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Using confirmatory factor analysis to explore associated factors of intimate partner violence in a sample of Chinese rural women: a cross-sectional study

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ABSTRACT

Objectives To estimate the prevalence of intimate partner violence (IPV) among a sample of rural Chinese women and to explore associated factors.

Design Cross-sectional study.

Setting Rural areas of Guangyuan City, Sichuan, China.

Participants We recruited 1501 women, aged 16 years and older, who had been living locally for at least 2 years and reported being married or in a relationship during the past 12 months. They were among a sample of 1898 potential participants from our larger parent study on the prevalence of depressive-distress symptoms.

Methods Participants completed demographic and social economic measures, the Short Form of the Revised Conflict Tactics Scale and the Duke Social Support Index. We applied χ^2 test, analysis of variance and confirmatory factor analysis for analysis.

Results The overall prevalence of IPV in the past 12 months was 29.05%; the prevalence of physical, psychological and sexual violence was 7.66%, 26.58% and 3.20%, respectively. The overall prevalence was highest among women aged 16–29 years, and was more common among those without a high school diploma and who saw their family's financial status as very poor or stagnant. Women who were not victims of IPV had higher levels of social support. Confirmatory factor analysis showed that the total effects of social support on physical, psychological and sexual violence were −0.12, −0.35 and −0.12, respectively. The indirect effects of objective economic status on physical, psychological and sexual violence were −0.047, −0.014 and −0.047, respectively, but the total effect was not significant. The indirect effect of education on psychological violence was −0.056.

Conclusion IPV is common in rural Guangyuan. Our data are comparable with the findings from north-west of China. Social support is an important protective factor. Future work is needed to develop, test and later disseminate potential IPV interventions, with a focus on building actual and perceived supportive social networks.

Strength and limitations of this study

- This study is the first population-based study in this rural region to estimate the prevalence and associated factors of intimate partner violence (IPV), including physical, psychological and sexual violence, among women who were married or in a relationship during the past 12 months.
- We applied confirmatory factor analysis to explore associated factors of IPV, which could reveal the underlying structure of observed factors and estimate the strength of relationships between latent and observed factors.
- We might miss residents who had day jobs and were not at home; we did not investigate factors such as child maltreatment, marital dissatisfaction and education disparity between couples, and women's financial contributions to their families, which could be important factors associated with IPV.
- Cultural barriers could prevent women from reporting victimised experiences.
- Due to China's vast territory and its diverse nationalities, we must be cautious in generalising these results.

INTRODUCTION

Intimate partner violence (IPV), and violence against women in particular, is a prevalent and global public health concern.[1] The WHO reports four types of IPV, namely physical violence, psychological violence, sexual violence and controlling behaviours, and victims may experience different types of violence at the same time.[2] A large WHO multicountry study reported that the lifetime rates of physical and sexual violence by an intimate partner ranged from 13% to 61% and from 6% to 59%, respectively.[1 3]

Although much is known about IPV worldwide, very little is known about its occurrence in China. Since 2000, Hong Kong researchers have published myriad articles focusing on child abuse,[4] incest[5] and the emergence of non-governmental entities to address violence against women.[6] In contrast, research on violence against women in Mainland China remains

nascent. A 2004 study examined data from the 1999–2000 Chinese Health and Family Life Survey and reported that among adults, aged 20–64 years, 34% of women were hit during their current relationship and that 19% of the respondents reported male-to-female IPV.[7] Other studies were conducted in urban medical settings. For example, Xu and colleagues surveyed 600 women in an urban outpatient gynaecology clinic and found that 43% reported lifetime violence (including physical violence, sexual violence or both), placing them squarely in the mid-range when compared with international communities.[8] A recent multicountry study, including the USA, India, Nigeria, South Africa and China, reported that the IPV rate during the past year was 10.2% among ever-partnered women in Shanghai.[9] Teng and colleagues[10] recruited 1368 women in Guangzhou and reported that the prevalence of IPV over the past year was 39.2% for local women and 41.2% for migrant women.

Compared with studies in urban settings, few studies discuss IPV against women living in rural China. A study based on 3998 married, rural Chinese women reported the prevalence for IPV in the past year was 65.0%, and the prevalence for physical, psychological and sexual violence was 29.8%, 58.3% and 16.9%, respectively.[11] However, when compared with a community-based survey that sampled patients from urban, rural and industrial areas in Hunan, the lifetime reported rate of IPV was 12.4%, 3.3% and 14.5%, respectively.[12] It is unclear whether such discrepancies accurately reflect true differences or variations in sampling, measures, reporting and other social factors that can impede valid epidemiological assessments.

In addition to variable prevalence rates, there is a dearth of information about common IPV risk factors in rural Chinese settings. Although little is known about the risk factors specifically associated with IPV in rural China, there have been many studies across cultures, not specific to female victimisation, that provide some clues. Commonly reported IPV risk factors include young age, low education, low socioeconomic status/income, substance use, male dominance in the family, infidelity, high proportion of neighbourhood poverty, acceptance of violence and divorce regulations by the government.[2 3 13–16] The purpose of this paper is to explore these risk factors among a sample of rural Chinese women living in Sichuan Province. We used the social ecological model to contextualise commonly studied risk factors within a framework (see figure 1) and to generate hypotheses on IPV risk factors.[17]

In light of China's extraordinary economic transformation and the major social changes that are sweeping across the rural regions of the country, we see a need for further studies of IPV. Family structures and roles are changing rapidly, with unmatched levels of internal workforce migration from west to east and inland rural to urban coastal regions. This 'floating population' predominately includes men[18]; consequently, the term 'left-behind' implies too much homogeneity among women, elders and children who do not migrate for work, and it denotes populations that have emerged during the past two decades. Among the 'left-behind' population, most of them are rural women who devote themselves to family responsibilities. However, we have little understanding about how these dramatic changes have affected these women of common social and interpersonal problems such as IPV.

Based on data collected from the rural areas of Guangyuan City in northern Sichuan Province, we estimated the prevalence of IPV. We also tested whether the prevalence would be lower in Guangyuan region than in rural areas of northern China, where IPV against women has been described as an acceptable aspect of regional culture.[11] We also examined associated factors, hypothesising that measures sensitive to personal and interpersonal levels of the social ecological model will have a direct influence on IPV.

Societal level	Community level	Interpersonal level	Personal level
Divorce regulations by government	Acceptance of traditional gender roles	Education disparity	Young age
Lack of legislation on IPV within marriage	High proportion of poverty	Male dominance in the family	Low socio-economic status/ income
Protective marriage law	High proportion of unemployment	Economic stress	Low education
Traditional gender norms and social norms supportive of violence	High proportion of female literacy	Low female contribution to household income	Mental disorder
	Low proportion of women with high level of autonomy	Number of children	Substance use
	Social isolation of nuclear families	Infidelity	Acceptance of violence and exposure to prior abuse
		Sexual jealousy	Child maltreatment
		Marital dissatisfaction	

Figure 1 The socioecological model of risk factors of intimate partner violence (IPV).

METHODS

This study is part of a larger epidemiological study conducted in rural areas of Guangyuan City in Sichuan Province in July 2012. The larger study assessed the prevalence of distress and diagnosed psychopathology among rural women, and explored how women understand their conditions.[19 20] Guangyuan City is located in the north of Sichuan, a south-western province in China, with approximately 820 000 people in urban areas and 1.66 million in rural areas.[21] Of note, a 'city' in China most often comprised multiple regions including counties, towns, villages and rural areas. Of note, the Guangyuan region of Sichuan Province, especially its rural towns and villages in mountainous areas, was stricken by the 2008 Wenchuan earthquake. This regional area is economically underdeveloped with a 2010 per capita net household income of ¥4035.5 (US$585.3), one of the lowest in the province and in the country.[22]

Participants

The sampling strategy is discussed in greater detail elsewhere.[20] We recruited a socioeconomically diverse sample and used multistage sampling to randomly select towns and villages for this study. We included all women, aged 16 years and older (16 years is the age of consent in China), who had lived locally for at least 2 years and reported being married or in a relationship during the past 12 months. Local hospitals provided a list of eligible women based on the Chinese household registrations system (the hukou), which excluded women if (1) they had diagnosed mental or cognitive problems, such as schizophrenia, autism, dementia and mental retardation, which would impede their abilities to comprehend and answer questions; and (2) they were unable to communicate due to being deaf or mute.

To ascertain informed consent among these women, with many having low educational levels and a substantial proportion with functional illiteracy, we conducted a verbal consent with language attuned to participants' needs and without a written information sheet. This process did not begin until the potential participants were alone. We insisted that spouse, family members, neighbours or friends of the participants were not present before starting the face-to-face interviews. We provided participants toiletry items (such as toothpaste and soap) worth ¥5 (about US$0.80) to compensate for their time. If the participant reported any affirmative response regarding IPV, interviewers provided oral advice and suggestions on coping strategies to participants who endorsed IPV, including turning to family members and friends for help, searching help from the local village committee, women's federation or civil affairs department, calling the police for immediate intervention, and seeing a doctor. We also trained interviewers to explain these strategies with simple phrases that participants could understand. However, we did not provide any physical brochures or other materials, as these materials may have indicated the disclosure of IPV, which potentially could provoke perpetrators.

Procedure

We conducted the field survey in July 2012. Local government and Guangyuan Mental Health Center staff assisted us with recruitment. They coordinated with village leaders and village doctors, and held public information sessions about this study before the survey began. During the field survey, village leaders, doctors and reputable seniors led interviewers door to door to conduct the interviews. As some villages have low population density, local residents helped interviewers by transporting them door to door on motorcycles. When an eligible participant was not at home, or unavailable, the interviewer would return twice more. Interviewers conducted the surveys on their personal computers during the face-to-face interviews. Interviewers deleted the data in their computers after transferring the data on the research leader's flash drive.

Measures

Demographic information questionnaire

We designed the demographic questionnaire to collect sociodemographic information from participants. Items included age and education.

Family economic status

The family economic status questionnaire asks about family annual income, family property information, perceived family economic status, and family economic status compared with others in the village and compared with previous years.

Information provided about family annual income depended on participants' recall and was usually an estimation; therefore, we also collected information on the property to evaluate participants' economic status. We asked whether a participant's family owned a television, personal computer, modern kitchen range, mobile phone, DVD/VCD, refrigerator, sofa, modern living furniture (Western style composite furniture), two-wheeled motorised vehicles, three-wheeled or above motorised vehicles, air conditioner, washing machine and bank account with over ¥10 000 (about US$1571). We assigned 1 for each of the items the participant's family owned and 0 for those they did not; the score ranged from 0 to 13.

Social support

We applied the 23-item Duke Social Support Index (DSSI) to evaluate participants' social support.[23] The Chinese version had already been used in research, and studies on Chinese rural samples have reported internal consistency of over 0.79.[24 25] The DSSI assesses social interaction, perceived support and instrumental social support. Every answer has an assigned score, and these are added up to determine the total score (possible total scores ranged from 11 to 45); higher scores indicate higher social support levels. Our Cronbach's α was 0.835.

IPV experience

We applied the Short Form of the Revised Conflict Tactics Scale (CTS2S) to investigate participants' IPV experiences, which measures negotiation, psychological aggression,

physical assault, injury and sexual coercion, and has acceptable validity and sensitivity.[26] In our previous study, the CTS2S showed good internal reliability and structural validity in rural China.[27]

The CTS2S contains statements about participants' experiences during the past year and examines the frequencies of those events. For example, one of the statements is 'my partner pushed, shoved, or slapped me'. Participants' answers were categorised into eight categories: once in the past year, twice in the past year, 3–5 times in the past year, 6–10 times in the past year, 11–20 in the past year, more than 20 times in the past year, not in the past year but it did happen before, and this has never happened. We administered six victimisation questions across three IPV domains (physical violence, psychological violence and sexual violence). In this study, we defined the phrase 'in the past year' in the CTS2S as occurring during the 12 months preceding the survey, and participants were considered positive for IPV if they endorsed any of the six questions. Our Cronbach's α was 0.845.

Quality control

The larger epidemiological study described interview training and quality control measures in detail.[20] Briefly, we recruited interviewers who could speak and understand the local dialect in Guangyuan from the West China School of Public Health of Sichuan University. Faculty from Sichuan University and the University of Rochester Medical Center conducted training sessions related to the methods, interviewing skills, qualitative methods and safety regarding IPV identification. Considering that many women in Guangyuan might not speak or understand phrases/expression in putonghua (Mandarin), we required interviewers to explain the study consent, the purpose of the study and the questionnaire including statements and phrases in the CTS2S in local dialect. We deployed three research teams, each had eight interviewers and was led by experienced senior researchers. Questions were routinely checked for missing items postinterview to reduce missing data issues.

Analysis

Given that several risk factors can influence IPV both separately and collectively and are likely to be highly collinear,[3] we used confirmatory factor analysis (CFA). CFA is a type of structural equation modelling that allows researchers to determine the underlying structure of a set of observed factors based on a priori hypotheses and to estimate the strength of relationships between latent and observed factors.[28 29]

We hypothesised that there were six latent factors (namely, objective economic status, subjective economic status, social support, physical violence, psychological violence and sexual violence) and two observed factors (namely, age and education). Factors' labels and assignments are shown in online supplementary appendix.

We had a priori hypotheses based on the social ecological model according to report on violence and health,[30] more specifically that (1) age, education, objective economic status, subjective economic status and social support would have direct effects on physical violence, psychological violence and sexual violence; (2) age and education would have indirect effects on physical violence, psychological violence and sexual violence through objective economic status, subjective economic status and social support; and (3) objective economic status would have indirect effects on physical violence, psychological violence and sexual violence through subjective economic status and social support.

We ran the analysis with Mplus V.7.3 and applied the mean and variance-adjusted weighted least squares estimator (WLSMV) as the default estimation method in order to handle categorical continuous variable on Mplus.[31] The default model estimators in WLSMV included χ^2, df, χ^2/df, root mean square error of approximation (RMSEA) and its 95% CI (90% CI), comparative fit index (CFI), Tucker-Lewis Index (TLI), and weighted root mean square residual (WRMSR). The criteria to assess the model included the following: the lower χ^2 value and df, the better the model; CFI and TLI values should be 0.90 and over; the RMSEA value should be 0.06 and below; the lower limit of 90% CI should be 0 or close to 0, and its upper limit of 90% CI should be 0.08 and below; and the value of χ^2/df should be under 5.0.[31 32]

With respect to age, and consistent with our previous research,[19 20] we categorised participants into six age groups based on frequencies. For educational attainment, we divided participants into five groups based on the hierarchy of Chinese education system. We divided participants into six groups based on family annual income and four groups based on perceived family economic status: affluent, basic needs met, poor and very poor. We divided participants into three groups based on their family economic status compared with others: wealthier, same and poorer; and three groups based on their family economic status compared with previous years: better, same and worse. With respect to perceived health status, we divided participants into four groups: very good, good, average and bad. Finally, we divided participants into five groups based on perceived activity status: 'normal', 'cannot do heavy farm work, but can do light farm work', 'cannot do any farm work, but can do house work', 'cannot do house work but can take care of myself' and 'cannot take care of myself'. We applied X^2 test and analysis of variance for data description, and the statistical significance level was 0.05.

RESULTS

Demographic information

For this aspect of our larger study, we recruited 1501 of a potential 1898 women who were eligible for this study; all who consented completed the surveys. However, we found that 17 participants (1.13% of the total) did not answer the items related to perceived family financial

status, family economic status compared with others or family economic status compared with previous years. Since these 17 participants provided all other demographic information, social support and IPV experiences, we only excluded them on CFA.

The age of participants ranged from 16 to 87 years old, with a mean (SD) of 46.44 (13.11) years. Overall, participants were not well educated: 33.11% had never been educated, 41.51% had received primary school education and only 7.99% had received high school education and above. The annual family income of most of the participants was under ¥40 000: 17.65% were under ¥9999; 24.72% were between ¥10 000 and ¥19 999; 24.25% were between ¥20 000 and ¥29 999; and 14.19% were between ¥30 000 and ¥39 999. Meanwhile, 52.50% felt their family economic status was basic enough, while 31.25% felt it was poor. However, if participants compared their family economic status with others in the village, 57.16% felt it was the same comparing with the 36.38% who felt it was poorer. Most participants (74.55%) considered their family economic status better than in previous years, compared with 9.13% who considered it worse. With respect to the score of family properties, normality test showed it was a negatively skewed distribution, with the coefficients of kurtosis and skewness at −0.631 and −0.311; hence, we calculated its range, median and quartile, which were 0–13, 8 and 5, respectively. The mean score for DSSI was 37.33±5.13, and the mean scores for social interaction, perceived social support and instrumental social support were 7.81±1.70, 18.89±2.74 and 10.62±2.38, respectively. Details are shown in table 1.1 and table 1.2.

Table 1.1 Demographic information of participants

Demographic characteristics	n	IPV victim		Prevalence (%)	χ^2	P
		No	Yes			
Age						
16–29	204	127	77	37.75	19.873	0.001
30–39	225	159	66	29.33		
40–49	468	320	146	31.20		
50–59	364	276	88	24.18		
60–69	188	138	50	26.60		
70–	52	45	7	13.46		
Education						
Never educated	497	375	122	24.55	11.378	0.023
Primary school	623	442	181	29.10		
Junior high school	283	183	100	35.33		
High school	98	50	26	26.53		
College and above	22	15	7	31.82		
Family annual income						
¥0–¥9999	265	194	71	26.79	3.237	0.663
¥10 000–¥19 999	371	263	108	29.11		
¥20 000–¥29 999	346	248	98	28.32		
¥30 000–¥39 999	213	152	61	28.64		
¥40 000–¥49 999	116	83	33	28.45		
≥¥50 000	190	125	65	34.21		
Perceived family financial status*						
Affluent	182	124	58	31.87	9.091	0.028
Basic enough	788	582	206	26.14		
Difficult	469	318	151	32.20		
Very difficult	47	28	19	40.43		
Comparing with others*						
Wealthier	81	62	19	23.46	1.363	0.506
Same	858	606	252	29.37		
Poorer	546	384	162	29.67		
Comparing with previous years*						
Better	1119	810	309	27.61	6.095	0.047
Same	228	147	81	35.53		
Worse	137	94	43	31.39		

*Indicates missing data.
IPV, intimate partner violence.

IPV experience

Participants reported an IPV prevalence rate of 29.05% (436/1501). With respect to physical, psychological and sexual violence, shown in table 2, the prevalence was 7.66% (115/1501), 26.58% (399/1501) and 3.20% (48/1501), respectively.

The overall IPV prevalence was highest among women aged 16–29 years old (37.35%), followed by 31.20% among women aged 40–49 years old and lowest among women 70 years old and above. Prevalence rates also differed by education level. Prevalence was highest (35.33%) among women with junior high school education, followed by 31.82% among women with college education and above and lowest (24.55%) among women with no education. IPV prevalence rates varied by perceived economic status in this sample. Prevalence was highest (40.43%) among women whose perceived family economic status was very poor, followed by 32.20% among women whose perceived family economic status was poor and was lowest (26.14%) among women whose perceived family economic status was basic enough; prevalence was also highest (35.53%) among women whose perceived family economic status was the same as previous years, followed by 31.39% among women whose perceived family economic status was worse than previous years and lowest (27.61%) among women whose perceived family economic status was better than previous years. The study also found IPV victims had lower total social support levels; the total score of DSSI was 36.28±5.86 among victims and

Table 1.2 Social support level of participants

Social support	Mean	IPV victim		F	P
		No	Yes		
Total score	37.33±5.13	37.77±4.74	36.28±5.86	26.289	0.000
Social interaction	7.81±1.70	7.82±1.70	7.81±1.68	0.002	0.962
Perceived social support	18.89±2.74	19.15±2.58	18.24±3.00	35.154	0.000
Instrumental social support	10.62±2.38	10.78±2.18	10.23±2.77	16.778	0.000
Family properties	7.54±2.97	7.50±2.93	7.63±3.05	0.604	0.437

IPV, intimate partner violence.

37.77±4.74 among non-victims. Victims also had lower perceived and instrumental social support. Details are shown in Table 11and Table 11A.

Confirmatory factor analysis

Model testing

After seven iterations, we had the best fitting model. In model 7, the χ^2 was 129.23, the df was 50, the χ^2/df was 2.58, the RMSEA was 0.032 and its 95% CI was from 0.026 to 0.039, the CFI was 0.991, the TLI was 0.987, and the WRMSR was 1.116. According to the modification indexes, there was no error covariance that could be set as free parameters based on knowledge; hence, we chose model 7 as the final model. Table 3 shows the factor loadings and coefficients of the final model.

Direct and indirect effects of the final model

The results supported our a priori hypotheses that (1) social support had direct effects on physical, psychological and sexual violence; (2) objective economic status had indirect effects on physical, psychological and sexual violence through social support; and (3) education had indirect effect on psychological violence through social support and objective economic status. Table 3 and figure 2 show the effects.

As displayed in table 4, we found that (1) as education increased 1 unit, the risk for psychological violence decreased 0.056; (2) as economic status increased 1 unit, the risk for physical, psychological and sexual violence indirectly decreased 0.047, 0.014 and 0.047 units, respectively, but the total effects were not significant; and (3) as social support increased 1 unit, the risk for physical, psychological and sexual violence decreased 0.12, 0.35 and 0.12 units, respectively.

Table 2 IPV experiences of participants

IPV experiences	No (%)	Yes (%)
Ever experienced in the past 12 months	1065 (70.95)	436 (29.05)
Physical violence	1386 (92.34)	115 (7.66)
Psychological violence	1102 (73.42)	399 (26.58)
Sexual violence	1453 (96.80)	48 (3.20)

IPV, intimate partner violence.

DISCUSSION

IPV is well recognised as an important global health challenge, but it has not been well studied or

Table 3 Factor loadings and path coefficients of the final model

Model	Dependent variables	Independent variables	Statistics results	
			Standardised coefficient	P
Measurement model	OE	A3	0.61	0.00
		A4	0.79	0.00
	PHV	C1	0.84	0.00
		C2	0.98	0.00
	PSV	C3	0.45	0.00
		C4	0.71	0.00
	SV	C5	0.76	0.00
		C6	0.65	0.00
	SS	D1	0.55	0.00
		D2	0.42	0.00
		D3	0.40	0.00
Structure model	PHV	SS	−0.12	0.005
		OE	0.060	0.14
	PSV	SS	−0.35	0.00
		OE	0.11	0.060
	SV	SS	−0.12	0.021
		OE	0.062	0.11
	OE	A1	−0.18	0.00
		A2	0.30	0.00
	SS	A1	−0.068	0.18
		A2	0.13	0.012
		OE	0.41	0.00
Factor-related	PSV	PHV	0.91	0.00
	SV	PHV	0.30	0.00
		PSV	0.46	0.00
	C5	C1	0.31	0.00
	D3	D2	0.41	0.00

A1, age; A2, education; C1, being pushed, shoved or slapped; C2, being punched, kicked or beat-me-up; C3, being insulted, swore, shouted, yelled at; C4, being threatened to destroy belongings; C5, sex against will with physical force; C6, sex against will without physical force; D1, social interaction; D2, perceived social support; D3, instrumental social support; OE, objective economic status; PHV, physical violence; PSV, psychological violence; SS, social support; SV, sexual violence.

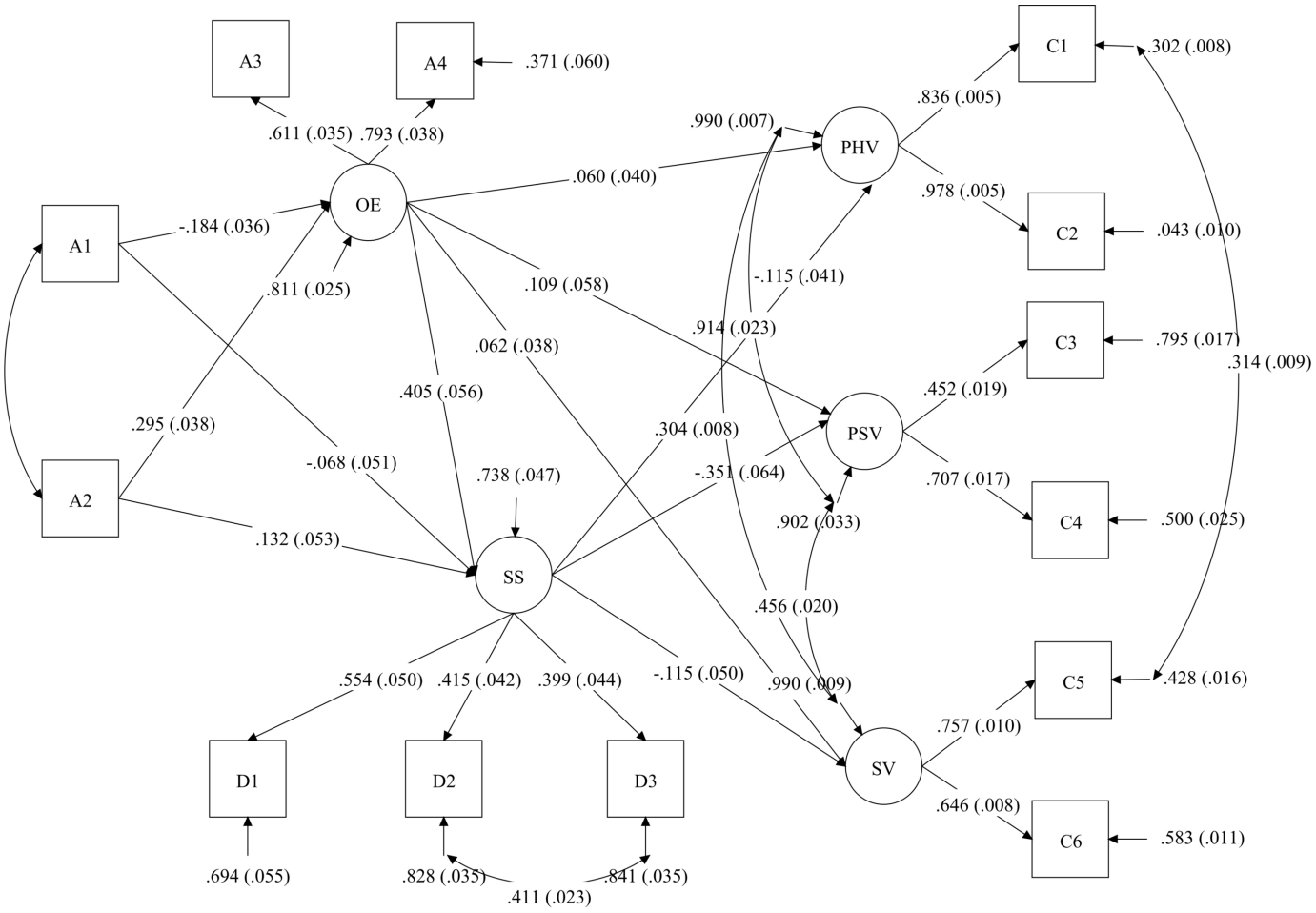

Figure 2 Final confirmatory factor analysis model. A1, age; A2, education; A3, family annual income; A4, family properties; C1, being pushed, shoved or slapped; C2, being punched, kicked or beat-me-up; C3, being insulted, swore, shouted, yelled at; C4, being threatened to destroy belongings; C5, sex against will with physical force; C6, sex against will without physical force; D1, social interaction; D2, perceived social support; D3, instrumental social support; OE, objective economic status; PHV, physical violence; PSV, psychological violence; SE, subjective economic status; SS, social support; SV, sexual violence.

well understood in China, particularly given the wide variability in reported prevalence. This variability may reflect deeply ingrained cultural practices that may impede accurate reporting, inadequately developed research or survey methods and limited samples involved in the past studies, and substantial geographical and social variations among those samples that have been involved in the past.

The prevalence rates from studies focusing on rural Chinese women experiencing IPV have not been consistent. A study focusing on married women under 37 years old in central China reported that the total lifetime IPV prevalence was 7.3%, with a prevalence of minor and severe physical violence at 6.4% and 5.8%, respectively, and the prevalence of psychological and sexual violence at 3% and 1%, respectively.[33 34] A study from north China reported

Table 4 Direct and indirect effects of the final model

	Physical violence			Psychological violence			Sexual violence		
Factors	**Direct effect**	**Indirect effect**	**Total effect**	**Direct effect**	**Indirect effect**	**Total effect**	**Direct effect**	**Indirect effect**	**Total effect**
Age	–	0.005	0.005	–	0.030	0.030	–	0.005	0.005
Education	–	−0.011	−0.011	–	−0.056*	−0.056*	–	−0.011	−0.011
Objective economic status	0.060	−0.047*	0.013	0.11	−0.014*	−0.033	0.062	−0.047*	0.015
Social support	−0.12*	–	−0.12*	−0.35*	–	−035*	−0.12*	–	−0.12*

*Indicates P<0.05.

that the prevalence rates of physical, psychological and sexual violence among women were 12.4%, 20.6% and 11.2%, respectively.[35] Our results did not fully support the expected finding that the prevalence of IPV was lower in Guangyuan as compared with results from northern China. The prevalence of psychological violence was higher in Guangyuan. Our results were close to those from Gao and Jacka's[36] study in Ningxia, in north-west of China, which reported the prevalence rates of physical, psychological and sexual violence at 4.4%, 23.9% and 1.1%.

There may be two possible explanations for the variability. First, studies were conducted in different areas of China, where differences in local cultural context and economic development may impact attitudes towards violence against women. In some cases, victims may perceive their experiences of violence as normative or private, resulting in response bias. Traditional Chinese practices, influenced by the Confucian doctrine, emphasise the inferior social status of women. A famous Confucian doctrine states that there are three kinds of obedience for women: *'San Cong'* (obeying your father before you are married, obeying your husband during marriage and obeying your sons after your husband dies); and four kinds of virtue: *'Si De'* (fidelity, tidiness, propriety in speech and commitment to needle work).[34 37] During our CTS2S assessments, several women cited these Confucian credos when asked about hitting or fighting, to rationalise violent behaviours as their punishment for failing to obey their husbands or partners. Hence, we can expect that the deeper traditional culture roots, the more underestimated IPV prevalence will be. Second, different studies applied varied research tools, such as the Abuse Assessment Screen, the Conflict Tactics Scale, the Revised Conflict Tactics Scale, the Composite Abuse Scale, and self-designed questionnaires or items. The differences in sensitivities and specificities of these tools could account for the variability in rates. Despite lower prevalence rates than expected, our findings here revealed important risk and protective factors for IPV among rural Chinese women.

This study also confirmed findings from previous studies suggesting that social support is an important protective factor for IPV against women. Several considerations may explain the association. First, social support is often a source of empowerment for women.[38] For example, an ethnographic study revealed that attending social activities could increase women's influence and prestige, and in turn decrease the risk for IPV.[39] Similarly, another anthropological study suggested that the more social support women have, the greater their social resources, and the more they pay attention to their rights.[40] Women with higher social support might decide to end the violent relationships and decrease their risks.[40] Second, perpetrators' controlling behaviours usually limit victims' interactions with other people, isolate victims, lower their social support level, and eventually lead to an increase in IPV risk and a vicious cycle.[41] Third, social support will buffer the negative and traumatic experience victims have been through. The buffer theory suggests that social support can buffer adverse life events and the negative impacts; individuals with high social support levels thus could cope with adverse events well and maintain physical and mental wellness.[42] In a 2002 study, Coker and colleagues[43] reported that, among American female IPV victims aged 18–65 years old, victims with high social support had greater perceptions of their mental health, better physical health, and lower prevalence of depression, anxiety, suicidal ideation and post-traumatic stress disorder.

Unlike social support, the association between sociodemographic factors and IPV is not consistent with previous studies. We did not find a significant relationship between age and IPV, but other studies have shown that younger age is a risk factor for both male perpetrators' violent behaviours and female victims' violent experiences.[44–48] This study found that the higher education level rural women had, the lower their risk for psychological violence, which was consistent with other studies.[13 49 50] Although education level had insignificant effects on physical and sexual violence in this study, we attributed this to the fact that the prevalence of physical and sexual violence was lower than psychological violence in this sample. The sample also had a low proportion of women with a relatively high education level; only 120 women received high school education and above.

This study found an indirect relationship between objective economic status and IPV. This relationship remains unsettled in current literature. Some studies reported that low family economic status was a critical risk factor for male-to-female violence.[45] Faced with the stress of poverty, men may be more likely to use violent behaviours as a solution to release pressure.[38] However, a study in South Africa reported that extremely poor family economic status protects women from IPV.[51] Other studies have reported that, compared with objective family economic status, the contribution women made to family income was a more important factor—women who made little contribution or were totally dependent on their partners faced increasing risk of IPV.[34 38 50 52]

We recognise several limitations. As a cross-sectional field study, interviewers were only able to recruit residents at home during the survey days; thus, some who had day jobs may have been missed. As China has a vast territory and many nationalities, rural women in different areas face various living environments, cultural backgrounds and customs in which attitudes towards IPV may vary; hence, we must be cautious in generalising our results. We did not investigate the relationship between IPV and other important factors, including childhood maltreatment, marital satisfaction, education disparity between couples and women's financial contributions to their families.

We encourage future investigators to investigate these factors and their relationships with IPV to fully understand IPV against women in China to develop and implement effective interventions. It will be important to examine

cultural barriers, such as Confusion precepts, to explore how these affect normative assumptions and openness to speaking with others about their experiences. Another traditional Chinese expression is '*Jia chou bu ke wai yang*', which means one should not reveal family disgrace to outsiders.[53–56] It is possible that the belief in this notion of family disgrace could lead some participants to under-report victimisation and male-to-female violence.

CONCLUSION

Findings from this study indicated that the overall IPV prevalence in Guangyuan rural areas was close to that in north-west of China, and we found that personal and interpersonal factors, especially social support, were linked to the occurrence of IPV.

In 2016, China implemented its first law against violence, which emphasises global responsibility of different societal sectors to stop violence, including government departments, judiciary authorities, non-governmental organisations, enterprises and institutions, and the citizens. Future work is needed to develop, test and then disseminate IPV prevention and intervention programmes. Our data suggested that reinforcing social support networks offers the potential to enhance real and perceived protection, which in turn may reduce the morbidity and mortality associated with IPV.

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Contributors FH designed the survey instruments, implemented the field survey, monitored data collection, cleaned the data, developed the plan for analysis, analysed the data, and drafted and revised the paper. CC designed the survey instruments, trained interviewers, assisted with the analysis plan, revised the paper and supervised FH. MNW designed the survey instruments, trained interviews and revised the paper. EDC initiated the project, revised the paper and supervised FH. PQ initiated the project, designed the survey instruments, monitored data collection, cleaned the data and revised the paper. All authors had full access to all the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis.

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