BMJ Open

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Journal:	*BMJ Open*
Manuscript ID	bmjopen-2016-012264
Article Type:	Research
Date Submitted by the Author:	13-Apr-2016
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Primary Subject Heading:	Public health
Secondary Subject Heading:	Global health
Keywords:	PUBLIC HEALTH, PREVENTIVE MEDICINE, SOCIAL MEDICINE

Factors associated with current intimate partner violence: a cross-sectional study among married migrant women in Shanghai, China

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Key words: Intimate partner violence; Migrant; Married women of reproductive age; Influential factors;

Word count: 2955

ABSTRACT

Objective: To identify factors associated with current intimate partner violence (IPV) against internal married migrant women in Shanghai, China.

Design: Cross-sectional survey.

Setting: Two sub-districts from one district in Shanghai, China.

Participants: A total of 958 married migrant women of reproductive age were selected through a community-based two-stage cluster sampling method (99.7% response rate) in April and May of 2010.

Outcome measures: Face-to-face interview were conducted using questionnaire developed based on the WHO Multi-country Study on Women's Health and Domestic Violence against Women. Multivariate logistic regression model was used to identify factors associated with different types of violence in the past 12 month at individual and relationship levels.

Results: Risk factors for emotional violence included lower age at marriage, higher levels of education, lower power to control economic assets, agreed that husband have some reasons to hit wife, frequent or sometimes quarrelling with husband. Risk factors for physical or sexual violence included lower power to control economic assets, experience of job change in the past year, and history of husband abused. Risk factors for any violence included lower age at marriage, higher levels of education, lower power to control economic assets, experience of job change in the past year, frequent or sometimes quarrelling with husband, acceptance of reasons for husband to hit wife, neighborhood would not offer help when family had an accident.

Conclusion: A number of risk factors at both individual and relationship levels were identified for IPV among married migrant women in Shanghai. Prevention efforts on IPV among this population should focus on these risk factors.

Strengths and limitations of this study

- This study used methodology similar to the WHO Multi-country Study on Women's Health and Domestic Violence against Women to measure IPV and related factors, which enables international comparability and ensures high quality of data.
- Some women might choose not to disclose IPV, especially physical and sexual violence because such kind of violence is generally considered an embarrassing private matter in China. However, the methodology used in the study considerably improved the disclosure of IPV and quality of data.
- This study was conducted among migrant women whose family were vulnerable in terms of socioeconomic status but not all women with diverse family economic levels. Thus, it is difficult to find significant associations between family economic status and IPV.
- Due to limited number of physical or sexual violence, we may lack the statistical power to identify significant associations between some of the variables and IPV, for example, partner's behaviors and physical or sexual violence.
- This was a cross-sectional study; the data could only provide evidence for associations but not for causality.

INTRODUCTION

Intimate partner violence (IPV) against women is the most common form of violence experienced by women worldwide.[1-4] It has been recognized not only as a human rights issue but also as a serious public health problem. It also has long-term consequences for women, their children, community and society. Prevention of IPV before it occurs will protect the physical, mental and economic well-being and development of women, families, communities and societies as a whole.[4]

To design effective program to reduce violence against women, it is crucial to understand the circumstances, and risk and protective factors, that influence its occurrence. Recent systematic reviews suggest that numerous studies have identified risk and protective factors associated with IPV. Based on the ecological model,[2,4] known risk factors of IPV include young age, low education, exposure to violence during childhood, alcohol assumption, acceptance of violence at individual level; multiple partner and low marital satisfaction at relationship level; weak community sanctions against IPV and poverty at community level; and traditional gender norms and social norms at societal level.[2,3,20] However, most of the evidence is from high-income countries. Due to differences in politics, economies, cultures, ecologies and histories, risk and protective factors identified in high-income countries may not be valid in low and middle income countries.

In traditional Chinese society, violence against a woman by her husband is generally considered as a family matter and is largely overlooked and ignored. Since the ICPD held in Cairo in 1994 and the Fourth World Conference on Women held in Beijing in 1995, IPV has received more attention. Less than two decades ago, physical abuse was not even acceptable as grounds for divorce in China, but in 2001 the marriage law was amended to explicitly ban domestic violence for the first time. Findings from a national population-based survey among women aged 20-64 with a spouse or other steady partner in 1999-2000 showed that 34% of women had ever experienced physical violence; the prevalence varied substantially between urban and rural areas, and between different regions of the country.[5] In the UN Multi-country Cross-sectional Study on Men and Violence in Asia and the Pacific, the prevalence of physical and/or sexual IPV in the surveyed sites in China was 51.6%.[3] Several studies al so reveal risk factors for IPV in China which are similar to those in other countries, such as low education, low socioeconomic status, alcohol use, low marital satisfaction, acceptance of violence, exposure to violence during childhood.[3.5.7] Until recently, however, studies which have been published concerning this issue in China are still very few and data on IPV risk factors among vulnerable population such as internal rural-urban migrants is scarce.

With the social and economic development and urbanization, internal rural-urban migration has been increasing in China since the mid-1980s. According to National Bureau of Statistics, there were 253 million migrants in China by the end of 2014.[8]

The average age of the migrant labor force is 33.7 years.[9] Compared with their urban counterparts, rural to urban migrants usually have lower education levels and fewer skills. Moreover, they face considerable insecurity in terms of employment, income, social welfare, and access to education resources for their children under the household registration system (*Hukou*), which was established in the late 1950s and classified households as rural or urban.[10-12] As a result, many migrants are engaged in physically demanding and low-skilled jobs with low-paying and temporary and live in very poor housing condition.[11-12] Despite their vulnerability to IPV, few studies have been conducted among this population in China. To fill this gap, we conducted a study to explore situations of IPV against women and the extent to which IPV is associated with a range of health outcomes among married migrant women of reproductive age in Shanghai, China. Findings on prevalence and health outcomes of IPV against married migrant women were published elsewhere.[13-14] This paper explores factors associated with IPV against married migrant women.

METHOD

Study design and subjects

The data are drawn from a cross-sectional survey conducted among married migrant women of reproductive age in April and May of 2010 in Shanghai, China's largest city with nearly 9 million migrants who have stayed in the city for more than six months.[15] Shanghai has 17 administrative districts and one county. Subjects were selected through a community-based two-stage cluster sampling method. First, 2 sub-districts were randomly selected in one district with middle socioeconomic development level. The sample was allocated equally in the two selected sub-districts. Second, 10 and 16 residential groups were randomly selected with selection probability proportion to the number of married migrant women in each residential group. In the selected residential groups, all eligible subjects were recruited in the study and interviewed in the survey. The eligibility criteria for selecting subjects included: a. married women who lived together with her husband; b. aged 20-49; c. both women and her husband have stayed in the city for more than six months but do not have Shanghai *hukou* or residence permit. The sample comprised 958 respondents, representing 99.7% of eligible women. All eligible respondents were fully informed, and voluntary to participate in the survey.

Trained female interviews completed face-to-face interview using questionnaire developed based on instrument from the World Health Organization (WHO) Multi-country Study on Women's Health and Domestic Violence against Women.[16] The interview was anonymous and was conducted in a private room outside women's home. To protect the safety of respondents and the research team and to improve the quality of the data, the survey followed the WHO ethical and safety guidelines for research on violence against women.[17] The questionnaire was piloted before formal survey.

Measures

Measures of IPV. IPV is defined as any act of emotional, physical or sexual abuse by a current or former husband (see figure 1). For each form of IPV, experience of violence in the lifetime after marriage and in the past year was asked. Considering that violence in the lifetime might be occurred before and after women's migration to Shanghai, we focus on IPV in the past year in this paper.

Emotional violence by a husband

- Was insulted or made to feel bad about herself
- was belittled or humiliated in front of others
- husband had done things to scare or intimidate her on purpose
- husband had threated to hurt her or someone her cared about
- husband had threated to separate her from her children

Physical violence by a husband

- was slapped or thrown something that could hurt her
- was pushed, shoved or dragged
- was hit with a fist or kicked
- was chocked or burnt on purpose
- was threatened or attacked with a knife or other weapon

Sexual violence by a husband

- was coerced to perform sexual acts that she found degrading or humiliating
- was physically forced into sexual intercourse when she did not want
- had sexual intercourse when she did not want to because she was afraid of what husband might do

Physical or sexual violence by a husband

- one or more of above acts of physical or sexual violence

Any violence by a husband

- one or more above acts of emotional, physical or sexual violence

Figure 1 Operational definition of IPV

Measures of risk factors. Risk factors at individual and relationship levels were examined, with factors at individual level referred to variables on demographic and socioeconomic characteristics and personal history, and factors at relationship level referred to variables related to husband, family members, relatives and neighborhood. Tables 2-3 show a detailed description and response for each variable. The variable of women's financial autonomy was measured by a sum score based on their answers to six questions presented in Table 1. The higher the sum score, the lower the financial

autonomy.

Table 1 Score assignment to questions on women's financial autonomy

Question	Yes	No
1. Are you able to spend the money you earn how you want yourself	0	1
2. Do you have to give all or part of the money you earn to your husband	1	0
3. Has your husband ever taken your earnings or savings from you against your will	1	0
4. Have you ever given up or refused a job for money because your husband did not want you to work	1	0
5. Does your husband ever refuse to give you money for household expenses, even when he has the money for other things	1	0
6. Do you think you alone could rise enough money to house and feed your family for 4 weeks in case of emergency	0	1

Data analysis

The dependent variables in the analysis include experience of emotional violence (yes, no), experience of physical or sexual violence (yes, no) and experience of any violence (yes, no) in the past year. The χ^2 test was used for bivariate analysis to examine the differences of violence between women with different characteristics. Logistic regression models with dichotomous measures were used for multivariate analysis to identify risk factors associated with recent IPV. Statistical analysis was performed using SAS 9.1.3 (SAS Institute Inc. Cary, NC).

RESULTS

Characteristics of respondents

The average age of respondents and their husband was 35.4±6.5 years and 37.4±6.7 years, respectively. An overwhelming majority of respondents (98.7%) were women in their first marriage. The average age of respondents at first marriage was 23.0±2.2 years. About 45% of them were self-employed or private owners and 9% had no job. As showed in Tables 2-3, a large majority of respondents had junior secondary or lower education, had medium economic status, had no job change in the past year, agreed that there are none reasons for husband to hit wife and reported no history of mother abused and husband abused. More than half of respondents had high family economic autonomy, had relatives in frequently contact with in Shanghai, and had neighborhood who would offer help when family had an accident. Majority of respondents reported that their husband had the experience of drinking, had no experience of gambling and no experience of physical fight with another man.

The overall prevalence of emotional, physical and sexual violence in their lifetime was 31.9%. Less than one fifth of respondents (18.7%) reported any forms of IPV in the past year, with 15.3% experiencing emotional violence, and 7.0% experiencing physical or sexual violence.

Table 2 Percentage distribution of respondents; and percentage of violence, by variable at individual level (%)

Variables	n (%)	Emotional violence	Physical or Sexual violence	Any violence
Age				
<30	228 (23.8)	16.7	7.0	20.2
30~40	464 (48.4)	15.1	5.8	17.9
>40	266 (27.8)	14.7	9.0	18.8
Education level				
Primary and lower	326 (34.0)	16.0**	9.8	20.9**
Junior	483 (50.4)	12.4	5.6	15.1
Senior and higher	149 (15.6)	23.5	5.4	25.5
Age at marriage				
≤22	423 (44.1)	20.6***	8.8	24.1***
>22	535 (55.9)	11.2	5.6	14.4
Family economic status				
High	59 (6.2)	10.2	8.5	13.6
Medium	784 (81.8)	15.6	6.4	18.8
Low	115 (12.0)	16.5	10.4	20.8
Financial autonomy (score)				
0 (High)	543 (56.7)	14.4***	3.0***	15.8***
1	283 (29.5)	12.0	6.7	15.9
≥2 (Low)	132 (13.8)	26.5	24.2	36.4
Job change in the past year				
Yes	44 (4.6)	31.8**	25.0***	43.1***
No	914 (95.4)	14.6	6.1	17.5
Reasons for husband to hit wife				
None	764 (79.7)	13.6**	6.0*	16.9**
Any	194 (20.3)	22.2	10.8	25.8

Note: * $P<0.05$, ** $P<0.01$, *** $P<0.0001$

Table 3 Percentage distribution of respondents; and percentage of violence, by variable at relationship level (%)

Variables	n (%)	Emotional violence	Physical or Sexual violence	Any violence
Frequency of quarrel with husband				
Never or rare	379 (39.6)	4.8***	2.4***	6.3***
Sometimes	548 (57.2)	22.3	9.3	22.3
Often	31 (3.2)	22.6	22.6	35.5
Frequency of husband's drinking				
Often	277 (28.9)	15.9	11.9***	22.0
Occasionally	370 (38.6)	17.6	5.7	19.7
Never	311 (32.5)	12.2	4.2	14.5
Frequency of husband's gambling				
Often or occasionally	239 (25.0)	22.6***	10.9**	26.8**
Never	719 (75.0)	12.9	5.7	16.0
Frequency of husband's physical fight with another man				
Often or occasionally	127 (13.3)	18.1	18.1***	24.4
Never	831 (86.7)	14.9	5.3	17.8
History of husband beaten by family members				
Yes	171 (17.8)	21.1*	19.3***	28.1**
No	787 (82.2)	14.1	4.3	16.7
History of mother beaten by her husband				
Yes	137 (14.3)	16.8	13.9***	22.6
No	821 (85.7)	15.1	5.9	18.0
Having relatives in frequent contact with in Shanghai				
Yes	541 (56.5)	12.7**	5.6*	15.3**
No	417 (43.5)	19.1	8.9	23.3
Neighborhood would offer help when family had an accident				
Yes	697 (72.8)	12.9**	6.3	15.9***
No	261 (27.2)	21.8	8.8	26.1

Note: * $P<0.05$, ** $P<0.01$, *** $P<0.0001$

Factors associated with IPV in the past year

Bivariate analysis on factors associated with IPV in the past year shows in Tables 2-3. In individual level, women's low financial autonomy, experiencing job change in the past year and agreeing that husband have some reasons to hit wife were significantly associated with all forms of IPV. Senior secondary or higher level of education and younger at marriage were significantly associated with emotional violence and any violence. In relationship level, quarrelling with husband, having a husband who had the experience of gambling, having a husband who was physically abused by family

members and having relatives in frequent contact with in Shanghai were associated with all forms of IPV. Having neighborhood who would offer help when family had an accident was significantly associated with emotional violence and any violence, while husband's experience of drinking and physical fight with another man, and history of mother abused were only significantly associated with physical or sexual violence.

Multivariate analysis including all independent variables was performed to test for possible confounding factors. As shown in Table 4, factors associated with emotional violence were similar to those from bivariate analysis for each variable, except that several variables in relationship level were no longer statistically significant including having a husband who had the experience of gambling, having relatives in frequent contact with in Shanghai, having neighborhood who would offer help when family had an accident and having a husband who was physically abused by family members. For physical or sexual violence, low financial autonomy and experience of job change in the past year in individual level, and history of husband abused in relationship level

Table 4 Multivariable logistic regression model of factors associated with different types of violence, Adjusted OR (95%CI)

Variable	Emotional violence	Physical or sexual violence	Any violence
Individual level			
Age			
<30	1.00	1.00	1.00
30~40	0.84(0.51-1.36)	0.98(0.45-2.13)	0.80(0.51-1.27)
>40	0.83(0.47-1.46)	1.56(0.68-3.57)	0.85(0.51-1.44)
Education level			
Primary and lower	1.00	1.00	1.00
Junior	0.91(0.58-1.43)	0.60(0.33-1.18)	0.78(0.52-1.18)
Senior and higher	3.53(1.90-6.54)***	0.75(0.28-2.03)	2.49(1.40-4.43)***
Age at marriage			
≤22	2.05(1.35-3.12)***	1.16(0.61-2.05)	1.71(1.17-2.51)**
>22	1.00	1.00	1.00
Family economic status			
High	0.77(0.26-2.26)	1.45(0.36-5.84)	0.90(0.34-2.42)
Medium	1.12 (0.62-2.05)	1.23(0.56-2.72)	1.23(0.70-2.16)
Low	1.00	1.00	1.00
Financial autonomy (score)			
0 (High)	1.00	1.00	1.00
1	0.77(0.48-1.25)	1.84(0.87-3.89)	0.92(0.60-1.42)
≥2 (Low)	1.84(1.10-3.10)**	7.88 (3.85-16.11)***	2.56(1.58-4.14)***

Job change in the past year			
Yes	2.14(1.03-4.65) *	4.03(1.59-10.37) **	2.86(1.37-5.97) **
No	1.00	1.00	1.00
Reasons for husband to hit wife			
None	1.00	1.00	1.00
Any	1.77(1.13-2.78) **	1.66(0.86-3.20)	1.60(1.05-2.44) *
Relationship level			
Husband was chosen with the help of parents or other people			
No	1.00	1.00	1.00
Yes	1.42(0.93-2.17)	0.55 (0.29-1.03)	1.24(0.84-1.84)
Frequency of quarrel with husband			
Rarely	1.00	1.00	1.00
Sometimes	5.23(3.04-9.00) **	2.04(0.93-4.49)	4.43(2.74-7.18) *
Often	4.91(1.69-14.25) *	2.27(0.62-8.32)	5.68(2.21-14.59) *
Frequency of husband's drinking			
Often	0.89(0.52-1.50)	1.98(0.91-4.29)	1.12(0.69-1.82)
Occasionally	0.97(0.60-1.57)	1.03(0.46-2.29)	0.96(0.61-1.52)
Never	1.00	1.00	1.00
Frequency of husband's gambling			
Ever	1.52(0.98-2.36)	0.91(0.47-1.76)	1.39(0.92-2.10)
Never	1.00	1.00	1.00
Frequency of husband's physical fight with another man			
Ever	0.69(0.39-1.25)	1.85(0.92-3.73)	0.73(0.43-1.26)
Never	1.00	1.00	1.00
History of husband beaten by family members			
Yes	0.98(0.61-1.58)	4.03(2.17-7.53) ***	1.21(0.78-1.88)
No	1.00	1.00	1.00
History of mother beaten by her husband			
Yes	0.89(0.51-1.54)	1.90(0.98-3.71)	1.01(0.62-1.67)
No	1.00	1.00	1.00
Having relatives in frequent contact with in Shanghai			
Yes	0.72(0.48-1.09)	0.98(0.53-1.80)	0.73(0.50-1.07)
No	1.00	1.00	1.00
Neighborhood would offer help when family had an accident			
Yes	1.00	1.00	1.00
No	1.45(0.96-2.19)	1.07(0.56-2.03)	1.49(1.01-2.20) *

Note：* $P<0.05$，** $P<0.01$，*** $P<0.0001$

remained strong risk factors in multivariate analysis. Husband's experience of physical fight with another man (OR=1.85, 95%CI 0.92～3.73, p=0.0837) and history of mother abused (OR=1.90, 95%CI 0.98～3.71, p=0.0589) were only marginally significantly associated with experience of physical or sexual violence. Whereas frequency of quarrel with husband, husband's experience of drinking, husband's experience of gambling or having relatives in frequent contact with in Shanghai were no longer statistically significantly associated with the experience of physical or sexual violence. For any violence, risk factors were similar to those from bivariate analysis for each variable, except that having a husband who had the experience of gambling, having a husband who was physically abused by family members and having relatives in frequent contact with in Shanghai were no longer statistically significant.

DISCUSSION

To the best of our knowledge, this was the first study to assess IPV and possible factors associated with different types of IPV among internal migrant women in China. This study used methodology similar to the WHO Multi-country Study on Women's Health and Domestic Violence against Women[16] to measure IPV and related factors, which enables international comparability and ensures high quality of data. Findings from this study shows that several risk factors for IPV at individual and relationship levels among married migrant women in China are consistent with existing evidence in china and other countries,[4,6-7,18,21] including younger at marriage, low financial autonomy, acceptance of husband to hit wife, low relationship quality and history of husband beaten by family members. Additional factors associated IPV identified in this study were experience of job change in the past year and whether neighborhood would offer help when family had an accident. Factors associated with IPV varied by type of violence in this study, and this finding is consistent with studies from other countries.[3,22]

At individual level, numerous studies have identified that low level of education is a risk factor of IPV.[2,4,20,27-29] Possibly due to the number of physically or sexually abused women was relatively small, however, we fail to identify such a relation for physical or sexual violence in the study. In contrast to previous studies which included physical violence in their definition of IPV, this study found that higher level of education was strongly associated with increased risk of emotional violence. Compared with physical or sexual violence, emotional violence looks being more civilized and thus it is more likely to be found in families with higher education. Some studies have found that women with a higher level of education than her husband were at increased risk of IPV.[21,23-24,26] This study also found women with higher education level than their husband were more likely to experience physical or sexual violence (12.8% vs 6.5%, χ^2=4.4321, p=0.0353). However, this association was not found in terms of the experience of emotional violence (10.3% vs

15.8%, χ^2=1.6923, p=0.1933).

Beside women's education level, financial autonomy and job change in the past year were strongly correlated with IPV at individual level. Women with low financial autonomy and experience of job change in the past year were significantly more likely to report IPV including emotional and physical or sexual violence. However, the association between family economic status and IPV was not observed. This finding suggests that economic inequality in a relationship is a more important predictor of IPV than family economic status.

Unanticipatedly, women's age was not associated with IPV in this study. This was in line with findings in another studies in China[7,21] but was in contrast to what has been found in other countries including WHO multi-country study.[4,18-20,27-29] More studies on Chinese population are needed to confirm this relation.

At relationship level, history of husband beaten by family member was strongly correlated with IPV in this study, whereas the association between support from neighborhood and experience of IPV was weak. Partnership with high marital conflicts and behaviors of partners, such as drug use, harmful use of alcohol and fight with other men, are other commonly cited risk factors associated with women's experience of IPV.[4,18,30] In this study, quarrelling with husband and having a husband who had the experience of drinking and physical fight with another man were significant more likely to experience IPV in bivariate analysis. Similar trend was found for these variables in multivariate analysis, but the results did not reach statistical significant. The possible reason might be due to the small number of physical or sexual violence in this study.

Several limitations of the study must be mentioned. First, some women might choose not to disclose IPV, especially physical and sexual violence because such kind of violence is generally considered an embarrassing private matter in China. However, the methodology used in the study considerably improved the disclosure of IPV and quality of data. Second, due to limited number of physical or sexual violence, we may lack the statistical power to identify significant associations between some of the variables and IPV, for example, partner's behaviors and physical or sexual violence. Third, this study was conducted among migrant women whose family were vulnerable in terms of socioeconomic status but not all women with diverse family economic levels. Thus, it is difficult to find significant associations between family economic status and IPV. Finally, because this was a cross-sectional study, the data could only provide evidence for associations but not for causality.

Despite these limitations, findings of this study offer some implications for public health action in terms of primary prevention of IPV. Risk factors identified in this study highlights the need to develop comprehensive interventions to address IPV among migrants at various levels. At individual level, interventions should be taken to

provide training programs for migrants, provide them with opportunities and rights equal to those of local urban people in the area of employment, payment, social security and public services, increase migrant women's economic and social power, and change their attitudes towards social and culture norms related to gender that support IPV. At relationship level, interventions can be taken to increase problem-solving and interaction skills and reduce behaviors which might increase marital conflicts. At the societal level, a supportive environment is needed to change individual and community attitudes and behaviors. On 27 December 2015, China's top legislature adopted the country's first law against domestic violence in a landmark move to bring traditionally silent abuse victims under legal protection.[31] The new law defines domestic violence as "physical, psychological and other harm inflicted by family members with beatings, restraint or forcible limits on physical liberty, recurring invectives and verbal threats". When it comes into force from March 2016, domestic violence will no longer be a "family matter" but a legal issue that demands action from the court and police. While the new law may address the law-enforcement side of the issue, changing people's attitudes toward domestic violence is still the fundamental challenge in China. Public education programs should be carried out by government departments, communities, schools, medical institutions, women's associations and other social groups.

Acknowledgements We would like to thank the local Population and Family Planning Committee for their support in the fields work.

Contributor: XT led study design, acquisition of data, analysis and interpretation of data, and drafting and revising the article. CL involved in design of the work, acquisition of data, interpretation of data, and revising the article.

Funding: The study on which this article is based was supported by the Ford Foundation.

Ethics Approval Ethical approval for this study was granted by the Ethical Committee in Research of the Shanghai Institute of Planned Parenthood Research, Shanghai, China.

Competing interests: None.

Data sharing statement: No additional data are available.

REFERENCES

1. United Nations. Ending violence against women: From words to action. New York: United Nations. 2006:43-45, 57-61. Available online: http://www.un.org/womenwatch/daw/public/VAW_Study/VAWstudyE.pdf (accessed on 22 March 2015)
2. Heise L. What Works to Prevent Partner Violence? An Evidence Overview. London: Department for International Development, 2011: 1-9.

3. Fulu E, Jewkes R, Roselli T, et al. Prevalence of and factors associated with male perpetration of intimate partner violence: findings from the UN Multi-country Cross-sectional Study on Men and violence in Asia and the Pacific. *Lancet Glob Health* 2013;1:e187-e207 doi:10.1016/S2214-109X(13)70074-3[published Online First:10 September 2013]
4. World Health Organization/London School of Hygiene and Tropical Medicine. Preventing intimate partner and sexual violence against women: taking action and generating evidence. Geneva: World Health Organization, 2010: 5-33.
5. Parish WL, Wang T, Laumann EO, et al. Intimate partner violence in China: national prevalence, risk factors and associated health problems. *Int Fam Plan Perspect* 2004 ;30:174-81.
6. Guo SF, Wu JL, Qu CY, et al. Domestic violence against women before, during and after pregnancy. *Zhonghua Liu Xing Bing Xue Za Zhi (Chinese Journal of Epidemiology)* 2004; 25: 9-11.(in Chinese)
7. Guo SF, Zhao FL, Wu JL, et al. Study on prevalence of domestic violence and its related factors in rural area of China. *China Public Health* 2007; 23(1): 4-6. (in Chinese)
8. National Bureau of Statistics of China. Statistical Communiqué of the People's Republic of China on the 2014 National Economic and Social Development. Available online: http://www.stats.gov.cn/enGliSH/PressRelease/201502/t20150228_687439.html (accessed on 2 December 2015)
9. The floating population division of National health and Family Planning Commission. The Development Report on China's Migrant Population, 2014. Available online: http://www.nhfpc.gov.cn/xcs/s3574/201411/dc3ba043cbf74e2d8fe68000d4651505.shtml (accessed on 10 April 2015)
10. Shi L. Rural Migrant Workers in China: Scenario, Challenges and Public Policy (Working Paper No. 89). International Labour Office, Policy Integration and Statistics Department. Geneva: ILO, 2008:6-17.
11. Chen Y. Rural migrants in urban China: Characteristics and challenges to public policy. *Local Econ* **2011;**26: 325–36.
12. Wu X, Treiman DJ. The household registration system and social stratification in China:1955–1996. *Demography* **2004;** *41:* 363-84.
13. Tu X, Lou C, Sun F, et al. Situation of domestic violence and health outcomes among married migrant women of reproductive age. *Zhonghua Liu Xing Bing Xue Za Zhi (Chinese Journal of Epidemiology)* 2014; 35: 484-88. (in Chinese)
14. Tu X, Lou C, Sun F, et al. Patterns of domestic violence among married migrant women of reproductive age and its relationship with abnormal pregnancy outcomes in Shanghai. *Sheng Zhi Yu Bi Yun* (*Reproduction and Contraception)* 2014;34:295-300. (in Chinese)
15. Shanghai Municipal Bureau of Statistics. Shanghai sixth national census in 2010 communiqué on major data. Available online: http://www.shanghai.gov.cn/shanghai/node2314/node2319/node12344/ u26ai25463.html (accessed on 14 April 2015).
16. Garcia-Moreno C, Jansen HA, Ellsberg M, et al. WHO Multi-country study on women's health and domestic violence against women. Geneva: World Health Organization 2005: 27-42, 69-71,132-62.
17. World Health Organization. Putting women first: ethical and safety recommendations for

research on domestic violence against women (WHO/FCH/GWH/01.1). Geneva: World Health Organization 2001: 9-29.

18. Capaldi DM, Knoble NB, Shortt JW, et al. A systematic review of risk factors for intimate partner violence. *Partner Abuse* 2012; 3: 231-80.
19. Cohen MM, Maclean H. Violence against Canadian Women. *BMC Women's Health* 2004; 4 (Supple 1) : S22.
20. Thompson RS, Bonomi AE, Anderson M, et al. Intimate partner violence prevalence, types, and chronicity in adult women. *Am J Prev Med* 2006; 30: 446- 57.
21. Xu X, Zhu F, O'Campo P, et al. Prevalence of and risk factors for intimate partner violence in China. *Am J Public Health* 2005;95:78-85.
22. Ali TS, Asad N, Mogren I, et al. Intimate partner violence in urban Pakistan: prevalence, frequency, and risk factors. *Int J Womens Health* 2011;16:105-15.
23. Flake DF. Individual, family, and community risk markers for domestic violence in Peru. *Violence Against Women* 2005; 11:353-73.
24. Ackerson LK, Kawachi I, Barbeau EM, et al. Effects of individual and proximate educational context on intimate partner violence: A population-based study of women in India. *Am J Public Health* 2008;98:507-14.
25. Johnson KB, Das MB. Spousal violence in Bangladesh as reported by men: prevalence and risk factors. *J Interpers Violence* 2009; 24:977-95.
26. Chan KL. Sexual violence against women and children in Chinese societies. *Trauma Violence Abuse* 2009; 10:69-85.
27. Kouyoumdjian FG, Calzavara LM, Bondy SJ, et al. Risk factors for intimate partner violence in women in the Rakai Community Cohort Study, Uganda, from 2000 to 2009. *BMC Public Health* 2013;13:566. Published online 2013 Jun 10. doi: 10.1186/1471-2458-13-566.
28. Abramsky T, Watts CH, Garcia-Moreno C, et al. What factors are associated with recent intimate partner violence? findings from the WHO multi-country study on women's health and domestic violence. *BMC Public Health* 2011;11:109. Published online 2011 Feb 16. doi: 10.1186/1471-2458-11-109.
29. Stöckl H, March L, Pallitto C, et al. Intimate partner violence among adolescents and young women: prevalence and associated factors in nine countries: a cross-sectional study. *BMC Public Health* 2014;14:751. Published online 2014 Jul 25. doi: 10.1186/1471-2458-14-751.
30. Djikanovic B, Jansen HA, Otasevic S. Factors associated with intimate partner violence against women in Serbia: a cross-sectional study. *J Epidemiol Community Health* 2010;64(8):728-35. doi: 10.1136/jech.2009.090415. [Published online first: 24 August 2009.]
31. Yang Y. China's first law against domestic violence to protect wives. Available online: http://www.womenofchina.cn/womenofchina/html1/features/rights/1601/42-1.htm (accessed on 18 January 2016)

STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No	Recommendation
Title and abstract (p1-2)	√1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found
Introduction		
Background/rationale (p4-5)	√2	Explain the scientific background and rationale for the investigation being reported
Objectives (p5)	√3	State specific objectives, including any prespecified hypotheses
Methods		
Study design (p5)	√4	Present key elements of study design early in the paper
Setting (p5)	√5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection
Participants (p5)	√6	(*a*) *Cohort study*—Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up *Case-control study*—Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls *Cross-sectional study*—Give the eligibility criteria, and the sources and methods of selection of participants
		(*b*) *Cohort study*—For matched studies, give matching criteria and number of exposed and unexposed *Case-control study*—For matched studies, give matching criteria and the number of controls per case
Variables (p6-7)	√7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable
Data sources/ measurement (p6-7)	√8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group
Bias (p5)	√9	Describe any efforts to address potential sources of bias
Study size (p5)	√10	Explain how the study size was arrived at
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why
Statistical methods (p7)	√12	(*a*) Describe all statistical methods, including those used to control for confounding
		(*b*) Describe any methods used to examine subgroups and interactions
		(*c*) Explain how missing data were addressed
		(*d*) *Cohort study*—If applicable, explain how loss to follow-up was addressed *Case-control study*—If applicable, explain how matching of cases and controls was addressed *Cross-sectional study*—If applicable, describe analytical methods taking account of sampling strategy
		(*e*) Describe any sensitivity analyses

Continued on next page

Results		
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed
		(b) Give reasons for non-participation at each stage
		(c) Consider use of a flow diagram
Descriptive data (p7)	√ 14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders
		(b) Indicate number of participants with missing data for each variable of interest
		(c) *Cohort study*—Summarise follow-up time (eg, average and total amount)
Outcome data (P7)	√ 15*	*Cohort study*—Report numbers of outcome events or summary measures over time
		Case-control study—Report numbers in each exposure category, or summary measures of exposure
		Cross-sectional study—Report numbers of outcome events or summary measures
Main results (p8-11)	√16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included
		(*b*) Report category boundaries when continuous variables were categorized
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses
Discussion		
Key results (p12)	√18	Summarise key results with reference to study objectives
Limitations (p13)	√19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias
Interpretation (p12-14)	√20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence
Generalisability (p13)	√21	Discuss the generalisability (external validity) of the study results
Other information		
Funding (p14)	√22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

BMJ Open

Risk factors associated with current intimate partner violence at individual and relationship levels: a cross-sectional study among married rural migrant women in Shanghai, China

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2016-012264.R1
Article Type:	Research
Date Submitted by the Author:	11-Nov-2016
Complete List of Authors:	Tu, Xiaowen; Shanghai Institute of Planned Parenthood Research; Key Laboratory of Reproduction Regulation of NPFPC (SIPPR, IRD, Fudan University) Lou, Chaohua; Shanghai Institute of Planned Parenthood Research; Key Laboratory of Reproduction Regulation of NPFPC (SIPPR, IRD, Fudan University)
Primary Subject Heading:	Public health
Secondary Subject Heading:	Global health
Keywords:	PUBLIC HEALTH, PREVENTIVE MEDICINE, SOCIAL MEDICINE

Risk factors associated with current intimate partner violence at individual and relationship levels: a cross-sectional study among married rural migrant women in Shanghai, China

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Key words: Intimate partner violence; Migrant; Married women of reproductive age; Risk factors;

ABSTRACT

Objective: To identify risk factors associated with current intimate partner violence (IPV) against married rural migrant women at their individual and relationship levels in Shanghai, China.

Design: Cross-sectional survey.

Setting: Two sub-districts from one district in Shanghai, China.

Participants: A total of 958 married rural migrant women of reproductive age were selected through a community-based two-stage cluster sampling method (99.7% response rate) in April and May of 2010.

Outcome measures: Face-to-face interview were conducted using questionnaire developed based on the WHO Multi-country Study on Women's Health and Domestic Violence against Women. Multivariate logistic regression model was used to identify risk factors associated with different types of violence in the past 12 month at individual and relationship levels.

Results: Women's low financial autonomy (adjusted OR ranges from 1.98~7.89) was risk factor with moderate to strong association with all types of violence. Other risk factors with strong association with violence included frequent or sometimes quarrelling with husband for emotional violence (adjusted OR 6.23~7.14) and any violence (adjusted OR 6.04~7.07); experience of job change in the past years (adjusted OR=4.03) and history of husband abused (adjusted OR 4.67) for physical or sexual violence.

Conclusion: Women's low financial autonomy and unstable employment status at individual level, quarrelling with husband and history of husband abused at relationship level were identified as most robust risk factors for IPV among married rural migrant women. Prevention efforts to address IPV among this population should be made to engage both woman and the husband with a focus on improving financial autonomy and employment status of women, promoting problem-solving and interaction skills of the couples, and changing their knowledge and attitudes towards gender norm and IPV.

Strengths and limitations of this study

- This study used methodology similar to the WHO Multi-country Study on Women's Health and Domestic Violence against Women to measure IPV and related factors, which enables international comparability and ensures high quality of data.
- Some women might choose not to disclose IPV, especially physical and sexual violence because such kind of violence is generally considered an embarrassing private matter in China. However, the methodology used in the study considerably improved the disclosure of IPV and quality of data.
- The variable of family economic status was reported by respondents but not measured by a scale. Because of relative economic homogeneity of the respondents, we may have failed to find significant associations between family economic status and IPV.
- Due to limited number of physical or sexual violence, we may lack the statistical power to identify significant associations between some of the variables and IPV, for example, partner's behaviors and physical or sexual violence.
- This was a cross-sectional study; the data could only provide evidence for associations but not for causality.

INTRODUCTION

Intimate partner violence (IPV) against women is the most common form of violence experienced by women worldwide.[1-4] It has been recognized not only as a human rights issue but also as a serious public health problem. It has long-term consequences for women, their children, community and society. Prevention of IPV before it occurs will protect the physical, mental and economic well-being and development of women, families, communities and societies as a whole.[4]

To design effective programs to reduce violence against women, it is crucial to understand the circumstances, and risk and protective factors, that influence its occurrence. Recent systematic reviews suggest that numerous studies have identified risk and protective factors associated with IPV. Based on the ecological model (see Fgure 1),[2,4] known risk factors of IPV include young age, low education, exposure to violence during childhood, alcohol consumption, acceptance of violence at individual level; multiple partner and low marital satisfaction at relationship level; weak community sanctions against IPV and poverty at community level; and traditional gender norms and social norms accepting violence at societal level.[2-5] However, most of the evidence is from other countries. Due to differences in politics, economies, cultures, ecologies and histories, risk and protective factors identified in other countries may not be valid in China.

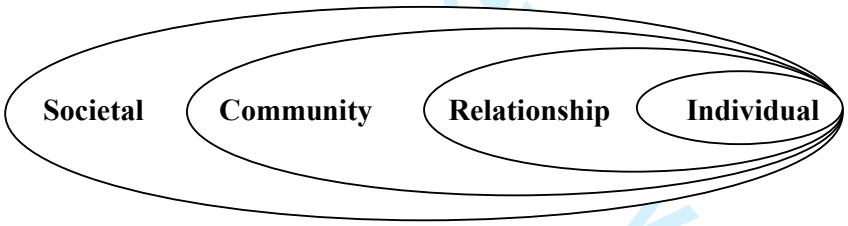

Figure 1 The ecological model for understanding IPV

In traditional Chinese society, violence against a woman by her husband is generally considered as a family matter and is largely overlooked and ignored. Since the ICPD held in Cairo in 1994 and the Fourth World Conference on Women held in Beijing in 1995, IPV has received more attention. Less than two decades ago, physical abuse was not even acceptable as grounds for divorce in mainland China, but in 2001 the marriage law was amended to explicitly ban domestic violence for the first time. Findings from a national population-based survey among women aged 20-64 with a spouse or other steady partner in 1999-2000 showed that 34% of women had ever experienced physical violence; the prevalence varied substantially between urban and rural areas, and between different regions of the country.[6] In the UN Multi-country Cross-sectional Study on Men and Violence in Asia and the Pacific, the prevalence of physical and/or sexual IPV in the surveyed sites in China was 51.6%.[3] Studies conducted in Hong Kong shows that the prevalence of physical violence among Chinese women ranges from 8.5% to 18% in the lifetime period, and 4.1% to 15.5%

in the preceding year. [7-8] Several studies also reveal risk factors for IPV in China which are similar to those in other countries, such as low education, low socioeconomic status, alcohol use, frequent quarreling with husband, acceptance of violence, exposure to violence during childhood. [3,6-11] Until recently, however, studies which have been published concerning this issue in China are still very few and data on IPV risk factors among vulnerable population such as internal rural-to-urban migrants (hereafter we refer to them simply as 'rural migrants') is scarce.

With the social and economic development and urbanization after economic reform in 1978, rural migrants who are former peasants or farmers have been increasing and have become a huge part of the urban labor force since the mid-1980s in China. According to National Bureau of Statistics, there were 253 million migrants in China by the end of 2014. Most of them were rural migrants who went to the cities to open small businesses or provide cheap labor in the hope of higher pay and a better life. [12] The average age of the rural migrant labor force is 33.7 years, and the majority had a junior secondary education.[13] Compared with their urban counterparts, rural migrants usually have lower education levels and fewer skills. As suggested by the 2000 census, for example, 44.1% of urban permanent had senior secondary school or higher education, which was more than three times that of migrants (13.3%).[14] Moreover, they face considerable insecurity in terms of employment, income, social welfare, and access to education resources for their children under the household registration system (*Hukou*), which was established in the 1950s and classified households as rural (agricultural) or urban (non-agricultural).[15-17] As an urban resident, a person is entitled to employment, health care, housing, pension and food subsidies. None of these privileges, however, are available to people with a rural registration. Only temporary residence permit and labor contracts are available for rural migrants.[18] Since the *Hukou* system links registration status with social welfare and employment, it is extremely difficult for anyone to change a rural *hukou* to an urban one. As a result, many rural migrants are engaged in physically demanding and low-skilled jobs with low-paying and temporary (i.e. jobs in the manufacturing, construction, commerce and service industries) and live in poor housing condition.[16-17] Most rural migrants are unable to move up to higher positions in urban industries, even as time goes by and as they change jobs over the years unless they have permanent urban residence permit (urban *Hukou*) [19]. Despite their vulnerability to IPV, few studies have been conducted among this population in China. To fill this gap, we conducted a study to explore situations of IPV against women and the extent to which IPV is associated with a range of health outcomes among married rural migrant women of reproductive age (15~49 years) in Shanghai, China. Findings on prevalence and health outcomes of IPV were published elsewhere. [20-21] Guided by the ecological model, this paper explores risk factors associated with different types of IPV against married rural migrant women, including factors on demographic and socioeconomic characteristics, financial autonomy and personal history at individual level, as well as factors related to husband, relatives and

neighbors at relationship level.

METHOD

Study design and subjects

The data are drawn from a cross-sectional survey conducted among married rural migrant women of reproductive age in April and May of 2010 in Shanghai, China's largest city with nearly 9 million migrants who have stayed in the city for more than six months. [22] The eligibility criteria for selecting subjects included: a. married women who lived together with her husband; b. aged 20-49 (the legal marriage age in China is 20 or old for female); c. both women and her husband had stayed in the city for more than six months but did not have Shanghai *hukou* or permanent residence permit. Women older than 49 years and unmarried women were not included in the study because only women of reproductive age were registered in the computer system of local population and family planning department and cohabitation before marriage in China is very low. According to China Family Development Report 2015, the proportion of family with a cohabiting relationship was only 0.2%.[23] Shanghai has 17 administrative districts and one county. Subjects were selected through a community-based two-stage cluster sampling method. First, 2 sub-districts were randomly selected in one district with middle socioeconomic development level, aiming at generating a sample which could represent the socioeconomic status of the study population. The sample was allocated equally in the two selected sub-districts. Second, 10 and 16 residential committees were randomly selected with selection probability proportion to the number of married migrant women in each residential committee. In the selected residential committees, all eligible subjects were recruited in the study; in case more than one eligible woman in a household, however, only one woman was randomly selected, for safety and confidentiality reasons. The sample comprised 958 respondents, representing 99.7% of eligible women. All eligible respondents were fully informed, and volunteered to participate in the survey.

Trained female interviews completed face-to-face interview using questionnaire developed based on instrument from the World Health Organization (WHO) Multi-country Study on Women's Health and Domestic Violence against Women. [24] The questionnaire was piloted before formal survey. All questions about violence were phrased and asked in a supportive and non-judgemental manner. To ensure homogeneity of data collection, all the interviews were special trained on methodological issues with special emphasis on introduction to IPV, concept on gender and gender inequality, skills in dealing with sensitive issues, concerns of confidentiality, ethical and safety, and knowledge and skills to provide counseling to interviewees. To protect the safety of respondents and the research team and to improve the quality of the data, the survey followed the WHO ethical and safety guidelines for research on violence against women.[25] The study was framed as a study on women's reproductive health so as to enable the participants to explain the survey to others safely. The interview was anonymous and was conducted in a private room outside women's home. Before the end of each interview, each victim was told

by the interviewers that "no one has the right to treat someone else in that way" and was provided with the necessary information for referral. The study and the procedures were approved by the Institutional Review Board of Shanghai Institute of Planned Parenthood Research, Shanghai, China.

Measures

Measures of IPV. IPV is defined as any act of emotional, physical or sexual abuse by a current or former husband (see Figure 2). For each form of IPV, experience of violence in the lifetime after marriage and in the past year was asked. Respondents were categorized as "yes" or "no" based on their response to questions about ever having experienced any act of each form of IPV in defined period of time. Considering that violence in the lifetime might be occurred before and after women's migration to Shanghai, we focus on IPV in the past year in this paper.

Emotional violence by a husband

- was insulted or made to feel bad about herself
- was belittled or humiliated in front of others
- husband had done things to scare or intimidate her on purpose
- husband had threated to hurt her or someone her cared about
- husband had threated to separate her from her children

Physical violence by a husband

- was slapped or thrown something that could hurt her
- was pushed, shoved or dragged
- was hit with a fist or kicked
- was chocked or burnt on purpose
- was threatened or attacked with a knife or other weapon

Sexual violence by a husband

- was coerced to perform sexual acts that she found degrading or humiliating
- was physically forced into sexual intercourse when she did not want
- had sexual intercourse when she did not want to because she was afraid of what husband might do

Physical or sexual violence by a husband

- one or more of above acts of physical or sexual violence

Any violence by a husband

- one or more above acts of emotional, physical or sexual violence

Figure 2 Operational definition of IPV

Measures of risk factors. Risk factors at individual and relationship levels were examined based on self-report, with factors at individual level referred to variables on demographic and socioeconomic characteristics and personal history, and factors at relationship level referred to variables related to husband, family members, relatives and neighbors. The variable of women's financial autonomy at individual level was measured by a sum score based on their answers to six questions presented in Table 1. The higher the sum score, the lower the financial autonomy. Tables 2-3 show a detailed description and categories of response for each variable.

Table 1 Score assignment to questions on women's financial autonomy

Question	Yes	No
1. Are you able to spend the money you earn how you want yourself	0	1
2. Do you have to give all or part of the money you earn to your husband	1	0
3. Has your husband ever taken your earnings/savings or your valuables/ other property from you against your will	1	0
4. Have you ever given up or refused a job for money because your husband did not want you to work	1	0
5. Does your husband ever refuse to give you money for household expenses, even when he has the money for other things	1	0
6. Do you think you alone could rise enough money to house and feed your family for 4 weeks in case of emergency	0	1

Data analysis

The dependent variables in the analysis include experience of emotional violence (yes, no), experience of physical or sexual violence (yes, no) and experience of any violence (yes, no) in the past year. The χ^2 test was used for bivariate analysis to examine the differences of violence between women with different characteristics. Logistic regression models with dichotomous measures were used for multivariate analysis to identify risk factors associated with recent IPV. The effects of cluster were adjusted in multivariable analysis by introducing it as a covariate to the model. Statistical analysis was performed using SAS 9.1.3 (SAS Institute Inc. Cary, NC).

RESULTS

Characteristics of respondents

The average age of respondents and their husband was 35.4±6.5 years and 37.4±6.7 years, respectively. An overwhelming majority of respondents (98.7%) were women in their first marriage. The average age of respondents at first marriage was 23.0±2.2 years. Majority of them (94.5%) had one or more children. More than half of respondents (57.2%) reported they were living with their children, 9.5% reported they were living with their parents or parents-in-law, 40.5% reported they were living without other families except their husband. Since migration to Shanghai, 31% of them had less than 5 years of residence, 35% had more than 10 years of residence. About 45% of them were self-employed or private owners of businesses, 28% were unskilled workers or workers in service sector (i.e. hotels and restaurants, hairdressing

and beauty, commerce and social services, etc.), 19% were skilled workers or managers and 9% had no job recently. As showed in Tables 2-3, a large majority of respondents had junior secondary or lower education, had medium economic status, had no job change in the past year, agreed that there are none reasons for husband to hit wife and reported no history of mother abused and husband abused. More than half of respondents had high financial autonomy, had relatives in frequently contact with in Shanghai, and had neighbors who would offer help when family had an accident. Majority of respondents reported that their husband had the experience of drinking, had no experience of gambling and no experience of physical fight with another man.

The overall prevalence of emotional, physical and sexual violence in their lifetime was 31.9%. Less than one fifth of respondents (18.7%) reported any forms of IPV in the past year, with 15.3% experiencing emotional violence, and 7.0% experiencing physical or sexual violence.

Factors associated with IPV in the past year

Bivariate analysis on factors associated with IPV in the past year shows in Tables 2-3. At individual level, women's low financial autonomy, experience of job change in the past year and agreement that husband have some reasons to hit wife were significantly associated with all forms of IPV. Senior secondary or higher level of education and younger at marriage were significantly associated with emotional violence and any violence. At relationship level, quarrelling with husband, having a husband who had the experience of gambling, having a husband who was physically abused by family members and having relatives in frequent contact with in Shanghai were associated with all forms of IPV. Having neighbors who would offer help when family had an accident was significantly associated with emotional violence and any violence, while husband's experience of drinking and physical fight with another man, and history of mother abused were only significantly associated with physical or sexual violence.

Multivariate analysis including all independent variables was performed. As shown in Table 4, factors associated with emotional violence were similar to those from bivariate analysis for each variable, except that experience of job change in the past year at individual level was marginally significant (OR=2.05, 95%CI 0.89~4.72, p=0.0913) and several variables at relationship level were no longer statistically significant including having a husband who had the experience of gambling, having neighbors who would offer help when family had an accident and having a husband who was physically abused by family members. For physical or sexual violence, low financial autonomy and experience of job change in the past year at individual level, and history of husband abused at relationship level remained strong risk factors in multivariate analysis. Husband's experience of physical fight with another man (OR=

Table 2 Percentage distribution of respondents; and percentage of violence, by variable at individual level (n=958)

Variables	n (%)	Emotional violence		Physical or sexual violence		Any violence	
		%	p value	%	p value	%	p value
Age							
<30	228 (23.8)	16.7	0.8081	7.0	0.2632	20.2	0.7674
30~40	464 (48.4)	15.1		5.8		17.9	
>40	266 (27.8)	14.7		9.0		18.8	
Education level							
Primary and lower	326 (34.0)	16.0	0.0043	9.8	0.0483	20.9	0.0081
Junior	483 (50.4)	12.4		5.6		15.1	
Senior and higher	149 (15.6)	23.5		5.4		25.5	
Age at marriage							
≤22	423 (44.1)	20.6	<0.0001	8.8	0.0585	24.1	0.0001
>22	535 (55.9)	11.2		5.6		14.4	
Family economic status							
High	59 (6.2)	10.2	0.5047	8.5	0.2528	13.6	0.5007
Medium	784 (81.8)	15.6		6.4		18.8	
Low	115 (12.0)	16.5		10.4		20.8	
Financial autonomy (score)							
0 (High)	543 (56.7)	14.4	0.0004	3.0***	<0.0001	15.8***	<0.0001
1	283 (29.5)	12.0		6.7		15.9	
≥2 (Low)	132 (13.8)	26.5		24.2		36.4	
Job change in the past year							
Yes	44 (4.6)	31.8	0.0019	25.0	<0.0001	43.1	<0.0001
No	914 (95.4)	14.6		6.1		17.5	
Reasons for husband to hit wife							
None	764 (79.7)	13.6	0.0032	6.0	0.0191	16.9	0.0046
Any	194 (20.3)	22.2		10.8		25.8	

Note：Chisq-test

Table 3 Percentage distribution of respondents; and percentage of violence, by variable at relationship level (n=958)

Variables	n (%)	Emotional violence		Physical or sexual violence		Any violence	
		%	p value	%	p value	%	p value
Husband was chosen with the help of parents or other people							
No	426(44.5)	13.2	0.0911	7.8	0.4137	16.9	0.2051
Yes	532(55.5)	17.1		6.4		20.1	
Frequency of quarrel with husband							
Never or rare	379 (39.6)	4.8	<0.0001	2.4	<0.0001	6.3	<0.0001
Sometimes	548 (57.2)	22.3		9.3		22.3	
Often	31 (3.2)	22.6		22.6		35.5	
Frequency of husband's drinking							
Often	277 (28.9)	15.9	0.1489	11.9	0.0005	22.0	0.0515
Occasionally	370 (38.6)	17.6		5.7		19.7	
Never	311 (32.5)	12.2		4.2		14.5	
Frequency of husband's gambling							
Often or occasionally	239 (25.0)	22.6	0.0005	10.9	0.0153	26.8	0.0004
Never	719 (75.0)	12.9		5.7		16.0	
Frequency of husband's physical fight with another man							
Often or occasionally	127 (13.3)	18.1	0.3531	18.1	<0.0001	24.4	0.0756
Never	831 (86.7)	14.9		5.3		17.8	
History of husband beaten by family members							
Yes	171 (17.8)	21.1	0.0223	19.3	<0.0001	28.1	0.0005
No	787 (82.2)	14.1		4.3		16.7	
History of mother beaten by her husband							
Yes	137 (14.3)	16.8	0.6125	13.9	0.0007	22.6	0.2009
No	821 (85.7)	15.1		5.9		18.0	
Having relatives in frequent contact with in Shanghai							
Yes	553 (57.9)	12.7	0.0063	5.6	0.0466	15.3	0.0019
No	403 (42.1)	19.1		8.9		23.3	
Neighbors would offer help when family had an accident							
Yes	697 (72.8)	12.9	0.0006	6.3	0.1769	15.9	0.0003
No	261 (27.2)	21.8		8.8		26.1	

Note：Chisq-test

1.87, 95%CI 0.93~3.76, p=0.0809) and history of mother abused (OR=1.85, 95%CI 0.95~3.64, p=0.0725) were only marginally significantly associated with experience of physical or sexual violence. Whereas frequency of quarrel with husband, husband's experience of drinking, husband's experience of gambling, having relatives in frequent contact with in Shanghai or having neighbors who would offer help when family had an accident were no longer statistically significantly associated with the experience of physical or sexual violence. For any violence, risk factors were similar to those from bivariate analysis for each variable, except that having a husband who had the experience of gambling and having neighbors who would offer help when family had an accident were no longer statistically significant.

Table 4 Multivariable logistic regression model of factors associated with different types of violence, Adjusted OR (95%CI) (n=956)

Variable	Emotional violence	Physical or sexual violence	Any violence
Individual level			
Age			
<30	1.00	1.00	1.00
30~40	0.89(0.49-1.61)	0.98(0.45-2.13)	0.80(0.50-1.28)
>40	0.84(0.50-1.40)	1.57(0.68-3.60)	0.90(0.52-1.56)
Education level			
Primary and lower	1.00	1.00	1.00
Junior	0.72(0.44-1.15)	0.63(0.33-1.18)	0.63(0.41-1.13)
Senior and higher	2.29(1.19-4.43) ***	0.74(0.27-2.04)	1.65(1.09-3.04) **
Age at marriage			
≤22	2.13(1.37-3.31) ***	1.16(0.61-2.05)	1.71(1.15-2.55) **
>22	1.00	1.00	1.00
Family economic status			
High	1.00(0.32-3.10)	1.47(0.36-5.96)	1.13(0.41-3.14)
Medium	1.11 (0.58-2.10)	1.24(0.56-2.74)	1.21(0.67-2.19)
Low	1.00	1.00	1.00
Financial autonomy (score)			
0 (High)	1.00	1.00	1.00
1	0.91(0.55-1.49)	1.85(0.87-3.93)	1.09(0.69-1.70)
≥2 (Low)	1.98(1.14-3.42) **	7.89 (3.86-16.14) ***	2.84(1.71-4.70) ***
Job change in the past year			
Yes	2.05(0.89-4.72)	4.03(1.57-10.35) **	2.82(1.30-6.12) **
No	1.00	1.00	1.00
Reasons for husband to hit wife			
None	1.00	1.00	1.00

Any	1.96(1.22-3.14)**	1.65(0.85-3.19)	1.71(1.10-2.66)*
Relationship level			
Husband was chosen with the help of parents or other people			
No	1.00	1.00	1.00
Yes	1.19(0.76-1.86)	0.54 (0.29-1.04)	1.07(0.71-1.62)
Frequency of quarrel with husband			
Rarely	1.00	1.00	1.00
Sometimes	7.14(4.22-13.02)*	2.06(0.93-4.55)	6.04(3.65-9.98)**
Often	6.23(2.09-18.62)**	2.28(0.63-8.35)	7.07(2.71-18.45)*
Frequency of husband's drinking			
Often	0.91(0.52-1.58)	1.98(0.91-4.31)	1.19(0.72-1.97)
Occasionally	1.03(0.62-1.70)	1.03(0.46-2.31)	1.02(0.63-1.63)
Never	1.00	1.00	1.00
Frequency of husband's gambling			
Ever	1.37(0.89-2.19)	0.91(0.47-1.76)	1.29(0.84-1.98)
Never	1.00	1.00	1.00
Frequency of husband's physical fight with another man			
Ever	0.65(0.35-1.22)	1.87(0.93-3.76)	0.71(0.40-1.25)
Never	1.00	1.00	1.00
History of husband beaten by family members			
Yes	1.45(0.86-2.44)	4.67(2.17-7.69)***	1.20(1.06-2.72)*
No	1.00	1.00	1.00
History of mother beaten by her husband			
Yes	0.91(0.51-1.60)	1.85(0.95-3.64)	1.03(0.62-1.73)
No	1.00	1.00	1.00
Having relatives in frequent contact with in Shanghai			
Yes	0.62(0.40-0.94)*	0.97(0.53-1.80)	0.62(0.42-0.92)*
No	1.00	1.00	1.00
Neighbors would offer help when family had an accident			
Yes	1.00	1.00	1.00
No	1.36(0.88-2.10)	1.07(0.56-2.02)	1.38(0.92-2.07)

Note: * $P<0.05$, ** $P<0.01$, *** $P<0.0001$

DISCUSSION

To the best of our knowledge, this was the first study to assess IPV and possible risk factors associated with different types of IPV among rural migrant women in China.

This study used methodology similar to the WHO Multi-country Study on Women's Health and Domestic Violence against Women [24] to measure IPV and related factors, which enables international comparability and ensures high quality of data. For example, the definitions of violence were operationalized using a range of behaviour-specific questions related to each type of violence, which has been used widely in studies of partner violence in the United States and elsewhere, and has been shown to encourage greater disclosure of violence than approaches that require respondents to identify themselves as abused or battered [26-27]. Findings from this study shows that several risk factors for IPV at individual and relationship levels among married rural migrant women in China are consistent with existing evidence among non-migrant women in china and other countries, [4-5,9-11] including younger at marriage, low financial autonomy, acceptance of husband to hit wife, low relationship quality and history of husband beaten by family members. Additional factors associated with IPV among rural migrant women identified in this study were experience of job change in the past year and whether having relatives in frequent contact with in Shanghai. While some risk factors were unique to a particular type of violence, common risk factors were shared by various types of violence in this study, and this finding is consistent with studies from other countries. [3,28]

At individual level, numerous studies have identified that low level of education is a risk factor of IPV.[2,4,29-32] Possibly due to the number of physically or sexually abused women was relatively small, however, we fail to identify such a relation for physical or sexual violence in the study. In contrast to previous studies which included physical violence in their definition of IPV, this study found that higher level of education was strongly associated with increased risk of emotional violence. There is a proverb in China that a gentleman should reason thing out rather than resort to force. Husbands with higher education may think that it is beneath their dignity to use force to deal with conflict or resolving disagreement. Also, although people with higher education may be more likely to perceive that physical and sexual abuse is a form of violence, they may not realize emotional abuse is also a form of violence. As a results, emotional violence rather than physical or sexual violence is more likely to be perpetrated against a wife by a husband with higher education level in Chinese society. Some studies have found that women with a higher level of education than her husband were at increased risk of IPV.[9,33-35] This study also found women with higher education level than their husband were more likely to experience physical or sexual violence (12.8% vs 6.5%, χ^2=4.4321, p=0.0353). However, this association was not found in terms of the experience of emotional violence (10.3% vs 15.8%, χ^2=1.6923, p=0.1933).

Beside women's education level, financial autonomy and job change in the past year were strongly correlated with IPV at individual level. Women with low financial autonomy and experience of job change in the past year were significantly more likely to report IPV. However, the association between family economic status and IPV was not observed. This finding suggests that economic inequality in a relationship is a

more important predictor of IPV than family economic status.

Unanticipatedly, women's age was not associated with IPV in this study. This was in line with findings in another studies in China [9,11] but was in contrast to what has been found in other countries including WHO multi-country study. [4-5,29-32,36] Studies in China failed to identify younger age as a risk factor might be because these studies were conducted in samples of married women with average age of 31~36 years, in which women younger than 20 were excluded. More studies on Chinese population are needed to confirm this relation.

At relationship level, quarrelling with husband and history of husband beaten by family member was strongly correlated with IPV in this study, whereas the association between support from relatives or neighbors and experience of IPV was weak. Partnership with high marital conflicts and partner's behaviors, such as drug use, harmful use of alcohol and fight with other men, are other commonly cited risk factors associated with women's experience of IPV.[4-5,37] In this study, having a husband who had the experience of drinking and physical fight with another man were significant more likely to experience physical or sexual violence in bivariate analysis. Similar trend was found for these variables in multivariate analysis, but the results did not reach statistical significant. The possible reason might be due to the small number of physical or sexual violence in this study.

Several limitations of the study must be mentioned. First, some women might choose not to disclose IPV, especially physical and sexual violence because such kind of violence is generally considered an embarrassing private matter in China. However, the methodology used in the study considerably improved the disclosure of IPV and quality of data. Second, due to limited number of physical or sexual violence, we may lack the statistical power to identify significant associations between some of the variables and IPV, for example, partner's behaviors and physical or sexual violence. Third, family economic status was reported by respondent but not measured by a scale. Because of relative economic homogeneity of the respondents, we may have failed to find significant associations between family economic status and IPV. Finally, because this was a cross-sectional study, the data could only provide evidence for associations but not for causality.

Despite these limitations, findings of this study offer some implications for public health action in terms of primary prevention of IPV. Risk factors identified in this study highlights the need to develop comprehensive interventions to address IPV among migrants at various levels with a focus on improving financial autonomy and employment status of women, promoting problem-solving and interaction skills of the couples, and changing their knowledge or attitudes towards gender norm and IPV. At individual level, interventions should be taken to provide occupational skills training programs for migrants, provide them with opportunities and rights equal to those of local urban people in the area of employment, payment, social security and public

services, increase migrant women's economic and social power, and change their attitudes towards social and culture norms related to gender that support IPV. At relationship level, efforts to promote problem-solving and interaction skills and reduce behaviors which might increase marital conflicts among women and their husband should be made to reduce quarreling between the couples. In addition, to change individual's attitudes and behaviors, a supportive environment at community and societal level is also needed based on the ecological model. On 27 December 2015, China's top legislature adopted the country's first law against domestic violence in a landmark move to bring traditionally silent abuse victims under legal protection. [38] The new law defines domestic violence as "physical, psychological and other harm inflicted by family members with beatings, restraint or forcible limits on physical liberty, recurring invectives and verbal threats". When it comes into force from March 2016, domestic violence will no longer be a "family matter" but a legal issue that demands action from the court and police. While the new law may address the law-enforcement side of the issue, changing people's attitudes toward domestic violence is still the fundamental challenge in China. Public education programs should be carried out by government departments, communities, schools, medical institutions, women's associations and other social groups.

Acknowledgements We would like to thank the local Population and Family Planning Committee for their support in the fields work.

Contributor: XT led study design, acquisition of data, analysis and interpretation of data, and drafting and revising the article. CL involved in design of the work, acquisition of data, interpretation of data, and revising the article.

Funding: The study on which this article is based was supported by the Ford Foundation.

Ethics Approval Ethical approval for this study was granted by the Ethical Committee in Research of the Shanghai Institute of Planned Parenthood Research, Shanghai, China.

Competing interests: None.

Data sharing statement: No additional data are available.

REFERENCES

1. United Nations. Ending Violence against Women: From Words to Action. New York: United Nations. 2006:43-45, 57-61. Available online: http://www.un.org/womenwatch/daw/public/VAW_Study/VAWstudyE.pdf (accessed 22 March 2015).
2. Heise L. What Works to Prevent Partner Violence? An Evidence Overview. London: Department for International Development 2011: 1-9.
3. Fulu E, Jewkes R, Roselli T, et al. Prevalence of and factors associated with male

perpetration of intimate partner violence: findings from the UN Multi-country Cross-sectional Study on Men and violence in Asia and the Pacific. *Lancet Glob Health* 2013;1:e187-e207 doi:10.1016/S2214-109X(13)70074-3[published Online First:10 September 2013] .

4. World Health Organization/London School of Hygiene and Tropical Medicine. Preventing Intimate Partner and Sexual Violence against Women: Taking Action and Generating Evidence. Geneva: World Health Organization 2010: 5-33.
5. Capaldi DM, Knoble NB, Shortt JW, et al. A systematic review of risk factors for intimate partner violence. *Partner Abuse* 2012; 3: 231-80.
6. Parish WL, Wang T, Laumann EO, et al. Intimate partner violence in China: national prevalence, risk factors and associated health problems. *Int Fam Plan Perspect* 2004 ;30:174-81.
7. Tang C. Lai B. A review of empirical literature on the prevalence and risk markers of male-on-female intimate partner violence in contemporary China, 1987-2006. *Aggress Violent Beh* 2008;13:10-28.
8. Chan KL, Brownridge DA, Tiwari A, Fong DY, Leung WC. Understanding violence against Chinese women in Hong Kong: an analysis of risk factors with a special emphasis on the role of in-law conflict. *Violence Against Women* 2008;14:1295-312.
9. Xu X, Zhu F, O'Campo P, et al. Prevalence of and risk factors for intimate partner violence in China. *Am J Public Health* 2005;95:78-85.
10. Guo SF, Wu JL, Qu CY, et al. Domestic violence against women before, during and after pregnancy. *Zhonghua Liu Xing Bing Xue Za Zhi (Chinese Journal of Epidemiology)* 2004; 25: 9-11.(in Chinese)
11. Guo SF, Zhao FL, Wu JL, et al. Study on prevalence of domestic violence and its related factors in rural area of China. *China Public Health* 2007; 23: 4-6. (in Chinese)
12. National Bureau of Statistics of China. Statistical Communiqué of the People's Republic of China on the 2014 National Economic and Social Development. Available online: http://www.stats.gov.cn/enGliSH/PressRelease/201502/t20150228_687439.html (accessed 2 December 2015).
13. The floating population division of National health and Family Planning Commission. The Development Report on China's Migrant Population, 2014. Available online: http://www.nhfpc.gov.cn/xcs/s3574/201411/dc3ba043cbf74e2d8fe68000d4651505.shtml (accessed 10 April 2015).
14. Wong DFK, Li CY, Song HX. Rural migrant workers in urban China: living a marginalised life. *Int J Soc Welf* 2007;16:32-40.
15. Chen Y. Rural migrants in urban China: Characteristics and challenges to public policy. *Local Econ* 2011;26: 325-36.
16. Shi L. Rural Migrant Workers in China: Scenario, Challenges and Public Policy (Working Paper No. 89). International Labour Office, Policy Integration and Statistics Department. Geneva: ILO 2008:6-17.
17. Wu X, Treiman DJ. The household registration system and social stratification in China:1955–1996. *Demography* 2004; *41:* 363-84.
18. Cai Q. Migrant remittances and family ties: a case study in China. *Int J Popul Geogry* 2003;9: 471-83.

19. Han KQ, Huang CC, Han WJ. Social mobility of migrant peasant workers in China. *Sociology Mind* 2011; 1:206-11.
20. Tu X, Lou C, Sun F, et al. Situation of domestic violence and health outcomes among married migrant women of reproductive age. *Zhonghua Liu Xing Bing Xue Za Zhi (Chinese Journal of Epidemiology)* 2014; 35: 484-88. (in Chinese)
21. Tu X, Lou C, Sun F, et al. Patterns of domestic violence among married migrant women of reproductive age and its relationship with abnormal pregnancy outcomes in Shanghai. *Sheng Zhi Yu Bi Yun* (*Reproduction and Contraception)* 2014;34:295-300. (in Chinese)
22. Shanghai Municipal Bureau of Statistics. Shanghai sixth national census in 2010 communiqué on major data. Available online: http://www.shanghai.gov.cn/shanghai/node2314/node2319/node12344/ u26ai25463.html (accessed 14 April 2015).
23. Department of Family Development, National Health and Family Planning Commission. China Family Development Report 2015. Beijing: China Population Publishing House, 2015:10-11. (in Chinese)
24. Garcia-Moreno C, Jansen HA, Ellsberg M, et al. WHO Multi-country Study on Women's Health and Domestic Violence against Women. Geneva: World Health Organization 2005: 27-42, 69-71,132-62.
25. World Health Organization. Putting Women First: Ethical and Safety Recommendations for Research on Domestic Violence against Women (WHO/FCH/GWH/01.1). Geneva: World Health Organization 2001: 9-29.
26. Krug EG, Dahlberg LL, Mercy JA, Zwi AB, Lozana R. World Report on Violence and Health. Geneva: World Health Organization 2002:91-93.
27. Ellsberg MC, Heise L. Researching Violence against Women: A Practical Guide for Researchers and Activists. Washington, DC: PATH/World Health Organization 2005:85-101.
28. Ali TS, Asad N, Mogren I, et al. Intimate partner violence in urban Pakistan: prevalence, frequency, and risk factors. *Int J Womens Health* 2011;16:105-15.
29. Thompson RS, Bonomi AE, Anderson M, et al. Intimate partner violence prevalence, types, and chronicity in adult women. *Am J Prev Med* 2006; 30: 446- 57.
30. Kouyoumdjian FG, Calzavara LM, Bondy SJ, et al. Risk factors for intimate partner violence in women in the Rakai Community Cohort Study, Uganda, from 2000 to 2009. *BMC Public Health* 2013;13:566. Published online 2013 Jun 10. doi: 10.1186/1471-2458-13-566.
31. Abramsky T, Watts CH, Garcia-Moreno C, et al. What factors are associated with recent intimate partner violence? findings from the WHO multi-country study on women's health and domestic violence. *BMC Public Health* 2011;11:109. Published online 2011 Feb 16. doi: 10.1186/1471-2458-11-109.
32. Stöckl H, March L, Pallitto C, et al. Intimate partner violence among adolescents and young women: prevalence and associated factors in nine countries: a cross-sectional study. *BMC Public Health* 2014;14:751. Published online 2014 Jul 25. doi: 10.1186/1471-2458-14-751.
33. Flake DF. Individual, family, and community risk markers for domestic violence in Peru. *Violence against Women* 2005; 11:353-73.
34. Ackerson LK, Kawachi I, Barbeau EM, et al. Effects of individual and proximate educational context on intimate partner violence: A population-based study of women in India. *Am J Public Health* 2008;98:507-14.
35. Chan KL. Sexual violence against women and children in Chinese societies. *Trauma Violence*

Abuse 2009; 10:69-85.

36. Cohen MM, Maclean H. Violence against Canadian Women. *BMC Women's Health* 2004; 4 (Supple 1) : S22.
37. Djikanovic B, Jansen HA, Otasevic S. Factors associated with intimate partner violence against women in Serbia: a cross-sectional study. *J Epidemiol Community Health* 2010;64(8):728-35. doi: 10.1136/jech.2009.090415. [Published online first: 24 August 2009.]
38. Yang Y. China's first law against domestic violence to protect wives. Available online: http://www.womenofchina.cn/womenofchina/html1/features/rights/1601/42-1.htm (accessed 18 January 2016).

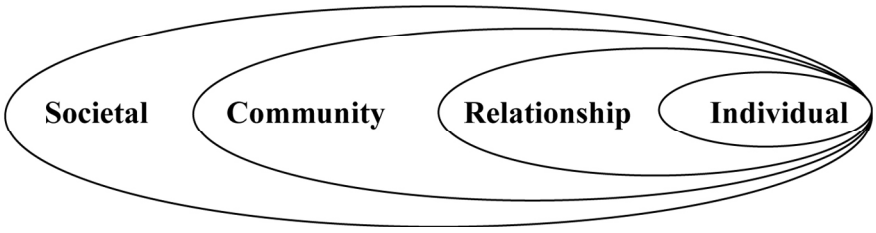

Figure 1 The ecological model for understanding IPV

136x77mm (300 x 300 DPI)

Emotional violence by a husband

- was insulted or made to feel bad about herself
- was belittled or humiliated in front of others
- husband had done things to scare or intimidate her on purpose
- husband had threatened to hurt her or someone her cared about
- husband had threatened to separate her from her children

Physical violence by a husband

- was slapped or thrown something that could hurt her
- was pushed, shoved or dragged
- was hit with a fist or kicked
- was chocked or burnt on purpose
- was threatened or attacked with a knife or other weapon

Sexual violence by a husband

- was coerced to perform sexual acts that she found degrading or humiliating
- was physically forced into sexual intercourse when she did not want
- had sexual intercourse when she did not want to because she was afraid of what husband might do

Physical or sexual violence by a husband

- one or more of above acts of physical or sexual violence

Any violence by a husband

- one or more above acts of emotional, physical or sexual violence

Figure 2 Operational definition of IPV

150x179mm (300 x 300 DPI)

STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No	Recommendation
Title and abstract (p1-2)	√1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found
Introduction		
Background/rationale (p4-5)	√2	Explain the scientific background and rationale for the investigation being reported
Objectives (p5)	√3	State specific objectives, including any prespecified hypotheses
Methods		
Study design (p5)	√4	Present key elements of study design early in the paper
Setting (p5)	√5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection
Participants (p5)	√6	(*a*) *Cohort study*—Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up *Case-control study*—Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls *Cross-sectional study*—Give the eligibility criteria, and the sources and methods of selection of participants
		(*b*) *Cohort study*—For matched studies, give matching criteria and number of exposed and unexposed *Case-control study*—For matched studies, give matching criteria and the number of controls per case
Variables (p6-7)	√7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable
Data sources/ measurement (p6-7)	√8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group
Bias (p5)	√9	Describe any efforts to address potential sources of bias
Study size (p5)	√10	Explain how the study size was arrived at
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why
Statistical methods (p7)	√12	(*a*) Describe all statistical methods, including those used to control for confounding
		(*b*) Describe any methods used to examine subgroups and interactions
		(*c*) Explain how missing data were addressed
		(*d*) *Cohort study*—If applicable, explain how loss to follow-up was addressed *Case-control study*—If applicable, explain how matching of cases and controls was addressed *Cross-sectional study*—If applicable, describe analytical methods taking account of sampling strategy
		(*e*) Describe any sensitivity analyses

Continued on next page

Results		
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed
		(b) Give reasons for non-participation at each stage
		(c) Consider use of a flow diagram
Descriptive data (p7)	√ 14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders
		(b) Indicate number of participants with missing data for each variable of interest
		(c) *Cohort study*—Summarise follow-up time (eg, average and total amount)
Outcome data (P7)	√ 15*	*Cohort study*—Report numbers of outcome events or summary measures over time
		Case-control study—Report numbers in each exposure category, or summary measures of exposure
		Cross-sectional study—Report numbers of outcome events or summary measures
Main results (p8-11)	√16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included
		(*b*) Report category boundaries when continuous variables were categorized
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses
Discussion		
Key results (p12)	√18	Summarise key results with reference to study objectives
Limitations (p13)	√19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias
Interpretation (p12-14)	√20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence
Generalisability (p13)	√21	Discuss the generalisability (external validity) of the study results
Other information		
Funding (p14)	√22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

BMJ Open

Risk factors associated with current intimate partner violence at individual and relationship levels: a cross-sectional study among married rural migrant women in Shanghai, China

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2016-012264.R2
Article Type:	Research
Date Submitted by the Author:	23-Feb-2017
Complete List of Authors:	Tu, Xiaowen; Shanghai Institute of Planned Parenthood Research; Key Laboratory of Reproduction Regulation of NPFPC (SIPPR, IRD, Fudan University) Lou, Chaohua; Shanghai Institute of Planned Parenthood Research; Key Laboratory of Reproduction Regulation of NPFPC (SIPPR, IRD, Fudan University)
Primary Subject Heading:	Public health
Secondary Subject Heading:	Global health
Keywords:	PUBLIC HEALTH, PREVENTIVE MEDICINE, SOCIAL MEDICINE

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Key words: Intimate partner violence; Migrant; Married women of reproductive age; Risk factors;

ABSTRACT

Objective: To identify individual and relationship risk factors associated with current intimate partner violence (IPV) against married rural migrant women at their levels in Shanghai, China.

Design: Cross-sectional survey.

Setting: Two sub-districts of one administrative district, Shanghai, China.

Participants: A total of 958 married rural migrant women of reproductive age were selected using a community-based two-stage cluster sampling method in April and May of 2010.

Outcome measures: Data were collected using a modified questionnaire based on instrument from the WHO Multi-country Study on Women's Health and Domestic Violence against Women. Adjusted odds ratio (AOR) and 95% confidence interval (CI) from multivariable logistic regression model were estimated to identify individual and relationship risk factors associated with different types of violence in the past 12 month.

Results: Women's low financial autonomy was associated with all types of violence (AORs ranged from 1.98 to 7.89, P<0.05). Quarrelling with husband was a very strong risk factor (AORs above 6, P<0.05) for both emotional violence and any violence. Experience of job change in the past years (AOR=4.03, 95% CI 1.57-10.35) and history of husband abused (AOR=4.67, 95% CI 2.17-7.69) were strongly associated with physical or sexual violence.

Conclusion: Women's low financial autonomy and unstable employment status at individual level, quarrelling with husband and history of husband beaten by family members at relationship level were identified as most robust risk factors for IPV among married rural migrant women. Prevention efforts to address IPV among this population should be made to engage both women and their husbands with a focus on improving financial autonomy and employment status of women, promoting problem-solving and interaction skills of the couples, and changing their knowledge and attitudes towards gender norms and IPV.

Strengths and limitations of this study

- Study method was adopted from the WHO Multi-country Study on Women's Health and Domestic Violence against Women to measure IPV and related factors, which enables international comparability and ensures high quality of data.
- The modified study method also minimized the underreporting of IPV which is generally considered an embarrassing private matter in China.
- The self-reported family economic status was not associated with IPV due to lack of variation in the studied population.
- This study has insufficient statistical power to investigate other potential risk factors (e.g. partner's behavior) in association with IPV due to small sample size.
- As a cross-sectional study, this study could only provide evidence for associations but not for causality.

INTRODUCTION

Intimate partner violence (IPV) against women is the most common form of violence experienced by women worldwide.[1-4] It is not only a human rights issue but also a serious public health problem with long-term consequences on women, their children, community and society. Prevention of IPV will protect the physical, mental and economic well-being and development of women, families, communities and societies as a whole.[4]

Understanding the status quo and risk factors of IPV is crucial for developing intervention programs to effectively reduce violence against women. Numerous studies have identified risk factors associated with IPV at individual, relationship, community, and societal levels as shown by the ecological model in Figure 1.[2-5] However, few studies have been conducted to investigate IPV risk factors in China. Findings from other counties may not be applicable in China due to differences in politics, economies, cultures, ecologies, and histories.

Violence against a woman by her husband is traditionally considered as a family matter in China which is largely overlooked and ignored. IPV has received more and more attention in China since the International Conference on Population and Development in Cairo in 1994 and the Fourth World Conference on Women in Beijing in 1995. Physical abuse was not an acceptable ground for divorce in mainland China until 2001 when the marriage law was amended to explicitly ban domestic violence. A national population-based survey found that 34% of women of 20-64 years old with a spouse or a steady partner experienced physical violence and the prevalence varied substantially between urban and rural areas and by regions in 1999-2000.[6] One multi-country study conducted by the United Nation reported a prevalence of 51.6% physical and/or sexual IPV in the surveyed sites of China.[3] Studies conducted in Hong Kong showed that the prevalence of physical violence among Chinese women ranged from 8.5% to 18% in the lifetime period and 4.1% to 15.5% in the preceding year.[7, 8] Some risk factors for IPV in China were similar to those reported in other countries, such as low education, low socioeconomic status, alcohol use, frequent quarreling with husband, acceptance of violence, exposure to violence during childhood.[3, 6-11] However, no studies to date has investigated the IPV risk factors among vulnerable population such as internal rural-to-urban migrants (hereafter referred as ‘rural migrants’) in China.

The size of rural migrants who are former peasants or farmers have been increasing since the mid-1980s in China due to the social-economic development and urbanization of the economic reform started in 1978. Rural migrants are becoming a huge part of the urban labor force according to the National Bureau of Statistics. Most of the 253 million migrants in China by the end of 2014 were rural migrants who went to cities to open small businesses or provide cheap labor in the hope of higher pay and a better life.[12] Rural migrants were young (33.7 years old on average), lived in poor

housing condition and the majority had a junior secondary education.[13] Comparing to their urban counterparts, rural migrants had lower education levels and fewer skills. They were three times less likely to have senior secondary school or higher education than urban permanents (13.3% versus 44.1%) based on the 2000 Census.[14] Rural migrants also face considerable insecurity in employment, income, social welfare, and access to education resources for their children under the household registration system (*Hukou*) established in the 1950s to classify households as rural (agricultural) or urban (non-agricultural).[15-17] It is extremely difficult to change a *hukou* from rural to urban due to its linkage to the registration status of social welfare and employment. People with an urban *Hukou* are entitled to employment, health care, housing, pension and food subsidies in China which are not available to people with a rural *Hukou*. Rural migrants only have temporary residence permit and labor contracts protection.[18] Many rural migrants are engaged in physically demanding, low-paying, and low-skilled temporary jobs in the manufacturing, construction, commerce and service industries due to the *Hukou* limitation.[16, 17] Most rural migrants are unable to move up to higher positions in urban industries until they have permanent urban residence permit (urban *Hukou*).[19] Little is known about IPV in rural migrants despite their vulnerability to IPV. To fill this gap, we conducted a study to investigate IPV against women and its association with a range of health outcomes among married rural migrant women of reproductive age (15~49 years) in Shanghai, China. Findings on prevalence and health outcomes of IPV were published elsewhere.[20, 21] This paper examined risk factors associated with different types of IPV against married rural migrant women, including individual factors on demographic and socioeconomic characteristics, financial autonomy and personal history, as well as relationship factors related to husband, relatives and neighbors.

METHOD

Study design and subjects

Data were drawn from a cross-sectional survey conducted among married rural migrant women of reproductive age in April and May of 2010 in Shanghai, China's largest city with nearly 9 million migrants who have stayed in the city for more than six months.[22] Eligibility subjects are married women of 20-49 years old (the legal marriage age in China is 20 or old for female) living together with husband and the couple had stayed in the city for more than six months but did not have Shanghai *hukou* or permanent residence permit. Women older than 49 years and unmarried women were excluded because women older than 49 years were not registered in the computerized system of local population and family planning department and cohabitation before marriage in China is very low (0.2% based on China Family Development Report 2015 [23]).

Shanghai has 17 administrative districts and one county. Subjects were selected through a community-based two-stage cluster sampling method. First, two sub-districts were randomly selected from one district with an average socioeconomic development level of Shanghai to generate a sample representing the socioeconomic

status of the study population. Second, residential committees were randomly selected from each sub-district with selection probability proportional to the number of married migrant women living in the residential committee. Ten and sixteen residential committees were respectively selected from the two sub-districts to equally split the study sample size between sub-districts. This study recruited all eligible subjects living the selected residential committees. For households with more than one eligible subject, one woman was randomly selected for safety and confidentiality reasons. The final study sample comprised 958 women representing 99.7% of eligible women. All study participants were fully informed of and consented to the survey.

Trained female interviewers completed a face-to-face interview with each study participant using a modified questionnaire based on instrument from the World Health Organization (WHO) Multi-country Study on Women's Health and Domestic Violence against Women.[24] The questionnaire was pilot tested before the main data collection. All questions about violence were phrased and asked in a supportive and non-judgemental manner. To ensure consistent data collection, interviewers were uniformly trained on methodological issues with special emphasis on introduction of IPV, gender and gender inequality, skills in dealing with sensitive issues, concerns of confidentiality, ethical and safety, and knowledge and skills to provide counseling to interviewees. To protect the safety of participants and the research team and to improve the quality of the data, the survey followed the WHO ethical and safety guidelines for research on violence against women.[25] The study was framed as a research on women's reproductive health for participants to safely explain the survey to others. The interview was anonymous and was conducted in a private room outside of participant's home. Before the end of each interview, interviewer told each IPV victim that "no one has the right to treat someone else in that way" and was provided with the necessary information for referral. The study and the procedures were approved by the Institutional Review Board of Shanghai Institute of Planned Parenthood Research, Shanghai, China.

Measures

IPV is defined as any act of emotional, physical or sexual abuse by a current or former husband (Figure 2). IPV in the lifetime after marriage and in the past year were asked separately. Participants were grouped based on their experiences (yes or no) in the defined period of time. Considering that violence in the lifetime could have occurred before and after women's migration to Shanghai, this study focused on IPV in the past year.

Self-report risk factors for IPV include demographic and socioeconomic characteristics, personal history, and factors related to husband, family members, relatives and neighbors. Women's financial autonomy was measured by a sum score based on their answers to six questions presented in Table 1. The higher the sum score, the lower the financial autonomy. Definitions and categorizations of other risk factors are shown in Tables 2-3.

Table 1 Score assignment to questions on women's financial autonomy

Question	Yes	No
1. Are you able to spend the money you earn how you want yourself?	0	1
2. Do you have to give all or part of the money you earn to your husband?	1	0
3. Has your husband ever taken your earnings/savings or your valuables/ other property from you against your will?	1	0
4. Have you ever given up or refused a job for money because your husband did not want you to work?	1	0
5. Does your husband ever refuse to give you money for household expenses, even when he has the money for other things?	1	0
6. Do you think that you alone could raise enough money for housing and feed your family for 4 weeks in case of emergency?	0	1

Data analysis

IPV was dichotomized in the analysis as the dependent variable, including emotional violence, physical or sexual violence (defined as one or more acts of physical or sexual violence in combination), and any violence (defined as one or more acts of emotional, physical or sexual violence in combination) in the past year. Chi-square P value was used to test the significance of IPV frequency distribution by risk factors. Adjusted odds ratios (AOR) and 95% confidence intervals (CI) from multiple logistic regression model were used to measure a risk factor in association with IPV controlling for other risk factors. Clustering sampling effects were adjusted in the logistic regression. All statistical analysis was performed in SAS version 9.1.3 for Windows® (SAS Institute Inc. Cary, NC).

RESULTS

Characteristics of participants

The average age of participants and their husbands at interview was 35.4±6.5 years and 37.4±6.7 years respectively. Participants were 23.0±2.2 years old on average at their first marriage. Almost all participants were in their first marriage and had one or more children (98.7% and 94.5% respectively, results not shown). Results in Tables 2-3 showed that the majority of subjects received junior secondary or lower education (84.4%), had medium economic status (81.8%), had no job change in the past year (95.4%), agreed on husband having no reason hitting wife (79.7%) and did not have a mother or a husband with abused history (85.7% and 82.2% respectively). About a third of respondents (34.5%) had lived in Shanghai for more than 10 years and another third (31.1%) for less than 5 years (results not shown). More than half of participants had high financial autonomy (56.7%), had relatives in frequent contact and living in Shanghai (57.9%), and had neighbors to help in need (72.8%). The majority of participants' husbands had drinking experience but no experience in gambling or physical fight with another man. More than half (57.2%) were living with their children, 9.5% living with parents or parents-in-law, and 40.5% living with husbands only (results not shown). Close to half (44.5%) of the participants were self-employed or private owners of businesses, 28.0% were unskilled workers or

workers in service sector (i.e. hotels and restaurants, hairdressing and beauty, commerce and social services), 18.5% were skilled workers or managers, and 9% had no job recently (results not shown).

About a third (31.9%) of participants reported emotional, physical or sexual violence in lifetime. Less than one fifth (18.7%) of participants reported any forms of IPV in the past year, with 15.3% experiencing emotional violence, and 7.0% experiencing physical or sexual violence.

Factors associated with IPV in the past year

Results from bivariate analysis of factors associated with IPV in the past year are shown in Tables 2 and 3. Individual factors of women's low financial autonomy, experience of job change in the past year, and agreement on husband having some reasons hitting wife were significantly associated with the three forms of IPV. Higher level of education and younger at marriage were significantly associated with emotional violence and any violence. Relationship factors of quarrel with husband, having a husband with gambling experience, having a husband with abused history by family members, and having relatives in frequent contact with in Shanghai were also associated with the three forms of IPV. Having neighbors who would offer help when family had an accident was significantly associated with emotional violence and any violence, while having a husband with experience of drinking or physical fight with another man, and having a mother with abused history by her own husband were only significantly associated with physical or sexual violence.

As shown in Table 4, association results from multiple logistic regression were similar to those of the bivariate analysis for emotional violence, except that experience of job change in the past year at individual level was marginally significant (OR=2.05, 95%CI 0.89~4.72, p=0.0913) and several variables at relationship level were no longer statistically significant including having a husband with gambling experience, having neighbors to help at a family accident and having a husband with physically abused history by family members. For physical or sexual violence, individual factors of low financial autonomy and experience of job change in the past year, and relationship factor of having a husband with abused history remained strong risk factors in the multiple analysis. Husband's experience of physical fight with another man (OR=1.87, 95%CI 0.93~3.76, p=0.0809) and having a mother with abused history by her own husband (OR=1.85, 95%CI 0.95~3.64, p=0.0725) were only marginally significantly associated with physical or sexual violence. Whereas frequency of quarrel with husband, husband's experience of drinking, husband's experience of gambling, having relatives in frequent contact with in Shanghai or having neighbors to help at family accident were no longer statistically significantly associated with respondents' experience of physical or sexual violence. For any violence, results from multiple regression were similar to those from bivariate analysis, except that having a husband with gambling experience and having neighbors to help at family accident were no longer statistically significant.

Table 2 Percentage distribution of respondents; and percentage of violence, by variable at individual level (n=958)

Variables	n (%)	Emotional violence		Physical or sexual violence		Any violence	
		%	p value	%	p value	%	p value
Age (year)							
<30	228 (23.8)	16.7	0.8081	7.0	0.2632	20.2	0.7674
30~40	464 (48.4)	15.1		5.8		17.9	
>40	266 (27.8)	14.7		9.0		18.8	
Education level							
Primary and lower	326 (34.0)	16.0	0.0043	9.8	0.0483	20.9	0.0081
Junior	483 (50.4)	12.4		5.6		15.1	
Senior and higher	149 (15.6)	23.5		5.4		25.5	
Age at marriage (year)							
≤22	423 (44.1)	20.6	<0.0001	8.8	0.0585	24.1	0.0001
>22	535 (55.9)	11.2		5.6		14.4	
Family economic status							
High	59 (6.2)	10.2	0.5047	8.5	0.2528	13.6	0.5007
Medium	784 (81.8)	15.6		6.4		18.8	
Low	115 (12.0)	16.5		10.4		20.8	
Financial autonomy (score)							
0 (High)	543 (56.7)	14.4	0.0004	3.0***	<0.0001	15.8***	<0.0001
1	283 (29.5)	12.0		6.7		15.9	
≥2 (Low)	132 (13.8)	26.5		24.2		36.4	
Job change in the past year							
Yes	44 (4.6)	31.8	0.0019	25.0	<0.0001	43.1	<0.0001
No	914 (95.4)	14.6		6.1		17.5	
Reasons for husband hitting wife							
None	764 (79.7)	13.6	0.0032	6.0	0.0191	16.9	0.0046
Any	194 (20.3)	22.2		10.8		25.8	

Note：Chi-square-test

Table 3 Percentage distribution of respondents; and percentage of violence, by variable at relationship level (n=958)

Variables	n (%)	Emotional violence		Physical or sexual violence		Any violence	
		%	p value	%	p value	%	p value
Husband was chosen with the help of parents or other people							
No	426(44.5)	13.2	0.0911	7.8	0.4137	16.9	0.2051
Yes	532(55.5)	17.1		6.4		20.1	
Frequency of quarrel with husband							
Never or rare	379 (39.6)	4.8	<0.0001	2.4	<0.0001	6.3	<0.0001
Sometimes	548 (57.2)	22.3		9.3		22.3	
Often	31 (3.2)	22.6		22.6		35.5	
Frequency of husband's drinking							
Often	277 (28.9)	15.9	0.1489	11.9	0.0005	22.0	0.0515
Occasionally	370 (38.6)	17.6		5.7		19.7	
Never	311 (32.5)	12.2		4.2		14.5	
Frequency of husband's gambling							
Often or occasionally	239 (25.0)	22.6	0.0005	10.9	0.0153	26.8	0.0004
Never	719 (75.0)	12.9		5.7		16.0	
Frequency of husband's physical fight with another man							
Often or occasionally	127 (13.3)	18.1	0.3531	18.1	<0.0001	24.4	0.0756
Never	831 (86.7)	14.9		5.3		17.8	
History of husband beaten by family members							
Yes	171 (17.8)	21.1	0.0223	19.3	<0.0001	28.1	0.0005
No	787 (82.2)	14.1		4.3		16.7	
History of mother beaten by her husband							
Yes	137 (14.3)	16.8	0.6125	13.9	0.0007	22.6	0.2009
No	821 (85.7)	15.1		5.9		18.0	
Having relatives in frequent contact with in Shanghai							
Yes	553 (57.9)	12.7	0.0063	5.6	0.0466	15.3	0.0019
No	403 (42.1)	19.1		8.9		23.3	
Neighbors would offer help when family had an accident							
Yes	697 (72.8)	12.9	0.0006	6.3	0.1769	15.9	0.0003
No	261 (27.2)	21.8		8.8		26.1	

Note：Chi-square-test

Table 4 Multivariable logistic regression model of factors associated with different types of violence, Adjusted OR (95%CI) (n=956)

Variable	Emotional violence	Physical or sexual violence	Any violence
Individual level			
Age (year)			
<30	1.00	1.00	1.00
30~40	0.89(0.49-1.61)	0.98(0.45-2.13)	0.80(0.50-1.28)
>40	0.84(0.50-1.40)	1.57(0.68-3.60)	0.90(0.52-1.56)
Education level			
Primary and lower	1.00	1.00	1.00
Junior	0.72(0.44-1.15)	0.63(0.33-1.18)	0.63(0.41-1.13)
Senior and higher	2.29(1.19-4.43)***	0.74(0.27-2.04)	1.65(1.09-3.04)**
Age at marriage (year)			
≤22	2.13(1.37-3.31)***	1.16(0.61-2.05)	1.71(1.15-2.55)**
>22	1.00	1.00	1.00
Family economic status			
High	1.00(0.32-3.10)	1.47(0.36-5.96)	1.13(0.41-3.14)
Medium	1.11 (0.58-2.10)	1.24(0.56-2.74)	1.21(0.67-2.19)
Low	1.00	1.00	1.00
Financial autonomy (score)			
0 (High)	1.00	1.00	1.00
1	0.91(0.55-1.49)	1.85(0.87-3.93)	1.09(0.69-1.70)
≥2 (Low)	1.98(1.14-3.42)**	7.89 (3.86-16.14)***	2.84(1.71-4.70)***
Job change in the past year			
Yes	2.05(0.89-4.72)	4.03(1.57-10.35)**	2.82(1.30-6.12)**
No	1.00	1.00	1.00
Reasons for husband hitting wife			
None	1.00	1.00	1.00
Any	1.96(1.22-3.14)**	1.65(0.85-3.19)	1.71(1.10-2.66)*
Relationship level			
Husband was chosen with the help of parents or other people			
No	1.00	1.00	1.00
Yes	1.19(0.76-1.86)	0.54 (0.29-1.04)	1.07(0.71-1.62)
Frequency of quarrel with husband			
Rarely	1.00	1.00	1.00
Sometimes	7.14(4.22-13.02)*	2.06(0.93-4.55)	6.04(3.65-9.98)**
Often	6.23(2.09-18.62)**	2.28(0.63-8.35)	7.07(2.71-18.45)*

Frequency of husband's drinking			
Often	0.91(0.52-1.58)	1.98(0.91-4.31)	1.19(0.72-1.97)
Occasionally	1.03(0.62-1.70)	1.03(0.46-2.31)	1.02(0.63-1.63)
Never	1.00	1.00	1.00
Frequency of husband's gambling			
Ever	1.37(0.89-2.19)	0.91(0.47-1.76)	1.29(0.84-1.98)
Never	1.00	1.00	1.00
Frequency of husband's physical fight with another man			
Ever	0.65(0.35-1.22)	1.87(0.93-3.76)	0.71(0.40-1.25)
Never	1.00	1.00	1.00
History of husband beaten by family members			
Yes	1.45(0.86-2.44)	4.67(2.17-7.69)***	1.20(1.06-2.72)*
No	1.00	1.00	1.00
History of mother beaten by her husband			
Yes	0.91(0.51-1.60)	1.85(0.95-3.64)	1.03(0.62-1.73)
No	1.00	1.00	1.00
Having relatives in frequent contact with in Shanghai			
Yes	0.62(0.40-0.94)*	0.97(0.53-1.80)	0.62(0.42-0.92)*
No	1.00	1.00	1.00
Neighbors would offer help when family had an accident			
Yes	1.00	1.00	1.00
No	1.36(0.88-2.10)	1.07(0.56-2.02)	1.38(0.92-2.07)

Note: * $P<0.05$, ** $P<0.01$, *** $P<0.0001$

DISCUSSION

To the best of our knowledge, this is the first study to assess IPV and possible risk factors associated with different types of IPV among rural migrant women in China. The modified study method was adopted from the WHO Multi-country Study on Women's Health and Domestic Violence against Women [24] to measure IPV and related factors, which enables international comparability and ensures high quality of data. For example, the definitions of violence were operationalized using a range of behavior-specific questions related to each type of violence, which has been used widely in studies of partner violence in the United States and elsewhere, and has been shown to encourage greater disclosure of violence than approaches that require respondents to identify themselves as abused or battered.[26, 27] Findings from this study show that several risk factors for IPV at individual and relationship levels among married rural migrant women in China are consistent with existing evidence among non-migrant women in China and other countries, [4, 5, 9-11] including young age at marriage, low financial autonomy, acceptance of wife beating by husband, low

relationship quality and history of husband beaten by family members. Additional factors associated with IPV among rural migrant women identified in this study were experience of job change in the past year and having relatives in frequent contact with in Shanghai. While some risk factors were unique to a particular type of violence, common risk factors were shared by various types of violence in this study, which is consistent with studies from other countries.[3, 28]

At individual level, numerous studies have identified that low level of education is a risk factor of IPV.[2, 4, 29-32] However, we fail to identify such a relation for physical or sexual violence in the study, possibly due to the small sample size of women with physically or sexually abuse. In contrast, this study found that higher level of education was strongly associated with increased risk of emotional violence. There is a proverb in China that a gentleman should reason thing out rather than resort to force. Husbands with higher education may therefore think that it is beneath their dignity to use force to deal with conflict or resolve disagreement. In addition, emotional abuse may be less likely to be perceived as a form of violence in comparison to physical or sexual abuse. As a result, emotional violence rather than physical or sexual violence is more likely to be perpetrated against a wife by a husband with higher level of education in China. Previous study also found that women with a higher level of education than their husbands were at increased risk for IPV.[9, 33-35] This study confirmed this finding for physical or sexual violence (12.8% vs 6.5%, χ^2=4.4321, p=0.0353) but not emotional violence (10.3% vs 15.8%, χ^2=1.6923, p=0.1933).

Beside women's education level, individual factors of financial autonomy and job change in the past year were also strongly associated with IPV. Women with low financial autonomy and experience of job change in the past year were significantly more likely to report IPV. However, family economic status was not a predictor of IPV. These findings suggest that economic inequality in a relationship is a more important predictor of IPV than family economic status.

Unanticipatedly, this study did not find women's age in association with IPV, which is in line with findings from studies in China [9, 11] but different from studies in other countries including the WHO multi-country study.[4, 5, 29-32, 36] Most studies in China were conducted in married women between 31 and 36 years old on average excluding younger women of less than 20 years old which might have led to the null association of women's age with IPV. More studies are therefore needed to confirm this null association.

This study found strong associations of relationship factors of quarrelling with husband and history of husband beaten by family member with IPV but weak association of support from relatives or neighbors with IPV. Partnership with high marital conflicts and partner's behaviors, such as drug use, harmful use of alcohol and fighting with other men, are other commonly cited risk factors at relationship level

associated with women's experience of IPV.[4, 5, 37] This study did find husband's experience in drinking or physical fight with another man in association with physical or sexual violence but the results were only significant in the bivariate analysis not the multiple regression analysis. The small sample size of women with physical or sexual violence might have contributed to the change of statistical significance.

Several limitations of the study must be mentioned. First, some women might have chosen not to disclose IPV, especially physical or sexual violence because they are generally considered an embarrassing private matter in China, even though this study used a methodology considerably improve the disclosure of IPV and quality of data. Second, this study has insufficient statistical power to examine some variables in association with IPV (such as, partner's behaviors and physical or sexual violence) due to small sample size. Third, this study did not collect scaled data on family economic status. Because of the homogeneity of family economic status among respondents, this study failed to identify significant associations of family economic status with IPV. Finally, results from this cross-sectional study could only provide evidence for associations but not for causality.

Despite the limitations, study findings have public health implications for the primary prevention of IPV. The identified risk factors highlight the need of comprehensive interventions to address IPV among migrants at various levels. The interventions should focus on improving financial autonomy and employment status of women, promoting problem-solving and interaction skills of the couples, and changing their knowledge or attitudes towards gender norms and IPV. At individual level, interventions should provide training on occupational skills for migrants, provide them with equal opportunities and rights to the local urban residence in the area of employment, payment, social security and public services, increase migrant women's economic and social power, and change their attitudes towards social and culture norms related to gender that support IPV. At relationship level, efforts should be made to promote problem-solving and interaction skills and to reduce behaviors leading to marital conflicts in order to reduce quarrels between couples. In addition, to change individual's attitudes and behaviors, a supportive environment at community and societal levels is also needed based on the ecological model. On December 27, 2015, China's top legislature adopted the country's first law against domestic violence in a landmark move to bring traditionally silent abuse victims under legal protection.[38] The new law defines domestic violence as "physical, psychological and other harm inflicted by family members with beatings, restraint or forcible limits on physical liberty, recurring invectives and verbal threats". With it coming into force in March 2016, domestic violence will no longer be a "family matter" but a legal issue that demands action from the court and police. While the new law may address the law-enforcement side of the issue, changing people's attitudes toward domestic violence is still the fundamental challenge in China. Public education programs should be carried out by government departments, communities, schools, medical institutions, women's associations and other social groups.

Acknowledgements We would like to thank the local Population and Family Planning Committee for their support in the fields work. We also gratefully acknowledge Dr. Juan Yang from Outcomes and Long-Term Follow-up Section, Genetic Disease Screening Program, California Department of Public Health who help us improve the quality of the article.

Contributor: XT led study design, acquisition of data, analysis and interpretation of data, and drafting and revising the article. CL involved in design of the work, acquisition of data, interpretation of data, and revising the article.

Funding: The study on which this article is based was supported by the Ford Foundation.

Ethics Approval Ethical approval for this study was granted by the Ethical Committee in Research of the Shanghai Institute of Planned Parenthood Research, Shanghai, China.

Competing interests: None.

Data sharing statement: No additional data are available.

REFERENCES

1. United Nations. Ending Violence against Women: From Words to Action. New York: United Nations. 2006:43-45, 57-61. Available online: http://www.un.org/womenwatch/daw/public/VAW_Study/VAWstudyE.pdf (accessed 22 March 2015).
2. Heise L. What Works to Prevent Partner Violence? An Evidence Overview. London: Department for International Development 2011: 1-9.
3. Fulu E, Jewkes R, Roselli T, et al. Prevalence of and factors associated with male perpetration of intimate partner violence: findings from the UN Multi-country Cross-sectional Study on Men and violence in Asia and the Pacific. *Lancet Glob Health* 2013;1:e187-e207 doi:10.1016/S2214-109X(13)70074-3[published Online First:10 September 2013] .
4. World Health Organization/London School of Hygiene and Tropical Medicine. Preventing Intimate Partner and Sexual Violence against Women: Taking Action and Generating Evidence. Geneva: World Health Organization 2010: 5-33.
5. Capaldi DM, Knoble NB, Shortt JW, et al. A systematic review of risk factors for intimate partner violence. *Partner Abuse* 2012; 3: 231-80.
6. Parish WL, Wang T, Laumann EO, et al. Intimate partner violence in China: national prevalence, risk factors and associated health problems. *Int Fam Plan Perspect* 2004 ;30:174-81.
7. Tang C. Lai B. A review of empirical literature on the prevalence and risk markers of male-on-female intimate partner violence in contemporary China, 1987-2006. *Aggress Violent Beh* 2008;13:10-28.

8. Chan KL, Brownridge DA, Tiwari A, Fong DY, Leung WC. Understanding violence against Chinese women in Hong Kong: an analysis of risk factors with a special emphasis on the role of in-law conflict. *Violence Against Women* 2008;14:1295-312.
9. Xu X, Zhu F, O'Campo P, et al. Prevalence of and risk factors for intimate partner violence in China. *Am J Public Health* 2005;95:78-85.
10. Guo SF, Wu JL, Qu CY, et al. Domestic violence against women before, during and after pregnancy. *Zhonghua Liu Xing Bing Xue Za Zhi (Chinese Journal of Epidemiology)* 2004; 25: 9-11.(in Chinese)
11. Guo SF, Zhao FL, Wu JL, et al. Study on prevalence of domestic violence and its related factors in rural area of China. *China Public Health* 2007; 23: 4-6. (in Chinese)
12. National Bureau of Statistics of China. Statistical Communiqué of the People's Republic of China on the 2014 National Economic and Social Development. Available online: http://www.stats.gov.cn/enGliSH/PressRelease/201502/t20150228_687439.html (accessed 2 December 2015).
13. The floating population division of National health and Family Planning Commission. The Development Report on China's Migrant Population, 2014. Available online: http://www.nhfpc.gov.cn/xcs/s3574/201411/dc3ba043cbf74e2d8fe68000d4651505.shtml (accessed 10 April 2015).
14. Wong DFK, Li CY, Song HX. Rural migrant workers in urban China: living a marginalised life. *Int J Soc Welf* 2007;16:32-40.
15. Chen Y. Rural migrants in urban China: Characteristics and challenges to public policy. *Local Econ* 2011**;**26: 325-36.
16. Shi L. Rural Migrant Workers in China: Scenario, Challenges and Public Policy (Working Paper No. 89). International Labour Office, Policy Integration and Statistics Department. Geneva: ILO 2008:6-17.
17. Wu X, Treiman DJ. The household registration system and social stratification in China:1955–1996. *Demography* 2004**;** *41:* 363-84.
18. Cai Q. Migrant remittances and family ties: a case study in China. *Int J Popul Geogry* 2003;9: 471-83.
19. Han KQ, Huang CC, Han WJ. Social mobility of migrant peasant workers in China. *Sociology Mind* 2011; 1:206-11.
20. Tu X, Lou C, Sun F, et al. Situation of domestic violence and health outcomes among married migrant women of reproductive age. *Zhonghua Liu Xing Bing Xue Za Zhi (Chinese Journal of Epidemiology)* 2014; 35: 484-88. (in Chinese)
21. Tu X, Lou C, Sun F, et al. Patterns of domestic violence among married migrant women of reproductive age and its relationship with abnormal pregnancy outcomes in Shanghai. *Sheng Zhi Yu Bi Yun* (*Reproduction and Contraception)* 2014;34:295-300. (in Chinese)
22. Shanghai Municipal Bureau of Statistics. Shanghai sixth national census in 2010 communiqué on major data. Available online: http://www.shanghai.gov.cn/shanghai/node2314/node2319/node12344/ u26ai25463.html (accessed 14 April 2015).
23. Department of Family Development, National Health and Family Planning Commission. China Family Development Report 2015. Beijing: China Population Publishing House, 2015:10-11. (in Chinese)
24. Garcia-Moreno C, Jansen HA, Ellsberg M, et al. WHO Multi-country Study on Women's

Health and Domestic Violence against Women. Geneva: World Health Organization 2005: 27-42, 69-71,132-62.

25. World Health Organization. Putting Women First: Ethical and Safety Recommendations for Research on Domestic Violence against Women (WHO/FCH/GWH/01.1). Geneva: World Health Organization 2001: 9-29.
26. Krug EG, Dahlberg LL, Mercy JA, Zwi AB, Lozana R. World Report on Violence and Health. Geneva: World Health Organization 2002:91-93.
27. Ellsberg MC, Heise L. Researching Violence against Women: A Practical Guide for Researchers and Activists. Washington, DC: PATH/World Health Organization 2005:85-101.
28. Ali TS, Asad N, Mogren I, et al. Intimate partner violence in urban Pakistan: prevalence, frequency, and risk factors. *Int J Womens Health* 2011;16:105-15.
29. Thompson RS, Bonomi AE, Anderson M, et al. Intimate partner violence prevalence, types, and chronicity in adult women. *Am J Prev Med* 2006; 30: 446- 57.
30. Kouyoumdjian FG, Calzavara LM, Bondy SJ, et al. Risk factors for intimate partner violence in women in the Rakai Community Cohort Study, Uganda, from 2000 to 2009. *BMC Public Health* 2013;13:566. Published online 2013 Jun 10. doi: 10.1186/1471-2458-13-566.
31. Abramsky T, Watts CH, Garcia-Moreno C, et al. What factors are associated with recent intimate partner violence? findings from the WHO multi-country study on women's health and domestic violence. *BMC Public Health* 2011;11:109. Published online 2011 Feb 16. doi: 10.1186/1471-2458-11-109.
32. Stöckl H, March L, Pallitto C, et al. Intimate partner violence among adolescents and young women: prevalence and associated factors in nine countries: a cross-sectional study. *BMC Public Health* 2014;14:751. Published online 2014 Jul 25. doi: 10.1186/1471-2458-14-751.
33. Flake DF. Individual, family, and community risk markers for domestic violence in Peru. *Violence against Women* 2005; 11:353-73.
34. Ackerson LK, Kawachi I, Barbeau EM, et al. Effects of individual and proximate educational context on intimate partner violence: A population-based study of women in India. *Am J Public Health* 2008;98:507-14.
35. Chan KL. Sexual violence against women and children in Chinese societies. *Trauma Violence Abuse* 2009; 10:69-85.
36. Cohen MM, Maclean H. Violence against Canadian Women. *BMC Women's Health* 2004; 4 (Supple 1) : S22.
37. Djikanovic B, Jansen HA, Otasevic S. Factors associated with intimate partner violence against women in Serbia: a cross-sectional study. *J Epidemiol Community Health* 2010;64(8):728-35. doi: 10.1136/jech.2009.090415. [Published online first: 24 August 2009.]
38. Yang Y. China's first law against domestic violence to protect wives. Available online: http://www.womenofchina.cn/womenofchina/html1/features/rights/1601/42-1.htm (accessed 18 January 2016).

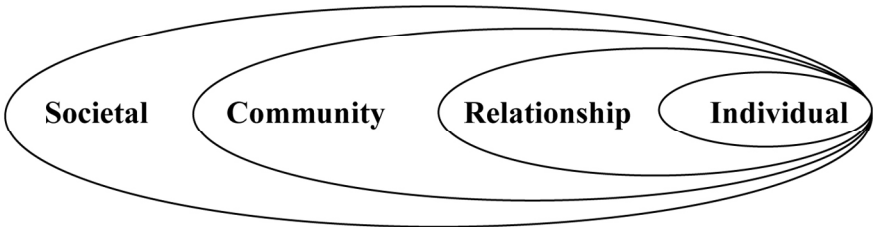

Figure 1 The ecological model for understanding IPV

Figure 1: The ecological model for understanding IPV

136x77mm (300 x 300 DPI)

Emotional violence by a husband

- was insulted or made to feel bad about herself
- was belittled or humiliated in front of others
- husband had done things to scare or intimidate her on purpose
- husband had threatened to hurt her or someone her cared about
- husband had threated to separate her from her children

Physical violence by a husband

- was slapped or thrown something that could hurt her
- was pushed, shoved or dragged
- was hit with a fist or kicked
- was chocked or burnt on purpose
- was threatened or attacked with a knife or other weapon

Sexual violence by a husband

- was coerced to perform sexual acts that she found degrading or humiliating
- was physically forced into sexual intercourse when she did not want
- had sexual intercourse when she did not want to because she was afraid of what husband might do

Figure 2 Operational definition of IPV

150x141mm (300 x 300 DPI)

STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No	Recommendation
Title and abstract (p1-2)	√1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found
Introduction		
Background/rationale (p4-5)	√2	Explain the scientific background and rationale for the investigation being reported
Objectives (p5)	√3	State specific objectives, including any prespecified hypotheses
Methods		
Study design (p5)	√4	Present key elements of study design early in the paper
Setting (p5)	√5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection
Participants (p5)	√6	(*a*) *Cohort study*—Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up *Case-control study*—Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls *Cross-sectional study*—Give the eligibility criteria, and the sources and methods of selection of participants
		(*b*) *Cohort study*—For matched studies, give matching criteria and number of exposed and unexposed *Case-control study*—For matched studies, give matching criteria and the number of controls per case
Variables (p6-7)	√7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable
Data sources/ measurement (p6-7)	√8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group
Bias (p5)	√9	Describe any efforts to address potential sources of bias
Study size (p5)	√10	Explain how the study size was arrived at
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why
Statistical methods (p7)	√12	(*a*) Describe all statistical methods, including those used to control for confounding
		(*b*) Describe any methods used to examine subgroups and interactions
		(*c*) Explain how missing data were addressed
		(*d*) *Cohort study*—If applicable, explain how loss to follow-up was addressed *Case-control study*—If applicable, explain how matching of cases and controls was addressed *Cross-sectional study*—If applicable, describe analytical methods taking account of sampling strategy
		(*e*) Describe any sensitivity analyses

Continued on next page

Results		
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed
		(b) Give reasons for non-participation at each stage
		(c) Consider use of a flow diagram
Descriptive data (p7)	√ 14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders
		(b) Indicate number of participants with missing data for each variable of interest
		(c) *Cohort study*—Summarise follow-up time (eg, average and total amount)
Outcome data (P7)	√ 15*	*Cohort study*—Report numbers of outcome events or summary measures over time
		Case-control study—Report numbers in each exposure category, or summary measures of exposure
		Cross-sectional study—Report numbers of outcome events or summary measures
Main results (p8-11)	√16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included
		(*b*) Report category boundaries when continuous variables were categorized
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses
Discussion		
Key results (p12)	√18	Summarise key results with reference to study objectives
Limitations (p13)	√19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias
Interpretation (p12-14)	√20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence
Generalisability (p13)	√21	Discuss the generalisability (external validity) of the study results
Other information		
Funding (p14)	√22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.