DO NEGATIVE EMOTIONAL STATES PLAY A ROLE IN THE ASSOCIATION
BETWEEN INTIMATE PARTNER VIOLENCE AND POOR HEALTH-RELATED
QUALITY OF LIFE IN CHINESE WOMEN FROM LOW-INCOME FAMILIES?

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completion of the telephone surveys by the HKU Social Science Research Center is much appreciated. Finally, the hard work of our research staff in data collection and analysis must be acknowledged.

KEY WORDS

Intimate partner violence, Health-related quality of life, Low-income families

ABSTRACT

A cross-sectional analysis on a dataset of 156 participants in a health assessment programme explored whether negative emotional states mediated the association between intimate partner violence (IPV) and health-related quality of life (HRQoL). Compared with IPV screen-negative participants, those who screened positive had significantly lower HRQoL and significantly higher levels of depression, anxiety and stress. The inverse associations between the presence of IPV and HRQoL were found to be mediated by depression, anxiety and stress. Therefore, interventions to alleviate negative emotions in women suffering from IPV have the potential to be useful in improving their HRQoL.

## INTRODUCTION

Intimate partner violence (IPV) has been defined as any behaviour among individuals in a current, or former, intimate relationship that results in physical, emotional or sexual harm (Feder & Macmillan, 2012). Such behaviours can include beating, intimidation, controlling who the victim sees and talks to, and sexual assault (Feder & Macmillan, 2012). IPV is the most common form of violence against women and has been recognised as a global public health problem and human rights issue (Abramsky et al., 2011). Estimates published by the World Health Organization (WHO) revealed that the prevalence of lifetime physical and/or sexual IPV among ever-partnered women ranged from 23 to 38% for all WHO regions (World Health Organization, London School of Hygiene and Tropical Medicine, & South African Medical Research Council, 2013). Although the prevalence of IPV among Chinese women in Hong Kong appears to be lower than that of other areas, rates are still troubling. For example, a local representative survey of 1,223 young adults (aged 18-27 years) indicated that the lifetime incidence of IPV was 8.6% and reported IPV in the preceding year was 4.9% (Zhang et al.,, 2015). Additional studies conducted in Hong Kong have investigated IPV among samples of pregnant women (Lau, 2005; Lau et al., 2008; Leung et al., 1999; Tiwari et al., 2008). In two such studies, 9.1% (Tiwari et al., 2008) and 15.7% (Leung et al., 1999) of participants reported that they had experienced IPV in the past year. It was also found that 4.3% (Leung et al., 1999) and 11.2% (Lau, 2005; Lau et al., 2008) of women had been abused during their pregnancies.

The profound negative impact of IPV on health outcomes is well established. Compared with non-abused women, those who have experienced IPV report significantly more health symptoms and conditions, which include gynecological problems, headaches,

back pain, stress, depression, hypertension, abdominal pain, anxiety and digestive problems (Bacchus et al., 2018; Bonomi et al., 2009; Bonomi et al., 2006; Campbell et al., 2002; Choi, Wong, & Fong, 2017; Coker et al., 2000; Schei & Bakketeig, 1989). As a result, IPV has been shown to have adverse effects on a victim's health-related quality of life (HRQoL) (Bonomi et al., 2006). HRQoL is a multidimensional concept, which reflects an individual's perceived physical, social and emotional functioning and their ability to live an independent and fulfilling life (Guyatt, Feeny, & Patrick, 1993). Studies worldwide have consistently found that women who have been abused have significantly poorer emotional HRQoL when compared with women who have not experienced IPV (Alsaker et al., 2006; Choi, Wong, & Fong, 2017; Costa et al., 2015; Guo et al., 2017; Tiwari et al., 2008). Although emotional HRQoL appears to be most severely impacted by IPV, a number of studies have also found that victims of IPV report significantly worse physical HRQoL than non-victims (Alsaker et al., 2018; Bakas et al., 2012; Leung et al., 2005).

In order to fully understand the impact of IPV on health outcomes, including HRQoL, it is important to investigate the pathways that connect them (Dutton et al., 2006). Indeed, knowledge about mediators could shape the focus and components of clinical interventions to improve HRQoL among victims. Mental health is one such mediator that deserves further investigation as there are established interventions that can improve it. Indeed, poorer mental health has been shown to have a profound negative impact on HRQoL. For example, a recent study conducted in Hong Kong found that depressive, anxiety and stress symptoms mediated the association between IPV and reduced HRQoL in a sample of college students (Choi, Wong, & Fong, 2017). This finding is in line with other studies, where mental health was found to adversely impact HRQoL in patients with

schizophrenia (Lim & Lee, 2018), beta-thalassemia major (Adib-Hajbaghery, Ahmadi, & Poormansouri, 2015) and kidney disease (Perales Montilla, Duschek, & Reyes del Paso, 2016).

The objective of the present study was to contribute to this growing area of research by exploring the relationship between IPV and HRQoL among Hong Kong Chinese women from low-income families with a specific focus on the mediating roles of anxiety, depression and stress. To the author's knowledge, no research to date has explored mental health's mediating impact on HRQoL among this population. Lower socioeconomic status has consistently been identified as a determinant of IPV (Yakubovich et al., 2018) and the impact of IPV on HRQoL is magnified for women from low-income families who are known to be subject to a number of different stressors as well as poor access to healthcare (Fung et al., 2016; Sutherland, Sullivan, & Bybee, 2001; Wong et al., 2018). Specifically, we hypothesised that the association between IPV and impaired HRQoL is mediated fully or partially through its impact on mental health.

## METHOD

Study design and setting

This study was a cross-sectional analysis of a dataset collected as part of a prospective cohort study nested within the Trekkers Family Enhancement Scheme (TFES). Details of the scheme and cohort study protocol are published elsewhere (Fung et al., 2016; Lam et al., 2017). In brief, the TFES was established in 2012 and is funded by a local philanthropic organisation, the Kerry Group Kuok Foundation. The scheme is based in Tung Chung, a developing satellite residential area situated on an outlying island of Hong

Kong. Tung Chung has high levels of socioeconomic deprivation and limited access to healthcare (Fung et al., 2016). The objective of the TFES is to empower low-income families in Tung Chung to achieve their full potentials by providing support and opportunities in health, education, employment and environmental harmony (Fung et al., 2016). In terms of healthcare, a Health Empowerment Programme is delivered, which consists of a Health Literacy Programme, Self-care Enablement Programme and Health Ambassador Programme as well as annual health assessments. The Health Literacy programme includes a series of health seminars and workshops that aim to improve knowledge of health and health services, while the Self-care Enablement Programme focuses on interactive training courses to enable families to develop the skills and means to enhance their physical and mental well-being and to deal with health issues. The purpose of the Health Ambassador Programme is to train adult participants to act as lay health advisors for other families (Fung et al., 2016).

Participants were identified through local Non-Government Organizations and sent an invitation letter for the TFES, which listed the inclusion criteria: 1) at least one family member working full-time or part-time; 2) one or more dependent children aged 6 to 11 years; 3) a monthly income less than 75% of Hong Kong's median monthly household income and, 4) the ability to provide written consent to take part in the study (Fung et al., 2016; Lam et al., 2017).

Family members from the TFES were invited to participate in a cohort study, which evaluated the impact of the Health Empowerment Programme on a range of health outcomes, such as HRQoL, health enablement, and health service utilisation (Fung et al., 2016). Recruitment took place between January 2012 and September 2015. As part of the

cohort study, participants attended a health assessment that included a self-completed questionnaire on sociodemographic factors, and standard measures on IPV likelihood, HRQoL and depression, anxiety and stress symptoms. If required, on-site support was provided by trained research assistants in the completion of the questionnaires. On average, participants took between 20 to 30 minutes to complete the questionnaires.

Participants

Female participants were eligible for inclusion in this analysis if they were 18 years of age or older and were taking part in the prospective cohort study.

Study instruments

The Chinese Abuse Assessment Screen (C-AAS) was administered to identify participants who had experienced IPV (Parker & McFarlane, 1991). This scale is a translation of the English AAS and assesses if IPV has occurred during the respondent's lifetime, throughout the preceding year, during pregnancy (if applicable) and if the respondent is/was afraid of the individual(s) who abused them (response options for all items: yes/no) (Parker & McFarlane, 1991). The C-AAS measures emotional and physical violence separately for the three time periods covered whereas the English AAS combines emotional and physical abuse for the lifetime period and focuses on only physical and sexual abuse for the other two time periods (preceding 12 months and pregnancy) (Tiwari et al., 2009). This difference is due to previous research highlighting a higher prevalence of emotional violence among Chinese abused women (Tiwari et al., 2007). In the current study, a participant was considered a victim of IPV if she provided a positive response (yes)

to any of the scale items. The C-AAS has been validated among a sample of pregnant and nonpregnant Hong Kong Chinese women (Tiwari et al., 2007). It was found to have acceptable measurement accuracy with high specificity ($\geq$ 89%), reasonable sensitivity (36.3 to 65.8%), high positive predictive values ($\geq$ 80%), and adequate negative predictive values (66 to 93%).

The outcome of interest was HRQoL, which measured by the Chinese (Hong Kong) version of the 12-item Short Form Questionnaire Version 2 (SF-12v2). The SF-12v2 is a widely used instrument, which functions as the shortened version of the 36-item Short-Form Health Survey (SF-36) (Ware, Kosinski, & Keller, 1996). The SF-12v2 assesses HRQoL during the previous four weeks and consists of 12 items grouped into eight domains: General Health (GH), Physical Functioning (PF), Role Physical (RP), Body Pain (BP), Vitality (VT), Social Functioning (SF), Role Emotional (RE), and Mental Health (MH). The scores of these eight domains can be combined to form a physical component summary (PCS) score and a mental component summary (MCS) score, ranging from 0 to 100 (Lam et al., 2010; Ware, 2005). Higher domain and summary scores indicate better HRQoL (Lam et al., 2013). The Chinese (Hong Kong) version of the SF-12v2 has been validated in the local population and found to have adequate internal reliability (Cronbach's alpha ($\alpha$) coefficient range: 0.60 to 0.89) (Lam et al., 2010; Lam et al., 2013).

Depression, anxiety and stress were included as potential predictors of the association between IPV and HRQoL. These distinct symptoms were measured by the Chinese validated translation of the 21-item Depression Anxiety Stress Scale (DASS-21) (Antony et al., 1998; Wang et al., 2016). The DASS-21 consists of three 7-item subscales that asses the severity of symptoms related to stress, anxiety and depression. Participants

were asked to indicate the extent to which they experienced each symptom over the past week. Responses were recorded on a 4-point Likert scale, ranging from 0 (did not apply over the past week) to 3 (applied very much or most of the time). Scores for each subscale range from 0 to 21 with higher scores indicating greater severity of symptoms (Lovibond & Lovibond, 1996; Wang et al., 2016). The DASS-21 has been found to have good reliability (Cronbach's α range: 0.81 to 0.94) (Antony et al., 1998; Clara, Cox, & Enns, 2001; Gloster et al., 2008; Henry & Crawford, 2005; Lovibond & Lovibond, 1996; Norton, 2007). Convergent and discriminate validity have also been established with a good correlation identified when paired with the Beck Depression Inventory and Beck Anxiety Inventory (Antony et al., 1998; Beck et al., 1988; Beck et al., 1961; Gloster et al. 2008; Lovibond & Lovibond, 1995; Lovibond & Lovibond, 1996; Norton, 2007). The Chinese version of the DASS-21 was tested in Chinese-speaking population where a confirmation factor analysis showed adequate discrimination between depression, anxiety and stress (Moussa, Lovibond, & Laube, 2001). A good internal consistency was also found with a minimum Cronbach's α of 0.80 (Chan et al., 2012; Wang et al., 2016).

A number of sociodemographic variables were adjusted for as potential confounding factors of HRQoL: age (years), marital status (married, unmarried), education level (primary or below, secondary, university or above), work status (working, not working), current smoker and current drinker. Data for monthly household income was also collected. The Hong Kong median monthly household income was 20,000 Hong Kong Dollars (HKD) (~ 2,580 US dollars) at the time of study enrolment and the poverty line was defined as half of the median household income of the general population in Hong Kong (10,000 HKD) (Hong Kong Economic Analysis Division, 2013). Income was

therefore grouped into three categories: 1) less than 10,000 HKD (below the poverty line), 2) 10,000 to 20,000 HKD (between the poverty line and the Hong Kong median monthly household income), 3) ≥ 20,000 HKD (above the Hong Kong median monthly household income).

Statistical methods

Sociodemographic characteristics, SF-12v2 summary scores and DASS-21 subscale scores for participants who had experienced IPV and those who had not experienced IPV were compared by *t*-tests for continuous data and Pearson's chi-squared ($\chi^2$) test for categorical data. Effect sizes (Cohen's D for *t*-tests and Phi for $\chi^2$ tests) were also calculated (Cohen, 1988; Cramer, 1946). The effect sizes were classified as follows: small effect (<0.2), medium effect (≥0.2 and <0.5) and large effect (≥0.5).
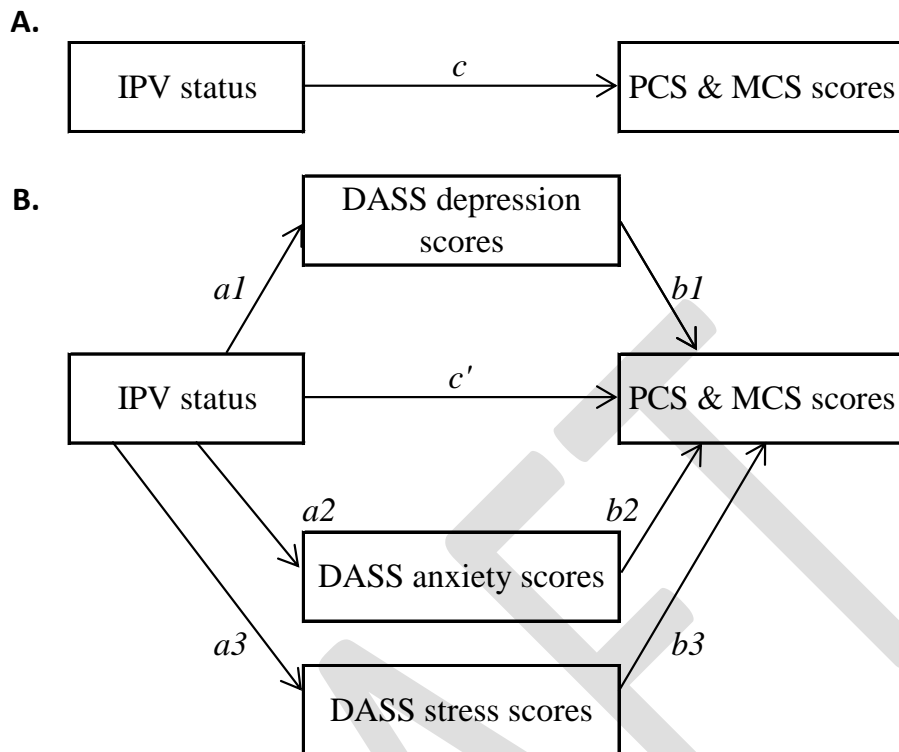
A correlation matrix with the associated p-values was computed for the IPV status, SF-12v2 summary scores and DASS-21 subscale scores. The correlation was assessed using the Pearson's correlation coefficient for the two continuous variables and the point-biserial correlation coefficient for correlation between one binary variable and one continuous variable. If any of the DASS-21 subscale scores had significant correlations with both IPV status and the SF-12v2 summary scores, then they were considered potential mediators.

Multiple linear regression models were used to examine the association between IPV status, SF-12v2 summary scores and DASS-21 subscale scores. Sociodemographic characteristics were adjusted for. Linearity, normality, homoscedasticity and absence of multicollinearity were checked for all models. When the outcome was HRQoL, the three

DASS-21 subscale scores were included as predictors in the model if they were found to be significantly correlated with HRQoL.

If the multiple linear regression model suggested that depression, anxiety and stress could mediate the association between IPV and HRQoL, then the Baron and Kenney's multistage regression approach was applied (Baron & Kenny, 1986). This approach included four steps: 1) test whether IPV (independent variable) was significantly associated with HRQoL scores (dependent variable); 2) test whether IPV predicted DASS-21 subscale scores (mediator); 3) identify whether the each of the DASS-21 subscale scores were associated with HRQoL scores and, 4) HRQoL was regressed on both IPV and three DASS-21 subscales (figure 1). Sociodemographic characteristics were adjusted for in all of the above analyses. Bootstrapping with 5000 samples was also used to estimate the 95% confidence intervals (CI) for indirect effects of IPV on HRQoL through the three negative emotional states (Preacher & Hayes, 2008). The indirect effect, suggesting there could be a mediating effect, was significant if the 95% CI did not contain 0 (Preacher & Hayes, 2008). If the direct correlation (c) between IPV and SF-12v2 scores was significant but became non-significant after controlling for the DASS-21 subscale scores, a complete mediating effect is present. If a significant but reduced coefficient was found between the relationships of IPV and HRQoL after controlling for the emotional states, a partial mediation was present (Baron & Kenny, 1986).

Data analysis was undertaken using IBM SPSS 24 (IBM SPSS Inc., Chicago, IL, USA). Statistical significance was set at p-value < 0.05. The mediation analyses were conducted using the SPSS macro PROCESS (Hayes, 2013).

**A.**

IPV status $\xrightarrow{\quad c \quad}$ PCS & MCS scores

**B.**

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                    DASS depression
                        scores
              a1                    b1
    IPV status ──────── c' ────────► PCS & MCS scores
              a2              b2
                   DASS anxiety scores
         a3                      b3
                   DASS stress scores
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**Figure 1.** Conceptual model for the simple mediation model – DASS-21 scores mediate the association between IPV and HRQoL

Abbreviations: IPV = intimate partner violence; DASS = Depression Anxiety Stress Scale; PCS = Physical Component Summary; MCS = Mental Component Summary

Ethical approval

Ethical approval was obtained from the Institutional Review Board of the University of Hong Kong – the Hospital Authority Hong Kong West Cluster (Reference number: UW 12-517).

RESULTS

Participants

In total, 212 eligible participants were identified from the TFES and invited to take part in the prospective cohort study (Fung et al., 2016). Of those invited, 172 (81.1%) agreed to participate. Sixteen participants were excluded for not completing one of the included measures (C-AAS (n = 6), DASS-21 and SF-12v2 (n = 7), sociodemographics (n = 3)). Of the 156 participants included in the final analysis, 13.5% (n = 21) screened positive for IPV. The characteristics of the study participants are presented in table 1.

Descriptive data

The majority (96.7%) of the included participants reported a monthly household income of 20,000 HKD or less (Table 1). Compared to IPV screen-negative participants, a significantly higher proportion of participants who screened positive for IPV were not currently working (51.9% *vs.* 81.0%, p = 0.012). There were no statistically significant differences between the two groups in terms of age, smoking prevalence, alcohol consumption, marital status, education level or monthly household income.

In terms of HRQoL, when compared with screen-negative participants, those who screened positive had significantly lower (worse) PCS (44.5 *vs.* 48.8, p = 0.044) and MCS (41.0 *vs.* 47.3, p = 0.022) scores (Table 1). The comparison of DASS-21 scores showed that screen-positive participants had significantly higher (worse) mean scores for all three subscales (depression: 4.8 *vs.* 2.7, p = 0.042; anxiety: 4.8 *vs.* 2.7, p = 0.009; stress: 8.2 *vs.* 4.1, p = 0.005), indicating more negative emotional symptoms.

**Table 1.** Sociodemographic characteristics, SF-12v2 summary scores and DASS-21 subscale scores amongst participants who screened positive for IPV and screen-negative participants

| Characteristic | Total N = 156 | Screen-negative N = 135 (86.5%) | Screen-positive N = 21 (13.5%) | Test score | Effect size | p value |
|---|---|---|---|---|---|---|
| **Mean age**, years (SD) | 39.4 (6.1) | 39.4 (6.2) | 39.7 (6.3) | 0.21 | 0.05 | 0.834 |
| **Current smoking**, n (%) | 13 (8.3%) | 9 (6.7%) | 4 (19.0%) | 3.65 | 0.15 | 0.056 |
| **Current drinking**, n (%) | 15 (9.7%) | 12 (9.0%) | 3 (14.3%) | 0.59 | 0.06 | 0.442 |
| **Marital status,** n (%) | | | | | | |
| Unmarried | 23 (14.7%) | 21 (15.6%) | 2 (9.5%) | 0.53 | 0.06 | 0.468 |
| Married | 133 (85.3%) | 114 (84.4%) | 19 (90.5%) | | | |
| **Employment status,** n (%) | | | | | | |
| Not working | 87 (55.8%) | 70 (51.9%) | 17 (81.0%) | 6.24 | 0.20 | 0.012 |
| Working | 69 (44.2%) | 65 (48.1%) | 4 (19.0%) | | | |
| **Education,** n (%) | | | | | | |
| Primary or below | 34 (22.1%) | 26 (19.5%) | 8 (38.1%) | 4.00 | 0.16 | 0.135 |
| Secondary | 115 (74.7%) | 103 (77.4%) | 12 (57.1%) | | | |
| University or above | 5 (3.2%) | 4 (3.0%) | 1 (4.8%) | | | |
| **Household income,** n (%) | | | | | | |
| < 10 000 HKD | 57 (37.5%) | 49 (37.4%) | 8 (38.1%) | 0.83 | 0.07 | 0.659 |
| 10 000 to 20 000 HKD | 90 (59.2%) | 77 (58.8%) | 13 (61.9%) | | | |
| ≥ 20 000 HKD | 5 (3.3%) | 5 (3.8%) | 0 (0.0%) | | | |

**SF-12v2**

| | | | | | | |
|---|---|---|---|---|---|---|
| Physical functioning | 85.7 (23.6) | 86.9 (22.6) | 78.6 (28.8) | 1.50 | 0.35 | 0.135 |
| Role physical | 77.0 (23.0) | 78.9 (24.3) | 61.3 (31.9) | 2.95 | 0.69 | 0.004 |
| Bodily pain | 67.3 (28.5) | 69.4 (27.8) | 51.2 (29.0) | 2.79 | 0.65 | 0.006 |
| General health | 41.8 (26.4) | 42.3 (26.3) | 37.4 (28.6) | 0.79 | 0.18 | 0.432 |
| Vitality | 55.7 (27.4) | 57.6 (26.7) | 41.7 (29.9) | 2.50 | 0.59 | 0.013 |
| Social functioning | 73.1 (28.9) | 73.9 (28.8) | 64.3 (29.1) | 1.42 | 0.33 | 0.158 |
| Role emotional | 72.9 (27.6) | 75.1 (25.6) | 57.1 (34.8) | 2.83 | 0.66 | 0.033 |
| Mental health | 62.9 (20.5) | 64.0 (19.7) | 53.6 (22.8) | 2.20 | 0.52 | 0.029 |
| Physical Component Summary | 48.3 (9.2) | 48.8 (8.6) | 44.5 (12.1) | 2.03 | 0.48 | 0.044 |
| Mental Component Summary | 46.7 (11.9) | 47.3 (10.9) | 41.0 (16.1) | 2.31 | 0.54 | 0.022 |

**DASS-21**

| | | | | | | |
|---|---|---|---|---|---|---|
| Depression | 3.0 (3.3) | 2.7 (3.1) | 4.8 (4.4) | 2.78 | 0.65 | 0.042 |
| Anxiety | 3.0 (3.5) | 2.7 (3.2) | 4.8 (4.5) | 2.66 | 0.62 | 0.009 |
| Stress | 4.6 (4.2) | 4.1 (3.6) | 8.2 (6.0) | 4.45 | 1.04 | 0.005 |

Abbreviations: IPV = intimate partner violence; SD = standard deviation; SF-12v2 = 12-item Short Form Questionnaire version 2; DASS-21 = 21-item Depression Anxiety Stress Scale.

Please note: sample sizes for educational background and household income are 154 and 152, respectively.

Table 2 shows the Pearson's correlation between IPV screening status, SF-12v2 summary scores and DASS-21 subscale scores. The results showed that screening status was negatively correlated with SF-12v2 summary scores, while positively correlated with DASS-21 subscale scores. In addition, the three DASS-21 subscale scores were all significantly correlated with SF-12v2 PCS and MCS, which indicated that depression, anxiety and stress were potential mediators of the association between screening status and HRQoL.

**Table 2.** Correlations between IPV screening status, SF-12v2 summary scores and DASS-21 subscale scores

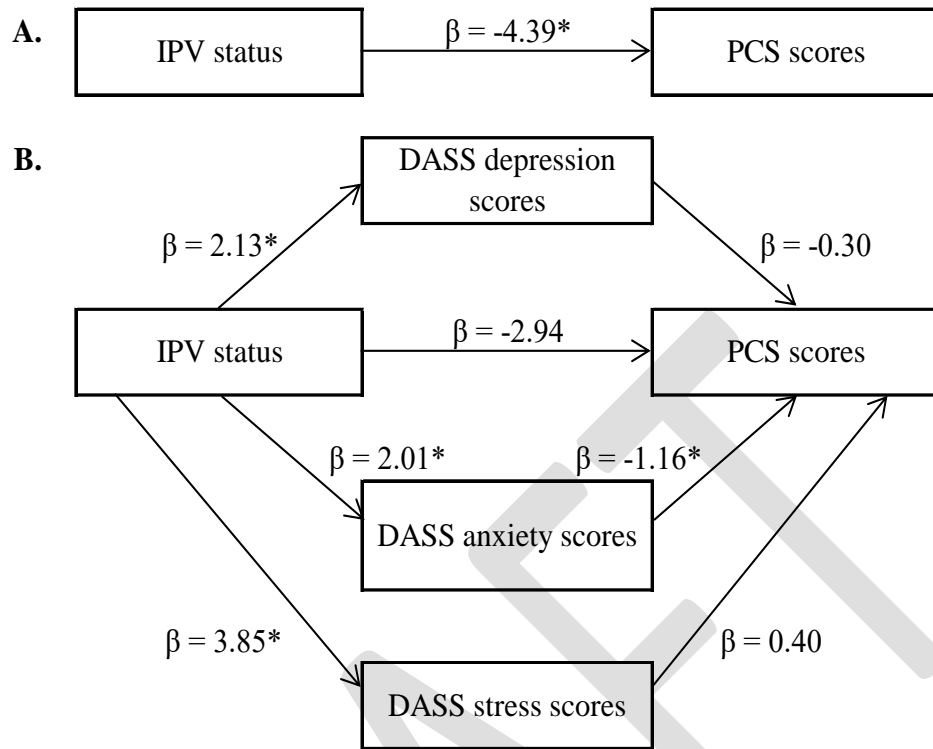|  | IPV status | PCS | MCS | Depression | Anxiety | Stress |
|---|---|---|---|---|---|---|
| IPV status | 1.000 | -0.161* | -0.183* | 0.218* | 0.209* | 0.337* |
| PCS |  | 1.000 | 0.024 | -0.310* | -0.404* | -0.271* |
| MCS |  |  | 1.000 | -0.635* | -0.503* | -0.661* |
| Depression |  |  |  | 1.000 | 0.780* | 0.813* |
| Anxiety |  |  |  |  | 1.000 | 0.770* |
| Stress |  |  |  |  |  | 1.000 |

Abbreviations: IPV = intimate partner violence; PCS = Physical Component Summary; MCS = Mental Component Summary

After adjusting for sociodemographic characteristics, PCS scores among participants who screened positive for IPV were reduced by 4.39 (p = 0.049) compared with screen-negative participants (Figure 2). After incorporating the three DASS-21 subscales into the model, the significant direct effect of IPV on PCS scores was no longer present ($\beta$ = -2.94, p = 0.181), which suggests a full-mediation model through anxiety. The bootstrapping results showed that the 95% CI (corrected for bias) did not contain 0 for the anxiety subscale, indicating that the mediating effect of DASS-21 anxiety in the relationship between IPV and PCS was valid, while the DASS-21 depression and stress subscales were not mediators.

Similarly, after adjusting for sociodemographic characteristics, the MCS scores of women who screened positive for IPV were reduced by 6.07 (p = 0.033) compared to screen-negative participants (Figure 3). After further controlling for the three DASS-21 subscales, there was no longer a significant direct impact of IPV on MCS scores ($\beta$ = 1.00, p = 0.660), which indicated a full-mediation model through depression and stress. When the mediators were depression and stress subscale scores, the bias corrected 95% CI for the mediation models and did not contain 0. This shows that both depression and stress mediated the relationship between IPV and MCS, while anxiety was not a mediator.
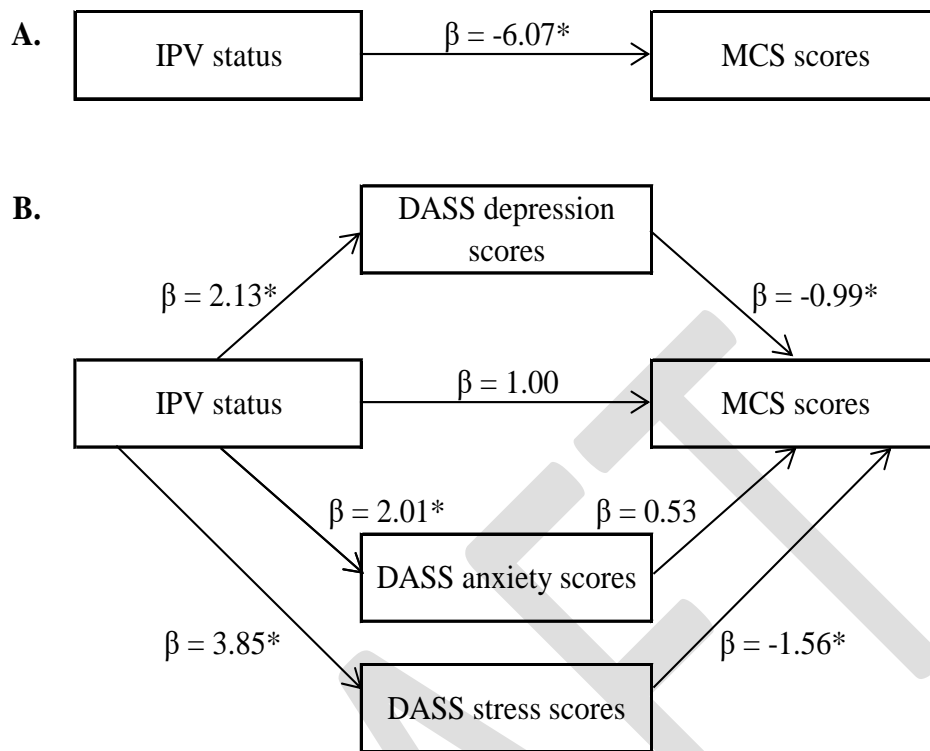
**A.**

IPV status  $\beta = -4.39^*$  → PCS scores

**B.**

DASS depression scores

$\beta = 2.13^*$

$\beta = -0.30$

IPV status  $\beta = -2.94$  → PCS scores

$\beta = 2.01^*$  $\beta = -1.16^*$

DASS anxiety scores

$\beta = 3.85^*$  $\beta = 0.40$

DASS stress scores

**Figure 2.** Mediation models showing the effect of negative emotional states on the relationship between IPV and PCS scores using Baron and Kenney's multistage regression approach

Abbreviations: IPV = intimate partner violence; DASS = Depression Anxiety Stress Scale; PCS = Physical Component Summary.

**A.**

| IPV status | $\beta = -6.07*$ → | MCS scores |

**B.**

DASS depression scores

IPV status

DASS anxiety scores

DASS stress scores

MCS scores

$\beta = 2.13*$

$\beta = -0.99*$

$\beta = 1.00$

$\beta = 2.01*$

$\beta = 0.53$

$\beta = 3.85*$

$\beta = -1.56*$

**Figure 3.** Mediation models showing the effect of negative emotional states on the relationship between IPV and MCS scores using Baron and Kenney's multistage regression approach

Abbreviations: IPV = intimate partner violence; DASS = Depression Anxiety Stress Scale; MCS = Mental Component Summary.

## DISCUSSION

The present study was the first to explore the association between IPV, mental health (depression, anxiety and stress) and HRQoL in low-income Hong Kong Chinese women. First, consistent with previous research, it was found that women who screened positive for IPV reported significantly poorer HRQoL than screen-negative participants,

particularly in the emotional domains (Alsaker et al., 2018; Alsaker et al., 2006; Costa et al., 2015; Leung et al., 2005; Tiwari et al., 2008). The observed reductions in HRQoL may lead to morbidity and mortality (Landman et al., 2010; Xie et al., 2014) as well as having an adverse impact on dependent children (Guo et al., 2017). We also found that screened-positive participants had significantly higher levels of depression, anxiety and stress, which again mirrors findings of earlier studies that demonstrated the adverse impact of IPV on a range of emotional outcomes (Bacchus et al., 2018; Choi, Wong, & Fong, 2017; Golding, 1999; Lagdon, Armour, & Stringer, 2014; Tang, 1997; Wong et al., 2011). Indeed, a systematic review and meta-analysis of 16 longitudinal studies (n = 36,163 participants) found that women exposed to IPV were at increased risk of subsequent depression (Devries et al., 2013). However, there was also a reverse association in that depressive symptoms increased the odds of women subsequently reporting IPV (Devries et al., 2013). This result is supported in a more recent review and meta-analysis of 35 cohort studies (n = 48,863) where positive associations were found between IPV and ensuing depressive symptoms as well as between depressive symptoms and subsequent IPV (Bacchus et al., 2018). These findings demonstrate a more complex, bidirectional relationship between IPV and mental health.

Our study also found that anxiety mediated the relationship between IPV and physical HRQoL, while depression and stress mediated the association between IPV and mental HRQoL through a full-mediation model. This finding of different mediators on the association between IPV and physical or mental HRQoL is consistent with that found in the study conducted by Choi et al, which investigated the impact of depression, anxiety and stress on the association between IPV and HRQoL among college students in Hong Kong

(Choi, Wong, & Fong, 2017). A possible explanation is that although anxiety and depression have shared symptoms, anxiety is also associated with many physical symptoms, including dizziness, shortness of breath, chest pain, headaches and muscle pain (Gelenberg, 2000). Such symptoms could cause limitations in physical functioning and bodily pain and therefore be interpreted as physical illness. On the other hand, people experience depressive symptoms (e.g., low mood, hopelessness) as psychological rather than physical. Our rather contradictory finding that stress was only associated with mental HRQoL should be explored further as stress has similar physical effects to anxiety (e.g., tension, irritability) and would therefore be expected to be associated with physical HRQoL as well as mental HRQoL.

It is important to note that there are a number of additional factors that could account for the unexplained variance between IPV and HRQoL. The type, duration, frequency and severity of the violence are four such factors. Moreover, other aspects of mental well-being, including self-esteem, self-efficacy and self-identity, have been found to be strongly impacted by IPV among low-income women (Matheson et al., 2015) and could therefore also affect health outcomes.

Limitations

A number of limitations to this study need to be acknowledged. First, the cross-sectional design prevents us from drawing a causal conclusion. We designed the study based on the evidence that IPV results in symptoms of anxiety, depression and stress. However, the association between mental health and IPV has also been found to be bidirectional (Bacchus et al., 2018; Devries et al., 2013). Second, it is important to note

that all study variables were self-reported, which could have introduced bias. Our study was also underpowered, so results must be interpreted with caution. Finally, the generalisability of the results is also subject to certain limitations. For example, it should be noted that victims of severe IPV, including those who are subjected to controlling behaviours, may have been unable to attend the TFES. The study also included a small sample (n = 156) of selected participants from a community family support program, so findings may not be generalisable to other low-income families in Hong Kong. However, we hope our findings could stimulate further studies on the role of mental health in women experiencing IPV.

Implications for future research and clinical practice

Future research should examine the effects identified in the current study using larger and more representative samples as well as a longitudinal design in order to identify causal associations. It is also important that recent violence is distinguished from historical IPV and other factors that could potentially mediate the relationship between IPV and HRQoL should be explored. In addition to self-report, an interesting avenue for future research would be to explore the role of biomarkers (e.g., cortisol levels). A recent systematic review identified a growing body of evidence demonstrating the dysregulation of stress-related biomarkers in IPV victims (Yim & Kofman, 2019). However, the authors of the review noted that biological and psychological outcomes have mainly been studied independently and that the biological literature is limited by small sample sizes. It is therefore important that additional research incorporates both outcomes in order to examine how they are affected by IPV and how such outcomes influence health.

Qualitative studies should also be conducted to explore the associations in more depth and to further understanding on how IPV leads to stress, anxiety and depression and how each of these negative symptoms subsequently impairs HRQoL in women from low-income families. Indeed, to the author's knowledge, no qualitative studies have specifically investigated this relationship.

Our findings support the importance of interventions to reduce symptoms of anxiety, depression and stress in order to ultimately improve the HRQoL of women who have experienced IPV. However, women from low-income families are contending with both poverty and IPV and there may therefore be a number of complex barriers that prevent them from accessing support. For example, limited available healthcare (Fung et al., 2016), severity of violence, sociodemographic factors (e.g., ethnic origin, language barriers, education level) and fear of losing custody of children (Lelaurain, Graziani, & Lo Monaco, 2017). As barriers are likely to differ between populations, community-based participatory research could be conducted with IPV survivors and service providers in order to identify and address individual, community and systematic factors that both prevent and facilitate intervention access (Baum, MacDougall, & Smith, 2006).

In terms of intervention content, brief supportive counselling to women conducted by family doctors, who are usually the first professional group that abused women speak with, might be an effective and feasible way to reduce the suffering from IPV (Feder et al., 2009). Advocacy interventions could also be a means by which to improve the mental health of women experiencing IPV (Ferrari et al., 2018; Tiwari et al., 2018). Such interventions can be delivered by a range of advocates, including trained lay mentors and healthcare professionals, and seek to empower abused women by providing advice,

ongoing support, and facilitating access to appropriate services (Rivas et al., 2015). Indeed, four different advocacy interventions were designed for specific groups of abused women in Hong Kong (Tiwari et al., 2018): pregnant women, those living in shelters, community-dwelling women, and women who had moved to Hong Kong from Mainland China. The interventions were positively received with improvements found in mental health outcomes, although not all were clinically important (Tiwari et al., 2018). A recent trial conducted in the UK evaluated the effectiveness of the Psychological Advocacy Towards Healing (PATH) intervention, which consisted of eight psychological-focused advocacy sessions for IPV survivors (Ferrari et al., 2018). When compared with normal advocacy care, clinically relevant improvements were found for psychological distress as well as symptoms of depression and mental HRQoL among those who took part in the PATH intervention. In view of these findings, a targeted intersectional advocacy intervention, which includes a strong a psychological component, could be developed and piloted among Hong Kong Chinese women from low-income families. Moreover, there have been calls for supportive programs for low-income women to include peers with lived experience of IPV as a way to build social connections and further enhance mental health (Matheson et al., 2015). Advocacy interventions could therefore aim to engage and train peer mentors to assist with intervention delivery.

In addition to support from peer mentors, informal social support could also help to moderate the emotional symptoms – poor HRQoL relationship. Indeed, a longitudinal study found that women with greater perceived social support reported greater reductions in depressive symptoms over two years when compared with women with lower levels of social support (Beeble et al., 2009). Those working with victims of IPV should encourage

women to expand and strengthen their social networks. However, it is also critical that service providers are aware of the potential negative impact on the health and well-being of informal supporters of IPV victims (Gregory, Williamson, & Feder, 2017).

Finally, there is a need for increased awareness of screening for mental health symptoms among victims of IPV so that suitable psychosocial or medical support can be provided. Such screening could be undertaken by primary care doctors and service providers working directly with IPV victims, provided that adequate screening protocols, training and follow-up management of positive cases are in place to ensure that screening is both appropriate and beneficial (Simmons et al., 2017).

Conclusion

Participants who screened positive for IPV had significantly lower HRQoL and reported significantly more negative emotional symptoms when compared with screen-negative participants. Our findings suggested that the relationship between IPV and HRQoL was completely mediated through depression, anxiety and stress. The findings underscore the preeminence of screening and managing these symptoms among women with IPV. Specific interventions that focus on enhancing appropriate cognitive, behavioural and coping skills to reduce negative emotions should be implemented by health and social service providers to preserve the HRQoL of vulnerable women.

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