e. lacking), but also when the potential for received social support extracts a 'cost' (i.e. is negative). We refer to this using Tilden's and Galyen's (1987) term, 'the dark side' of social support (1987). The House and Kahn conceptualization of social support does not fully capture the idea that social support is not always helpful or beneficial to the recipient. Negative behaviour is not considered 'support' in the social support literature and must be examined from a social networks perspective. Examples of problematic behaviour from network members may include, 'persons who invaded privacy, broke promises, took advantage, or caused feelings of anger and conflict' (Tilden & Galyen 1987 p. 11).

Furthermore, per Cobb's (1976), there is an assumption of 'mutual obligation.' Tilden and Galyen (1987) focused on the notion of mutual obligation and were instrumental in examining the negative aspects of social support. They considered costs, conflict, reciprocity, and equity as additional factors of social support and social network 'equations' and acknowledged that the social support and social network assets may contain elements of liability if the network members have more needs than the individual whose social support is being measured (Figure 1). The notion that

Social support - Costs & Benefits

| Cost: "The darker side" | Benefit: "The brighter side" |

❖ Cost
❖ Conflict
❖ Reciprocity
❖ Equity

❖ Emotional
❖ Instrumental
❖ Informational
❖ Appraisal

**Figure 1** Social support – cost and benefits.

social support is not only received but also given and exacts a price is gaining influence, especially in women's health research. In theories that account for health disparities such as Sojourner Syndrome (Mullings 2005), researchers have posited that the costs of giving support to others in one's social network may be higher for women and for African American women in particular.

*Partner support*
Positive emotional support from a partner has been shown to buffer the negative effects of illness and stress (Israel & Round 1987). The buffering effects of partner support need not be limited to emotional support and may include all of the components defined by House and Kahn (1985) (emotional, appraisal, instrumental, and informational support). However, it is also important to critically examine the assumption that partnered individuals have more social support than those who are single. Tilden and Nelson (1999) concluded that this assumption was false: 'an unhappy marriage tends to restrict access to other sources of social support and because unmarried people often have large networks of supportive friends' (p. 867). Given knowledge about the lack of equity in household work (Schwartz & Lindley 2009) and the prevalence of domestic violence against married women (Williams *et al.* 2008), the assumption that partnered status conveys greater support is called into question and, in fact, the quality of the partner relationship may be poor enough to result in negative social support or to become a health liability.

*Purpose and hypothesis*
The purpose of this investigation was to define the relevant concepts of social support, social networks, and the costs of social support generally and then consider theoretically how these could relate to partner support or not. We

considered these factors empirically with two examples of how very simple variables of 'partner quality' could be constructed post hoc in an existing data set.

*Validity*
We examined the construct validity of the partner quality variables and predictive validity. Finally, we assessed the usefulness of the alternative partner quality variables for predicting the outcome of postpartum depression (PPD), a phenomenon experienced by women to varying extents in most cultures, in perinatal health outcomes research. We hypothesize that the alternative indicators of partner support that reflect the reality of women's circumstances more accurately will improve predictive validity of the current norm of modelling only presence/absence of a partner.

## The study

### Aim

*Attempting an incremental change to improve validity and explain more variance*
The aim of this study was to examine alternative ways of operationalizing 'partnered status' in relation to social support. It was not our goal to redefine social support or social networks. Rather, we proposed an incremental step to change the way partnership is operationalized. To do this, we created a partnership demographic variable to take the place of 'partnered' or 'married' in two ways that take potential cost or 'dark side' factors into account. First, we created a four-level variable indicating: not partnered and abused; partnered and abused; not partnered and not abused; or partnered and not abused. Second, we used a single item from the Quality of Life Scale (Frisch *et al.* 1992): 'How satisfied are you with your love relationship?' We assessed the construct and predictive validity of these alternative 'partnership' variables using an existing research database.

### Design

In this *post hoc* use of a research database, we explored the question: What is the effect of creating alternative 'partner relationship' demographic variables? We examined partnered status ('yes'/'no'), intimate partner victimization status ('yes'/'no'), a four-level variable that combines those two factors (Table 1), and a single-item subjective appraisal by the woman of the quality of her 'love relationship,' which allows for women who consider themselves not in a love relationship to answer neutrally. The parent study

**Table 1** Flow diagram depicting the creation of the four-level partner variable.

| Step 1 Raw survey item data about living situation | | | Step 2 Reduced to partnered (yes/no) | | | Step 3 Past year IPV (yes/no) | | | Step 4 Cross-tabulation partnered × IPV | | | | Step 5 Four-level Partner variable | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lives with… | % | n | | % | n | | % | n | Partnered | IPV no | IPV yes | Row total | Group | % | n |
| Husband | 61·7 | 350 | *Partnered* | 71·3 | 404 | Past year IPV | 3·5 | 20 | | 399 | 5 | 404 | 1: Partnered and abused | 0·9 | 5 |
| Male DP | 9·2 | 52 | | | | | | | | | | | 2: Not partnered and abused | 2·6 | 15 |
| Female DP | 0·4 | 2 | | | | No Past year IPV | 96·5 | 547 | | 148 | 15 | Row Total 163 | 3: Not partnered and Not abused | 26·1 | 148 |
| Parents | 16·6 | 94 | *Not partnered* | 28·7 | 163 | | | | *Not partnered* | | | | 4: Partnered and Not abused Not abused | 70·4 | 399 |
| Other relatives | 5·5 | 31 | | | | | | | | | | | | | |
| Friend (not DP) | 1·6 | 9 | | | | | | | | Total 547 | Total 20 | Total 567 | | 100 | 567 |
| Alone | 4·9 | 28 | | | | | | | | | | | | | |
| Refused question | 0·2 | 1 | | | | | | | | | | | | | |

DP, domestic partner; IPV, intimate partner violence.

provided the data for this analysis, and we conducted bivariate and multivariate statistical analyses to assess the construct validity and predictive validity of the alternative partner status variables. We then concluded which alternative variable was optimal by our criteria: it does not assume partnered status is an asset and it explains the most variance.

The database used for this methodological analysis was collected for a prospective, longitudinal study of the effects of prenatal posttraumatic stress disorder (PTSD) on childbearing outcomes; detailed information on methods and recruitment is presented elsewhere (Seng *et al.* 2009). Women were selected into three cohorts: non-exposed controls, trauma-exposed controls, and trauma-exposed/PTSD-diagnosed cases. The sample included women with recent exposure to intimate partner violence (IPV) (3·5%, $n = 20$). These data included early pregnancy, late pregnancy, and postpartum standardized telephone interviews and provided traditional demographics (e.g. living arrangement with husband, domestic partner (DP), parents), information about past-year IPV, a measure of quality of life that included an item about quality of the love relationship, items about expected and actual satisfaction with the partner's social support during the major life event of giving birth, and a diagnostic measure of an important health outcome, PPD.

### Participants

This study is part of a larger prospective longitudinal cohort study (Psychobiology of PTSD & Adverse Outcomes of Childbearing, NIH R01 NR008767). The sample for this secondary analysis included 567 women who completed the postpartum wave of data collection. They were recruited via prenatal care clinics in three health systems (one in a university town and two in an urban area) in the U.S. state of Michigan. Eligible women were identified by the clinic nurses who conducted new obstetric patient intake histories and were invited to participate in a study about 'stressful things that happen to women, emotions, and pregnancy.' Eligible research participants included women who were 28 weeks of gestation or less, expecting their first born infant, could speak and understand English, and were at least 18 years of age.

### Data collection

The measures used in this analysis were established measures adapted for the telephone format except for a study-specific variable created from three items about how

supportive the woman expected her partner to be during her labour. Figure 2 depicts the survey items used in this analysis with their wording and response sets.

The demographic items were taken from the Centers for Disease Control and Prevention (CDC) Pregnancy Risk Assessment Monitoring System (PRAMS) survey (CDC

| Survey 1: Early Gestation (<28 weeks) | Survey 2: Late Gestation (~35 weeks) | Survey 3: Postpartum (~6 weeks) |
|---|---|---|
| *Partnered or not partnered* | *Quality of life* | *Actual labor support appraisal* |
| Which of these best describe your living arrangements? Would you say…. | How satisfied are you with the following aspects of your life… | How did your partner react to your delivery? |
| 1. Living alone | | 1. Very disappointed, it was not at all as he had hoped |
| 2. With a husband | 'Your love relationship?' | 2. Disappointed, it was not quite as he had hoped it would be |
| 3. A male domestic partner* | 1. Very dissatisfied | 3. Undecided |
| 4. A female domestic partner* | 2. Somewhat dissatisfied | 4. Pleased, it was as much as he had hoped it would be |
| 5. Parents | 3. Neither satisfied or dissatisfied (neutral) | 5. Very pleased, it was very much as he had hoped it would be. |
| 6. Other relatives | 4. Somewhat satisfied | How much do you agree or disagree with the following statement: 'My partner made it easy for me to talk about my delivery.' Would you say... |
| 7. A housemate who is not a domestic partner* | 5. Very satisfied | 1. Strongly disagree |
| | | 2. Disagree |
| | | 3. Undecided |
| | | 4. Agree |
| | | 5. Strongly agree |
| *Intimate partner violence (IPV)* | *Expectations of labor support* | *Labor appraisal* |
| Were you ever abused or physically attacked by someone you knew, for example, a parent, boyfriend, or husband? By physically attacked, we mean hit, slapped, choked, burned, or beat up. | How supportive of this pregnancy is your partner? Would you say... | We want to hear how your labor experience was. Using any number from 1 to 10 where 1 is the most horrible labor experience possible, and 10 is the most wonderful labor experience possible, what number would you use to rate your labor experience? |
| | 1. Not at all supportive | |
| | 2. Not very supportive | |
| | 3. Indifferent | |
| | 4. Fairly supportive | |
| Has this happened within the past year? (yes/no/or refused) | 5. Very supportive | |
| | How often do you talk with your partner about giving birth? Would you say... | |
| Who was it? Was it…. | 1. Never | |
| Your husband | 2. Rarely | |
| Your ex-husband | 3. Sometimes | |
| A boyfriend | 4. Often | |
| A stranger | 5. Very often | |
| Someone else | How much encouragement do you expect to receive from your partner during the birth? Would you say... | |
| | 1. None | |
| | 2. Very little | |
| | 3. Some | |
| | 4. A fair amount | |
| | 5. A lot | |

**Figure 2** Description of survey items used as variables. *Domestic partner refers to an adult with whom you share a sexual and economic partnership, even though you are not married.

2009). Legal marital status was not assessed on the surveys; however, partnered status (married, male DP, and female DP) was ascertained via a survey item related to the woman's living situation. We compared race/ethnicity, being pregnant as a teen, living in poverty, having a high school education or less, seeking care in a central city clinic as a proxy for urban residence, and age by partnered and abused status. We also compared levels of cumulative sociodemographic disadvantage (SDD) using a sum of these factors.

Experience of IPV was assessed with a Life Stressor Checklist (Wolfe & Kimerling 1997) item that is behaviourally specific. Those who disclosed lifetime IPV were asked follow-up questions from the Abuse Assessment Screen (AAS) (McFarlane *et al.* 1992) to determine past year exposure.

## Ethical considerations

The data were collected from August 2005–March 2009 at three academic health centres in the Midwest. The study was conducted with approval from the Institutional Review Boards of all three systems. Participants reviewed an informed consent document and completed the informed consent process verbally during the initial telephone interview. Women included in this analysis had data in all three surveys ($n = 567$). Attrition occurred across waves of data collection, and those who completed all three surveys were less likely to be sociodemographically disadvantaged. However, disadvantaged women were oversampled, so results of this analysis will still be generalizable to pregnant women in maternity care.

## Data analysis

We assessed validity of alternative partner quality variables using linear regression standardized betas (similar to correlation coefficients) and adjusted $R$-squares (to estimate proportion of variance explained) using SPSS version 17.0. The significance level for all analyses was set at 0·05.

First, we assessed construct validity and used unadjusted linear regression modelling. We then compared 'known group' partner quality variables with a factor we expected to be correlated: the woman's rating of her satisfaction with the quality of her love relationship. Second, we assessed the predictive validity of the known group variables and the satisfaction variable with the woman's expectations of partner support in labour and her appraisal of actual support in labour using a series of unadjusted regression models. Third, we compared these partner quality variables in their

predictive validity with PPD using both unadjusted and adjusted multiple regression models to estimate their relative explanatory value.

The first validation item was drawn from the Quality of Life Inventory® (QoLi; Pearson Antonio, TX, USA) (Frisch *et al.* 1992). The QoLi uses a stem to ask, 'How satisfied are you with the following aspects of your life' and provides 14 items, including 'your love relationship' with a five-level response set (Figure 2). Women without love relationships still answer this question and usually choose the neutral, middle response. However, they sometimes express a level of satisfaction or dissatisfaction. It is not known whether this rating indicates satisfaction with being single or with love relationships the women do not consider partnerships.

The second validation involved two variables. The first variable was created as a mean of three study-specific questions about the woman's expected level of partner support in labour (Figure 2). The mean of the three is used as a summary variable referred to as 'her *expected* partner labor support.' Data were missing for 75 women for this prelabour variable because they gave birth prior to being contacted for the late gestation interview. The second construct validation summary variable was the mean of two items from the Perceptions of Care Questionnaire (Fisher 1994) referred to as 'her actual partner labor support' (Figure 2).

Finally, we assessed predictive validity using PPD in a series of unadjusted linear regression models. We used the 35-item Postpartum Depression Screening Scale (PDSS) (Beck & Gamble 2000). This measure is a seven-factor scale that was developed based on qualitative research and attained sensitivity of 94% and specificity of 98% for major depression (cut-off score of 80) and sensitivity of 91% and specificity of 72% for minor depression (cut-off score of 60) compared with the Structured Clinical Interview for DSM-IV (SCID) in psychometric testing. We created a series of four multiple regression models that would compare the importance of each alternative partner relationship predictor alone with other theoretically related factors, including rating of actual partner social support in labour and rating of the labour experience itself. We used a fifth regression model to compare the best predictor controlling for the others.

## Results

### Demographics

The demographics of the programme participants using the Chi-square test for independence are presented in Table 2.

**Table 2** Demographics by four partner and abuse groups: Chi-square test for independence ($n = 567$).

| | Group 1: Partnered/ abuse % ($n$) 0·9 (5) | Group 2: Not partnered/ abuse % ($n$) 2·6 (15) | Group 3: Not partnered/no abuse % ($n$) 26·1 (148) | Group 4: Partnered/no abuse % ($n$) 70·4 (399) | Total ($n = 567$) % ($n$) | $\chi^2$ | d.f. | $P$ |
|---|---|---|---|---|---|---|---|---|
| Race/ethnicity* | | | | | | | | |
| African Americans ($n = 170$) | 1·8 (3) | 7·1 (12) | 67·1 (114) | 24·1 (41) | 30 (170) | 2·5 | 3 | <0·001 |
| European Americans ($n = 325$) | 0·3 (1) | 0·6 (2) | 7·4 (24) | 91·7 (298) | 57·4 (325) | 1·7 | 3 | <0·001 |
| Latinas ($n = 31$) | 0 (0) | 6·5 (2) | 22·6 (7) | 71·0 (22) | 5·5 (31) | 4·8 | 3 | 0·570 |
| Asians ($n = 47$) | 0 (0) | 0 (0) | 8·5 (4) | 91·5 (43) | 8·3 (47) | 11·2 | 3 | 0·011 |
| Hawaiian/Pacific Islander ($n = 3$) | 0 (0) | 0 (0) | 0 (0) | 100 (3) | 0·5 (3) | 1·3 | 3 | 0·736 |
| American Indian/Alaska Native ($n = 7$) | 0 (0) | 14·3 (1) | 57·1 (4) | 28·6 (2) | 1·2 (7) | 8·0 | 3 | 0·045 |
| Other race/ethnicity ($n = 23$) | 4·3 (1) | 0 (0) | 30·4 (7) | 65·2 (15) | 4·1 (23) | 4·2 | 3 | 0·246 |
| Teens (18–20) ($n = 89$) | 1·1 (1) | 10·1 (9) | 71·9 (64) | 16·9 (15) | 15·7 (89) | 149·8 | 3 | <0·001 |
| Income <$15,000 ($n = 85$) | 1·2 (1) | 5·9 (5) | 65·9 (56) | 27·1 (23) | 15 (85) | 91·1 | 3 | <0·001 |
| High school or less ($n = 184$) | 1·6 (3) | 6·0 (11) | 65·2 (120) | 27·2 (50) | 32·5 (184) | 244·4 | 3 | <0·001 |
| Urban residence ($n = 187$) | 2·1 (4) | 7·0 (13) | 66·8 (125) | 24·1 (45) | 33·0 (187) | 286·3 | 3 | <0·001 |
| Mean age (SD) | 24·8 (4·1) | 22·6 (4·7) | 22·4 (4·5) | 29·1 (4·5) | 27·1 (5·4) | | | |
| Mean number of SDDs (SD) | 2·4 (1·8) | 3·3 (1·0) | 3·2 (1·3) | 0·4 (1·0) | 1·3 (1·7) | | | |

*Some demographics do not total to the full sample size of 567 due to small numbers of participants declining the question or due to women giving more than one race/ethnic identity.
The $\chi^2$, Chi-square statistic; d.f., degrees of freedom; SD, Standard deviation; SDD, sociodemographic disadvantage, which is a sum of being African American, pregnant as a teen, with low income, high school education or less, and seeking prenatal care in a central city clinic as a proxy for urban residence.

African American perinatal women disproportionately encountered abuse whether partnered or not partnered as compared with their European American counterparts who experience less abuse and are partnered or not. Latina women experienced high rates of not partnered abuse; however, the results are not statistically significant. The perinatal Asian, Native Hawaiian/Pacific Islander women in this population were not abused, whereas American Indian/Alaska Natives group included one, not partnered, abused woman. The Native Hawaiian/Pacific Islander group was not large enough to obtain significance. Women who did not identify a race/ethnic group were predominantly not partnered and not abused with one woman in an IPV relationship.

Teens (ages 18–20) also disproportionately encounter abuse when compared with their cohorts with 10·1% not partnered and abused. Approximately, 65% of all women had an income <$15,000, an education of high school or less, an urban residence, and were not partner/not abused. Abused women who were *not* partnered had an income <$15,000, an education of high school or less, had an urban residence approximately 3·5 times less than those women who are abused and partnered. The mean age of the partnered women was slightly older than the not partnered women. The mean age of the total sample was 27·1 (SD 5·4) years with a range of ages from 18–45 years.

Data were missing data for a few reasons. Some women refused items such as race/ethnicity and 'How did your partner react to your delivery?' Also, 75 pregnant women gave birth early, so data were missing in relation to their 'expected partner support in labor.' They did, however, complete items that were not time-critical, including the quality of life measure.

Several of the interval-level variables (the quality of love relationship item, mean expected and actual partner support in labour) were left skewed. The labour appraisal rating was normally distributed. The PDSS score was slightly right skewed. Regression residuals of all dependent variables were normally distributed as required to meet the assumptions for regression modelling (Lewis-Beck 1980).

## Partner variables

We defined 'partner' as a husband, male domestic partner, or female domestic partner. We define a domestic partner as an adult with whom the participant shared a sexual and economic partnership, even if not married. Partnered women represented 71·3% ($n = 404$) of the total population and included women with husbands (61·6%, $n = 349$), women with male DPs (9·2%, $n = 52$), and women with female DPs (0·4%, $n = 2$). Partnered women experienced rates of abuse less than single women (1·2%, $n = 5$ compared with 7·4%, $n = 12$). Participants who were partnered and abused include married women (0·6%, $n = 2$), women with male DPs (3·8%, $n = 2$), and women with female DPs (50%, $n = 1$).

Our four-level variable was ordinal, with group 1 (married abused women) differing most from group 4 (married, not abused women) in relation to the mean quality of love relationship score in a one-way ANOVA (Group 1 mean = 3·80 to Group 4 mean = 4·85, $f$ = 18·3, $P < 0.001$). This is also supported by the reasonably linear correlation between the four-level group variable and the love relationship score ($r = 0.295$, $P < 0.001$). An independent samples $t$-test indicated a statistically significant difference in quality of love relationship scores for women who were abused in the past year (mean = 4·15, SD 1·18) and non-abused women (mean = 4·74, SD 0·68); t (566) = 2·22, $P = 0.04$). Women who were not living with partners included 28·7% ($n = 163$) of the population. We did not determine how many of these pregnant women are still in relationships with the fathers of their infants, how many pregnancies was a result of sexual assault, or how many infants were born from donor processes. These participants generally expressed high levels of satisfaction with their love relationships. The quality of the love relationship variable had a mean of 4·72 and SD 0·71 in the total sample of women.

## Construct validation analyses

The first bivariate linear regression with the partner quality variables used to assess construct validity (in relation to her rating of quality of the love relationship) confirmed that the four-level partner quality variable ($R^2 = 0.085$) was more strongly correlated with and explains more variance than either the partnered status ($R^2 = 0.066$) or IPV status variables alone ($R^2 = 0.022$) (See supporting information Table S1 in the online version of the article in Wiley Online Library).

The second set of bivariate linear regressions added the rating of quality of the love relationship as an additional alternative partner quality variable. This subjective factor was more strongly correlated and explained much more variance in relation to the expected partner support in labour ($R^2 = 0.151$) (See supporting information Table S2 in the online version of the article in Wiley Online Library).

However, it was not as strongly correlated ($R^2 = 0.021$) as the four-level partnered abuse variable in relation to the appraisal of actual partner support ($R^2 = 0.029$) (See supporting information Table S3 in the online version of the article in Wiley Online Library).

## Predictive validation analyses

Bivariate linear regressions with all of the alternative partner variables in relation to the outcome of depression score clearly showed that the woman's appraisal of the love relationship explained more variance, even though this single predictor did not explain on its own very much variance in such a complex, causal disorder as PPD (Table 3).

Repeating these linear regression models with two additional predictors confirmed that the woman's subjective appraisal was the best of the alternative partner relationship variables. When controlling for a woman's satisfaction with her partner's actual social support in labour and controlling for her overall appraisal of her labour experience (from horrible to wonderful), only the quality of love relationship item was independently significantly associated with the PDSS score. When re-run with the other proposed variables, neither partner status alone, nor did recent IPV alone, nor the combined four-level variable approach a statistically significant independent relationship with PDSS score. In these adjusted models, it is interesting to note that a woman's appraisal of the labour was never a statistically significant predictor of PDSS score. However, her level of satisfaction with her partner's actual support in labour was consistently important and explained somewhat more variance than the love relationship rating item itself, perhaps due to the more proximal relationship in time of that survey query with the postpartum depression outcome (Table 4).

Finally, because the quality of the love relationship item did not capture actual partner status or IPV, we concluded the analysis with an adjusted regression model that included all three of those variables as predictors. Although partner status and IPV were not independently associated with

**Table 3** Predictive validity assessment of all four alternative partner variables using the outcome of postpartum depression (PDSS sum score): bivariate regressions.

| Partner variable used | Adjusted $R^2$ | d.f. | $F$ | Standardized β coefficient | $t$ | $P$ |
|---|---|---|---|---|---|---|
| Partnered or not | −0·001 | 1,565 | 0·273 | −0·022 | −0·523 | 0·602 |
| IPV or not | 0·004 | 1,565 | 3·055 | 0·073 | 1·748 | 0·081 |
| Four-level variable | 0·005 | 1,565 | 3·712 | −0·081 | −1·927 | 0·055 |
| Quality of love relationship item | 0·036 | 1,565 | 22·052 | −0·194 | −4·696 | <0·001 |

d.f., degrees of freedom; IPV, intimate partner violence.

**Table 4** Adjusted* Predictive validity assessments of the four alternative partner variables with the outcome of postpartum depression (PDSS sum score): standard multiple regression.

| Model a | Adjusted $R^2 = 0.044$; $F = 9.081$; d.f. = (3,529); Model $P < 0.001$ | | |
|---|---|---|---|
| | Standardized β | $t$ | $P$ |
| Four-level variable | −0.024 | −0.554 | 0.580 |
| Partner's labour support | −0.194 | −4.132 | <0.001 |
| Labour appraisal | −0.044 | −0.955 | 0.340 |

| Model b | Adjusted $R^2 = 0.044$; $F = 9.163$; d.f. = (3,529); Model $P < 0.001$ | | |
|---|---|---|---|
| | Standardized β | $t$ | $P$ |
| Partnered | 0.032 | 0.736 | 0.462 |
| Partner's labour support | −0.204 | −4.354 | <0.001 |
| Labour appraisal | −0.043 | −0.928 | 0.354 |

| Model c | Adjusted $R^2 = 0.044$; $F = 9.077$; d.f. = (3,529); Model $P < 0.001$ | | |
|---|---|---|---|
| | Standardized β | $t$ | $P$ |
| Past year IPV | 0.023 | 0.544 | 0.587 |
| Partner's labour support | −0.195 | −4.164 | <0.001 |
| Labour appraisal | −0.046 | −0.980 | 0.327 |

| Model d | Adjusted $R^2 = 0.066$; $F = 13.431$ d.f. = (3,528); Model $P < 0.001$ | | |
|---|---|---|---|
| | Standardized β | $t$ | $P$ |
| Quality of love relationship item #5 | −0.152 | −3.582 | <0.001 |
| Partner's labour support | −0.174 | −3.759 | <0.001 |
| Labour appraisal | −0.047 | −1.034 | 0.301 |

| Model e | Adjusted $R^2 = 0.066$; $F = 8.546$; d.f. = (5,526); Model $P < 0.001$ | | |
|---|---|---|---|
| | Standardized β | $t$ | $P$ |
| Quality of love relationship item #5 | −0.164 | −3.774 | <0.001 |
| Partnered | 0.068 | 1.546 | 0.123 |
| Past year IPV | 0.016 | 0.362 | 0.718 |
| Partner's labour support | −0.180 | −3.837 | <0.001 |
| Labour appraisal | −0.048 | −1.052 | 0.293 |

*Model a–d are adjusted for appraisal of the partner's actual support in labour and the woman's rating of the labour experience. Model e uses all three partner variables, starting with her subjective appraisal of the quality of the love relationship and adjusting for partnered status and past year IPV.
IPV, intimate partner violence.

PDSS score, including them in the model strengthened the statistically significant association of the woman's appraisal of the quality of the love relationship (Table 4).

## Discussion

Our findings suggested that from a social support standpoint, partnered vs. single status alone was never the best indicator of behavioural or health outcomes. The change from the assumption that partnership is an asset in all cases is supported by several decades of sociological and health research. Our pragmatic approach of creating a four-level variable would be feasible in any health study using data that include IPV assessment, and including a single-item quality of love relationship variable in future studies would not be difficult. Using these two factors together improved variance explained in both behavioural (partner support in labour) and health (PDSS score) outcomes in this validation analysis and suggested that there is value to this approach when use of entire scales is not feasible or necessary for the research question.

There are several strengths in this analysis, including the fact that our sample was large and diverse. Second, the time points for data collection coincide with clinical practice in that asking about social support should occur early in pregnancy, so that services can be implemented in time to affect outcomes. Third, although few studies have examined the 'darker side' of social support in pregnant women, it is no longer taboo to consider, either in research or in clinical practice, the notion that having a partner may not always be a benefit. Thus, the analysis presented here is in line with technically, socially acceptable, and feasible means of improving assessment and measurement of the quality of the partner relationship.

Despite these aforementioned strengths, *post hoc* use of one-, two-, and three-item variables means that this is not as strong an approach as *a priori* use of reliable and valid scales. That said, one goal of this analysis was to highlight the opportunity of creating alternatives from existing data. Attrition across this longitudinal study occurred, and the more disadvantaged women were lost to follow-up. Therefore, there may be fewer abused women left by the third-wave, outcome analysis. However, the parent study included a large enough number of disadvantaged women that the final wave of data still included a diverse sample. Our alternative partner quality variables included dichotomous (partnered status, abuse status), ordinal (four-level variable), and interval-level (quality of love relationship) variables. In validation studies, different levels of measurement can sometimes affect the strength of the correlation above and beyond the effect of the actual relationship of the constructs in the paired measures. Thus, the standardized betas derived in relation to the dichotomous or ordinal variables here may vary somewhat from what the correlation values would have

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## What is already known about this topic

- Social support is considered a positive attribute that promotes improved health outcomes in a variety of populations and across numerous health conditions.
- The presence of a partner (married or domestic) is often used as a proxy for social support.
- Given knowledge of the prevalence of intimate partner violence, feminist and women's health researchers have questioned the adequacy of assuming positive social support based on married/partnered status.

## What this paper adds

- Our results, based on a perinatal research data set, support the notion that simply having a partner should not be construed as an adequate indicator of social support.
- The presence or absence of intimate partner violence in the relationship was a better predictor of social support than simply having a partner or not.
- A single question about the woman's appraisal of the quality of the love relationship with her partner provided a better assessment of social support than partnered status alone.

## Implications for practice and/or policy

- Women's health clinicians should not assume that partnered status assures social support among their patients.
- Assessment of partner support may be accomplished by asking about intimate partner violence and partnered status or by asking, 'How satisfied are you with the quality of your love relationship?'
- It is important to consider the potential negative impact of a partnered relationship and not assume the presence of a partner adds benefit in the context of women's health.

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been if the construct validity assessment had used a multi-trait-multi-method matrix design to match the comparisons on level of measurement (DeVellis 1991).

## Conclusion

### Clinical and research implications

In summary, the IPV variable was actually the best predictor of the woman's appraisal of partner behaviour in labour, suggesting that abuse status and rating of the quality of the love relationship are useful partner quality factors. When modelled together, the abuse factor was not independently, significantly predictive of the health outcome (PDSS score); however, it did modify (strengthen) the association of subjective rating with that outcome. Therefore, it appears that if healthcare practitioners and researchers want to improve their assessment of the quality of the partner relationship for their patients, the best way is simply to ask, 'How satisfied are you with your partner or love relationship or your single status?' However, the current standard of care, to ask about IPV in pregnancy, is also important.

Many researchers have only considered whether a relationship exists (i.e. partnered/not partnered) and they have not given consideration to the quality of the relationship. For future research, this methodological analysis suggests that the 'darker side' of social support, especially in relation to partner relationship, should be considered in women's health outcomes research.

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## Author Contributions

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- substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data.
- drafting the article or revising it critically for important intellectual content.

## Supporting Information Online

Additional Supporting Information may be found in the online version of this article:

**Table S1.** Construct Validity Check #1: Associations of Alternative Partner Variables with Quality of Her Love Relationship (QoLi Item #5): Bivariate Regressions

**Table S2.** Construct Validity Check#2: Associations of Alternative Partner Variables with Her Expectation of Partner Support in Labor: Bivariate Regressions

**Table S3.** Construct Validity Check#3: Her Appraisal of the Partner's Actual Support in Labor: Bivariate Regressions

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