

BMJ Open

BMJ Open is committed to open peer review. As part of this commitment we make the peer review history of every article we publish publicly available.

When an article is published we post the peer reviewers' comments and the authors' responses online. We also post the versions of the paper that were used during peer review. These are the versions that the peer review comments apply to.

The versions of the paper that follow are the versions that were submitted during the peer review process. They are not the versions of record or the final published versions. They should not be cited or distributed as the published version of this manuscript.

BMJ Open is an open access journal and the full, final, typeset and author-corrected version of record of the manuscript is available on our site with no access controls, subscription charges or pay-per-view fees (<http://bmjopen.bmj.com>).

If you have any questions on BMJ Open's open peer review process please email info.bmjopen@bmj.com

BMJ Open

Workplace violence against healthcare professionals in multi-ethnicity area: a cross-sectional study in southwest China

Journal:	<i>BMJ Open</i>
Manuscript ID	bmjopen-2020-037464
Article Type:	Original research
Date Submitted by the Author:	04-Feb-2020
Complete List of Authors:	Jia, Haonan; Harbin Medical University, Department of Health Policy and Hospital Management, School of Public Health Fang, Huiying; Harbin Medical University, Department of Health, Policy and Hospital Management, School of Public Health Chen, Ruohui; Harbin Medical University, Social Medicine Jiao, Mingli; Harbin Medical University, Health policy Wei, Lifeng; Harbin Medical University, Zhang, Gangyu; Harbin Medical University, Department of Health, Policy and Hospital Management, School of Public Health Li, Yuanheng; Harbin Medical University, Department of Health Policy and Hospital Management Wang, Ying; Harbin Medical University, Department of Health Policy and Hospital Management Wang, Yameng; Harbin Medical University Jiang, Kexin; Harbin Medical University, Department of Health, Policy and Hospital Management, School of Public Health Li, Jingqun; No.1 People's Hospital of Heihe Jia, Xiaowen; No.1 People's Hospital of Heihe, Department of General Surgery Ismael, Omar Yacouba; Harbin Medical University, Department of Health, Policy and Hospital Management, School of Public Health Wu, Qunhong; Harbin Medical School, Social Medicine Mao, Jingfu; Harbin Medical University
Keywords:	Health & safety < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, PUBLIC HEALTH, Health policy < HEALTH SERVICES ADMINISTRATION & MANAGEMENT

SCHOLARONE™
Manuscripts



I, the Submitting Author has the right to grant and does grant on behalf of all authors of the Work (as defined in the below author licence), an exclusive licence and/or a non-exclusive licence for contributions from authors who are: i) UK Crown employees; ii) where BMJ has agreed a CC-BY licence shall apply, and/or iii) in accordance with the terms applicable for US Federal Government officers or employees acting as part of their official duties; on a worldwide, perpetual, irrevocable, royalty-free basis to BMJ Publishing Group Ltd ("BMJ") its licensees and where the relevant Journal is co-owned by BMJ to the co-owners of the Journal, to publish the Work in this journal and any other BMJ products and to exploit all rights, as set out in our [licence](#).

The Submitting Author accepts and understands that any supply made under these terms is made by BMJ to the Submitting Author unless you are acting as an employee on behalf of your employer or a postgraduate student of an affiliated institution which is paying any applicable article publishing charge ("APC") for Open Access articles. Where the Submitting Author wishes to make the Work available on an Open Access basis (and intends to pay the relevant APC), the terms of reuse of such Open Access shall be governed by a Creative Commons licence – details of these licences and which [Creative Commons](#) licence will apply to this Work are set out in our licence referred to above.

Other than as permitted in any relevant BMJ Author's Self Archiving Policies, I confirm this Work has not been accepted for publication elsewhere, is not being considered for publication elsewhere and does not duplicate material already published. I confirm all authors consent to publication of this Work and authorise the granting of this licence.

1 **Workplace violence against healthcare professionals in multi-**
2 **ethnicity area: a cross-sectional study in southwest China**

3 Haonan Jia^{a*}, Huiying Fang^{b*}, Ruohui Chen^{a*}, Mingli Jiao^{a,c}✉, Lifeng Wei^a, Gangyu
4 Zhang^a, Yuanheng Li^a, Ying Wang^a, Yameng Wang^a, Kexin Jiang^d, Jingqun Li^e,
5 Xiaowen Jia^f, Omar Yacouba Ismael^a, Jingfu Mao^g✉, Qunhong Wu^h

6 *a Department of Health Policy and Hospital Management, Harbin Medical University,*
7 *Nangang District, Harbin, China;*

8 *b President's Office of Qingdao Women and Children's Hospital, Shibei District,*
9 *Qingdao, China;*

10 *c Chinese Academy of Social Science, Institute of Quantitative & Technical Economics,*
11 *Dongcheng District, Beijing China;*

12 *d Medical department, General Hospital of Heilongjiang Agricultural Reclamation,*
13 *Harbin 150088, China*

14 *e Department of Cardiology, No.1 People's Hospital of Heihe, Aihui District, Heihe,*
15 *China;*

16 *f Department of General Surgery, No.1 People's Hospital of Heihe, Aihui District,*
17 *Heihe, China;*

18 *g Department of Human Resource Management, Harbin Medical University, Nangang*
19 *District, Harbin, China;*

20 *h Department of Social Medicine, Harbin Medical University, Nangang District,*
21 *Harbin, China*

22 *Contributed Equally

1
2
3
4 **23 Corresponding author:**
5

6
7 24 Mingli Jiao, Harbin Medical University, 157 Baojian Road, Nangang District, Harbin,
8
9 25 Heilongjiang, 150086, China. Email: minglijiao@126.com. [Tel:+86 13613675693](tel:+8613613675693)
10

11
12 26 Jingfu Mao, Harbin Medical University, 157 Baojian Road, Nangang District, Harbin,
13
14 27 Heilongjiang, 150086, China. Email: mjfhyd@yeah.com. [Tel:+86 13836134966](tel:+8613836134966)
15
16

17 **28 Word count:3612**
18

19 **29 Abstract**
20

21
22 30 Objective: The purpose of this study is to examine WPV towards healthcare
23
24 31 professionals in multi-ethnicity area of China, including prevalence, influencing
25
26 32 factors, healthcare professionals' response to WPV, expected anti-violence
27
28 33 training measures and content, and evaluation of WPV interventions.
29

30
31 34 Methods: We conducted a cross-sectional study in a Grade III Class A hospital in
32
33 35 the capital of Yunnan province, which is the province with most kinds of ethnic
34
35 36 minorities groups in China. Data were collected from July to October 2017 using
36
37 37 questionnaires designed jointly by International Labour Office (ILO),
38
39 38 International Council of Nurses (ICN), World Health Organization (WHO), and
40
41 39 Public Services International (PSI). Descriptive statistics, Chi-square test, Fisher's
42
43 40 exact test, propensity score matching (PSM) and logistic regression were used to
44
45 41 analyze. A total of 2,036 valid questionnaires were collected. The prevalence of
46
47 42 physical and psychological violence was 5.4% and 43.7%, respectively.
48
49

50
51 43 Results: Healthcare professionals who were ethnic minorities were more likely to
52
53 44 experience psychological violence. After stratified by gender, males who are ethnic
54
55
56
57
58
59
60

1
2
3
4 45 minorities suffered more physical violence, while females psychological violence .

5
6 46 We also found a unique work situation in China—overtime duty call work (6pm-

7
8
9 47 7am) was a risk factor of psychological violence (OR=1.403, $p<0.05$). Ethnic

10
11 48 minority healthcare professionals less likely to order perpetrators to stop or to

12
13
14 49 report to superiors when facing psychological violence ($p<0.05$). Ethnic minority

15
16
17 50 healthcare professionals are more interested in receiving training of force skills

18
19 51 and self-defense. Both Han and ethnic minority participant considered security

20
21 52 measures as the most useful intervention, while changing the time of shift as the

22
23
24 53 most useless one.

25
26
27 54 Conclusion: Our study comprehensively described WPV towards healthcare

28
29 55 professionals in multi-ethnicity minority area. More WPV research conducted in

30
31 56 multi-ethnicity area are needed.

32
33
34 57 **Keyword:** Workplace violence; healthcare professionals; multi-ethnicity area

35
36
37 58 **Strengths and limitations**

38
39
40 59 ✧ Although lots of study investigate WPV in hospital, few of them conducted in
41
42 60 multi-ethnicity minority area.

43
44
45 61 ✧ Different with previous studies that pay attention to single part of WPV, our
46
47 62 study describe WPV comprehensively including prevalence, influencing factor,
48
49 63 response to WPV.etc.

50
51
52 53 ✧ Due to the recall bias or reporting bias resulting from shame and stigma, the
53
54 64 number of violence events in past 12 months may be underestimated.

55
56
57 65 ✧ Our study didn't explain WPV using cultural factors, which needs further study
58
59 66

1
2
3
4 67 to fulfill.
5
6

7 68 **1. Introduction**
8

9 69 In December 2019, a doctor was killed brutally by a patient's family member in
10
11 70 Beijing. Less than a month later, another doctor in Beijing hospital was stabbed
12
13
14 71 and severe injured. These 2 cases once again drew great attention to the safety of
15
16
17 72 healthcare professionals in Chinese society.
18

19 73 Workplace violence (WPV) towards healthcare professionals is an extremely
20
21
22 74 serious problem in China lasted for a long time. From 2000 to 2015, there were
23
24
25 75 less than 290 severe WPV towards healthcare workers reported by media¹. The
26
27 76 seriousness of WPV towards healthcare professionals in China leads to great
28
29
30 77 attention from researchers. Most of researches that studied WPV prevalence of
31
32
33 78 China were conducted in the area that Han people (the main ethnic group in China)
34
35 79 mainly lives in ,and the reported rates of physical and psychological violence are
36
37
38 80 6.4%–35.4% and 54.4%–79.8%, respectively²⁻⁷. However, few WPV studies
39
40
41 81 conducted in multi-ethnicity area of China. According to the latest national census
42
43 82 in 2010, ethnic minorities account for 8.49% of the total population in China. In
44
45
46 83 multi-ethnicity area, the proportion and ethnic diversity of both ethnic minority
47
48 84 patients and healthcare professionals is higher. In addition, research has revealed
49
50
51 85 that due to the relatively lower level of education in general, ethnic minorities may
52
53
54 86 suffered work discrimination to some extent⁸. However, since healthcare
55
56
57 87 profession requires high level of skill and education, it's still unknow whether this
58
59
60 88 discrimination exists in healthcare workplace or not. It's essential to provide more

1
2
3
4 89 information of WPV in multi-ethnicity area thus conduct specific interventions.
5

6
7 90 Also, limited studies from other counties and regions focus on WPV towards
8
9 91 healthcare professionals in multi-ethnicity areas.
10

11 92 Although many studies have investigated the influence factor of WPV towards
12
13 93 healthcare professionals, an essential factor has been neglected. In China, the
14
15 94 medical system requires healthcare workers to be on 24 hours standby and to be
16
17 95 able to connect with for on-call work beyond the general worktime. Due to the
18
19 96 work regulation, healthcare professionals in charge are responsible for their
20
21 97 patients at any time, even when they have already got off work or have a rest. In
22
23 98 addition, healthcare workers who are on duty would ask their superior or
24
25 99 healthcare professionals in charge of patients for help when meet severe
26
27 100 situations. These make it common that physicians who are at rest must go back
28
29 101 work if needed, which often happens in late night. However, limited study has
30
31 102 taken this factor into consideration.
32
33
34
35
36
37
38
39

40 103 Due to the research purpose and background, most previous WPV studies were
41
42 104 conducted in several hospitals, which has several advantages. Firstly, more
43
44 105 samples could be collected to make a more reliable conclusion. In addition, the
45
46 106 results could reflect common problems in a certain context. However, at the same
47
48 107 time, it would neglect some specific factors or characteristics. The investigation
49
50 108 conducted in a typical and representative hospital is conducive to examine the
51
52 109 relation between specific factors or information and WPV, which could also be an
53
54 110 effective reference of practical work for hospitals with similar features. As for
55
56
57
58
59
60

1
2
3
4 111 multi-ethnicity area, the study conducted in several hospitals may cover up the
5
6 112 features of ethnic minorities due to the difference proportion of ethnic groups in
7
8
9 113 each hospital. Therefore, it's necessary to choose a hospital that is both
10
11
12 114 representative for the region and with the proper proportion of ethnic groups.

13
14 115 Most previous WPV studies have only investigate a part of WPV, such as
15
16
17 116 prevalence, influencing factors, or interventions. In this study, we aim to
18
19
20 117 investigate the WPV in a general hospital of multi-ethnicity area, including the
21
22 118 prevalence, influencing factors, response to WPV and evaluation of WPV
23
24
25 119 intervention, which could not only interpret WPV from a broader perspective, but
26
27 120 also provide more reference for practice.

30 121 **2.Methods**

32 122 *2.1 Study population*

34
35 123 Yunnan, located in southwestern border of China, has the greatest diversity of
36
37
38 124 ethnic minorities in southwestern China, containing 52 of 56 ethnic groups (51
39
40 125 ethnic minority groups and Han). In 2017, 33.6% residents in Yunnan were ethnic
41
42
43 126 minority groups.

44
45 127 We conducted a retrospective survey in a Grade III Class A hospital in Kunming,
46
47
48 128 the capital of Yunnan Province. The hospital was founded in 1939 and is the first
49
50
51 129 Grade III Class A hospital in Yunnan Province. It is one of the most capable general
52
53 130 hospitals in Yunnan, containing 2,400 open beds and over 2 million annual total
54
55
56 131 visits. Around 18.6% the hospital employees were ethnic minorities at the time of
57
58
59 132 the study. As a medical center in the province, it has wide radiation range, and
60

1
2
3
4 133 patients from all over the province come to the hospital ask for medical treatment.
5

6
7 134 *2.2 Questionnaire*
8

9 135 A questionnaire developed jointly by the International Labour Office (ILO),
10
11 136 International Council of Nurses (ICN), World Health Organization (WHO), and
12
13
14 137 Public Services International (PSI) in 2003 was used to measure hospital WPV⁹.
15
16
17 138 First, we asked for permission to use the questionnaire from the ILO and WHO.
18
19 139 Then, we translated it into Mandarin Chinese and back translated it into English
20
21
22 140 to verify the accuracy of the Mandarin version. After this translation processed, 17
23
24
25 141 experts in the field of healthcare were invited to assess the effectiveness of the
26
27 142 measurement tools, including the applicability of culture and the appropriateness
28
29
30 143 of language. We selected 79 medical staff to form a group and conducted a two-
31
32
33 144 week test-retest reliability test (0.83).
34

35 145 The questionnaire included the following sections: (1) demographics (e.g.,
36
37 146 gender, age, education, ethnicity, occupation) and work status (e.g., shift work,
38
39
40 147 overtime duty call work, participation in anti-violence training, anxiety regarding
41
42
43 148 WPV); (2) experience of physical violence in the past 12 months (i.e., intentional
44
45
46 149 behavior that harms healthcare workers physically); (3) experience of
47
48 150 psychological violence in the past 12 months (i.e., verbal abuse, threatening events,
49
50
51 151 and sexual harassment); (4) healthcare professionals' response to physical
52
53
54 152 violence and psychological violence; (5) the expected measures (e.g. leaflets, video,
55
56 153 lecture) and content of anti-violence training (e.g. WPV cognition, self-defense; (6)
57
58 154 the evaluation of usefulness of WPV interventions.
59
60

155 *2.3 Sample and data collection*

156 First, we obtained permission from the hospital management office and human
157 resources department to collect employee's information in the whole hospital.
158 Then, the person who is in charge of each unit issued a questionnaire to the staff
159 and informed them of the instructions and precautions. The study subjects
160 included doctors, nurses, medical technicians, etc. and was conducted on the basis
161 of voluntary and anonymous.

162 Because the respondents were asked to provide their experience of WPV in the
163 previous 12 months, we excluded employees who met any of the following criteria:
164 (1) less than 1 year of work experience in this hospital; (2) short-term
165 secondment or training (less than 12 months); (3) personnel who did not come to
166 work during the study period due to traveling, training, vacation, etc.

167 The questionnaire had to be completed by employees themselves and could not
168 be answered by any other person. The time of data collection ranged from July to
169 October 2017. A total of 2,036 valid questionnaires were collected, and the
170 effective response rate was 83.79%.

171 *2.4 Data analysis*

172 Descriptive statistics were used to summarize the demographic characteristics,
173 prevalence of physical and psychological violence and the response to WPV
174 between Han and ethnic minority participants. Chi-square test and Fisher's exact
175 was to compare the difference of response to WPV between Han and ethnic
176 minority healthcare workers.

1
2
3
4 177 Since the bias in the number between Han and ethnic minority participants,
5
6
7 178 propensity score matching (PSM) was used to match the group of ethnic minority
8
9
10 179 healthcare professionals (treatment group) to the group of Han healthcare
11
12 180 professionals (control group) in a 1:2 manner to create two groups with similar
13
14 181 demographic characteristics. The propensity score model used the ethnicity as a
15
16
17 182 dependent variable, age, gender, marriage status, educational background and
18
19
20 183 years of work experience as explanatory variables. After matching, a set of 960
21
22 184 cases was created, with 325 ethnic minority and 635 Han healthcare professionals.
23
24
25 185 The matched set was used to identify the factors associated with WPV in hospitals
26
27 186 using logistics regression. Since the fact that the proportion of male and female
28
29
30 187 was almost 1:3, we have also conducted logistics regression stratified by gender.

31
32 188 The data were entered using Epidata 3.1 and analyzed using IBM SPSS Statistics
33
34
35 189 22.0. The significance level was set at 0.05.

36 37 38 190 *2.5 Ethic approval*

39
40 191 This study was reviewed and approved by the Research Ethics Committee of
41
42
43 192 Harbin Medical University and the investigation hospital (Project Identification
44
45
46 193 Code: HMUIRB20160014). All the respondents were provided with informed
47
48 194 consent, which described the purpose and method of data collection and kept the
49
50
51 195 data confidential.

52 53 196 *2.6 Patient and public involvement*

54
55
56 197 No patient involved.

57 58 198 **3. Results**

199 *3.1 Demographic characteristics*

200 Table 1 shows the demographic details of the 509 men and 1,527 women who
 201 participated in the study. Around 84% of respondents were of “Han ethnicity”,
 202 while 16% were ethnic minorities. A majority of respondents were nurses (42.7%)
 203 and physicians (31.5%), 12.5% were medical technology workers, the rest (11.6%)
 204 held other positions. Most of the respondents (70.2%) worked in rotational shifts,
 205 and 74.2% engaged in overtime work (from 6 pm to 7 am the next day), such as
 206 overtime or emergency consultation. Over half reported high or extremely high
 207 levels of anxiety regarding WPV (58.9%) and participated in anti-violence training
 208 (67.5%). As for the prevalence of WPV, 43.7% of the respondents reported that
 209 they have experienced psychological violence, while 5.4% reported physical
 210 violence.

211 **Table1. Demographic information and the prevalence of workplace violence**

	N	%
Gender		
Male	509	25.0%
Female	1527	75.0%
Age		
≤30	940	46.2%
31–45	789	38.8%
≥46	207	15.1%
Marital status		

Single	603	29.6%
Married	1389	68.2%
Divorced/widowed	44	2.2%
Education background		
College graduates	448	22.0%
Bachelor	1207	59.3%
Master's and above	381	18.7%
Ethnicity		
Han	1711	84.0%
Minority	325	16.0%
Years of work experience		
1-5	570	28.0%
6-10	548	26.9%
11-20	413	20.3%
>20	505	24.8%
Profession		
Physician	624	31.5%
Nurse	869	42.7%
Medical technology	255	12.5%
Others	236	11.6%
Work in shift		

1			
2			
3			
4	Yes	1429	70.2
5			
6	No	607	29.8
7			
8			
9	Overtime duty call work		
10			
11	(6 pm-7am)		
12			
13			
14	Yes	1510	74.2%
15			
16	No	526	25.8%
17			
18			
19	Anxiety level		
20			
21			
22	Never	103	5.1%
23			
24	Low	219	10.8%
25			
26	Moderate	513	25.2%
27			
28	High	360	17.7%
29			
30	Extremely high	841	41.2%
31			
32			
33			
34			
35	Anti-violence training		
36			
37	Yes	1374	67.5%
38			
39	No	662	32.5%
40			
41			
42			
43	Physical violence		
44			
45	Yes	110	5.4%
46			
47	No	1926	94.5%
48			
49			
50			
51	Psychological violence		
52			
53	Yes	889	43.7%
54			
55	No	1147	56.3%
56			
57			

212 *3.2 Influencing factors*

1
2
3
4 213 Table 2 shows the results of the logistic regression analysis of physical and
5
6
7 214 psychological violence using the matched set (unstratified and stratified by
8
9 215 gender), including P-values, odds ratios (OR) and 95% confidence intervals
10
11 216 (95%CI). The unstratified results showed that female respondents had lower odds
12
13
14 217 of experiencing physical violence than male did (OR = 0.287; $P = 0.000$).
15
16
17 218 Respondents with anxiety level towards WPV had higher odds of physical violence
18
19 219 (OR = 1.875; $P = 0.000$). After stratified by gender, the results showed that the
20
21
22 220 educational background of masters and above(OR=7.485 $P = 0.026$), ethnic
23
24 221 minority(OR=3.312 $P = 0.030$), anxiety level towards WPV(OR=2.456 $P = 0.003$)
25
26
27 222 were the risk factors of physical violence for males, while only anxiety level
28
29
30 223 towards WPV(OR=1.838 $P = 0.008$) was the risk factor of physical violence for
31
32
33 224 females.

34
35 225 As for psychological violence, minority medical workers had higher odds of
36
37 226 experiencing it than did workers of Han ethnicity (OR = 1.542; $P = 0.003$).
38
39
40 227 Engaging in overtime work from 6 pm to 7 am the following day was also a risk
41
42
43 228 factor of psychological violence (OR = 1.403; $P = 0.036$). Anxiety level about
44
45
46 229 WPV was also negatively associated with psychological violence (OR=1.543; $P =$
47
48 230 0.000). When stratified by gender, females who are ethnic minorities
49
50
51 231 (OR=1.711; $P = 0.001$)were more likely to suffer psychological violence, while
52
53
54 232 anti-violence training (OR=0.713; $P = 0.042$) was the positively associated with
55
56 233 psychological violence; both males (OR=1.483; $P = 0.003$)and females
57
58 234 (OR=1.508; $P = 0.000$) with higher anxiety level towards WPV suffered more
59
60

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

235 psychological violence.

For peer review only

236

Table 2. Results of logistic regression of physical and psychological violence

Variable	Physical Violence									Psychological Violence									
	Unstratified			Stratified						Unstratified			Stratified						
				Male			Female						Male			Female			
	OR	95% CI	P	OR	95% CI	P	OR	95% CI	P	OR	95% CI	P	OR	95% CI	P	OR	95% CI	P	
Gender																			
Male	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Female	0.287	0.151-0.546	0.000	-	-	-	-	-	-	0.998	0.711-1.400	0.990	-	-	-	-	-	-	-
Age (years)																			
≤30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31-45	1.263	0.265-6.013	0.770	3.250	0.066-160.962	0.554	0.761	0.091-6.359	0.801	1.107	0.551-2.227	0.775	0.772	0.190-3.141	0.718	1.455	0.636-3.332	0.374	
≥46	1.436	0.430-4.801	0.557	0.515	0.014-19.395	0.720	2.406	0.451-12.843	0.304	0.803	0.455-1.418	0.450	0.492	0.160-1.506	0.214	1.099	0.554-2.182	0.787	
Marital status																			
Single	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Married	0.466	0.078-2.771	0.401	0.099	0.005-1.861	0.122	0.965	0.085-10.921	0.977	0.850	0.296-2.442	0.762	0.572	0.052-6.347	0.649	0.851	0.260-2.779	0.789	
Divorced/widowed	0.463	0.089-2.408	0.360	0.320	0.021-4.836	0.411	0.573	0.061-5.416	0.627	0.949	0.344-2.618	0.920	0.776	0.075-7.991	0.831	0.883	0.284-2.749	0.883	
Educational background																			
College graduates	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bachelors	0.981	0.349-2.751	0.970	0.921	0.098-8.696	0.943	0.690	0.208-2.281	0.542	0.923	0.580-1.469	0.735	1.184	0.496-2.826	0.704	0.884	0.503-1.554	0.668	
Masters and above	1.358	0.546-3.378	0.510	7.485	1.272-44.041	0.026	0.451	0.147-1.381	0.163	1.202	0.792-1.825	0.387	1.156	0.546-2.448	0.705	1.234	0.738-2.065	0.423	
Ethnicity																			

1																			
2																			
3																			
4																			
5																			
6	Han	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7																			
8	Minority	1.574	0.863-2.869	0.139	3.312	1.121-9.788	0.030	1.182	0.531-2.632	0.683	1.542	1.161-2.048	0.003	1.069	0.563-2.033	0.838	1.711	1.240-2.362	0.001
9																			
10																			
11	Years of work experience																		
12																			
13	1-5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14																			
15																			
16	6-10	0.818	0.202-3.309	0.778	1.003	0.020-51.346	0.999	0.989	0.175-5.591	0.990	0.537	0.282-1.023	0.059	0.595	0.158-2.237	0.442	0.510	0.241-1.083	0.080
17																			
18																			
19	11-20	0.498	0.138-1.805	0.289	0.769	0.017-35.107	0.893	0.513	0.104-2.531	0.412	0.718	0.402-1.284	0.265	0.618	0.188-2.029	0.428	0.716	0.361-1.421	0.339
20																			
21	>20	0.799	0.271-2.361	0.685	1.368	0.035-53.891	0.867	0.846	0.252-2.840	0.786	1.336	0.800-2.231	0.268	1.438	0.460-4.496	0.533	1.236	0.689-2.219	0.477
22																			
23																			
24	Work in shift																		
25																			
26	Yes	1.162	0.575-2.350	0.676	0.869	0.257-2.944	0.822	1.506	0.589-3.853	0.393	1.171	0.851-1.610	0.333	1.283	0.653-2.520	0.469	1.124	0.777-1.625	0.535
27																			
28																			
29	No	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30																			
31																			
32	Overtime duty call work																		
33																			
34	(6pm-7am)																		
35																			
36																			
37	Yes	0.875	0.430-1.781	0.713	1.343	0.308-5.856	0.695	0.734	0.31301.724	0.478	1.403	1.022-1.925	0.036	1.263	0.573-2.782	0.562	1.412	0.997-2.000	0.052
38																			
39																			
40	No	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
41																			
42	Anxiety level	1.875	1.339-2.624	0.000	2.456	1.348-4.475	0.003	1.838	1.172-2.884	0.008	1.500	1.326-1.697	0.000	1.483	1.144-1.921	0.003	1.508	1.307-1.739	0.000
43																			
44																			
45	Anti-violence training																		
46																			
47	Yes	1.253	0.647-2.426	0.504	3.288	0.867-12.473	0.080	0.886	0.388-2.022	0.773	0.790	0.592-1.055	0.111	1.090	0.561-2.115	0.800	0.713	0.514-0.989	0.042
48																			
49																			
50	No	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
51																			

237 OR: odds ratio; CI: Confidence interval.

238 *3.3 Participants' response to WPV*

239 Table 3 shows the different response to psychological/physical violence
 240 between Han and ethnic minority healthcare professionals. More Han healthcare
 241 professionals ordered perpetrators to stop and reported to superiors than ethnic
 242 minorities when psychological violence happened, and the difference shows
 243 statistical significance ($p < 0.05$). As for the physical violence, compared to ethnic
 244 minority, more Han healthcare professionals chose to respond in all ways except
 245 pretending nothing happened. However, none of the difference is statistically
 246 significant.

247 **Table 3. Response to psychological and physical violence**

	Psychological violence				Physical Violence			
	Han(N=727)		Ethnic minority(N=162)		Han(N=88)		Ethnic minority(N=22)	
	n	%	n	%	n	%	n	%
Pretend nothing happened	216	29.71	49	30.25	6	6.82	4	18.18
Order to stop*	324	44.57	55	33.95	27	30.68	3	13.64
Talk to families or friends	474	65.20	114	70.37	21	23.86	4	18.18
Psychological counseling	70	9.63	23	14.20	9	10.23	2	9.09
Talk to colleague	631	86.80	131	80.86	33	37.50	6	27.27
Change department	47	6.46	13	8.02	4	4.55	0	0.00
Report to superiors*	469	64.51	82	50.62	31	35.23	6	27.27
Charge perpetrators	28	3.85	4	2.47	5	5.68	0	0.00

248 *: Statistically significant in psychological violence

249 *3.4 Anti-violence training measures and content*

250 Table 4 has shown the anti-violence training measures and content expected by
 251 healthcare professionals. Lecture is the most expected measures of training both
 252 by Han (54.13%) and ethnic minority (52.62%). Pre-job training is expected by
 253 half of ethnic minority healthcare professionals, which is slightly higher than that
 254 proportion in Han (43.89%). Wall newspaper and poster is the least popular
 255 measure both by Hans and ethnic minorities. As for the training content, more
 256 than 70% Han and ethnic minority participants expects identification of WPV
 257 signs and escaping training. Compared to Han, ethnic minority healthcare
 258 professionals are more interested in force skills and self-defense, and these
 259 differences show statistical significance($p<0.05$).

260 **Table 4. Expected measures and contents of anti-violence training**

	Han		Ethnic minority	
	n	%	n	%
Expected training measures				
Leaflets	680	39.74%	125	38.46%
Video	759	44.36%	145	44.62%
Lectures	926	54.12%	171	52.62%
Wall newspaper, poster	435	25.42%	77	23.69%
Employee handbooks	507	29.63%	93	28.62%
Pre-job training	751	43.89%	163	50.15%

Expected training content

WPV cognition	891	52.07%	177	54.46%
Identification of WPV signs	1242	72.59%	234	72.00%
Language skills	1162	67.91%	232	71.38%
Force skills*	815	47.63%	182	56.00%
Relevant laws and regulations	1113	65.05%	223	68.62%
Escaping training	1235	72.18%	245	75.38%
Self-defense*	1227	71.71%	257	79.08%

261

262 *3.5 Evaluation of the usefulness of WPV interventions*

263 As for the evaluation of interventions, there is no significant difference between
 264 Han and ethnic minority healthcare professionals. Participants hold that security
 265 measures are the most useful ways to prevent WPV. The following are improving
 266 the environment and anti-violence training. More than 40% consider patient
 267 examination and changing the time of shift as useless measures. There are few
 268 differences when stratified by ethnicity. More Han healthcare workers look down
 269 on the usefulness of protective equipment, while ethnic minority participants
 270 undervalue patient examination and anti-violence training. However, none of this
 271 difference between Han and ethnic minority is statistically significant. (Table 5)

272

Table 5. Evaluation of the usefulness of WPV interventions

	All participants		Han		Ethnic minority	
	n	%	n	%	n	%
Improve the environment (e.g. enhance lighting)						
Very useful	715	35.12	611	35.71	104	32.00
Somewhat useful	945	46.41	784	45.82	161	49.54
Useless	376	18.47	316	18.47	60	18.46
Restrict non-staff access						
Very useful	591	29.03	513	29.98	78	24.00
Somewhat useful	778	38.21	638	37.29	140	43.08
Useless	667	32.76	560	32.73	107	32.92
Patient examination (e.g. history of committing violence)						
Very useful	498	24.46	429	25.07	69	21.23
Somewhat useful	698	34.28	586	34.25	112	34.46
Useless	840	41.26	696	40.68	144	44.31
Increase manpower						
Very useful	667	32.76	571	33.37	96	29.54
Somewhat useful	796	39.10	663	38.75	133	40.92
Useless	573	28.14	477	27.88	96	29.54
Protective equipment						
Very useful	610	29.96	522	30.51	88	27.08
Somewhat useful	738	36.25	625	36.53	113	34.77

Useless	688	33.79	564	32.96	124	38.15
Change the time of shift						
Very useful	470	23.08	411	24.02	59	18.15
Somewhat useful	699	34.33	578	33.78	121	37.23
Useless	867	42.58	722	42.20	145	44.62
Avoid working alone						
Very useful	659	32.37	568	33.20	91	28.00
Somewhat useful	636	31.24	526	30.74	110	33.85
Useless	741	36.39	617	36.06	124	38.15
Anti-violence training						
Very useful	785	38.56	675	39.45	110	33.85
Somewhat useful	800	39.29	672	39.28	128	39.38
Useless	449	22.05	362	21.16	87	26.77
Security measures						
Very useful	899	44.16	762	44.54	137	42.15
Somewhat useful	932	45.78	779	45.53	153	47.08
Useless	205	10.07	170	9.94	35	10.77

273

274 **4.Discussion**

275 This study examined the prevalence, influence factors, and response of WPV in a
 276 hospital where located in multi- ethnicity area of China. The percentage of medical
 277 workers of minority ethnicity was substantially higher than what has been

1
2
3
4 278 reported in studies conducted in eastern and central China (2.41–7.95%)¹⁰⁻¹². The
5
6
7 279 result shows that the prevalence of physical and psychological violence in our
8
9 280 study are lower than what has been found in areas Han people mainly lives in ²⁻⁷
10
11 281 ^{13 14}. The results of logistics regression indicated that ethnic minority healthcare
12
13
14 282 professionals maybe more likely to suffer psychological violence. After stratified
15
16
17 283 by gender, males who are ethnic minorities were more likely to suffer physical
18
19 284 violence, while females psychological violence. This discrepancy may be due to the
20
21
22 285 proportion of males and females. Some studies from other countries or regions
23
24
25 286 showed that ethnic minority healthcare workers were less likely to experience
26
27 287 WPV when comparing to the majority (Whites)^{15 16}, while some studies held the
28
29
30 288 opposite conclusion that ethnic minority healthcare professionals were more
31
32
33 289 vulnerable in suffering workplace bullying, verbal abuse, physical violence, etc. ¹⁷⁻
34
35 290 ²¹ However, due to the huge difference of investigation background and
36
37
38 291 participants' characteristics, these studies couldn't be compared with our study.
39
40 292 We speculate several reasons for this result. First, study shows that there is
41
42
43 293 behavioural difference between Han and ethnic minority, culture and religious
44
45 294 beliefs may be a key factor to explaining ²². Second, our study shows that when
46
47
48 295 facing WPV, compared with Han, ethnic minority healthcare professionals may be
49
50
51 296 more likely to tolerate, which may lead to more violence. Third, the language from
52
53 297 difference linguistic culture may hamper the doctor-patient communication, thus
54
55
56 298 lead to violence²³.

57
58 299 Respondents who engaged in overtime duty call work from 6 pm to 7 am had
59
60

1
2
3
4 300 greater odds of experiencing psychological violence. This is a new finding in our
5
6 301 study, which has been ignored in most research in China. We speculate several
7
8
9 302 reasons for this finding. First, our definition of overtime work might have captured
10
11 303 individuals handling urgent issues. The staff working therein are more likely to
12
13
14 304 experience higher levels of frustration, distress, cognitive impairment or arousal²⁴
15
16
17 305 ²⁵, which is similar with the WPV high-risk department — emergency department.
18
19 306 Second, healthcare professionals would face more aggressive situations such as
20
21
22 307 drunk patients or companions and traumatic patients caused by fighting. Third,
23
24
25 308 since the on-call work is not during the general working time, there are less
26
27
28 309 colleagues and guards. We suggest that more effective measures should be
29
30
31 310 adopted to protect healthcare professionals who engage duty call beyond general
32
33
34 311 working time. Future study should investigate this phenomenon in Han mainly
35
36
37 312 living area.

38 313 The result of logistics regression shows that males have higher odds of
39
40
41 314 experiencing physical violence, which is similar to the WPV studies conducted in
42
43
44 315 the areas that Han mainly lives in^{6 14 26}. In other countries, some studies came to
45
46
47 316 the same thing²⁷⁻³⁰, while some studies have reported that women are more
48
49
50 317 vulnerable to physical violence³¹. This discrepancy can be attributed to the
51
52
53 318 different study backgrounds³². In many countries, beliefs, ethics, or moral
54
55
56 319 principles serve as guidance for public behavior. For instance, in some Arab
57
58
59 320 countries, being a male is a risk factor of experiencing WPV partly because of
60
321 321 cultural norms that reject disrespect of females³⁰. Consistent with other

1
2
3
4 322 researches^{6 14} conducted in the areas that Han mainly lives in , our study shows
5
6 323 that higher anxiety levels regarding WPV increased the odds of experiencing WPV
7
8
9 324 in multi-ethnicity area, which may because WPV can lead to adaptive behavior that
10
11 325 might create opportunities for the violence reoccurred³³.

12
13
14 326 Compared to Han, more ethnic minority healthcare professionals pretend
15
16 327 nothing happened after suffering physical violence. Also, they may less likely to
17
18 328 talk with surroundings about these events, or to report to their leaders, or to use
19
20 329 legal methods. The reason why we think there is no statistical significance in this
21
22 330 result is the number of cases physical violence happened. Despite this, we
23
24 331 speculate that this may due to the cultural belief of ethnic minority makes them
25
26 332 silent. Study has proved that talking with surroundings about their WPV is helpful
27
28 333 to release their tension or anxiety gain from WPV³⁴. Since the anxiety towards
29
30 334 WPV is a risk factor to WPV, more social support from individual level, such as
31
32 335 friends, families, and colleagues, should be provided to help ethnic minority
33
34 336 healthcare professionals managing violence through diverse methods instead of
35
36 337 tolerating by themselves. Study has shown that in the environment that encourage
37
38 338 to report WPV, more incidents of WPV were reported and healthcare workers
39
40 339 gained better awareness of risk for violence, as well as how to avoid potential
41
42 340 danger, and how to manage aggressive customers³⁵. An adequate WPV reporting
43
44 341 system should be established to encourage ethnic minority healthcare
45
46 342 professionals to report their WPV experience.

47
48
49 343 It seems that both Han and ethnic minority healthcare professionals are less
50
51
52
53
54
55
56
57
58
59
60

1
2
3
4 344 interested in the textual anti-violence training measures (leaflets, poster, wall
5
6
7 345 newspaper, employee handbook). Although printed materials could summarize
8
9 346 content and be learned repeatedly, the lack of practice details makes it less
10
11 347 effective³⁶. Video holds the advantages such as attractiveness, convenience, clarity
12
13
14 348 of demonstration, superior cost-effectiveness and easy to apply, while lectures
15
16
17 349 contain variety of lively styles such as group interaction and scenario simulation,
18
19
20 350 which makes them more popular^{37 38}. Future study should compare the effect of
21
22 351 these measures. Pre-job training is more needed by ethnic minority healthcare
23
24 352 workers, which maybe that it could help them to adapt to work environment
25
26
27 353 better and faster. As for the training content, ethnic minority healthcare
28
29
30 354 professionals are more interested in tough measures. Since ethnic minorities are
31
32 355 more likely to suffer psychological violence, they may perceive more threat thus
33
34
35 356 give rise to the tendency of handle violence by force^{39 40}.

37
38 357 Our finding indicated that there is no much difference in evaluation of
39
40 358 usefulness of WPV intervention between Han and ethnic minority. Security
41
42
43 359 measure is regarded as the most useful intervention of WPV. China has enacted
44
45
46 360 ‘Guidance on strengthening the security and protection system construction in
47
48 361 hospitals’ in 2013 and ‘Opinions on strictly punishing medical related crimes and
49
50
51 362 maintaining the medical order’ in 2017 to strengthen security of hospital.
52
53
54 363 However, since these policies served as instructions rather than mandatory
55
56 364 regulations, insufficient resource has constrained the implementation in all
57
58
59 365 hospitals. Security measures are not only an intervention that could prevent
60

1
2
3
4 366 healthcare professionals from WPV, but also may enhance the sense of safety as a
5
6
7 367 kind of organizational support. Hospitals should implement specific scale of
8
9
10 368 security measures according to actual situation. Most participants consider anti-
11
12 369 violence training as useful. Although it could increase the knowledge and boost
13
14 370 confidence, the effect could not reduce of WPV incidents for long-term⁴¹. We
15
16
17 371 suggest that it's essential to make a complete and periodic curriculum for
18
19 372 repetitive training. Improving environment, such as enhancing lighting and install
20
21
22 373 cameras, is be considered as useful measure. Previous study has shown that
23
24
25 374 working in a daring environment at night is a risk factor of WPV⁴². Camera
26
27 375 installation is required by Occupational Safety and Health Administration
28
29
30 376 (OSHA)⁴³, which may be a deterrence for committing violence. Using protective
31
32
33 377 equipment is not a popular intervention. In the period of frequent WPV in China,
34
35
36 378 there are indeed some healthcare workers wearing helmet at work⁴⁴. However,
37
38 379 this may lead to a more tense doctor-patient relationship. Participants don't trust
39
40
41 380 patient examination and restriction non-staff access much. Due to big hospital
42
43
44 381 scale and treatment number, there would be numerous patients admitted to
45
46
47 382 hospital. The process of patient examination and restriction of non-staff access
48
49
50 383 would not be serious enough, otherwise the crowded queue and longer waiting
51
52
53 384 time may breed new contradictions. In addition, since there is no system or
54
55
56 385 platform share the patient information between each hospital, it is difficult to
57
58
59 386 verify WPV history strictly. Although previous studies have shown that work shift
60
387 is negatively associated with WPV^{14 28 30}, changing the time of shift are treated as

1
2
3
4 388 less useful. It may be better to enhance the protection during shift rather than
5
6
7 389 changing the regulation.

8 9 390 **5. Limitations**

10
11 391 This study has a few limitations. First, since the respondents were asked to
12
13
14 392 report WPV that had taken place in the past 12 months, violence might not be
15
16
17 393 adequately reported due to recall bias or reporting bias resulting from shame and
18
19
20 394 stigma. Second, the study exploratively examined the WPV in multi-ethnicity area
21
22
23 395 are but did not conduct in-depth research on the underlying cause by cultural
24
25 396 factors. Future, research should investigate the perpetrators or patients,
26
27 397 especially explore WPV by qualitative methods.

28 29 30 398 **6. Conclusion**

31
32 399 Our study investigated WPV in a hospital located in multi-ethnicity area. The
33
34
35 400 WPV prevalence reported in our study is lower than that in the areas that Han
36
37
38 401 mainly lives in. Ethnic minority healthcare professionals may be more likely to
39
40
41 402 suffer WPV and they have differences in response to WPV compared to Han.
42
43 403 Additionally, we broke through the single focus of existing WPV research and
44
45 404 explored WPV from a more comprehensive perspective including prevalence,
46
47
48 405 influencing factors, response to WPV, expected anti-violence training measures
49
50
51 406 and contents, and evaluation of interventions, which may provide a practical
52
53 407 reference to hospitals with similar characteristics. More WPV research should be
54
55
56 408 conducted in multi-ethnicity areas from the perspective of perpetrator or patients,
57
58
59 409 especially by qualitative methods.
60

1
2
3
4 410 **Contributors** : Mingli Jiao, Jingfu Mao and Qunhong Wu contributed to the
5
6 411 conception and design of the study. Haonan Jia, Huiying Fang, Yameng Wang,
7
8
9 412 Kexin Jiang, Yuanheng Li, Ying, Wang, Lifen Wei, and Gangyu Zhang contributed to
10
11 413 the data collection. Omar Yacouba Ismael, Haonan Jia and Xiaowen Jia contributed
12
13
14 414 to literature search and data quality control. Huiying Fang and Haonan Jia, Ruohui
15
16
17 415 Chen did the statistical analysis and drafted the original manuscript. Mingli Jiao
18
19 416 revised the manuscript for important intellectual content. Ruohui Chen, Kexin
20
21
22 417 Jiang and Jingqun Li prepared the manuscript and supplementary material. All
23
24
25 418 authors contributed to data interpretation and rewriting the paper.
26
27 419 Haonan Jia, Huiying Fang, Ruohui Chen contributed equally to this work. Mingli
28
29
30 420 Jiao and Jingfu Mao are corresponding author.

31 32 33 421 34 35 422 **Funding**

36
37 423 This study was funded by the Natural Science Foundation of China (Grant
38
39
40 424 No.71273002, 71473064); New Century Excellent Talents of University from the
41
42
43 425 Ministry of Education, China (Grant No.1252-NCET02); the China Postdoctoral
44
45
46 426 Science Foundation (Grant No.2015M570211, 2016T90181); the Heilongjiang
47
48
49 427 Provincial Association of Social Sciences (Grant No.15058), and the Collaborative
50
51
52 428 Innovation Centre of Social Risks Governance in Health; Think Tank of Public
53
54
55 429 Health Security and Health Reform of Heilongjiang Province.

56 430 **Consent for publication:** Not applicable.

57
58
59 431 **Competing interests:** The authors declare that they have no competing interests.
60

1
2
3
4 432 **Acknowledgements:** We thank the management office and all the participants for
5
6 433 data collection.
7
8

9 434 **Data sharing statement:** Data are available from the corresponding author and
10
11 435 investigation hospital upon reasonable request.
12
13

14 436 **Reference**

- 15
16
17 437 1. Zhao M, Jiang K, Yang L, et al. The Big Data Research on Violence against Doctors:
18
19 438 Based on the Media Report from 2000 to 2015 *Medicine & Philosophy*
20
21 439 2017;38(01):89-93.
22
23
24 440 2. Liqun Y, Shoufang J, Xiaoxia T, et al. Analysis of prevalence of workplace violence
25
26 441 in staff of two hospitals in Tangshan. *Modern Preventive Medicine*
27
28 442 2006;33(2):147-52.
29
30
31 443 3. Jing G, Pei H, Xiaoli Z, et al. The investigation on coping capacity of nursing staff
32
33 444 to medical workplace violence. *Chinese Nursing Management*
34
35 445 2015;15(6):688-91.
36
37
38 446 4. Lin H, Yan J, Jian W, et al. A survey on effect of workplace violence in hospital on
39
40 447 work-related stress of medical staffs. *Chongqing Medicine*
41
42 448 2012;41(06):590-92.
43
44
45 449 5. Chen ZH, Wang SY, Jing CX, et al. Prevalence of workplace violence in staff of two
46
47 450 hospitals in Guangzhou. *Chinese Journal of Preventive Medicine*
48
49 451 2003;37(5):358.
50
51
52 452 6. Liu H, Zhao S, Jiao M, et al. Extent, nature, and risk factors of workplace violence
53
54 453 in public tertiary hospitals in China: a cross-sectional survey. *International*
55
56
57
58
59
60

- 1
2
3
4 454 Journal of Environmental Research and Public Health 2015;12(6):6801-17.
5
6
7 455 7. Zhao S, Liu H, Ma H, et al. Coping with Workplace Violence in Healthcare Settings:
8
9 456 Social Support and Strategies. International journal of environmental
10
11 457 research and public health 2015;12:14429-44.
12
13
14 458 8. Su L. A Study on the Occupational Status and Social Attitudes of Ethnic
15
16
17 459 Minorities: Based on the Analysis of 2011 Chinese Social Survey Data.
18
19 460 Ethno-National Studies 2016(02):42-54+124.
20
21
22 461 9. Framework guidelines for addressing workplace violence in the health sector.
23
24 462 Geneva, Switzerland,: ISBN, 2002.
25
26
27 463 10. Liu Y, Deng L, Min Y. Investigation of psychological violence at hospital
28
29 464 workplace in Guangzhou. Chinese Journal of Public Health
30
31 465 2009;25(09):1050-51.
32
33
34 466 11. Qianqian W, Lei X. Investigation of workplace violence and influencing factors
35
36 467 of nurses in Pingyang County General Hospital. Journal of Traditional
37
38 468 Chinese Medicine Management 2016;24(17):18-20.
39
40
41 469 12. Lulu S. The research of prevention of hospital workplace violence based on
42
43 470 game theory – through the analysis of hospital, patient, and media as game
44
45 471 role players. Jilin University, 2014.
46
47
48
49 472 13. Jiao M, Ning N, Li Y, et al. Workplace violence against nurses in Chinese
50
51 473 hospitals: a cross-sectional survey. Bmj Open 2015;5(3):e006719.
52
53
54 474 14. Sun P, Zhang X, Sun Y, et al. Workplace Violence against Health Care Workers
55
56 475 in North Chinese Hospitals: A Cross-Sectional Survey. International Journal
57
58
59
60

- 1
2
3
4 476 of Environmental Research and Public Health 2017;14(1):96.
5
6
7 477 15. Baukje M, Ryan H, Anita LL, et al. Prevalence of abusive encounters in the
8
9 478 workplace of family physicians: a minor, major, or severe problem?
10
11 479 Canadian Family Physician Médecin De Famille Canadien 2010;56(3):e101.
12
13
14 480 16. Campbell JC, Jill Theresa M, Joan K, et al. Workplace violence: prevalence and
15
16
17 481 risk factors in the safe at work study. Journal of Occupational &
18
19 482 Environmental Medicine 2011;53(1):82.
20
21
22 483 17. Lyn Q. Workplace bullying in junior doctors: questionnaire survey. British
23
24 484 Medical Journal 2002;324(7342):878-79.
25
26
27 485 18. Jane B, Geoff P. At breaking point: A survey of the wellbeing and working lives
28
29 486 of nurses in 2005. London, England: Royal College of Nursing, 2006.
30
31
32 487 19. Giga SI, Hoel H, Lewis D. A Review of Black and Minority Ethnic (BME)
33
34 488 Employee Experiences of Workplace Bullying. 2008
35
36
37 489 20. Keshet Y, Popper-Giveon A. Race-based experiences of ethnic minority health
38
39 490 professionals: Arab physicians and nurses in Israeli public healthcare
40
41 491 organizations. Ethnicity & Health 2017;23(4):1-18.
42
43
44 492 21. Dehghan-Chaloshtari S, Ghodousi A. Factors and Characteristics of Workplace
45
46 493 Violence Against Nurses: A Study in Iran. Journal of Interpersonal Violence
47
48 494 2017:088626051668317.
49
50
51
52
53 495 22. Kang C. Cultural differences between Tibetans and ethnic Han Chinese in
54
55 496 ultimatum bargaining experiments. Journal of Political Economy
56
57 497 2009;25(1):78-84.
58
59
60

- 1
2
3
4 498 23. Perloff RM, Bonder B, Ray GB, et al. Doctor-patient communication, cultural
5
6 499 competence, and minority health: Theoretical and empirical perspectives.
7
8
9 500 American Behavioral Scientist 2006;49(6):835-52.
10
11 501 24. Beech B, Leather P. Workplace violence in the health care sector: A review of
12
13
14 502 staff training and integration of training evaluation models. Aggression and
15
16
17 503 Violent Behavior 2006;11(1):27-43.
18
19 504 25. Hahn S, Zeller A, Needham I, et al. Patient and visitor violence in general
20
21
22 505 hospitals: A systematic review of the literature. Aggression and Violent
23
24
25 506 Behavior 2008;13(6):431-41.
26
27 507 26. Siying W, Wei Z, Huangyuan L, et al. Workplace violence and influencing factors
28
29
30 508 among medical professionals in China. American Journal of Industrial
31
32
33 509 Medicine 2012;55(11):1000-08.
34
35 510 27. Algwaiz WM, Alghanim SA. Violence exposure among health care professionals
36
37
38 511 in Saudi public hospitals. A preliminary investigation. Saudi Medical
39
40
41 512 Journal 2012;33(1):76.
42
43 513 28. Carluccio A, Knychala V, Marshall C. Violence against frontline NHS staff.
44
45
46 514 London: NHS Security Management Service, 2010.
47
48 515 29. Flannery RB, Walker AP. Characteristics of four types of patient assaults: six
49
50
51 516 year analysis of the Assaulted Staff Action Program (ASAP). Psychiatric
52
53
54 517 Quarterly 2011;82(1):11-21.
55
56 518 30. Kitaneh M, Hamdan M. Workplace violence against physicians and nurses in
57
58
59 519 Palestinian public hospitals: a cross-sectional study. BMC Health Services
60

- 1
2
3
4 520 Research 2012;12(1):1-9.
5
6
7 521 31. Arimatsu M, Wada K, Yoshikawa T, et al. An epidemiological study of work-
8
9 522 related violence experienced by physicians who graduated from a medical
10
11 523 school in Japan. *Journal of Occupational Health* 2008;50(5):357-61.
12
13
14 524 32. Hills D, Joyce C. A review of research on the prevalence, antecedents,
15
16
17 525 consequences and prevention of workplace aggression in clinical medical
18
19 526 practice. *Aggression and Violent Behavior* 2013;18(5):554-69.
20
21
22 527 33. Whittington R, Wykes T, . . An observational study of associations between
23
24 528 nurse behaviour and violence in psychiatric hospitals. *Journal of*
25
26
27 529 *Psychiatric and Mental Health Nursing* 2010;1(2):85-92.
28
29
30 530 34. Coker AL, Smith PH, Thompson MP, et al. Social support protects against the
31
32 531 negative effects of partner violence on mental health. *Journal of Women's*
33
34
35 532 *Health & Gender-based Medicine* 2002;11(5):465-76.
36
37
38 533 35. Arnetz JE, Arnetz BB. Implementation and evaluation of a practical
39
40 534 intervention programme for dealing with violence towards health care
41
42
43 535 workers. *Journal of Advanced Nursing* 2000;31(3):668-80.
44
45
46 536 36. Ramezaninia J, Naghibi Sistani M, Ahangari Z, et al. Comparison of the effect of
47
48 537 toothbrushing education via video, lecture and pamphlet on the dental
49
50
51 538 plaque index of 12-year-old children. *Children* 2018;5(4):50.
52
53
54 539 37. Li F, Jiang F, Jin X-M, et al. Cost-efficiency assessment of 3 different pediatric
55
56 540 first-aid training models for caregivers and teachers in Shanghai. *Pediatric*
57
58 541 *emergency care* 2011;27(5):357-60.
59
60

- 1
2
3
4 542 38. Lees A, Rock W. A Comparison between Written, Verbal, and Videotape Rral
5
6 543 Hygiene Instruction for Patients with Fixed Appliances. British Journal of
7
8
9 544 Orthodontics 2000;27(4):323-28.
- 10
11 545 39. Meloy JR. Pathologies of attachment, violence, and criminality. Handbook of
12
13
14 546 Psychology 2003:509-26.
- 15
16
17 547 40. Meloy JR. The psychopathic mind: Origins, dynamics, and treatment: Rowman
18
19 548 & Littlefield 1988.
- 20
21
22 549 41. Heckemann B, , Zeller A, , Hahn S, , et al. The effect of aggression management
23
24 550 training programmes for nursing staff and students working in an acute
25
26 551 hospital setting. A narrative review of current literature. Nurse Education
27
28 552 Today 2015;35(1):212-19.
- 29
30
31
32 553 42. Moore PV, Simonowitz JA, Rigdon JE, et al. Workplace violence: prevention
33
34 554 efforts by the occupational health nurse. AAOHN Journal 1997;45(6):305-
35
36 555 18.
- 37
38
39
40 556 43. Guidelines for preventing workplace violence for health care social service
41
42 557 workers. Guidelines for preventing workplace violence for health care
43
44 558 social service workers: Occupational Safety Health Administration 2004.
- 45
46
47
48 559 44. Healthcare workers wear helmets to work for safety: Sina; 2006 [Available
49
50 560 from: [http://news.sina.com.cn/s/p/2006-12-](http://news.sina.com.cn/s/p/2006-12-25/064711876752.shtml)
51
52
53 561 [25/064711876752.shtml](http://news.sina.com.cn/s/p/2006-12-25/064711876752.shtml)2006.
- 54
55
56 562

STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *cross-sectional studies*

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	2
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	2-3
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	3-6
Objectives	3	State specific objectives, including any prespecified hypotheses	6
Methods			
Study design	4	Present key elements of study design early in the paper	6
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	6-8
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants	8
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	7-8
Data sources/ measurement	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	7-9
Bias	9	Describe any efforts to address potential sources of bias	-
Study size	10	Explain how the study size was arrived at	8
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	8-9
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	8-9
		(b) Describe any methods used to examine subgroups and interactions	-
		(c) Explain how missing data were addressed	-
		(d) If applicable, describe analytical methods taking account of sampling strategy	-
		(e) Describe any sensitivity analyses	-
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	8
		(b) Give reasons for non-participation at each stage	8
		(c) Consider use of a flow diagram	-
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	10
		(b) Indicate number of participants with missing data for each variable of interest	-
Outcome data	15*	Report numbers of outcome events or summary measures	10-20
Main results	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	10-20
		(b) Report category boundaries when continuous variables were categorized	10-16
		(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	18	Summarise key results with reference to study objectives	21
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	26-27
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	21-26
Generalisability	21	Discuss the generalisability (external validity) of the study results	27
Other information			
Funding	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	28

*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

Workplace violence against healthcare professionals in multi-ethnicity area: A cross-sectional study in southwest China

Journal:	<i>BMJ Open</i>
Manuscript ID	bmjopen-2020-037464.R1
Article Type:	Original research
Date Submitted by the Author:	05-Jun-2020
Complete List of Authors:	Jia, Haonan; Harbin Medical University, Department of Health Policy and Hospital Management Fang, Huiying; Qingdao Women and Children's Hospital, President's Office Chen, Ruohui; Harbin Medical University, Department of Health Policy and Hospital Management Jiao, Mingli; Harbin Medical University, Department of Health Policy and Hospital Management; Chinese Academy of Social Sciences Wei, Lifeng; Harbin Medical University, Department of Health Policy and Hospital Management Zhang, Gangyu; Harbin Medical University, Department of Health, Policy and Hospital Management Li, Yuanheng; Harbin Medical University, Department of Health Policy and Hospital Management Wang, Ying; Harbin Medical University, Department of Health Policy and Hospital Management Wang, Yameng; Harbin Medical University, Department of Health Policy and Hospital Management Jiang, Kexin; General Hospital of Heilongjiang Agricultural Reclamation, Medical department Li, Jingqun; No.1 People's Hospital of Heihe, Department of Cardiology Jia, Xiaowen; No.1 People's Hospital of Heihe, Department of General Surgery Ismael, Omar Yacouba; Harbin Medical University, Department of Health Policy and Hospital Management Mao, Jingfu; Harbin Medical University, Department of Human Resource Management Wu, Qunhong; Harbin Medical University, Department of Social Medicine
Primary Subject Heading:	Public health
Secondary Subject Heading:	Medical management, Occupational and environmental medicine
Keywords:	Health & safety < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, PUBLIC HEALTH, Health policy < HEALTH SERVICES ADMINISTRATION & MANAGEMENT

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60





I, the Submitting Author has the right to grant and does grant on behalf of all authors of the Work (as defined in the below author licence), an exclusive licence and/or a non-exclusive licence for contributions from authors who are: i) UK Crown employees; ii) where BMJ has agreed a CC-BY licence shall apply, and/or iii) in accordance with the terms applicable for US Federal Government officers or employees acting as part of their official duties; on a worldwide, perpetual, irrevocable, royalty-free basis to BMJ Publishing Group Ltd ("BMJ") its licensees and where the relevant Journal is co-owned by BMJ to the co-owners of the Journal, to publish the Work in this journal and any other BMJ products and to exploit all rights, as set out in our [licence](#).

The Submitting Author accepts and understands that any supply made under these terms is made by BMJ to the Submitting Author unless you are acting as an employee on behalf of your employer or a postgraduate student of an affiliated institution which is paying any applicable article publishing charge ("APC") for Open Access articles. Where the Submitting Author wishes to make the Work available on an Open Access basis (and intends to pay the relevant APC), the terms of reuse of such Open Access shall be governed by a Creative Commons licence – details of these licences and which [Creative Commons](#) licence will apply to this Work are set out in our licence referred to above.

Other than as permitted in any relevant BMJ Author's Self Archiving Policies, I confirm this Work has not been accepted for publication elsewhere, is not being considered for publication elsewhere and does not duplicate material already published. I confirm all authors consent to publication of this Work and authorise the granting of this licence.

1 **Workplace violence against healthcare professionals in multi-**
2 **ethnicity area: A cross-sectional study in southwest China**

3 Haonan Jia^{a*}, Huiying Fang^{b*}, Ruohui Chen^{a*}, Mingli Jiao^{a,c}✉, Lifeng Wei^a, Gangyu
4 Zhang^a, Yuanheng Li^a, Ying Wang^a, Yameng Wang^a, Kexin Jiang^d, Jingqun Li^e,
5 Xiaowen Jia^f, Omar Yacouba Ismael^a, Jingfu Mao^g✉, Qunhong Wu^h

6 *a Department of Health Policy and Hospital Management, Harbin Medical University,*
7 *Nangang District, Harbin, China;*

8 *b President's Office, Qingdao Women and Children's Hospital, Shibei District,*
9 *Qingdao, China;*

10 *c Chinese Academy of Social Science, Institute of Quantitative & Technical Economics,*
11 *Dongcheng District, Beijing China;*

12 *d Medical department, General Hospital of Heilongjiang Agricultural Reclamation,*
13 *Harbin 150088, China*

14 *e Department of Cardiology, No.1 People's Hospital of Heihe, Aihui District, Heihe,*
15 *China;*

16 *f Department of General Surgery, No.1 People's Hospital of Heihe, Aihui District,*
17 *Heihe, China;*

18 *g Department of Human Resource Management, Harbin Medical University, Nangang*
19 *District, Harbin, China;*

20 *h Department of Social Medicine, Harbin Medical University, Nangang District,*
21 *Harbin, China*

22 ***Contributed Equally**

1
2
3
4 **23 Corresponding author:**
5

6
7 24 Mingli Jiao, Harbin Medical University, 157 Baojian Road, Nangang District, Harbin,
8
9 25 Heilongjiang, 150086, China. Email: minglijiao@126.com. Tel:+86 13613675693
10

11
12 26 Jingfu Mao, Harbin Medical University, 157 Baojian Road, Nangang District, Harbin,
13
14 27 Heilongjiang, 150086, China. Email: mjfhyd@yeah.com. Tel:+86 13836134966
15
16

17 **28 Word count:** 3915
18

19 **29 Abstract**
20

21
22 30 **Objective:** The purpose of this study is to examine workplace violence (WPV)
23
24 31 towards healthcare professionals in multi-ethnicity area of China, including
25
26 32 prevalence, influencing factors, healthcare professionals' response to WPV,
27
28 33 expected anti-violence training measures and content, and evaluation of WPV
29
30 34 interventions.
31
32

33
34 35 **Design:** A cross-sectional study.
35
36

37
38 36 **Setting:** A Grade III Class A hospital in the capital of Yunnan province, which is the
39
40 37 province with most kinds of ethnic minorities groups in China.
41
42

43
44 38 **Participants:** In total, 2,036 healthcare professionals participated with a response
45
46 39 rate was 83.79%.
47

48
49 40 **Results:** The prevalence of physical and psychological violence was 5.4% and
50
51 41 43.7%, respectively. Healthcare professionals who were ethnic minorities were
52
53 42 more likely to experience psychological violence (OR=1.54, 95%CI=1.16-2.05).
54

55
56 43 After stratified by gender, males who were ethnic minorities suffered more
57
58 44 physical violence (OR=3.31, 95%CI=1.12-9.79), while females suffered
59
60

1
2
3
4 45 psychological violence (OR=1.71, 95%CI=1.24-2.36). We also found a unique
5
6 46 work situation in China—overtime duty on call work (6 pm-7 am) was a risk factor
7
8
9 47 of psychological violence (OR=1.403, 95%CI=1.02-.93). Ethnic minority
10
11 48 healthcare professionals less likely ordered perpetrators to stop or reported to
12
13
14 49 superiors when facing psychological violence. Ethnic minority healthcare
15
16
17 50 professionals are more interested in receiving training of force skills and self-
18
19
20 51 defense. Both Han and ethnic minority participants considered security measures
21
22 52 as the most useful intervention, while changing the time of shift as the most
23
24
25 53 useless one.

26
27 54 Conclusion: Our study comprehensively described WPV towards healthcare
28
29
30 55 professionals in multi-ethnicity minority area. More WPV research conducted in
31
32 56 multi-ethnicity area are needed.

33
34
35 57 **Keyword:** Workplace violence; healthcare professionals; multi-ethnicity area

36
37
38 58 **Strengths and limitations**

- 39
40 59 ✧ Although lots of studies investigated WPV in hospital, few of them were
41
42 60 conducted in multi-ethnicity minority area.
- 43
44 61 ✧ Previous studies paid attention to a single part of WPV whereas our study
45
46 62 describes WPV comprehensively including prevalence, influencing factor,
47
48 63 response to WPV.
- 49
50 64 ✧ Due to recall bias or reporting bias resulting from shame and stigma, the
51
52 65 number of violent events in the past 12 months may be underestimated.
- 53
54 66 ✧ Our study did not explain WPV using cultural factors, which further studies
55
56
57
58
59
60

1
2
3
4 67 can investigate.
5

6
7 68 **1. Introduction**
8

9 69 In December 2019, a doctor was brutally killed by a patient's family member in
10
11 70 Beijing. Less than a month later, another doctor in Beijing hospital was stabbed
12
13
14 71 and severely injured. These two cases once again drew great attention to the safety
15
16
17 72 of healthcare professionals in the Chinese society.
18

19 73 Workplace violence (WPV) was defined as "incidents where employees are
20
21
22 74 abused, threatened, assaulted or subject to other offensive acts or behaviors in
23
24
25 75 circumstances related to their work", which includes two types: (1) physical
26
27 76 violence (e.g., beating, kicking, slapping, stabbing, shooting, pushing, biting, and
28
29
30 77 pinching) and (2) psychological violence (e.g., threat of physical force against
31
32
33 78 another person or group that can result in harm to physical, mental, spiritual,
34
35 79 moral, or social development)¹. WPV towards healthcare professionals is an
36
37
38 80 extremely serious problem in China, which is happening for a long time. There
39
40
41 81 were less than 290 severe WPV towards healthcare workers reported by media
42
43
44 82 from 2000 to 2015². The seriousness of WPV towards healthcare professionals in
45
46
47 83 China leads to great attention from researchers. Most of researches that studied
48
49
50 84 WPV prevalence of China were conducted in the area where the Han people (the
51
52
53 85 main ethnic group in China) mainly live and rates of physical and psychological
54
55 86 violence were 6.4%–35.4% and 54.4%–79.8%, respectively ³⁻⁸. However, there
56
57 87 were few WPV studies conducted in multi-ethnicity area of China. According to the
58
59 88 latest national census in 2010, ethnic minorities account for 8.49% of the total
60

1
2
3
4 89 population in China. In multi-ethnicity area, the proportion and ethnic diversity of
5
6 90 both ethnic minority patients and healthcare professionals is higher. In addition,
7
8
9 91 there is preferential treatment policy in education for Chinese ethnic minorities
10
11 92 (lower threshold to receive high level of education), which may make ethnic
12
13
14 93 minority workers' capabilities undervalued ^{9 10}. However, since healthcare
15
16
17 94 professionals require high level of skill and education, it is still unknown whether
18
19
20 95 the ethnic minority healthcare professionals' ability and skill would be
21
22 96 undervalued that can lead to patients' distrust with even more WPV occurrence. It
23
24
25 97 is essential to provide more information of WPV in the multi-ethnicity area thus
26
27 98 conducting specific interventions. In addition, limited studies from other counties
28
29
30 99 and regions focus on WPV towards healthcare professionals in multi-ethnicity
31
32
33 100 areas.

34
35 101 Although many studies have investigated the influence factor of WPV towards
36
37 102 healthcare professionals, an essential factor has been neglected. In China, more
38
39
40 103 than 90% healthcare professionals work more than eight hours a day, which
41
42
43 104 makes overtime work a common phenomenon ¹¹. Since the medical system
44
45
46 105 requires healthcare professionals in charge to be responsible for their patients at
47
48
49 106 any time, duty on call has become a form of overtime work. Healthcare workers
50
51 107 need to be on 24 hours standby and be able to return to hospital if patients are in
52
53
54 108 an acute or severe situation, even when they have already got off work or having
55
56 109 a rest ¹². Previous studies found that workload was associated with WPV
57
58
59 110 victimization ^{13 14}. However, limited WPV studies focused on relationship between
60

1
2
3
4 111 WPV experience and the exact form of overtime.
5

6 112 Most previous WPV studies have only investigated a part of WPV, such as
7
8
9 113 prevalence, influencing factors, or interventions. In this study, we aim to
10
11 114 investigate WPV in a general hospital of multi-ethnicity area, including the
12
13
14 115 prevalence, influencing factors, response to WPV and evaluation of WPV
15
16
17 116 intervention, which could not only interpret WPV from a broader perspective, but
18
19
20 117 also provide more reference for practice.
21

22 118 **2. Methods**

23 24 25 119 *2.1 Study population*

26
27 120 Yunnan, located in southwestern border of China, has the greatest diversity of
28
29
30 121 ethnic minorities in China, containing 52 of 56 ethnic groups (51 ethnic minority
31
32 122 groups and Han). In 2017, 33.6% residents in Yunnan were ethnic minority groups.
33

34
35 123 We conducted a retrospective survey in a Grade III Class A hospital in Kunming,
36
37
38 124 the capital of Yunnan Province. The hospital was founded in 1939 and is the first
39
40 125 Grade III Class A hospital in Yunnan Province. It is one of the most capable general
41
42
43 126 hospitals in Yunnan, containing 2,400 open beds and over 2 million annual total
44
45
46 127 visits. Around 18.6% of the hospital's employees were ethnic minorities at the
47
48 128 time of the study. As a medical center in the province, it has a wide radiation range,
49
50
51 129 and patients from all over the province come to the hospital seeking medical
52
53 130 treatment.
54

55 56 131 *2.2 Questionnaire*

57
58 132 A questionnaire developed jointly by the International Labor Office (ILO),
59
60

1
2
3
4 133 International Council of Nurses (ICN), World Health Organization (WHO), and
5
6 134 Public Services International (PSI) in 2003 was used to measure WPV ¹. First, we
7
8
9 135 asked for permission to use the questionnaire from the ILO and WHO. Thereafter,
10
11
12 136 we translated it into Mandarin Chinese and back translated it into English to verify
13
14 137 the accuracy of the Mandarin version. After this translation processed, 17 experts
15
16
17 138 in the field of healthcare were invited to assess the effectiveness of the
18
19
20 139 measurement tools, including the applicability of culture and the appropriateness
21
22
23 140 of language. We selected 79 medical staff to form a group and conducted a two-
24
25 141 week test-retest reliability test (0.83).

26
27 142 The questionnaire included the following sections: (1) demographics (e.g.,
28
29
30 143 gender, age, education, ethnicity, occupation) and work status (e.g., shift work,
31
32
33 144 overtime duty on call work, participation in anti-violence training, anxiety
34
35 145 regarding WPV); (2) experience of physical violence in the past 12 months (i.e.,
36
37
38 146 intentional behavior that harms healthcare workers physically); (3) experience of
39
40
41 147 psychological violence in the past 12 months (i.e., verbal abuse, threatening events,
42
43
44 148 and sexual harassment); (4) healthcare professionals' response to physical
45
46
47 149 violence and psychological violence; (5) the expected measures (e.g., leaflets,
48
49
50 150 video, lecture) and content of anti-violence training (e.g., WPV cognition, self-
51
52
53 151 defense; (6) the evaluation of usefulness of WPV interventions.

53 152 *2.3 Sample and data collection*

54
55
56 153 First, we obtained permission from the hospital management office and human
57
58
59 154 resource department to collect employee's information in the hospital. Thereafter,
60

1
2
3
4 155 the person in charge of each unit issued a questionnaire to the staff and informed
5
6 156 them of the instructions and precautions. The study subjects included doctors,
7
8
9 157 nurses, medical technicians who participated voluntarily and remained
10
11
12 158 anonymous.

13
14 159 The respondents were asked to provide their experience of WPV in the previous
15
16
17 160 12 months, therefore, we excluded employees who met any of the following
18
19
20 161 criteria: (1) less than 1 year of work experience in this hospital; (2) short-term
21
22 162 secondment or training (less than 12 months); (3) personnel who did not come to
23
24
25 163 work during the study period due to traveling, training, vacation, and so on.

26
27 164 The questionnaire had to be completed by employees themselves and could not
28
29
30 165 be answered by any other person. The time of data collection ranged from July to
31
32
33 166 October 2017. A total of 2,036 valid questionnaires were collected, and the
34
35 167 effective response rate was 83.79%.

36 37 168 *2.4 Data analysis*

38
39
40 169 Descriptive statistics were used to summarize the demographic characteristics,
41
42
43 170 prevalence of physical and psychological violence and the response to WPV
44
45
46 171 between Han and ethnic minority participants. Chi-square test and Fisher's exact
47
48
49 172 were used to compare the difference of response to WPV between Han and ethnic
50
51 173 minority healthcare workers.

52
53 174 Since ethnic minority participants were almost 1/5 of Han participants in our
54
55
56 175 data collection, the result may be biased if we used the original data to conduct
57
58
59 176 logistic regression. To control confounders and to balance the number of Han and
60

1
2
3
4 177 ethnic minority samples, propensity score matching (PSM) was used. The PSM
5
6 178 model used the ethnicity as a dependent variable, and age, gender, marriage status,
7
8
9 179 educational background, and years of work experience as explanatory variables.
10
11 180 We matched the group of ethnic minority healthcare professionals (treatment
12
13
14 181 group) to the group of Han healthcare professionals (control group) in a 1:2
15
16
17 182 manner to create two groups. These two groups had similar explanatory variables
18
19 183 (age, gender, marriage status, educational background, years of work experience)
20
21
22 184 and different dependent variable – ethnicity, which could control confounders and
23
24
25 185 highlighted the comparison between Han and ethnic minority healthcare
26
27 186 professionals. After matching, a set of 960 cases were created, with 325 ethnic
28
29
30 187 minority and 635 Han healthcare professionals. The matched set was used to
31
32
33 188 identify the factors associated with WPV in hospitals using logistics regression.
34
35 189 Since the proportion of male and female was almost 1:3, we also conducted
36
37
38 190 logistics regression stratified by gender.

39
40 191 The data were entered using Epidata 3.1 and analyzed using IBM SPSS Statistics
41
42
43 192 22.0. The significance level was set at 0.05.

44 45 193 *2.5 Ethics approval*

46
47
48 194 This study was reviewed and approved by the Research Ethics Committee of
49
50
51 195 Harbin Medical University and the investigation hospital (Project Identification
52
53 196 Code: HMUIRB20160014). All the respondents were provided with informed
54
55
56 197 consent, which described the purpose and method of data collection and kept the
57
58
59 198 data confidential.
60

199 *2.6 Patient and public involvement*

200 No patients were involved in the whole process of the research.

201 **3. Results**

202 *3.1 Demographic characteristics*

203 Table 1 shows the demographic details of the 509 men and 1,527 women who
 204 participated in the study. Around 84% of respondents were of “Han ethnicity”,
 205 while 16% were ethnic minorities. A majority of respondents were nurses (42.7%)
 206 and physicians (31.5%), 12.5% were medical technology workers, the rest (11.6%)
 207 held other positions. Most of the respondents (70.2%) worked in rotational shifts,
 208 and 74.2% engaged in overtime work (from 6 pm to 7 am the next day), such as
 209 overtime or emergency consultation. Over half reported high or extremely high
 210 levels of anxiety regarding WPV (58.9%) and participated in anti-violence training
 211 (67.5%). As for the prevalence of WPV, 43.7% of the respondents reported that
 212 they had experienced psychological violence, while 5.4% reported physical
 213 violence.

215 **Table 1. Demographic information and the prevalence of workplace violence**

216 (N=2036)

	n	%
Gender		
Male	509	25.0%
Female	1527	75.0%

Age		
≤30	940	46.2%
31–45	789	38.8%
≥46	207	15.1%
Marital status		
Single	603	29.6%
Married	1389	68.2%
Divorced/widowed	44	2.2%
Education background		
College graduates	448	22.0%
Bachelor	1207	59.3%
Master's and above	381	18.7%
Ethnicity		
Han	1711	84.0%
Minority	325	16.0%
Years of work experience		
1–5	570	28.0%
6–10	548	26.9%
11–20	413	20.3%
>20	505	24.8%
Profession		

Physician	624	31.5%
Nurse	869	42.7%
Medical technology	255	12.5%
Others	236	11.6%
Work in shift		
Yes	1429	70.2
No	607	29.8
Overtime duty on call		
work (6 pm-7 am)		
Yes	1510	74.2%
No	526	25.8%
Anxiety level		
Never	103	5.1%
Low	219	10.8%
Moderate	513	25.2%
High	360	17.7%
Extremely high	841	41.2%
Anti-violence training		
Yes	1374	67.5%
No	662	32.5%
Physical violence		
Yes	110	5.4%

No	1926	94.5%
Psychological violence		
Yes	889	43.7%
No	1147	56.3%

217 *3.2 Influencing factors*

218 Table 2 shows the results of the logistic regression analysis of physical and
 219 psychological violence using the matched set (unstratified and stratified by
 220 gender), including P-values, odds ratios (OR) and 95% confidence intervals
 221 (95%CI). The unstratified results showed that female respondents had lower odds
 222 of experiencing physical violence than males did (OR=0.29, 95%CI=0.15-0.55).
 223 Respondents with anxiety level towards WPV had higher odds of physical violence
 224 (OR=1.88, 95%CI=1.34-2.62). After stratified by gender, the results showed that
 225 the educational background of masters and above (OR=7.49, 95%CI=1.27-44.04),
 226 ethnic minority (OR=3.31, 95%CI=1.12-9.79), anxiety level towards WPV
 227 (OR=2.46, 95%CI=1.35-4.48) were associated with physical violence occurrence
 228 for males, while only anxiety level towards WPV (OR=1.84, 95%CI=1.17-2.88)
 229 was statistically significant in physical violence experience for females.

230 As for psychological violence, minority medical workers had higher odds of
 231 experiencing it than workers of Han ethnicity (OR=1.54, 95%CI=1.16-2.05).
 232 Engaging in overtime work from 6 pm to 7 am the following day was also a risk
 233 factor of psychological violence (OR=1.40, 95%CI=1.02-1.93). Anxiety level about
 234 WPV was also negatively associated with psychological violence (OR=1.50,

1
2
3
4 235 95%CI=1.33-1.70). When stratified by gender, females who were ethnic
5
6
7 236 minorities (OR=1.71, 95%CI=1.24-2.36) were more likely to suffer psychological
8
9
10 237 violence, while anti-violence training (OR=0.71, 95%CI=0.51-0.99) was
11
12 238 positively associated with psychological violence; both males (OR=1.48,
13
14 239 95%CI=1.14-1.92) and females (OR=1.51, 95%CI=1.31-1.74) with higher
15
16
17 240 anxiety levels towards WPV were associated with WPV victimization.
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

241

Table 2. Results of logistic regression of physical and psychological violence (N=960)

	Physical violence			Psychological violence		
	Unstratified	Stratified		Unstratified	Stratified	
		Male	Female		Male	Female
Gender						
Male	Reference	-	-	Reference	-	-
Female	0.29(0.15-0.55) ***	-	-	0.99(0.71-1.40)	-	-
Ethnicity						
Han		Reference			Reference	
Minority	1.57(0.86-2.87)	3.31(1.12-9.79) *	1.18(0.53-2.63)	1.54(1.16-2.05) **	1.07(0.56-2.03)	1.71(1.24-2.36) **
Age (years)						
≤30		Reference			Reference	
31-45	1.26(0.27-6.01)	3.25(0.07-160.96)	0.76(0.09-6.36)	1.11(0.55-2.23)	0.77(0.19-3.14)	1.46(0.64-3.33)

1							
2							
3							
4							
5	≥46	1.44(0.43-4.80)	0.52 (0.01-19.40)	2.41(0.45-12.84)	0.80(0.46-1.42)	0.49(0.16-1.51)	1.10(0.55-2.18)
6							
7							
8	Marital status						
9							
10	Single		Reference			Reference	
11							
12							
13	Married	0.47(0.08-2.77)	0.10(0.01-1.86)	0.97(0.09-10.92)	0.85(0.30-2.44)	0.57(0.05-6.35)	0.85(0.26-2.78)
14							
15							
16	Divorced/widowed	0.46(0.09-2.41)	0.32(0.02-4.84)	0.57(0.06-5.42)	0.95(0.34-2.62)	0.78(0.08-7.99)	0.88(0.28-2.75)
17							
18	Educational background						
19							
20							
21	College graduates		Reference			Reference	
22							
23							
24	Bachelors	0.98(0.35-2.75)	0.92(0.10-8.70)	0.69(0.21-2.28)	0.92(0.58-1.47)	1.18(0.50-2.83)	0.88(0.50-1.55)
25							
26	Masters and above	1.36(0.55-3.38)	7.49(1.27-44.04)*	0.45(0.15-1.38)	1.20(0.79-1.83)	1.16(0.55-2.45)	1.23(0.74-2.07)
27							
28							
29	Years of work experience						
30							
31	1-5		Reference			Reference	
32							
33							
34	6-10	0.82(0.20-3.31)	1.00(0.02-51.35)	0.99(0.18-5.59)	0.54(0.28-1.02)	0.60(0.16-2.24)	0.51(0.24-1.08)
35							
36							
37	11-20	0.50(0.14-1.81)	0.77(0.02-35.11)	0.51(0.10-2.53)	0.72(0.42-1.28)	0.62(0.19-2.03)	0.72(0.36-1.42)
38							
39							
40							
41							
42							
43							
44							
45							
46							

1							
2							
3							
4							
5	>20	0.80(0.27-2.36)	1.37(0.04-53.89)	0.85(0.25-2.84)	1.34(0.80-2.23)	1.44(0.46-4.50)	1.24(0.69-2.22)
6							
7							
8	Work in shift						
9							
10	Yes	1.16(0.58-2.35)	0.87(0.26-2.94)	1.51(0.59-3.86)	1.17(0.85-1.61)	1.28(0.65-2.52)	1.12(0.78-1.63)
11							
12	No		Reference			Reference	
13							
14							
15							
16	Overtime duty on call						
17							
18	work (6 pm-7 am)						
19							
20	Yes	0.88(0.43-1.78)	1.34(0.31-5.86)	0.73(0.31-1.72)	1.40(1.02-1.93) *	1.26(0.57-2.78)	1.41(0.99-2.00)
21							
22	No		Reference			Reference	
23							
24							
25							
26	Anxiety level	1.88(1.34-2.62) ***	2.46(1.35-4.48) **	1.84(1.17-2.88) **	1.50(1.33-1.70) ***	1.48(1.14-1.92) ***	1.51(1.31-1.74) ***
27							
28							
29	Anti-violence training						
30							
31	Yes	1.25(0.65-2.43)	3.29(0.87-12.47)	0.89(0.39-2.02)	0.80(0.59-1.06)	1.09(0.56-2.12)	0.71(0.51-0.99) *
32							
33	No		Reference			Reference	
34							
35							

242 Note: (*): p<0.05; (**): p<0.01; (***): p<0.001. All the variables in each logistic regression models were mutually adjusted.

1
2
3
4 243 *3.3 Participants' response to WPV*
5

6 244 Table 3 shows the different response to psychological/physical violence
7
8
9 245 between Han and ethnic minority healthcare professionals. More Han healthcare
10
11 246 professionals ordered perpetrators to stop (OR=0.64, 95%CI=0.45-0.91) and
12
13
14 247 reported to superiors (OR=0.56, 95%CI=0.40-0.79) than ethnic minorities when
15
16
17 248 psychological violence happened, and this difference was statistically significant.
18
19 249 As for the physical violence, compared to ethnic minority, more Han healthcare
20
21
22 250 professionals chose to respond in all ways except pretending nothing happened.
23
24
25 251 However, none of the difference was statistically significant.
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

Table 3. Response to psychological and physical violence

	Psychological violence					Physical Violence				
	Han (N=727)		Ethnic minority (N=162)		OR (95%CI)	Han (N=88)		Ethnic minority (N=22)		OR (95%CI)
	n	%	n	%		n	%	n	%	
Pretend nothing happened	216	29.71	49	30.25	1.03(0.71-1.49)	6	6.82	4	18.18	3.04(0.78-11.88)
Order to stop	324	44.57	55	33.95	0.64(0.45-0.91)***	27	30.68	3	13.64	0.36(0.10-1.31)
Talk to families or friends	474	65.20	114	70.37	1.27(0.88-1.84)	21	23.86	4	18.18	0.71(0.22-2.33)
Psychological counseling	70	9.63	23	14.20	1.55(0.94-2.57)	9	10.23	2	9.09	0.88(0.18-4.39)
Talk to colleague	631	86.80	131	80.86	0.64(0.41-1.01)	33	37.50	6	27.27	0.63(0.22-1.76)
Change department	47	6.46	13	8.02	1.26(0.67-2.39)	4	4.55	0	0.00	-
Report to superiors	469	64.51	82	50.62	0.56(0.40-0.79)***	31	35.23	6	27.27	0.69(0.24-1.94)
Charge perpetrators	28	3.85	4	2.47	0.63(0.22-1.83)	5	5.68	0	0.00	-

1
2
3
4
5
6 253 Note: (*): $p < 0.05$; (**): $p < 0.01$; (***): $p < 0.001$. Han participants as the reference.
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46

For peer review only

254

255 *3.4 Anti-violence training measures and content*

256 Table 4 has shown the anti-violence training measures and content expected by
 257 healthcare professionals. Lectures were the most expected measures of training
 258 both by Han (54.13%) and ethnic minority (52.62%). Pre-job training was
 259 expected from half of ethnic minority healthcare professionals, which was slightly
 260 higher than the proportion of Han healthcare professionals (OR=1.29,
 261 95%CI=1.01-1.63). Wall newspaper and poster were the least popular measures
 262 both by Hans and ethnic minorities. As for the training content, more than 70%
 263 Han and ethnic minority participants expected identification of WPV signs and
 264 escaping training. Compared to Han, ethnic minority healthcare professionals
 265 were more interested in force skills (OR=1.40, 95%CI=1.10-1.78) and self-
 266 defense (OR=1.48, 95%CI=1.10-2.01).

267 **Table 4. Expected measures and contents of anti-violence training (N=2036)**

	Han		Ethnic minority		OR (95%CI)
	n	%	n	%	
Expected training measures					
Leaflets	680	39.74	125	38.46	0.95(0.74-1.21)
Video	759	44.36	145	44.62	1.01(0.80-1.28)
Lectures	926	54.12	171	52.62	0.94(0.74-1.19)
Wall newspaper, poster	435	25.42	77	23.69	0.91(0.69-1.20)
Employee handbooks	507	29.63	93	28.62	0.95(0.73-1.24)

Pre-job training	751	43.89	163	50.15	1.29(1.01-1.63) *
Expected training content					
WPV cognition	891	52.07	177	54.46	1.10(0.87-1.40)
Identification of WPV signs	1242	72.59	234	72.00	0.97(0.75-1.27)
Language skills	1162	67.91	232	71.38	1.18(0.91-1.53)
Force skills	815	47.63	182	56.00	1.40(1.10-1.78) **
Relevant laws and regulations	1113	65.05	223	68.62	1.18(0.91-1.52)
Escaping training	1235	72.18	245	75.38	1.18(0.90-1.55)
Self-defense	1227	71.71	257	79.08	1.48(1.10-2.01) *

268 Note: (*): $p < 0.05$; (**): $p < 0.01$; (***): $p < 0.001$. Han participants as the reference.

269 *3.5 Evaluation of the usefulness of WPV interventions*

270 As for the evaluation of interventions, there were no significant differences
 271 between Han and ethnic minority healthcare professionals. Participants
 272 considered that security measures were the most useful ways to prevent WPV. The
 273 following were improving the environment and anti-violence training. More than
 274 40% considered patient examination and changing the time of shift as useless
 275 measures. There were few differences when stratified by ethnicity. More Han
 276 healthcare workers looked down on the usefulness of protective equipment, while
 277 ethnic minority participants undervalued patient examination and anti-violence
 278 training. However, none of these differences between Han and ethnic minority
 279 were statistically significant. (Table 5)

280

Table 5. Evaluation of the usefulness of WPV interventions (N=2036)

	All participants		Han		Ethnic minority	
	n	%	n	%	n	%
Improve the environment (e.g., enhance lighting)						
Very useful	715	35.12	611	35.71	104	32.00
Somewhat useful	945	46.41	784	45.82	161	49.54
Useless	376	18.47	316	18.47	60	18.46
Restrict non-staff access						
Very useful	591	29.03	513	29.98	78	24.00
Somewhat useful	778	38.21	638	37.29	140	43.08
Useless	667	32.76	560	32.73	107	32.92
Patient examination (e.g., history of committing violence)						
Very useful	498	24.46	429	25.07	69	21.23
Somewhat useful	698	34.28	586	34.25	112	34.46
Useless	840	41.26	696	40.68	144	44.31
Increase manpower						
Very useful	667	32.76	571	33.37	96	29.54
Somewhat useful	796	39.10	663	38.75	133	40.92
Useless	573	28.14	477	27.88	96	29.54
Protective equipment						
Very useful	610	29.96	522	30.51	88	27.08
Somewhat useful	738	36.25	625	36.53	113	34.77

Useless	688	33.79	564	32.96	124	38.15
Change the time of shift						
Very useful	470	23.08	411	24.02	59	18.15
Somewhat useful	699	34.33	578	33.78	121	37.23
Useless	867	42.58	722	42.20	145	44.62
Avoid working alone						
Very useful	659	32.37	568	33.20	91	28.00
Somewhat useful	636	31.24	526	30.74	110	33.85
Useless	741	36.39	617	36.06	124	38.15
Anti-violence training						
Very useful	785	38.56	675	39.45	110	33.85
Somewhat useful	800	39.29	672	39.28	128	39.38
Useless	449	22.05	362	21.16	87	26.77
Security measures						
Very useful	899	44.16	762	44.54	137	42.15
Somewhat useful	932	45.78	779	45.53	153	47.08
Useless	205	10.07	170	9.94	35	10.77

281

282 4. Discussion

283 This study examined the prevalence, influence factors, and response of WPV in a
 284 hospital located in the multi- ethnicity area of China. The percentage of medical
 285 workers of minority ethnicity was substantially higher than previous studies

1
2
3
4 286 conducted in eastern and central China (2.41–7.95%)¹⁵⁻¹⁷. Due to the different
5
6
7 287 investigation tools and time period, it is difficult to compare the WPV prevalence
8
9
10 288 with some other researches. However, compared with our previous studies with
11
12 289 the same questionnaire and time period, the prevalence of physical and
13
14 290 psychological violence in our study are lower than what has been found in areas
15
16
17 291 where Han people mainly lived ^{7 8 18 19}. The results of logistics regression indicated
18
19
20 292 that ethnic minority healthcare professionals maybe more likely to suffer
21
22 293 psychological violence. After stratified by gender, males who were ethnic
23
24 294 minorities were more likely to suffer physical violence, while females from
25
26
27 295 psychological violence. The different results in stratified and unstratified analysis
28
29
30 296 may be due to the proportion of males and females. Namely, in unstratified
31
32 297 analysis, the fact that males suffered more physical violence would be covered by
33
34
35 298 the fact that females suffered more psychological violence. Some studies from
36
37
38 299 other countries or regions showed that ethnic minority healthcare workers were
39
40
41 300 less likely to experience WPV when comparing to the majority (Whites)^{20 21}, while
42
43 301 some studies held the opposite conclusion that ethnic minority healthcare
44
45 302 professionals were more vulnerable in suffering workplace bullying, verbal abuse,
46
47
48 303 physical violence, etc. ²²⁻²⁶ However, due to the huge difference between the
49
50
51 304 background investigation and participants' characteristics, these studies could not
52
53
54 305 be compared with our study. We speculate several reasons for this result. First,
55
56 306 our study showed that there were behavioral differences between Han and ethnic
57
58
59 307 minority, culture and religious beliefs could be key factors in explaining this ²⁷.
60

1
2
3
4 308 Second, our study showed that when facing WPV, compared with Han, ethnic
5
6 309 minority healthcare professionals may be more likely to tolerate it, which may
7
8
9 310 lead to more violence. Third, the language from difference linguistic culture may
10
11 311 hamper the doctor-patient communication, thus lead to violence²⁸. Fourth, ethnic
12
13 312 minority healthcare professionals' ability or skill maybe undervalued by patients,
14
15 313 thus leading to distrust or WPV, which needs further studies to investigate this
16
17 314 phenomenon from the patients' perspective.

18
19
20
21
22 315 Respondents who engaged in overtime duty on call work from 6 pm to 7 am had
23
24 316 greater odds of experiencing psychological violence. This is a new finding in our
25
26 317 study, which has been ignored in most research of China. We speculate several
27
28 318 reasons for this finding. First, our definition of overtime duty on call work might
29
30 319 have captured individuals handling urgent issues. The staff working therein are
31
32 320 more likely to experience higher levels of frustration, distress, cognitive
33
34 321 impairment or arousal^{29 30}, which is similar with the WPV high-risk department
35
36 322 — emergency department. Second, healthcare professionals would face more
37
38 323 aggressive situations such as drunk patients or companions and traumatic
39
40 324 patients caused by fighting. Third, since the on-call work is not during the general
41
42 325 working time, there are less colleagues and guards. We suggest that more effective
43
44 326 measures should be adopted to protect healthcare professionals who engage duty
45
46 327 on-call beyond general working time. Future studies should investigate this
47
48 328 phenomenon in mainly Han living area.

49 329 The result of logistics regression showed that males have higher odds of
50
51
52
53
54
55
56
57
58
59
60

1
2
3
4 330 experiencing physical violence, which is similar to the WPV studies conducted in
5
6 331 the areas that Han mainly lived ^{7 19 31}. In other countries, some studies came to the
7
8
9 332 same conclusion ³²⁻³⁵, while some studies have reported that women were more
10
11 333 vulnerable to physical violence ³⁶. These different results could be attributed to
12
13
14 334 the different study backgrounds ³⁷. In many countries, beliefs, ethics, or moral
15
16
17 335 principles serve as guidance for public behavior. For instance, in some Arab
18
19 336 countries, being a male is a risk factor of experiencing WPV partly because of
20
21
22 337 cultural norms that reject disrespect of females ³⁵. Consistent with other
23
24
25 338 researches ^{7 19} conducted in the areas that Han mainly lives in , our study showed
26
27 339 that higher anxiety levels regarding WPV was associated with WPV experience.
28
29
30 340 Further study should determine whether the anxiety is the predisposition of
31
32
33 341 consequence of WPV occurrence.

34
35 342 Compared to Han, more ethnic minority healthcare professionals pretend
36
37 343 nothing happened after suffering physical violence. In addition, they may less
38
39
40 344 likely talk to others about these events, or report to their leaders, or use legal
41
42
43 345 methods. The reason we think there was no statistical significance in this result
44
45
46 346 was that the number of participants who experienced physical violence was small.
47
48 347 Despite this, we speculate that this may be due to the cultural belief of ethnic
49
50
51 348 minority that causes them to remain silent. Previous study has proved that talking
52
53
54 349 with others in their surroundings about their WPV was helpful to release their
55
56 350 tension or anxiety caused from WPV ³⁸. Since the anxiety towards WPV is
57
58
59 351 associated with WPV experience, more social support for the individual, such as
60

1
2
3
4 352 friends, families, and colleagues, should be provided to help ethnic minority
5
6 353 healthcare professionals manage violence through diverse methods instead of
7
8
9 354 tolerating it by themselves. Previous study has shown that in the environment that
10
11 355 encourages reporting WPV, more incidents of WPV were reported and healthcare
12
13
14 356 workers gained better awareness of risk for violence, as well as how to avoid
15
16
17 357 potential danger, and how to manage aggressive customers ³⁹. An adequate WPV
18
19 358 reporting system should be established to encourage ethnic minority healthcare
20
21
22 359 professionals to report their WPV experience.

23
24 360 It seems that both Han and ethnic minority healthcare professionals are less
25
26
27 361 interested in the textual anti-violence training measures (leaflets, poster, wall
28
29
30 362 newspaper, employee handbook). Although printed materials could summarize
31
32
33 363 content and be learned repeatedly, the lack of practice details makes it less
34
35 364 effective ⁴⁰. Videos hold the advantages such as attractiveness, convenience, clarity
36
37
38 365 of demonstration, superior cost-effectiveness and easy to apply, while lectures
39
40
41 366 contain variety of lively styles such as group interaction and scenario simulation,
42
43 367 which makes them more popular ^{41 42}. Future studies should compare the effect of
44
45
46 368 these measures. Pre-job training is more needed by ethnic minority healthcare
47
48
49 369 workers, which could help them adapt to the work environment better and faster.
50
51 370 As for the training content, ethnic minority healthcare professionals are more
52
53
54 371 interested in tough measures. Since ethnic minorities are more likely to suffer
55
56
57 372 psychological violence, they may perceive more threat thus give rise to the
58
59 373 tendency of handling violence by force ^{43 44}.

1
2
3
4 374 Our findings indicated that there was not much difference in evaluation of
5
6 375 usefulness of WPV intervention between Han and ethnic minority. Security
7
8
9 376 measure is regarded as the most useful intervention of WPV. China has enacted
10
11 377 'Guidance on strengthening the security and protection system construction in
12
13
14 378 hospitals' in 2013, and 'Opinions on strictly punishing medical related crimes and
15
16
17 379 maintaining the medical order' in 2017, to strengthen security of hospital.
18
19 380 However, since these policies served as instructions rather than mandatory
20
21
22 381 regulations, insufficient resource had constrained the implementation in all
23
24
25 382 hospitals. Security measures are not only an intervention that could prevent
26
27 383 healthcare professionals from WPV, but also may enhance the sense of safety as a
28
29
30 384 kind of organizational support. Hospitals should implement specific scale of
31
32
33 385 security measures according to the actual situation. Most participants consider
34
35 386 anti-violence training useful. Although it could increase knowledge and boost
36
37
38 387 confidence, the effect could not reduce of WPV incidents for long-term ⁴⁵. We
39
40 388 suggest that it is essential to make a complete and periodic curriculum for
41
42
43 389 repetitive training. Improving environment, such as enhancing lighting and
44
45
46 390 installing cameras, should be considered as a useful measure. A previous study has
47
48 391 shown that working in a daring environment at night is a risk factor of WPV ⁴⁶.
49
50
51 392 Camera installation is required by Occupational Safety and Health Administration
52
53 393 (OSHA)⁴⁷, which may be a deterrence for committing violence. Using protective
54
55
56 394 equipment is not a popular intervention. In the period of frequent WPV in China,
57
58 395 there are indeed some healthcare workers wearing a helmet at work ⁴⁸. However,
59
60

1
2
3
4 396 this may lead to a more tense doctor-patient relationship. Participants do not trust
5
6
7 397 patient examination and restriction to non-staff access. Due to large hospital
8
9
10 398 scales and treatment numbers, there would be numerous patients admitted to
11
12 399 hospital. The process of patient examination and restriction of non-staff access
13
14 400 would not be serious enough, otherwise the crowded queue and longer waiting
15
16
17 401 time may breed new contradictions. In addition, since there is no system or
18
19
20 402 platform sharing the patient's information between each hospital, it is difficult to
21
22 403 verify WPV history strictly. Although previous studies have shown that work shift
23
24 404 is negatively associated with WPV ^{19 33 35}, changing the time of shift are treated as
25
26
27 405 less useful. It may be better to enhance the protection during shift rather than
28
29
30 406 changing the regulation.

31
32 407 Due to the research purpose and background, most previous WPV studies were
33
34
35 408 conducted in several hospitals, which has several advantages. Firstly, more
36
37
38 409 samples could be collected to make a more reliable conclusion. In addition, the
39
40
41 410 results could reflect common problems in a certain context. However, at the same
42
43
44 411 time, it would neglect some specific factors or characteristics. The investigation
45
46
47 412 conducted in a typical and representative hospital is conducive to examine the
48
49
50 413 relation between specific factors or information and WPV, which could also be an
51
52
53 414 effective reference of practical work for hospitals with similar features. Our study
54
55
56 415 has exploratively examined WPV in multi-ethnicity area using PSM, and which
57
58
59 416 method was conducive to control confounders and minimized the bias caused by
60
417 quantity gap. In addition, our study has given a complete report about WPV,

1
2
3
4 418 including prevalence, influencing factor, healthcare professionals' response to
5
6 419 WPV, expected content and measure of anti-violence training, and healthcare
7
8
9 420 professionals' evaluation of WPV interventions, which was helpful to interpret
10
11
12 421 WPV from wider aspects.

13 14 422 **5. Limitations**

15
16
17 423 This study has a few limitations. First, since the respondents were asked to
18
19 424 report WPV that had taken place in the past 12 months, violence might not be
20
21
22 425 adequately reported due to recall bias or reporting bias resulting from shame and
23
24 426 stigma. Second, the study exploratively examined the WPV in multi-ethnicity area
25
26
27 427 but did not conduct in-depth research on the underlying cause by cultural factors.
28
29 428 Third, our study is limited to consider the temporality between the influencing
30
31
32 429 factor and WPV, which makes it difficult to conclude the causation. In addition, the
33
34 430 clustering effect of WPV in several departments were not fully considered, which
35
36
37 431 may affect the standard error of the results. Future research should investigate the
38
39
40 432 perpetrators or patients, especially explore WPV by qualitative methods.

41 42 43 433 **6. Conclusion**

44
45 434 Our study investigated WPV in a hospital located in a multi-ethnicity area.
46
47
48 435 Ethnic minority healthcare professionals may be more likely to suffer WPV and
49
50
51 436 have different responses to WPV compared to Han. Additionally, we broke through
52
53
54 437 the single focus of existing WPV research and explored WPV from a more
55
56 438 comprehensive perspective including prevalence, influencing factors, response to
57
58
59 439 WPV, expected anti-violence training measures and contents, and evaluation of
60

1
2
3
4 440 interventions, which may provide a practical reference to hospitals with similar
5
6 441 characteristics. Moreover, WPV research should be conducted in multi-ethnicity
7
8 442 areas from the perspective of the perpetrator or patients, especially by qualitative
9
10 443 methods.
11
12
13
14 444

15
16
17 445 **Contributors :** Mingli Jiao, Jingfu Mao and Qunhong Wu contributed to the
18
19 446 conception and design of the study. Haonan Jia, Huiying Fang, Yameng Wang,
20
21 447 Kexin Jiang, Yuanheng Li, Ying Wang, Lifeng Wei, and Gangyu Zhang contributed
22
23 448 to the data collection. Omar Yacouba Ismael, Haonan Jia and Xiaowen Jia
24
25 449 contributed to literature search and data quality control. Huiying Fang and
26
27 450 Haonan Jia, Ruohui Chen did the statistical analysis and drafted the original
28
29 451 manuscript. Mingli Jiao revised the manuscript for important intellectual content.
30
31 452 Ruohui Chen, Kexin Jiang and Jingqun Li prepared the manuscript and
32
33 453 supplementary material. All authors contributed to data interpretation and
34
35 454 rewriting the paper.
36
37
38
39
40
41
42

43 455 Haonan Jia, Huiying Fang, Ruohui Chen contributed equally to this work. Mingli
44
45 456 Jiao and Jingfu Mao are corresponding author.
46
47
48
49

50 458 **Funding**

51
52
53 459 This study was funded by the Natural Science Foundation of China (Grant
54
55 460 No.71273002, 71473064); New Century Excellent Talents of University from the
56
57 461 Ministry of Education, China (Grant No.1252-NCET02); the China Postdoctoral
58
59
60

1
2
3
4 462 Science Foundation (Grant No.2015M570211, 2016T90181); the Heilongjiang
5
6 463 Provincial Association of Social Sciences (Grant No.15058), and the Collaborative
7
8
9 464 Innovation Centre of Social Risks Governance in Health; Think Tank of Public
10
11 465 Health Security and Health Reform of Heilongjiang Province.

12
13
14 466 **Consent for publication:** Not applicable.

15
16
17 467 **Competing interests:** The authors declare that they have no competing interests.

18
19 468 **Acknowledgements:** We thank the management office and all the participants for
20
21
22 469 data collection.

23
24
25 470 **Data sharing statement:** Data are available from the corresponding author and
26
27 471 investigation hospital upon reasonable request.

28 29 30 472 **Reference**

- 31
32 473 1. Framework guidelines for addressing workplace violence in the health sector.
33
34 474 Geneva, Switzerland,: ISBN, 2002.
- 35
36 475 2. Zhao M, Jiang K, Yang L, et al. The Big Data Research on Violence against Doctors:
37
38 476 Based on the Media Report from 2000 to 2015 *Medicine & Philosophy*
39
40 477 2017;38(01):89-93.
- 41
42 478 3. Liqun Y, Shoufang J, Xiaoxia T, et al. Analysis of prevalence of workplace violence
43
44 479 in staff of two hospitals in Tangshan. *Modern Preventive Medicine*
45
46 480 2006;33(2):147-52.
- 47
48 481 4. Jing G, Pei H, Xiaoli Z, et al. The investigation on coping capacity of nursing staff
49
50 482 to medical workplace violence. *Chinese Nursing Management*
51
52 483 2015;15(6):688-91.
- 53
54 484 5. Lin H, Yan J, Jian W, et al. A survey on effect of workplace violence in hospital on
55
56 485 work-related stress of medical staffs. *Chongqing Medicine*
57
58 486 2012;41(06):590-92.
- 59
60 487 6. Chen ZH, Wang SY, Jing CX, et al. Prevalence of workplace violence in staff of two

- 1
2
3
4 488 hospitals in Guangzhou. *Chinese Journal of Preventive Medicine*
5
6 489 2003;37(5):358.
- 7
8 490 7. Liu H, Zhao S, Jiao M, et al. Extent, nature, and risk factors of workplace violence
9
10 491 in public tertiary hospitals in China: a cross-sectional survey. *International*
11
12 492 *Journal of Environmental Research and Public Health* 2015;12(6):6801-17.
- 13
14 493 8. Zhao S, Liu H, Ma H, et al. Coping with Workplace Violence in Healthcare Settings:
15
16 494 Social Support and Strategies. *International journal of environmental*
17
18 495 *research and public health* 2015;12:14429-44.
- 19
20 496 9. Coate S, Loury GC. Will Affirmative-Action Policies Eliminate Negative
21
22 497 Stereotypes? *The American Economic Review* 1993;83(5):1220-40.
- 23
24 498 10. Hasmath R, Ho B. Job acquisition, retention, and outcomes for ethnic minorities
25
26 499 in urban China. *Eurasian Geography and Economics* 2015;56(1):24-43.
- 27
28 500 11. White paper on medical practice in China: Chinese Medical Doctor Association,
29
30 501 2017.
- 31
32 502 12. Ji H, Tian K, Yunsen Z. Studying on the guarantee of medical professionals' right
33
34 503 of rest and construction of harmonious doctor-patient relationship. *The*
35
36 504 *Chinese Health Service Management* 2016;33(05):368-70.
- 37
38 505 13. Tak S, Sweeney MH, Alterman T, et al. Workplace Assaults on Nursing
39
40 506 Assistants in US Nursing Homes: A Multilevel Analysis. *American Journal of*
41
42 507 *Public Health* 2010;100(10):1938-45.
- 43
44 508 14. Cai W, Deng L, Liu M, et al. Antecedents of Medical Workplace Violence in South
45
46 509 China. *Journal of Interpersonal Violence* 2011;26(2):312-27.
- 47
48 510 15. Liu Y, Deng L, Min Y. Investigation of psychological violence at hospital
49
50 511 workplace in Guangzhou. *Chinese Journal of Public Health*
51
52 512 2009;25(09):1050-51.
- 53
54 513 16. Qianqian W, Lei X. Investigation of workplace violence and influencing factors
55
56 514 of nurses in Pingyang County General Hospital. *Journal of Traditional*
57
58 515 *Chinese Medicine Management* 2016;24(17):18-20.
- 59
60 516 17. Lulu S. The research of prevention of hospital workplace violence based on
517 517 game theory – through the analysis of hospital, patient, and media as game

- 1
2
3
4 518 role players. Jilin University, 2014.
- 5
6 519 18. Jiao M, Ning N, Li Y, et al. Workplace violence against nurses in Chinese
7
8 520 hospitals: a cross-sectional survey. *Bmj Open* 2015;5(3):e006719.
- 9
10 521 19. Sun P, Zhang X, Sun Y, et al. Workplace Violence against Health Care Workers
11
12 522 in North Chinese Hospitals: A Cross-Sectional Survey. *International Journal*
13
14 523 *of Environmental Research and Public Health* 2017;14(1):96.
- 15
16 524 20. Baukje M, Ryan H, Anita LL, et al. Prevalence of abusive encounters in the
17
18 525 workplace of family physicians: a minor, major, or severe problem?
19
20 526 *Canadian Family Physician Médecin De Famille Canadien* 2010;56(3):e101.
- 21
22 527 21. Campbell JC, Jill Theresa M, Joan K, et al. Workplace violence: prevalence and
23
24 528 risk factors in the safe at work study. *Journal of Occupational &*
25
26 529 *Environmental Medicine* 2011;53(1):82.
- 27
28 530 22. Lyn Q. Workplace bullying in junior doctors: questionnaire survey. *British*
29
30 531 *Medical Journal* 2002;324(7342):878-79.
- 31
32 532 23. Jane B, Geoff P. At breaking point: A survey of the wellbeing and working lives
33
34 533 of nurses in 2005. London, England: Royal College of Nursing, 2006.
- 35
36 534 24. Giga SI, Hoel H, Lewis D. A Review of Black and Minority Ethnic (BME)
37
38 535 Employee Experiences of Workplace Bullying. 2008
- 39
40 536 25. Keshet Y, Popper-Giveon A. Race-based experiences of ethnic minority health
41
42 537 professionals: Arab physicians and nurses in Israeli public healthcare
43
44 538 organizations. *Ethnicity & Health* 2017;23(4):1-18.
- 45
46 539 26. Dehghan-Chaloshtari S, Ghodousi A. Factors and Characteristics of Workplace
47
48 540 Violence Against Nurses: A Study in Iran. *Journal of Interpersonal Violence*
49
50 541 2017:088626051668317.
- 51
52 542 27. Kang C. Cultural differences between Tibetans and ethnic Han Chinese in
53
54 543 ultimatum bargaining experiments. *Journal of Political Economy*
55
56 544 2009;25(1):78-84.
- 57
58 545 28. Perloff RM, Bonder B, Ray GB, et al. Doctor-patient communication, cultural
59
60 546 competence, and minority health: Theoretical and empirical perspectives.
547 547 *American Behavioral Scientist* 2006;49(6):835-52.

- 1
2
3
4 548 29. Beech B, Leather P. Workplace violence in the health care sector: A review of
5 549 staff training and integration of training evaluation models. *Aggression and*
6
7 550 *Violent Behavior* 2006;11(1):27-43.
- 8
9 551 30. Hahn S, Zeller A, Needham I, et al. Patient and visitor violence in general
10
11 552 hospitals: A systematic review of the literature. *Aggression and Violent*
12
13 553 *Behavior* 2008;13(6):431-41.
- 14
15 554 31. Siying W, Wei Z, Huangyuan L, et al. Workplace violence and influencing factors
16
17 555 among medical professionals in China. *American Journal of Industrial*
18
19 556 *Medicine* 2012;55(11):1000-08.
- 20
21 557 32. Algwaiz WM, Alghanim SA. Violence exposure among health care professionals
22
23 558 in Saudi public hospitals. A preliminary investigation. *Saudi Medical*
24
25 559 *Journal* 2012;33(1):76.
- 26
27 560 33. Carluccio A, Knychala V, Marshall C. Violence against frontline NHS staff.
28
29 561 London: NHS Security Management Service, 2010.
- 30
31 562 34. Flannery RB, Walker AP. Characteristics of four types of patient assaults: six
32
33 563 year analysis of the Assaulted Staff Action Program (ASAP). *Psychiatric*
34
35 564 *Quarterly* 2011;82(1):11-21.
- 36
37 565 35. Kitaneh M, Hamdan M. Workplace violence against physicians and nurses in
38
39 566 Palestinian public hospitals: a cross-sectional study. *Bmc Health Services*
40
41 567 *Research* 2012;12(1):1-9.
- 42
43 568 36. Arimatsu M, Wada K, Yoshikawa T, et al. An epidemiological study of work-
44
45 569 related violence experienced by physicians who graduated from a medical
46
47 570 school in Japan. *Journal of Occupational Health* 2008;50(5):357-61.
- 48
49 571 37. Hills D, Joyce C. A review of research on the prevalence, antecedents,
50
51 572 consequences and prevention of workplace aggression in clinical medical
52
53 573 practice. *Aggression and Violent Behavior* 2013;18(5):554-69.
- 54
55 574 38. Coker AL, Smith PH, Thompson MP, et al. Social support protects against the
56
57 575 negative effects of partner violence on mental health. *Journal of Women's*
58
59 576 *Health & Gender-based Medicine* 2002;11(5):465-76.
- 60 577 39. Arnetz JE, Arnetz BB. Implementation and evaluation of a practical

- 1
2
3
4 578 intervention programme for dealing with violence towards health care
5
6 579 workers. *Journal of Advanced Nursing* 2000;31(3):668-80.
- 7
8 580 40. Ramezaninia J, Naghibi Sistani M, Ahangari Z, et al. Comparison of the effect of
9
10 581 toothbrushing education via video, lecture and pamphlet on the dental
11
12 582 plaque index of 12-year-old children. *Children* 2018;5(4):50.
- 13
14 583 41. Li F, Jiang F, Jin X-M, et al. Cost-efficiency assessment of 3 different pediatric
15
16 584 first-aid training models for caregivers and teachers in Shanghai. *Pediatric
17
18 585 emergency care* 2011;27(5):357-60.
- 19
20 586 42. Lees A, Rock W. A Comparison between Written, Verbal, and Videotape Rral
21
22 587 Hygiene Instruction for Patients with Fixed Appliances. *British Journal of
23
24 588 Orthodontics* 2000;27(4):323-28.
- 25
26 589 43. Meloy JR. Pathologies of attachment, violence, and criminality. *Handbook of
27
28 590 Psychology* 2003:509-26.
- 29
30 591 44. Meloy JR. The psychopathic mind: Origins, dynamics, and treatment: Rowman
31
32 592 & Littlefield 1988.
- 33
34 593 45. Heckemann B, , Zeller A, , Hahn S, , et al. The effect of aggression management
35
36 594 training programmes for nursing staff and students working in an acute
37
38 595 hospital setting. A narrative review of current literature. *Nurse Education
39
40 596 Today* 2015;35(1):212-19.
- 41
42 597 46. Moore PV, Simonowitz JA, Rigdon JE, et al. Workplace violence: prevention
43
44 598 efforts by the occupational health nurse. *AAOHN Journal* 1997;45(6):305-
45
46 599 18.
- 47
48 600 47. Guidelines for preventing workplace violence for health care social service
49
50 601 workers. Guidelines for preventing workplace violence for health care
51
52 602 social service workers: Occupational Safety Health Administration 2004.
- 53
54 603 48. Healthcare workers wear helmets to work for safety: Sina; 2006 [Available
55
56 604 from:[http://news.sina.com.cn/s/p/2006-12-
57
58 605 25/064711876752.shtml](http://news.sina.com.cn/s/p/2006-12-25/064711876752.shtml)2006.
- 59
60 606

STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *cross-sectional studies*

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	2
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	2-3
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	3-6
Objectives	3	State specific objectives, including any prespecified hypotheses	6
Methods			
Study design	4	Present key elements of study design early in the paper	6
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	6-8
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants	8
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	7-8
Data sources/ measurement	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	7-9
Bias	9	Describe any efforts to address potential sources of bias	-
Study size	10	Explain how the study size was arrived at	8
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	8-9
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	8-9
		(b) Describe any methods used to examine subgroups and interactions	-
		(c) Explain how missing data were addressed	-
		(d) If applicable, describe analytical methods taking account of sampling strategy	-
		(e) Describe any sensitivity analyses	-
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	8
		(b) Give reasons for non-participation at each stage	8
		(c) Consider use of a flow diagram	-
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	10
		(b) Indicate number of participants with missing data for each variable of interest	-
Outcome data	15*	Report numbers of outcome events or summary measures	10-20
Main results	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	10-20
		(b) Report category boundaries when continuous variables were categorized	10-16
		(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	18	Summarise key results with reference to study objectives	21
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	26-27
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	21-26
Generalisability	21	Discuss the generalisability (external validity) of the study results	27
Other information			
Funding	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	28

*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

Workplace violence against healthcare professionals in multi-ethnicity area: A cross-sectional study in southwest China

Journal:	<i>BMJ Open</i>
Manuscript ID	bmjopen-2020-037464.R2
Article Type:	Original research
Date Submitted by the Author:	27-Jun-2020
Complete List of Authors:	Jia, Haonan; Harbin Medical University, Department of Health Policy and Hospital Management Fang, Huiying; Qingdao Women and Children's Hospital, President's Office Chen, Ruohui; Harbin Medical University, Department of Health Policy and Hospital Management Jiao, Mingli; Harbin Medical University, Department of Health Policy and Hospital Management; Chinese Academy of Social Sciences Wei, Lifeng; Harbin Medical University, Department of Health Policy and Hospital Management Zhang, Gangyu; Harbin Medical University, Department of Health, Policy and Hospital Management Li, Yuanheng; Harbin Medical University, Department of Health Policy and Hospital Management Wang, Ying; Harbin Medical University, Department of Health Policy and Hospital Management Wang, Yameng; Harbin Medical University, Department of Health Policy and Hospital Management Jiang, Kexin; General Hospital of Heilongjiang Agricultural Reclamation, Medical department Li, Jingqun; No 1 People's Hospital of Heihe, Department of Cardiology Jia, Xiaowen; No 1 People's Hospital of Heihe, Department of General Surgery Ismael, Omar Yacouba; Harbin Medical University, Department of Health Policy and Hospital Management Mao, Jingfu; Harbin Medical University, Department of Human Resource Management Wu, Qunhong; Harbin Medical University, Department of Social Medicine
Primary Subject Heading:	Public health
Secondary Subject Heading:	Medical management, Occupational and environmental medicine
Keywords:	Health & safety < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, PUBLIC HEALTH, Health policy < HEALTH SERVICES ADMINISTRATION & MANAGEMENT

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60





I, the Submitting Author has the right to grant and does grant on behalf of all authors of the Work (as defined in the below author licence), an exclusive licence and/or a non-exclusive licence for contributions from authors who are: i) UK Crown employees; ii) where BMJ has agreed a CC-BY licence shall apply, and/or iii) in accordance with the terms applicable for US Federal Government officers or employees acting as part of their official duties; on a worldwide, perpetual, irrevocable, royalty-free basis to BMJ Publishing Group Ltd ("BMJ") its licensees and where the relevant Journal is co-owned by BMJ to the co-owners of the Journal, to publish the Work in this journal and any other BMJ products and to exploit all rights, as set out in our [licence](#).

The Submitting Author accepts and understands that any supply made under these terms is made by BMJ to the Submitting Author unless you are acting as an employee on behalf of your employer or a postgraduate student of an affiliated institution which is paying any applicable article publishing charge ("APC") for Open Access articles. Where the Submitting Author wishes to make the Work available on an Open Access basis (and intends to pay the relevant APC), the terms of reuse of such Open Access shall be governed by a Creative Commons licence – details of these licences and which [Creative Commons](#) licence will apply to this Work are set out in our licence referred to above.

Other than as permitted in any relevant BMJ Author's Self Archiving Policies, I confirm this Work has not been accepted for publication elsewhere, is not being considered for publication elsewhere and does not duplicate material already published. I confirm all authors consent to publication of this Work and authorise the granting of this licence.

1 **Workplace violence against healthcare professionals in multi-**
2 **ethnicity area: A cross-sectional study in southwest China**

3 Haonan Jia^{a*}, Huiying Fang^{b*}, Ruohui Chen^{a*}, Mingli Jiao^{a,c}✉, Lifeng Wei^a, Gangyu
4 Zhang^a, Yuanheng Li^a, Ying Wang^a, Yameng Wang^a, Kexin Jiang^d, Jingqun Li^e,
5 Xiaowen Jia^f, Omar Yacouba Ismael^a, Jingfu Mao^g✉, Qunhong Wu^h

6 *a Department of Health Policy and Hospital Management, Harbin Medical University,*
7 *Nangang District, Harbin, China;*

8 *b President's Office, Qingdao Women and Children's Hospital, Shibei District,*
9 *Qingdao, China;*

10 *c Chinese Academy of Social Science, Institute of Quantitative & Technical Economics,*
11 *Dongcheng District, Beijing China;*

12 *d Medical department, General Hospital of Heilongjiang Agricultural Reclamation,*
13 *Harbin 150088, China*

14 *e Department of Cardiology, No.1 People's Hospital of Heihe, Aihui District, Heihe,*
15 *China;*

16 *f Department of General Surgery, No.1 People's Hospital of Heihe, Aihui District,*
17 *Heihe, China;*

18 *g Department of Human Resource Management, Harbin Medical University, Nangang*
19 *District, Harbin, China;*

20 *h Department of Social Medicine, Harbin Medical University, Nangang District,*
21 *Harbin, China*

22 *Contributed Equally

1
2
3
4 **23 Corresponding author:**
5

6
7 24 Mingli Jiao, Harbin Medical University, 157 Baojian Road, Nangang District, Harbin,
8
9 25 Heilongjiang, 150086, China. Email: minglijiao@126.com. Tel:+86 13613675693
10

11
12 26 Jingfu Mao, Harbin Medical University, 157 Baojian Road, Nangang District, Harbin,
13
14 27 Heilongjiang, 150086, China. Email: mjfhyd@yeah.com. Tel:+86 13836134966
15
16

17 **28 Word count:** 3932
18

19 **29 Abstract**
20

21
22 30 Objective: The purpose of this study is to examine workplace violence (WPV)
23
24 31 towards healthcare professionals in multi-ethnicity area of China, including
25
26 32 prevalence, influencing factors, healthcare professionals' response to WPV,
27
28 33 expected anti-violence training measures and content, and evaluation of WPV
29
30 34 interventions.
31
32

33
34 35 Design: A cross-sectional study.
35
36

37
38 36 Setting: A Grade III Class A hospital in the capital of Yunnan province, which is the
39
40 37 province with most kinds of ethnic minorities groups in China.
41
42

43
44 38 Participants: In total, 2,036 healthcare professionals participated with a response
45
46 39 rate was 83.79%.
47

48
49 40 Results: The prevalence of physical and psychological violence was 5.4% and
50
51 41 43.7%, respectively. Healthcare professionals who were ethnic minorities were
52
53 42 more likely to experience psychological violence (OR=1.54, 95%CI=1.16-2.05).
54

55
56 43 After stratified by gender, males who were ethnic minorities suffered more
57
58 44 physical violence (OR=3.31, 95%CI=1.12-9.79), while females suffered
59
60

1
2
3
4 45 psychological violence (OR=1.71, 95%CI=1.24-2.36). We also found a unique
5
6 46 work situation in China—overtime duty on call work (6 pm-7 am) was a risk factor
7
8
9 47 of psychological violence (OR=1.40, 95%CI=1.02-1.93). Ethnic minority
10
11 48 healthcare professionals less likely ordered perpetrators to stop or reported to
12
13
14 49 superiors when facing psychological violence. Ethnic minority healthcare
15
16
17 50 professionals are more interested in receiving training of force skills and self-
18
19
20 51 defense. Both Han and ethnic minority participants considered security measures
21
22 52 as the most useful intervention, while changing the time of shift as the most
23
24
25 53 useless one.

26
27 54 Conclusion: Our study comprehensively described WPV towards healthcare
28
29
30 55 professionals in multi-ethnicity minority area. More WPV research conducted in
31
32 56 multi-ethnicity area are needed.

33
34
35 57 **Keyword:** Workplace violence; healthcare professionals; multi-ethnicity area

36
37
38 58 **Strengths and limitations**

- 39
40 59 ✧ Although lots of studies investigated WPV in hospital, few of them were
41
42 60 conducted in multi-ethnicity minority area.
- 43
44 61 ✧ Previous studies paid attention to a single part of WPV whereas our study
45
46 62 describes WPV comprehensively including prevalence, influencing factor,
47
48 63 response to WPV.
- 49
50 64 ✧ Due to recall bias or reporting bias resulting from shame and stigma, the
51
52 65 number of violent events in the past 12 months may be underestimated.
- 53
54 66 ✧ Our study did not explain WPV using cultural factors, which further studies
55
56
57
58
59
60

1
2
3
4 67 can investigate.
5

68 **1. Introduction**

69 In December 2019, a doctor was brutally killed by a patient's family member in
70 Beijing. Less than a month later, another doctor in Beijing hospital was stabbed
71 and severely injured. These two cases once again drew great attention to the safety
72 of healthcare professionals in the Chinese society.

73 Workplace violence (WPV) was defined as "incidents where employees are
74 abused, threatened, assaulted or subject to other offensive acts or behaviors in
75 circumstances related to their work", which includes two types: (1) physical
76 violence (e.g., beating, kicking, slapping, stabbing, shooting, pushing, biting, and
77 pinching) and (2) psychological violence (e.g., threat of physical force against
78 another person or group that can result in harm to physical, mental, spiritual,
79 moral, or social development)¹. WPV towards healthcare professionals is an
80 extremely serious problem in China, which is happening for a long time. There
81 were less than 290 severe WPV towards healthcare workers reported by media
82 from 2000 to 2015². The seriousness of WPV towards healthcare professionals in
83 China leads to great attention from researchers. Most of researches that studied
84 WPV prevalence of China were conducted in the area where the Han people (the
85 main ethnic group in China) mainly live and rates of physical and psychological
86 violence were 6.4%–35.4% and 54.4%–79.8%, respectively³⁻⁸. However, there
87 were few WPV studies conducted in multi-ethnicity area of China. According to the
88 latest national census in 2010, ethnic minorities account for 8.49% of the total

1
2
3
4 89 population in China. In multi-ethnicity area, the proportion and ethnic diversity of
5
6 90 both ethnic minority patients and healthcare professionals is higher. In addition,
7
8
9 91 there is preferential treatment policy in education for Chinese ethnic minorities
10
11 92 (lower threshold to receive high level of education), which may make ethnic
12
13
14 93 minority workers' capabilities undervalued ^{9 10}. However, since healthcare
15
16
17 94 professionals require high level of skill and education, it is still unknown whether
18
19
20 95 the ethnic minority healthcare professionals' ability and skill would be
21
22 96 undervalued that can lead to patients' distrust with even more WPV occurrence. It
23
24
25 97 is essential to provide more information of WPV in the multi-ethnicity area thus
26
27 98 conducting specific interventions. In addition, limited studies from other counties
28
29
30 99 and regions focus on WPV towards healthcare professionals in multi-ethnicity
31
32
33 100 areas.

34
35 101 Although many studies have investigated the influence factor of WPV towards
36
37 102 healthcare professionals, an essential factor has been neglected. In China, more
38
39
40 103 than 90% healthcare professionals work more than eight hours a day, which
41
42
43 104 makes overtime work a common phenomenon ¹¹. Since the medical system
44
45
46 105 requires healthcare professionals in charge to be responsible for their patients at
47
48
49 106 any time, duty on call has become a form of overtime work. Healthcare workers
50
51 107 need to be on 24 hours standby and be able to return to hospital if patients are in
52
53
54 108 an acute or severe situation, even when they have already got off work or having
55
56 109 a rest ¹². Previous studies found that workload was associated with WPV
57
58
59 110 victimization ^{13 14}. However, limited WPV studies focused on relationship between
60

1
2
3
4 111 WPV experience and the exact form of overtime.
5

6 112 Most previous WPV studies have only investigated a part of WPV, such as
7
8
9 113 prevalence, influencing factors, or interventions. In this study, we aim to
10
11 114 investigate WPV in a general hospital of multi-ethnicity area, including the
12
13
14 115 prevalence, influencing factors, response to WPV and evaluation of WPV
15
16
17 116 intervention, which could not only interpret WPV from a broader perspective, but
18
19
20 117 also provide more reference for practice.
21

22 118 **2. Methods**

23 24 25 119 *2.1 Study population*

26
27 120 Yunnan, located in southwestern border of China, has the greatest diversity of
28
29
30 121 ethnic minorities in China, containing 52 of 56 ethnic groups (51 ethnic minority
31
32
33 122 groups and Han). In 2017, 33.6% residents in Yunnan were ethnic minority groups.
34

35 123 We conducted a retrospective survey in a Grade III Class A hospital in Kunming,
36
37
38 124 the capital of Yunnan Province. The hospital was founded in 1939 and is the first
39
40
41 125 Grade III Class A hospital in Yunnan Province. It is one of the most capable general
42
43
44 126 hospitals in Yunnan, containing 2,400 open beds and over 2 million annual total
45
46
47 127 visits. Around 18.6% of the hospital's employees were ethnic minorities at the
48
49
50 128 time of the study. As a medical center in the province, it has a wide radiation range,
51
52
53 129 and patients from all over the province come to the hospital seeking medical
54
55
56 130 treatment.

57 131 *2.2 Questionnaire*

58 132 A questionnaire developed jointly by the International Labor Office (ILO),
59
60

1
2
3
4 133 International Council of Nurses (ICN), World Health Organization (WHO), and
5
6 134 Public Services International (PSI) in 2003 was used to measure WPV ¹. First, we
7
8
9 135 asked for permission to use the questionnaire from the ILO and WHO. Thereafter,
10
11
12 136 we translated it into Mandarin Chinese and back translated it into English to verify
13
14 137 the accuracy of the Mandarin version. After this translation processed, 17 experts
15
16
17 138 in the field of healthcare were invited to assess the effectiveness of the
18
19
20 139 measurement tools, including the applicability of culture and the appropriateness
21
22
23 140 of language. We selected 79 medical staff to form a group and conducted a two-
24
25 141 week test-retest reliability test (0.83).

26
27 142 The questionnaire included the following sections: (1) demographics (e.g.,
28
29
30 143 gender, age, education, ethnicity, occupation) and work status (e.g., shift work,
31
32
33 144 overtime duty on call work, participation in anti-violence training, anxiety
34
35 145 regarding WPV); (2) experience of physical violence in the past 12 months (i.e.,
36
37
38 146 intentional behavior that harms healthcare workers physically); (3) experience of
39
40
41 147 psychological violence in the past 12 months (i.e., verbal abuse, threatening events,
42
43
44 148 and sexual harassment); (4) healthcare professionals' response to physical
45
46
47 149 violence and psychological violence; (5) the expected measures (e.g., leaflets,
48
49
50 150 video, lecture) and content of anti-violence training (e.g., WPV cognition, self-
51
52
53 151 defense; (6) the evaluation of usefulness of WPV interventions.

53 152 *2.3 Sample and data collection*

54
55
56 153 First, we obtained permission from the hospital management office and human
57
58
59 154 resource department to collect employee's information in the hospital. Thereafter,
60

1
2
3
4 155 the person in charge of each unit issued a questionnaire to the staff and informed
5
6 156 them of the instructions and precautions. The study subjects included doctors,
7
8
9 157 nurses, medical technicians who participated voluntarily and remained
10
11
12 158 anonymous.

13
14 159 The respondents were asked to provide their experience of WPV in the previous
15
16
17 160 12 months, therefore, we excluded employees who met any of the following
18
19
20 161 criteria: (1) less than 1 year of work experience in this hospital; (2) short-term
21
22 162 secondment or training (less than 12 months); (3) personnel who did not come to
23
24
25 163 work during the study period due to traveling, training, vacation, and so on.

26
27 164 The questionnaire had to be completed by employees themselves and could not
28
29
30 165 be answered by any other person. The time of data collection ranged from July to
31
32
33 166 October 2017. A total of 2,036 valid questionnaires were collected, and the
34
35 167 effective response rate was 83.79%.

36 37 168 *2.4 Data analysis*

38
39
40 169 Descriptive statistics were used to summarize the demographic characteristics,
41
42
43 170 prevalence of physical and psychological violence and the response to WPV
44
45
46 171 between Han and ethnic minority participants. Chi-square test and Fisher's exact
47
48
49 172 were used to compare the difference of response to WPV between Han and ethnic
50
51 173 minority healthcare workers.

52
53 174 Since ethnic minority participants were almost 1/5 of Han participants in our
54
55
56 175 data collection, the result may be biased if we used the original data to conduct
57
58
59 176 logistic regression. To control confounders and to balance the number of Han and
60

1
2
3
4 177 ethnic minority samples, propensity score matching (PSM) was used. The PSM
5
6 178 model used the ethnicity as a dependent variable, and age, gender, marriage status,
7
8
9 179 educational background, and years of work experience as explanatory variables.
10
11 180 We matched the group of ethnic minority healthcare professionals (treatment
12
13
14 181 group) to the group of Han healthcare professionals (control group) in a 1:2
15
16
17 182 manner to create two groups. These two groups had similar explanatory variables
18
19 183 (age, gender, marriage status, educational background, years of work experience)
20
21
22 184 and different dependent variable – ethnicity, which could control confounders and
23
24
25 185 highlighted the comparison between Han and ethnic minority healthcare
26
27 186 professionals. After matching, a set of 960 cases were created, with 325 ethnic
28
29
30 187 minority and 635 Han healthcare professionals. The matched set was used to
31
32
33 188 identify the factors associated with WPV in hospitals using logistic regression.
34
35 189 Since the proportion of male and female was almost 1:3, we also conducted logistic
36
37
38 190 regression stratified by gender.

39
40 191 The data were entered using Epidata 3.1 and analyzed using IBM SPSS Statistics
41
42
43 192 22.0. The significance level was set at 0.05.

44 45 193 *2.5 Ethics approval*

46
47
48 194 This study was reviewed and approved by the Research Ethics Committee of
49
50
51 195 Harbin Medical University and the investigation hospital (Project Identification
52
53 196 Code: HMUIRB20160014). All the respondents were provided with informed
54
55
56 197 consent, which described the purpose and method of data collection and kept the
57
58
59 198 data confidential.
60

199 *2.6 Patient and public involvement*

200 No patients were involved in the whole process of the research.

201 **3. Results**

202 *3.1 Demographic characteristics*

203 Table 1 shows the demographic details of the 509 men and 1,527 women who
 204 participated in the study. Around 84% of respondents were of “Han ethnicity”,
 205 while 16% were ethnic minorities. A majority of respondents were nurses (42.7%)
 206 and physicians (31.5%), 12.5% were medical technology workers, the rest (11.6%)
 207 held other positions. Most of the respondents (70.2%) worked in rotational shifts,
 208 and 74.2% engaged in overtime work (from 6 pm to 7 am the next day), such as
 209 overtime or emergency consultation. Over half reported high or extremely high
 210 levels of anxiety regarding WPV (58.9%) and participated in anti-violence training
 211 (67.5%). As for the prevalence of WPV, 43.7% of the respondents reported that
 212 they had experienced psychological violence, while 5.4% reported physical
 213 violence.

215 **Table 1. Demographic information and the prevalence of workplace violence**

216 (N=2036)

	n	%
Gender		
Male	509	25.0%
Female	1527	75.0%

Age		
≤30	940	46.2%
31–45	789	38.8%
≥46	207	15.1%
Marital status		
Single	603	29.6%
Married	1389	68.2%
Divorced/widowed	44	2.2%
Education background		
College graduates	448	22.0%
Bachelor	1207	59.3%
Master's and above	381	18.7%
Ethnicity		
Han	1711	84.0%
Minority	325	16.0%
Years of work experience		
1–5	570	28.0%
6–10	548	26.9%
11–20	413	20.3%
>20	505	24.8%
Profession		

Physician	624	30.6%
Nurse	869	42.7%
Medical technology	294	14.4%
Others	249	12.3%
Work in shift		
Yes	1429	70.2
No	607	29.8
Overtime duty on call		
work (6 pm-7 am)		
Yes	1510	74.2%
No	526	25.8%
Anxiety level		
Never	103	5.1%
Low	219	10.8%
Moderate	513	25.2%
High	360	17.7%
Extremely high	841	41.2%
Anti-violence training		
Yes	1374	67.5%
No	662	32.5%
Physical violence		
Yes	110	5.4%

No	1926	94.5%
Psychological violence		
Yes	889	43.7%
No	1147	56.3%

217 *3.2 Influencing factors*

218 Table 2 shows the results of the logistic regression analysis of physical and
 219 psychological violence using the matched set (unstratified and stratified by
 220 gender), including P-values, odds ratios (OR) and 95% confidence intervals
 221 (95%CI). The unstratified results showed that female respondents had lower odds
 222 of experiencing physical violence than males did (OR=0.29, 95%CI=0.15-0.55).
 223 Respondents with anxiety level towards WPV had higher odds of physical violence
 224 (OR=1.88, 95%CI=1.34-2.62). After stratified by gender, the results showed that
 225 the educational background of masters and above (OR=7.49, 95%CI=1.27-44.04),
 226 ethnic minority (OR=3.31, 95%CI=1.12-9.79), anxiety level towards WPV
 227 (OR=2.46, 95%CI=1.35-4.48) were associated with physical violence occurrence
 228 for males, while only anxiety level towards WPV (OR=1.84, 95%CI=1.17-2.88)
 229 was statistically significant in physical violence experience for females.

230 As for psychological violence, minority medical workers had higher odds of
 231 experiencing it than workers of Han ethnicity (OR=1.54, 95%CI=1.16-2.05).
 232 Engaging in overtime work from 6 pm to 7 am the following day was also a risk
 233 factor of psychological violence (OR=1.40, 95%CI=1.02-1.93). Anxiety level about
 234 WPV was also negatively associated with psychological violence (OR=1.50,

1
2
3
4 235 95%CI=1.33-1.70). When stratified by gender, females who were ethnic
5
6
7 236 minorities (OR=1.71, 95%CI=1.24-2.36) were more likely to suffer psychological
8
9 237 violence, while anti-violence training (OR=0.71, 95%CI=0.51-0.99) was
10
11 238 positively associated with psychological violence; both males (OR=1.48,
12
13
14 239 95%CI=1.14-1.92) and females (OR=1.51, 95%CI=1.31-1.74) with higher
15
16
17 240 anxiety levels towards WPV were associated with WPV victimization.
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

241

Table 2. Results of logistic regression of physical and psychological violence (N=960)

	Physical violence			Psychological violence		
	Unstratified	Stratified		Unstratified	Stratified	
		Male	Female		Male	Female
Gender						
Male	Reference	-	-	Reference	-	-
Female	0.29(0.15-0.55) ***	-	-	0.99(0.71-1.40)	-	-
Ethnicity						
Han		Reference			Reference	
Minority	1.57(0.86-2.87)	3.31(1.12-9.79) *	1.18(0.53-2.63)	1.54(1.16-2.05) **	1.07(0.56-2.03)	1.71(1.24-2.36) **
Age (years)						
≤30		Reference			Reference	
31-45	1.26(0.27-6.01)	3.25(0.07-160.96)	0.76(0.09-6.36)	1.11(0.55-2.23)	0.77(0.19-3.14)	1.46(0.64-3.33)

1							
2							
3							
4							
5	≥46	1.44(0.43-4.80)	0.52 (0.01-19.40)	2.41(0.45-12.84)	0.80(0.46-1.42)	0.49(0.16-1.51)	1.10(0.55-2.18)
6							
7							
8	Marital status						
9							
10	Single		Reference			Reference	
11							
12							
13	Married	0.47(0.08-2.77)	0.10(0.01-1.86)	0.97(0.09-10.92)	0.85(0.30-2.44)	0.57(0.05-6.35)	0.85(0.26-2.78)
14							
15	Divorced/widowed	0.46(0.09-2.41)	0.32(0.02-4.84)	0.57(0.06-5.42)	0.95(0.34-2.62)	0.78(0.08-7.99)	0.88(0.28-2.75)
16							
17							
18	Educational background						
19							
20							
21	College graduates		Reference			Reference	
22							
23	Bachelors	0.98(0.35-2.75)	0.92(0.10-8.70)	0.69(0.21-2.28)	0.92(0.58-1.47)	1.18(0.50-2.83)	0.88(0.50-1.55)
24							
25	Masters and above	1.36(0.55-3.38)	7.49(1.27-44.04)*	0.45(0.15-1.38)	1.20(0.79-1.83)	1.16(0.55-2.45)	1.23(0.74-2.07)
26							
27							
28	Years of work experience						
29							
30							
31	1-5		Reference			Reference	
32							
33							
34	6-10	0.82(0.20-3.31)	1.00(0.02-51.35)	0.99(0.18-5.59)	0.54(0.28-1.02)	0.60(0.16-2.24)	0.51(0.24-1.08)
35							
36	11-20	0.50(0.14-1.81)	0.77(0.02-35.11)	0.51(0.10-2.53)	0.72(0.42-1.28)	0.62(0.19-2.03)	0.72(0.36-1.42)
37							
38							
39							
40							
41							
42							
43							
44							
45							
46							

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46

>20	0.80(0.27-2.36)	1.37(0.04-53.89)	0.85(0.25-2.84)	1.34(0.80-2.23)	1.44(0.46-4.50)	1.24(0.69-2.22)
Work in shift						
Yes	1.16(0.58-2.35)	0.87(0.26-2.94)	1.51(0.59-3.86)	1.17(0.85-1.61)	1.28(0.65-2.52)	1.12(0.78-1.63)
No	Reference			Reference		
Overtime duty on call work (6 pm-7 am)						
Yes	0.88(0.43-1.78)	1.34(0.31-5.86)	0.73(0.31-1.72)	1.40(1.02-1.93) *	1.26(0.57-2.78)	1.41(0.99-2.00)
No	Reference			Reference		
Anxiety level	1.88(1.34-2.62) ***	2.46(1.35-4.48) **	1.84(1.17-2.88) **	1.50(1.33-1.70) ***	1.48(1.14-1.92) ***	1.51(1.31-1.74) ***
Anti-violence training						
Yes	1.25(0.65-2.43)	3.29(0.87-12.47)	0.89(0.39-2.02)	0.80(0.59-1.06)	1.09(0.56-2.12)	0.71(0.51-0.99) *
No	Reference			Reference		

242 Note: (*): p<0.05; (**): p<0.01; (***): p<0.001. All the variables in each logistic regression models were mutually adjusted.

1
2
3
4 243 *3.3 Participants' response to WPV*
5

6 244 Table 3 shows the different response to psychological/physical violence
7
8
9 245 between Han and ethnic minority healthcare professionals. More Han healthcare
10
11 246 professionals ordered perpetrators to stop (OR=0.64, 95%CI=0.45-0.91) and
12
13
14 247 reported to superiors (OR=0.56, 95%CI=0.40-0.79) than ethnic minorities when
15
16
17 248 psychological violence happened, and this difference was statistically significant.
18
19 249 As for the physical violence, compared to ethnic minority, more Han healthcare
20
21
22 250 professionals chose to respond in all ways except pretending nothing happened.
23
24
25 251 However, none of the difference was statistically significant.
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

Table 3. Response to psychological and physical violence

	Psychological violence					Physical Violence				
	Han (N=727)		Ethnic minority (N=162)		OR (95%CI)	Han (N=88)		Ethnic minority (N=22)		OR (95%CI)
	n	%	n	%		n	%	n	%	
Pretend nothing happened	216	29.71	49	30.25	1.03(0.71-1.49)	6	6.82	4	18.18	3.04(0.78-11.88)
Order to stop	324	44.57	55	33.95	0.64(0.45-0.91)***	27	30.68	3	13.64	0.36(0.10-1.31)
Talk to families or friends	474	65.20	114	70.37	1.27(0.88-1.84)	21	23.86	4	18.18	0.71(0.22-2.33)
Psychological counseling	70	9.63	23	14.20	1.55(0.94-2.57)	9	10.23	2	9.09	0.88(0.18-4.39)
Talk to colleague	631	86.80	131	80.86	0.64(0.41-1.01)	33	37.50	6	27.27	0.63(0.22-1.76)
Change department	47	6.46	13	8.02	1.26(0.67-2.39)	4	4.55	0	0.00	-
Report to superiors	469	64.51	82	50.62	0.56(0.40-0.79)***	31	35.23	6	27.27	0.69(0.24-1.94)
Charge perpetrators	28	3.85	4	2.47	0.63(0.22-1.83)	5	5.68	0	0.00	-

1
2
3
4
5
6 253 Note: (*): $p < 0.05$; (**): $p < 0.01$; (***): $p < 0.001$. Han participants as the reference.
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46

For peer review only

254

255 *3.4 Anti-violence training measures and content*

256 Table 4 has shown the anti-violence training measures and content expected by
 257 healthcare professionals. Lectures were the most expected measures of training
 258 both by Han (54.13%) and ethnic minority (52.62%). Pre-job training was
 259 expected from half of ethnic minority healthcare professionals, which was slightly
 260 higher than the proportion of Han healthcare professionals (OR=1.29,
 261 95%CI=1.01-1.63). Wall newspaper and poster were the least popular measures
 262 both by Hans and ethnic minorities. As for the training content, more than 70%
 263 Han and ethnic minority participants expected identification of WPV signs and
 264 escaping training. Compared to Han, ethnic minority healthcare professionals
 265 were more interested in force skills (OR=1.40, 95%CI=1.10-1.78) and self-
 266 defense (OR=1.48, 95%CI=1.10-2.01).

267 **Table 4. Expected measures and contents of anti-violence training (N=2036)**

	Han		Ethnic minority		OR (95%CI)
	n	%	n	%	
Expected training measures					
Leaflets	680	39.74	125	38.46	0.95(0.74-1.21)
Video	759	44.36	145	44.62	1.01(0.80-1.28)
Lectures	926	54.12	171	52.62	0.94(0.74-1.19)
Wall newspaper, poster	435	25.42	77	23.69	0.91(0.69-1.20)
Employee handbooks	507	29.63	93	28.62	0.95(0.73-1.24)

Pre-job training	751	43.89	163	50.15	1.29(1.01-1.63) *
Expected training content					
WPV cognition	891	52.07	177	54.46	1.10(0.87-1.40)
Identification of WPV signs	1242	72.59	234	72.00	0.97(0.75-1.27)
Language skills	1162	67.91	232	71.38	1.18(0.91-1.53)
Force skills	815	47.63	182	56.00	1.40(1.10-1.78) **
Relevant laws and regulations	1113	65.05	223	68.62	1.18(0.91-1.52)
Escaping training	1235	72.18	245	75.38	1.18(0.90-1.55)
Self-defense	1227	71.71	257	79.08	1.48(1.10-2.01) *

268 Note: (*): $p < 0.05$; (**): $p < 0.01$; (***): $p < 0.001$. Han participants as the reference.

269 *3.5 Evaluation of the usefulness of WPV interventions*

270 As for the evaluation of interventions, there were no significant differences
 271 between Han and ethnic minority healthcare professionals. Participants
 272 considered that security measures were the most useful ways to prevent WPV. The
 273 following were improving the environment and anti-violence training. More than
 274 40% considered patient examination and changing the time of shift as useless
 275 measures. There were few differences when stratified by ethnicity. More Han
 276 healthcare workers looked down on the usefulness of protective equipment, while
 277 ethnic minority participants undervalued patient examination and anti-violence
 278 training. However, none of these differences between Han and ethnic minority
 279 were statistically significant. (Table 5)

280

Table 5. Evaluation of the usefulness of WPV interventions (N=2036)

	All participants		Han		Ethnic minority	
	n	%	n	%	n	%
Improve the environment (e.g., enhance lighting)						
Very useful	715	35.12	611	35.71	104	32.00
Somewhat useful	945	46.41	784	45.82	161	49.54
Useless	376	18.47	316	18.47	60	18.46
Restrict non-staff access						
Very useful	591	29.03	513	29.98	78	24.00
Somewhat useful	778	38.21	638	37.29	140	43.08
Useless	667	32.76	560	32.73	107	32.92
Patient examination (e.g., history of committing violence)						
Very useful	498	24.46	429	25.07	69	21.23
Somewhat useful	698	34.28	586	34.25	112	34.46
Useless	840	41.26	696	40.68	144	44.31
Increase manpower						
Very useful	667	32.76	571	33.37	96	29.54
Somewhat useful	796	39.10	663	38.75	133	40.92
Useless	573	28.14	477	27.88	96	29.54
Protective equipment						
Very useful	610	29.96	522	30.51	88	27.08
Somewhat useful	738	36.25	625	36.53	113	34.77

Useless	688	33.79	564	32.96	124	38.15
Change the time of shift						
Very useful	470	23.08	411	24.02	59	18.15
Somewhat useful	699	34.33	578	33.78	121	37.23
Useless	867	42.58	722	42.20	145	44.62
Avoid working alone						
Very useful	659	32.37	568	33.20	91	28.00
Somewhat useful	636	31.24	526	30.74	110	33.85
Useless	741	36.39	617	36.06	124	38.15
Anti-violence training						
Very useful	785	38.56	675	39.45	110	33.85
Somewhat useful	800	39.29	672	39.28	128	39.38
Useless	449	22.05	362	21.16	87	26.77
Security measures						
Very useful	899	44.16	762	44.54	137	42.15
Somewhat useful	932	45.78	779	45.53	153	47.08
Useless	205	10.07	170	9.94	35	10.77

281

282 4. Discussion

283 This study examined the prevalence, influence factors, and response of WPV in a
 284 hospital located in the multi- ethnicity area of China. The percentage of medical
 285 workers of minority ethnicity was substantially higher than previous studies

1
2
3
4 286 conducted in eastern and central China (2.41–7.95%)¹⁵⁻¹⁷. Due to the different
5
6
7 287 investigation tools and time period, it is difficult to compare the WPV prevalence
8
9
10 288 with some other researches. However, compared with our previous studies with
11
12 289 the same questionnaire and time period, the prevalence of physical and
13
14 290 psychological violence in our study are lower than what has been found in areas
15
16
17 291 where Han people mainly lived ^{7 8 18 19}. The results of logistic regression indicated
18
19
20 292 that ethnic minority healthcare professionals maybe more likely to suffer
21
22 293 psychological violence. After stratified by gender, males who were ethnic
23
24 294 minorities were more likely to suffer physical violence, while females from
25
26
27 295 psychological violence. The different results in stratified and unstratified analysis
28
29
30 296 may be due to the proportion of males and females. Namely, in unstratified
31
32 297 analysis, the fact that males suffered more physical violence would be covered by
33
34
35 298 the fact that females suffered more psychological violence. Some studies from
36
37
38 299 other countries or regions showed that ethnic minority healthcare workers were
39
40
41 300 less likely to experience WPV when comparing to the majority (Whites)^{20 21}, while
42
43 301 some studies held the opposite conclusion that ethnic minority healthcare
44
45 302 professionals were more vulnerable in suffering workplace bullying, verbal abuse,
46
47
48 303 physical violence, etc. ²²⁻²⁶ However, due to the huge difference between the
49
50
51 304 background investigation and participants' characteristics, these studies could not
52
53
54 305 be compared with our study. We speculate several reasons for this result. First,
55
56 306 our study showed that there were behavioral differences between Han and ethnic
57
58
59 307 minority, culture and religious beliefs could be key factors in explaining this ²⁷.
60

1
2
3
4 308 Second, our study showed that when facing WPV, compared with Han, ethnic
5
6 309 minority healthcare professionals may be more likely to tolerate it, which may
7
8
9 310 lead to more violence. Third, the language from difference linguistic culture may
10
11 311 hamper the doctor-patient communication, thus lead to violence²⁸. Fourth, ethnic
12
13 312 minority healthcare professionals' ability or skill maybe undervalued by patients,
14
15 313 thus leading to distrust or WPV, which needs further studies to investigate this
16
17 314 phenomenon from the patients' perspective.

21
22 315 Respondents who engaged in overtime duty on call work from 6 pm to 7 am had
23
24 316 greater odds of experiencing psychological violence. This is a new finding in our
25
26 317 study, which has been ignored in most research of China. We speculate several
27
28 318 reasons for this finding. First, our definition of overtime duty on call work might
29
30 319 have captured individuals handling urgent issues. The staff working therein are
31
32 320 more likely to experience higher levels of frustration, distress, cognitive
33
34 321 impairment or arousal^{29 30}, which is similar with the WPV high-risk department
35
36 322 — emergency department. Second, healthcare professionals would face more
37
38 323 aggressive situations such as drunk patients or companions and traumatic
39
40 324 patients caused by fighting. Third, since the on-call work is not during the general
41
42 325 working time, there are less colleagues and guards. We suggest that more effective
43
44 326 measures should be adopted to protect healthcare professionals who engage duty
45
46 327 on-call beyond general working time. Future studies should investigate this
47
48 328 phenomenon in mainly Han living area.

49 329 The result of logistic regression showed that males have higher odds of
50
51
52
53
54
55
56
57
58
59
60

1
2
3
4 330 experiencing physical violence, which is similar to the WPV studies conducted in
5
6 331 the areas that Han mainly lived ^{7 19 31}. In other countries, some studies came to the
7
8
9 332 same conclusion ³²⁻³⁵, while some studies have reported that women were more
10
11 333 vulnerable to physical violence ³⁶. These different results could be attributed to
12
13
14 334 the different study backgrounds ³⁷. In many countries, beliefs, ethics, or moral
15
16
17 335 principles serve as guidance for public behavior. For instance, in some Arab
18
19 336 countries, being a male is a risk factor of experiencing WPV partly because of
20
21
22 337 cultural norms that reject disrespect of females ³⁵. Consistent with other
23
24
25 338 researches ^{7 19} conducted in the areas that Han mainly lives in , our study showed
26
27
28 339 that higher anxiety levels regarding WPV was associated with WPV experience.
29
30 340 Further study should determine whether the anxiety is the predisposition of
31
32
33 341 consequence of WPV occurrence.

34
35 342 Compared to Han, more ethnic minority healthcare professionals pretend
36
37
38 343 nothing happened after suffering physical violence. In addition, they may less
39
40
41 344 likely talk to others about these events, or report to their leaders, or use legal
42
43
44 345 methods. The reason we think there was no statistical significance in this result
45
46
47 346 was that the number of participants who experienced physical violence was small.
48
49
50 347 Despite this, we speculate that this may be due to the cultural belief of ethnic
51
52
53 348 minority that causes them to remain silent. Previous study has proved that talking
54
55
56 349 with others in their surroundings about their WPV was helpful to release their
57
58
59 350 tension or anxiety caused from WPV ³⁸. Since the anxiety towards WPV is
60
351 associated with WPV experience, more social support for the individual, such as

1
2
3
4 352 friends, families, and colleagues, should be provided to help ethnic minority
5
6 353 healthcare professionals manage violence through diverse methods instead of
7
8
9 354 tolerating it by themselves. Previous study has shown that in the environment that
10
11 355 encourages reporting WPV, more incidents of WPV were reported and healthcare
12
13
14 356 workers gained better awareness of risk for violence, as well as how to avoid
15
16
17 357 potential danger, and how to manage aggressive customers ³⁹. An adequate WPV
18
19 358 reporting system should be established to encourage ethnic minority healthcare
20
21
22 359 professionals to report their WPV experience.

23
24 360 It seems that both Han and ethnic minority healthcare professionals are less
25
26
27 361 interested in the textual anti-violence training measures (leaflets, poster, wall
28
29
30 362 newspaper, employee handbook). Although printed materials could summarize
31
32
33 363 content and be learned repeatedly, the lack of practice details makes it less
34
35 364 effective ⁴⁰. Videos hold the advantages such as attractiveness, convenience, clarity
36
37
38 365 of demonstration, superior cost-effectiveness and easy to apply, while lectures
39
40
41 366 contain variety of lively styles such as group interaction and scenario simulation,
42
43 367 which makes them more popular ^{41 42}. Future studies should compare the effect of
44
45
46 368 these measures. Pre-job training is more needed by ethnic minority healthcare
47
48
49 369 workers, which could help them adapt to the work environment better and faster.
50
51 370 As for the training content, ethnic minority healthcare professionals are more
52
53
54 371 interested in tough measures. Since ethnic minorities are more likely to suffer
55
56
57 372 psychological violence, they may perceive more threat thus give rise to the
58
59 373 tendency of handling violence by force ^{43 44}.

1
2
3
4 374 Our findings indicated that there was not much difference in evaluation of
5
6 375 usefulness of WPV intervention between Han and ethnic minority. Security
7
8
9 376 measure is regarded as the most useful intervention of WPV. China has enacted
10
11 377 'Guidance on strengthening the security and protection system construction in
12
13
14 378 hospitals' in 2013, and 'Opinions on strictly punishing medical related crimes and
15
16
17 379 maintaining the medical order' in 2017, to strengthen security of hospital.
18
19 380 However, since these policies served as instructions rather than mandatory
20
21
22 381 regulations, insufficient resource had constrained the implementation in all
23
24
25 382 hospitals. Security measures are not only an intervention that could prevent
26
27 383 healthcare professionals from WPV, but also may enhance the sense of safety as a
28
29
30 384 kind of organizational support. Hospitals should implement specific scale of
31
32
33 385 security measures according to the actual situation. Most participants consider
34
35 386 anti-violence training useful. Although it could increase knowledge and boost
36
37
38 387 confidence, the effect could not reduce of WPV incidents for long-term ⁴⁵. We
39
40 388 suggest that it is essential to make a complete and periodic curriculum for
41
42
43 389 repetitive training. Improving environment, such as enhancing lighting and
44
45
46 390 installing cameras, should be considered as a useful measure. A previous study has
47
48 391 shown that working in a daring environment at night is a risk factor of WPV ⁴⁶.
49
50
51 392 Camera installation is required by Occupational Safety and Health Administration
52
53 393 (OSHA)⁴⁷, which may be a deterrence for committing violence. Using protective
54
55
56 394 equipment is not a popular intervention. In the period of frequent WPV in China,
57
58 395 there are indeed some healthcare workers wearing a helmet at work ⁴⁸. However,
59
60

1
2
3
4 396 this may lead to a more tense doctor-patient relationship. Participants do not trust
5
6
7 397 patient examination and restriction to non-staff access. Due to large hospital
8
9
10 398 scales and treatment numbers, there would be numerous patients admitted to
11
12 399 hospital. The process of patient examination and restriction of non-staff access
13
14 400 would not be serious enough, otherwise the crowded queue and longer waiting
15
16
17 401 time may breed new contradictions. In addition, since there is no system or
18
19
20 402 platform sharing the patient's information between each hospital, it is difficult to
21
22 403 verify WPV history strictly. Although previous studies have shown that work shift
23
24 404 is negatively associated with WPV ^{19 33 35}, changing the time of shift are treated as
25
26
27 405 less useful. It may be better to enhance the protection during shift rather than
28
29
30 406 changing the regulation.

31
32 407 Due to the research purpose and background, most previous WPV studies were
33
34
35 408 conducted in several hospitals, which has several advantages. Firstly, more
36
37
38 409 samples could be collected to make a more reliable conclusion. In addition, the
39
40
41 410 results could reflect common problems in a certain context. However, at the same
42
43
44 411 time, it would neglect some specific factors or characteristics. The investigation
45
46
47 412 conducted in a typical and representative hospital is conducive to examine the
48
49
50 413 relation between specific factors or information and WPV, which could also be an
51
52
53 414 effective reference of practical work for hospitals with similar features. Our study
54
55
56 415 has exploratively examined WPV in multi-ethnicity area using PSM, and which
57
58
59 416 method was conducive to control confounders and minimized the bias caused by
60
417 quantity gap. As a cross-sectional study, the causal conclusion on ethnicity and

1
2
3
4 418 gender could be strengthened by this temporality. In addition, our study has given
5
6 419 a complete report about WPV, including prevalence, influencing factor, healthcare
7
8
9 420 professionals' response to WPV, expected content and measure of anti-violence
10
11 421 training, and healthcare professionals' evaluation of WPV interventions, which
12
13
14 422 was helpful to interpret WPV from wider aspects.

17 423 **5. Limitations**

19 424 This study has a few limitations. First, since the respondents were asked to
20
21
22 425 report WPV that had taken place in the past 12 months, violence might not be
23
24
25 426 adequately reported due to recall bias or reporting bias resulting from shame and
26
27 427 stigma. Second, the study exploratively examined the WPV in multi-ethnicity area
28
29
30 428 but did not conduct in-depth research on the underlying cause by cultural factors.
31
32 429 Third, our study is limited to consider the temporality between the influencing
33
34
35 430 factor and WPV, which makes it difficult to conclude the causation. In addition, the
36
37 431 clustering effect of WPV in several departments were not fully considered, which
38
39
40 432 may affect the standard error of the results. Future research should investigate the
41
42
43 433 perpetrators or patients, especially explore WPV by qualitative methods.

45 434 **6. Conclusion**

48 435 Our study investigated WPV in a hospital located in a multi-ethnicity area.
49
50
51 436 Ethnic minority healthcare professionals may be more likely to suffer WPV and
52
53 437 have different responses to WPV compared to Han. Additionally, we broke through
54
55
56 438 the single focus of existing WPV research and explored WPV from a more
57
58
59 439 comprehensive perspective including prevalence, influencing factors, response to
60

1
2
3
4 440 WPV, expected anti-violence training measures and contents, and evaluation of
5
6 441 interventions, which may provide a practical reference to hospitals with similar
7
8 442 characteristics. Moreover, WPV research should be conducted in multi-ethnicity
9
10 443 areas from the perspective of the perpetrator or patients, especially by qualitative
11
12 444 methods.
13
14
15
16
17 445

18
19 446 **Contributors** : Mingli Jiao, Jingfu Mao and Qunhong Wu contributed to the
20
21 447 conception and design of the study. Haonan Jia, Huiying Fang, Yameng Wang,
22
23 448 Kexin Jiang, Yuanheng Li, Ying Wang, Lifeng Wei, and Gangyu Zhang contributed
24
25 449 to the data collection. Omar Yacouba Ismael, Haonan Jia and Xiaowen Jia
26
27 450 contributed to literature search and data quality control. Huiying Fang and
28
29 451 Haonan Jia, Ruohui Chen did the statistical analysis and drafted the original
30
31 452 manuscript. Mingli Jiao revised the manuscript for important intellectual content.
32
33 453 Ruohui Chen, Kexin Jiang and Jingqun Li prepared the manuscript and
34
35 454 supplementary material. All authors contributed to data interpretation and
36
37 455 rewriting the paper.
38
39
40
41
42
43
44

45 456 Haonan Jia, Huiying Fang, Ruohui Chen contributed equally to this work. Mingli
46
47 457 Jiao and Jingfu Mao are corresponding author.
48
49
50

51 458

53 459 **Funding**

54
55
56 460 This study was funded by the Natural Science Foundation of China (Grant
57
58 461 No.71273002, 71473064); New Century Excellent Talents of University from the
59
60

1
2
3
4 462 Ministry of Education, China (Grant No.1252-NCET02); the China Postdoctoral
5
6 463 Science Foundation (Grant No.2015M570211, 2016T90181); the Heilongjiang
7
8
9 464 Provincial Association of Social Sciences (Grant No.15058), and the Collaborative
10
11 465 Innovation Centre of Social Risks Governance in Health; Think Tank of Public
12
13
14 466 Health Security and Health Reform of Heilongjiang Province.

15
16
17 467 **Consent for publication:** Not applicable.

18
19 468 **Competing interests:** The authors declare that they have no competing interests.

20
21
22 469 **Acknowledgements:** We thank the management office and all the participants for
23
24
25 470 data collection.

26
27 471 **Data sharing statement:** Data are available from the corresponding author and
28
29
30 472 investigation hospital upon reasonable request.

31 32 473 **Reference**

- 33
34
35 474 1. Framework guidelines for addressing workplace violence in the health sector.
36
37 475 Geneva, Switzerland,: ISBN, 2002.
- 38
39 476 2. Zhao M, Jiang K, Yang L, et al. The Big Data Research on Violence against Doctors:
40
41 477 Based on the Media Report from 2000 to 2015 *Medicine & Philosophy*
42
43 478 2017;38(01):89-93.
- 44
45 479 3. Liqun Y, Shoufang J, Xiaoxia T, et al. Analysis of prevalence of workplace violence
46
47 480 in staff of two hospitals in Tangshan. *Modern Preventive Medicine*
48
49 481 2006;33(2):147-52.
- 50
51 482 4. Jing G, Pei H, Xiaoli Z, et al. The investigation on coping capacity of nursing staff
52
53 483 to medical workplace violence. *Chinese Nursing Management*
54
55 484 2015;15(6):688-91.
- 56
57 485 5. Lin H, Yan J, Jian W, et al. A survey on effect of workplace violence in hospital on
58
59 486 work-related stress of medical staffs. *Chongqing Medicine*
60
487 2012;41(06):590-92.

- 488 6. Chen ZH, Wang SY, Jing CX, et al. Prevalence of workplace violence in staff of two
489 hospitals in Guangzhou. *Chinese Journal of Preventive Medicine*
490 2003;37(5):358.
- 491 7. Liu H, Zhao S, Jiao M, et al. Extent, nature, and risk factors of workplace violence
492 in public tertiary hospitals in China: a cross-sectional survey. *International*
493 *Journal of Environmental Research and Public Health* 2015;12(6):6801-17.
- 494 8. Zhao S, Liu H, Ma H, et al. Coping with Workplace Violence in Healthcare Settings:
495 Social Support and Strategies. *International journal of environmental*
496 *research and public health* 2015;12:14429-44.
- 497 9. Coate S, Loury GC. Will Affirmative-Action Policies Eliminate Negative
498 Stereotypes? *The American Economic Review* 1993;83(5):1220-40.
- 499 10. Hasmath R, Ho B. Job acquisition, retention, and outcomes for ethnic minorities
500 in urban China. *Eurasian Geography and Economics* 2015;56(1):24-43.
- 501 11. White paper on medical practice in China: Chinese Medical Doctor Association,
502 2017.
- 503 12. Ji H, Tian K, Yunsen Z. Studying on the guarantee of medical professionals' right
504 of rest and construction of harmonious doctor-patient relationship. *The*
505 *Chinese Health Service Management* 2016;33(05):368-70.
- 506 13. Tak S, Sweeney MH, Alterman T, et al. Workplace Assaults on Nursing
507 Assistants in US Nursing Homes: A Multilevel Analysis. *American Journal of*
508 *Public Health* 2010;100(10):1938-45.
- 509 14. Cai W, Deng L, Liu M, et al. Antecedents of Medical Workplace Violence in South
510 China. *Journal of Interpersonal Violence* 2011;26(2):312-27.
- 511 15. Liu Y, Deng L, Min Y. Investigation of psychological violence at hospital
512 workplace in Guangzhou. *Chinese Journal of Public Health*
513 2009;25(09):1050-51.
- 514 16. Qianqian W, Lei X. Investigation of workplace violence and influencing factors
515 of nurses in Pingyang County General Hospital. *Journal of Traditional*
516 *Chinese Medicine Management* 2016;24(17):18-20.
- 517 17. Lulu S. The research of prevention of hospital workplace violence based on

- 1
2
3
4 518 game theory – through the analysis of hospital, patient, and media as game
5
6 519 role players. Jilin University, 2014.
- 7
8 520 18. Jiao M, Ning N, Li Y, et al. Workplace violence against nurses in Chinese
9
10 521 hospitals: a cross-sectional survey. *Bmj Open* 2015;5(3):e006719.
- 11
12 522 19. Sun P, Zhang X, Sun Y, et al. Workplace Violence against Health Care Workers
13
14 523 in North Chinese Hospitals: A Cross-Sectional Survey. *International Journal*
15
16 524 *of Environmental Research and Public Health* 2017;14(1):96.
- 17
18 525 20. Baukje M, Ryan H, Anita LL, et al. Prevalence of abusive encounters in the
19
20 526 workplace of family physicians: a minor, major, or severe problem?
21
22 527 *Canadian Family Physician Médecin De Famille Canadien* 2010;56(3):e101.
- 23
24 528 21. Campbell JC, Jill Theresa M, Joan K, et al. Workplace violence: prevalence and
25
26 529 risk factors in the safe at work study. *Journal of Occupational &*
27
28 530 *Environmental Medicine* 2011;53(1):82.
- 29
30 531 22. Lyn Q. Workplace bullying in junior doctors: questionnaire survey. *British*
31
32 532 *Medical Journal* 2002;324(7342):878-79.
- 33
34 533 23. Jane B, Geoff P. At breaking point: A survey of the wellbeing and working lives
35
36 534 of nurses in 2005. London, England: Royal College of Nursing, 2006.
- 37
38 535 24. Giga SI, Hoel H, Lewis D. A Review of Black and Minority Ethnic (BME)
39
40 536 Employee Experiences of Workplace Bullying. 2008
- 41
42 537 25. Keshet Y, Popper-Giveon A. Race-based experiences of ethnic minority health
43
44 538 professionals: Arab physicians and nurses in Israeli public healthcare
45
46 539 organizations. *Ethnicity & Health* 2017;23(4):1-18.
- 47
48 540 26. Dehghan-Chaloshtari S, Ghodousi A. Factors and Characteristics of Workplace
49
50 541 Violence Against Nurses: A Study in Iran. *Journal of Interpersonal Violence*
51
52 542 2017:088626051668317.
- 53
54 543 27. Kang C. Cultural differences between Tibetans and ethnic Han Chinese in
55
56 544 ultimatum bargaining experiments. *Journal of Political Economy*
57
58 545 2009;25(1):78-84.
- 59
60 546 28. Perloff RM, Bonder B, Ray GB, et al. Doctor-patient communication, cultural
547 547 competence, and minority health: Theoretical and empirical perspectives.

- 1
2
3
4 548 *American Behavioral Scientist* 2006;49(6):835-52.
- 5
6 549 29. Beech B, Leather P. Workplace violence in the health care sector: A review of
7
8 550 staff training and integration of training evaluation models. *Aggression and*
9
10 551 *Violent Behavior* 2006;11(1):27-43.
- 11
12 552 30. Hahn S, Zeller A, Needham I, et al. Patient and visitor violence in general
13
14 553 hospitals: A systematic review of the literature. *Aggression and Violent*
15
16 554 *Behavior* 2008;13(6):431-41.
- 17
18 555 31. Siying W, Wei Z, Huangyuan L, et al. Workplace violence and influencing factors
19
20 556 among medical professionals in China. *American Journal of Industrial*
21
22 557 *Medicine* 2012;55(11):1000-08.
- 23
24 558 32. Algwaiz WM, Alghanim SA. Violence exposure among health care professionals
25
26 559 in Saudi public hospitals. A preliminary investigation. *Saudi Medical*
27
28 560 *Journal* 2012;33(1):76.
- 29
30 561 33. Carluccio A, Knychala V, Marshall C. Violence against frontline NHS staff.
31
32 562 London: NHS Security Management Service, 2010.
- 33
34 563 34. Flannery RB, Walker AP. Characteristics of four types of patient assaults: six
35
36 564 year analysis of the Assaulted Staff Action Program (ASAP). *Psychiatric*
37
38 565 *Quarterly* 2011;82(1):11-21.
- 39
40 566 35. Kitaneh M, Hamdan M. Workplace violence against physicians and nurses in
41
42 567 Palestinian public hospitals: a cross-sectional study. *Bmc Health Services*
43
44 568 *Research* 2012;12(1):1-9.
- 45
46 569 36. Arimatsu M, Wada K, Yoshikawa T, et al. An epidemiological study of work-
47
48 570 related violence experienced by physicians who graduated from a medical
49
50 571 school in Japan. *Journal of Occupational Health* 2008;50(5):357-61.
- 51
52 572 37. Hills D, Joyce C. A review of research on the prevalence, antecedents,
53
54 573 consequences and prevention of workplace aggression in clinical medical
55
56 574 practice. *Aggression and Violent Behavior* 2013;18(5):554-69.
- 57
58 575 38. Coker AL, Smith PH, Thompson MP, et al. Social support protects against the
59
60 576 negative effects of partner violence on mental health. *Journal of Women's*
577 *Health & Gender-based Medicine* 2002;11(5):465-76.

- 1
2
3
4 578 39. Arnetz JE, Arnetz BB. Implementation and evaluation of a practical
5
6 579 intervention programme for dealing with violence towards health care
7
8 580 workers. *Journal of Advanced Nursing* 2000;31(3):668-80.
- 9
10 581 40. Ramezaninia J, Naghibi Sistani M, Ahangari Z, et al. Comparison of the effect of
11
12 582 toothbrushing education via video, lecture and pamphlet on the dental
13
14 583 plaque index of 12-year-old children. *Children* 2018;5(4):50.
- 15
16 584 41. Li F, Jiang F, Jin X-M, et al. Cost-efficiency assessment of 3 different pediatric
17
18 585 first-aid training models for caregivers and teachers in Shanghai. *Pediatric*
19
20 586 *emergency care* 2011;27(5):357-60.
- 21
22 587 42. Lees A, Rock W. A Comparison between Written, Verbal, and Videotape Rral
23
24 588 Hygiene Instruction for Patients with Fixed Appliances. *British Journal of*
25
26 589 *Orthodontics* 2000;27(4):323-28.
- 27
28 590 43. Meloy JR. Pathologies of attachment, violence, and criminality. *Handbook of*
29
30 591 *Psychology* 2003:509-26.
- 31
32 592 44. Meloy JR. The psychopathic mind: Origins, dynamics, and treatment: Rowman
33
34 593 & Littlefield 1988.
- 35
36 594 45. Heckemann B, , Zeller A, , Hahn S, , et al. The effect of aggression management
37
38 595 training programmes for nursing staff and students working in an acute
39
40 596 hospital setting. A narrative review of current literature. *Nurse Education*
41
42 597 *Today* 2015;35(1):212-19.
- 43
44 598 46. Moore PV, Simonowitz JA, Rigdon JE, et al. Workplace violence: prevention
45
46 599 efforts by the occupational health nurse. *AAOHN Journal* 1997;45(6):305-
47
48 600 18.
- 49
50 601 47. Guidelines for preventing workplace violence for health care social service
51
52 602 workers. Guidelines for preventing workplace violence for health care
53
54 603 social service workers: Occupational Safety Health Administration 2004.
- 55
56 604 48. Healthcare workers wear helmets to work for safety: Sina; 2006 [Available
57
58 605 from:[http://news.sina.com.cn/s/p/2006-12-](http://news.sina.com.cn/s/p/2006-12-25/064711876752.shtml)
59
60 606 [25/064711876752.shtml](http://news.sina.com.cn/s/p/2006-12-25/064711876752.shtml)2006.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

607

For peer review only

STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *cross-sectional studies*

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(a) Indicate the study’s design with a commonly used term in the title or the abstract	2
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	2-3
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	3-6
Objectives	3	State specific objectives, including any prespecified hypotheses	6
Methods			
Study design	4	Present key elements of study design early in the paper	6
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	6-8
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants	8
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	7-8
Data sources/ measurement	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	7-9
Bias	9	Describe any efforts to address potential sources of bias	-
Study size	10	Explain how the study size was arrived at	8
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	8-9
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	8-9
		(b) Describe any methods used to examine subgroups and interactions	-
		(c) Explain how missing data were addressed	-
		(d) If applicable, describe analytical methods taking account of sampling strategy	-
		(e) Describe any sensitivity analyses	-
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	8
		(b) Give reasons for non-participation at each stage	8
		(c) Consider use of a flow diagram	-
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	10
		(b) Indicate number of participants with missing data for each variable of interest	-
Outcome data	15*	Report numbers of outcome events or summary measures	10-20
Main results	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	10-20
		(b) Report category boundaries when continuous variables were categorized	10-16
		(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	18	Summarise key results with reference to study objectives	21
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	26-27
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	21-26
Generalisability	21	Discuss the generalisability (external validity) of the study results	27
Other information			
Funding	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	28

*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.