

# The Occupational Stress from Workplace Violence and the 2019-nCoV Pandemic in Chinese Healthcare Professionals: A Mobile App-Based Survey

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## Research

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# Abstract

**Objectives:** To investigate the medical occupational risk and stress level of workplace violence (WPV) and novel coronavirus 2019 (2019-nCoV) pandemic in Chinese healthcare professionals (HPs).

**Methods:** A national questionnaire survey was created to investigate HPs from 21 provinces of China. Seven questions in environment part and eight questions in stress part were used to assess medical occupation risk and stress respectively. Categorical data were statistically analyzed using chi-square tests. Structural equation model was performed to examine the correlations and differences among experiences of WPV, the 2019-nCoV pandemic, and occupational stress.

**Results:** Totally, 1241 HPs completed the online survey from March 1st, 2020 to May 25th, 2020. The majority of the participants thought the current Chinese medical occupation was in inferior circumstance ( $n = 433$ , 34.89%), at high risk ( $n = 1082$ , 81.19%) and was in middle class ( $n = 717$ , 57.78%). Work-related stress ranked first of medical occupational risk ( $n = 786$ , 63.34%). When being asked the possibility for their children to choose medicine, most HPs were uncertain ( $n = 542$ , 43.67%) or opposed ( $n = 547$ , 44.08%). More HPs thought there was no stress under 2019-nCoV pandemic ( $n = 303$ , 24.42%) than that under WPV ( $n = 48$ , 3.87%). WPV (Stress index = 3.23) put more pressure on HPs than the 2019-nCoV pandemic did (Stress index = 2.33) with significant difference ( $P = 0.006$ ). WPV had a positive relationship with increasing doctor-patient conflicts ( $E=0.5$ ,  $P=0.000$ ), and a negative correlation with ego-enhancement ( $E=-0.2$ ,  $P=0.000$ ) and public concern ( $E=-0.2$ ,  $P=0.000$ ). The 2019-nCoV pandemic had a positive correlation with ego-enhancement ( $E=0.09$ ,  $P=0.006$ ), the public's concern ( $E=0.1$ ,  $P=0.002$ ) and healthcare reform ( $E=0.1$ ,  $P=0.000$ ).

**Conclusions:** Most HPs believe that the current environment for Chinese medical occupation is abominable and at high risk. Compared with WPV, the 2019-nCoV pandemic increases personal risks and reduces psychological stress to HPs. WPV weakens enthusiasm and significantly intensifies doctor-patient conflicts.

## Plain English Summaries

To explore the risk of medical occupation in China and differences in occupational stress between workplace violence (WPV) and the 2019-nCoV pandemic, and examine the relationship between the 2019-nCoV pandemic and working enthusiasm among Chinese healthcare professionals (HPs). We did a mobile App-based questionnaire survey. Totally, 1241 HPs completed the online survey from March 1st, 2020 to May 25th, 2020.

Compared with WPV, the 2019-nCoV pandemic posed more personal risks and less psychological stress to HPs. WPV weakened working enthusiasm and significantly intensified doctor-patient conflict. The 2019-nCoV pandemic increased the practicing enthusiasm and was unrelated to doctor-patient conflict. Our findings also indicated that most HPs believed that the current practice environment for Chinese medical workers was poor. Work-related stress account for the first place of occupation risk. Most

participants regard their social status as the middle level and the social status of HPs has not changed after the outbreak.

## Introduction

The rising violence against healthcare professionals (HPs) is common around the world<sup>1</sup>, which is worse in India and China<sup>2-5</sup>. According to the statistical data of the National Health Commission, there are about one million medical disputes each year in China, averaging 40 in each medical institution<sup>6</sup>. In mainland China, workplace violence (WPV) from patients and their relatives/friends has increased rapidly in the past 20 years<sup>6</sup>. Cross-sectional studies in different regions of China have documented the prevalence of physical violence in workplace. The rate for WPV nearly doubled from 4.5% in 2008 to 8.3% in 2012. From 2013 to 2017, 288 violent incidents against Chinese HPs were publicly reported, and 67.0% -77.6% Chinese HPs faced intimidation, verbal and/or physical violence at work<sup>7</sup>. Another study counted the WPV incidents in China from 2000 to 2020<sup>8</sup>. Total 345 medical incidents occurred, of which 54 resulted in murder. Other forms of violence, such as disrespect or verbal aggression towards HPs, are even more frequent. WPV against HPs has become increasingly common recent years, making clinical medicine in China to be a high-risk career<sup>9</sup>.

On December 31st, 2019, the first detected severe acute respiratory syndrome (SARS) case caused by novel coronavirus 2019-nCoV was reported and confirmed in Wuhan, China. The ongoing 2019-nCoV pandemic has caused anxiety and depression around the world. HPs are on the front line fighting against the 2019-nCoV pandemic, facing a high infection risk and suffering from great psychological stress<sup>10,11</sup>. According to the survey, 38.7% of the HPs had mental stress during the 2019-nCoV pandemic period<sup>12</sup>. This stress not only reduced HPs motivation, increased turnover rates, but also has lasting effects on their physical and mental health. Therefore, a safe and harmonious workplace is vital to HPs' efficiency and long-term health<sup>2</sup>.

The aims of present study are to explore the risk of medical occupation in China and differences in occupational stress between WPV and the 2019-nCoV pandemic, and examine the relationship between the 2019-nCoV pandemic and working enthusiasm among Chinese HPs.

## Methods

### Survey target and structure

We launched an mobile app-based survey from March 1st, 2020 to May 25th, 2020. Chinese HPs were eligible for the study by WeChat (the largest mobile messaging app in China, which has around 1.08 billion monthly active users<sup>13</sup>). The questionnaire was self-designed on the basis of consulting a large amount of literature and had been revised after a pilot study and experts' evaluation (Figure 1). The questionnaire is consisted of 35 questions from three parts: general information, medical occupation

environment, medical occupation stress. Seven questions in environment part, eight questions (4 pairing questions) in stress part were used to assess medical occupation risk and stress respectively.

## **Survey procedure**

This survey was created on an app called Questionnaire Star (<https://www.wjx.cn/>). A uniform resource locator (URL) link of the survey was generated through this app. Next, we applied the snowball sampling method<sup>14</sup> to recruit participants, during which we took advantage of trusted interpersonal relationships among HPs. The volunteers posted the URL to their working WeChat Groups (“Wei XinQun” in Chinese) and WeChat Moments (“Peng You Quan” in Chinese), where all their HPs could easily obtain (Figure 1).

## **Ethical considerations**

This survey did not involve human specimens, which based on the questionnaire. During this survey, China is in a period of national blockade. Therefore, there was no ethical application.

## **Data processing and statistical analysis**

The collected questionnaires were reviewed manually. All data were clustered into a database, double-checked, and locked. The Statistical Product and Service Solutions (SPSS) 20.0 was used to analyze the data. Continuous variations were presented as median and range or as mean  $\pm$  standard deviation (SD) according to their distribution. Categorical variation were described by percentage and analyzed by chi-square tests. Linear regression model was used to examine whether gender, age, degree, major, professional title, hospital-level are predictive factors of medical occupation environment. The structural equation model was used to examine the correlations among experiences of violence, the 2019-nCoV pandemic, and occupational stress. A *P*-value of  $<0.05$  was considered statistically significant.

# **Results**

## **Participant characteristics**

The characteristics of the participants were summarized in Table 1. Totally, 1241 HPs from 21 provinces completed the online questionnaire. In terms of age, 38.03% ( $n = 472$ ) were between 31 to 40 years old, and 24.58% ( $n = 305$ ) were from 26 to 30. Most of the HPs were female ( $n = 826, 66.56\%$ ), and 92.02% ( $n = 1142$ ) had bachelor degree or above. Most of the participants had junior professional title ( $n = 535, 43.11\%$ ). Doctors, medical technicians, and nurses took up 65.67% ( $n = 815$ ), 7.41% ( $n = 92$ ), and 26.91% ( $n = 334$ ), respectively.

Table 1

Participant Characteristics (N = 1241), and P value of differences among different participants and medical occupational environment.

Variable	n(%)	Occupational Environment	Occupational Risk	Risk Classification	Children's medical education
		M±SD	M±SD	M±SD	M±SD
<b>Gender</b>					
Male	415(33.4)	3.38±1.002	1.73±0.768	2.59±0.930	3.25±0.753
Female	826(66.56)	3.16±0.899	1.64±0.708	2.62±0.943	3.31±0.747
F/t		0.000	0.038	0.587	0.133
<b>Age</b>					
18~25	96(7.74)	3.2±0.936	1.83±0.627	2.7±1.007	3.17±0.706
26~30	305(24.58)	3.19±0.909	1.83±0.8	2.61±0.933	3.29±0.691
31~40	472(38.03)	3.25±0.996	1.57±0.702	2.55±0.932	3.37±0.702
41~50	278(22.4)	3.27±0.894	1.6±0.692	2.69±0.926	3.21±0.851
51~60	80(6.45)	3.28±0.886	1.65±0.731	2.66±0.954	3.23±0.856
>60	10(0.81)	2.8±0.919	1.8±0.632	2.4±0.966	3.3±0.823
F/t		0.602	0.000	0.378	0.035
<b>Education Associate Degree</b>					
Junior's	99(7.98)	3.07±0.992	1.65±0.812	2.66±1.002	3.24±0.834
Bachelor's	702(56.57)	3.18±0.953	1.61±0.705	2.58±0.935	3.29±0.75
Master's	332(26.75)	3.38±0.89	1.72±0.723	2.65±0.929	3.35±0.703
Doctoral	108(8.7)	3.25±0.908	1.89±0.777	2.67±0.937	3.12±0.782
<i>p</i>		0.004	0.001	0.593	0.401
<b>Profession</b>					
Doctor	815(65.67)	3.42±0.893	1.64±0.707	2.67±0.932	3.34±0.737
Medical technician	92(7.41)	3.11±0.931	1.83±0.705	2.41±1.018	3.15±0.797
Nurse	334(26.91)	2.81±0.916	1.7±0.783	2.52±0.919	3.2±0.753
<i>p</i>		0.000	0.037	0.005	0.002

Variable	n(%)	Occupational Environment	Occupational Risk	Risk Classification	Children's medical education
		M±SD	M±SD	M±SD	M±SD
<b>Professional Title</b>					
Junior title	535(43.11)	3.29±0.957	1.51±0.66	2.59±0.916	3.34±0.725
Intermediate title	400(32.23)	3.36±0.908	1.62±0.675	2.7±0.938	3.35±0.771
Senior title	306(24.66)	3.26±0.843	1.64±0.718	2.73±0.951	3.2±0.892
<i>p</i>		0.014	0.000	0.255	0.092
<b>Hospital Level</b>					
Three	841(67.77)	3.22±0.94	1.68±0.719	2.54±0.92	3.31±0.724
Two	317(25.54)	3.27±0.957	1.55±0.704	2.79±0.957	3.35±0.772
One	19(1.53)	3.16±0.958	1.79±0.976	2.84±1.015	2.68±1.057
Other	64(5.16)	3.17±0.865	2.08±0.762	2.64±0.966	2.91±0.684
<i>p</i>		0.779	0.000	0.001	0.000

## Characteristics of medical occupation environment

Most participants thought the current professional environment of Chinese medical occupation was terrible ( $n = 433, 34.89\%$ ), and only 18.77% ( $n = 223$ ) of them thought it was good (Table 2). Significant differences were observed in the evaluation of Chinese medical professional environment in terms of gender, education associate degree, profession and professional title ( $P = 0.000, 0.004, 0.000, 0.014$ ) (Table 1). Chinese medical professional environment was better in the sight of female HPs, professional degree HPs, junior professional title HPs, and the nursing staves than others. Most participants thought medical occupation was at high risk ( $n = 1082, 81.19\%$ ) (Table 2). The subjective medical occupational risk degrees were different considering different ages, degrees, professional titles, and hospital-level, respectively ( $P = 0.000, 0.001, 0.000, 0.000$ ) (Table 1). The risk was higher in HPs between 31-60 years, and with intermediate professional titles (Junior and Bachelor), than others. Work-related stress ranked first among medical occupational risks ( $n = 786, 63.34\%$ ), followed by security threat from doctor-patient conflict ( $n = 368, 29.65\%$ ), physical injury from medical work ( $n = 31, 2.5\%$ ), and legal liability ( $n = 56, 4.51\%$ ) (Table 2). Medical occupational risk was various among different professionals, and hospital-levels ( $P = 0.005, 0.001$ ) HPs (Table 1).

Table 2  
 Characteristics of medical occupation environment (N=1241)

Variable	n(%)
<b>Occupational Environment</b>	
Good	223(18.77)
General	585(47.14)
Poor	433(34.89)
<b>Occupational Risk</b>	
High	1082(81.19)
General	144(11.6)
Low	14(1.13)
No	1(0.08)
<b>Risk Classification</b>	
Physical and mental stress (high load work)	786(63.34)
Physical injury	31(2.5)
Legal liability	56(4.51)
Physical safety (doctor-patient conflict)	368(29.65)
<b>Do you agree to children's medical education</b>	
Encourage	34(2.74)
Agree	118(9.51)
Uncertain	542(43.67)
Opposition	547(44.08)
<b>Social Status</b>	
Upper level	22(1.77)
Middle level	717(57.78)
Lower level	502(40.45)
<b>After the 2019-nCoV epidemic, do you think the social status of medical workers will change?</b>	
Worse	23(1.85)

\*Choose "worse" (n=23) or "better" (n=389) of social status to answer this question.



Variable	n(%)
No change	829(66.8)
Better	389(31.35)
<b>Duration of social status change*</b>	<b>n=412</b>
>10 years	50(12.14)
5-10 years	53(12.86)
3-5 years	73(17.72)
1-3 years	143(34.71)
< 1 year	93(22.57)
*Choose “wore” (n=23) or “better” (n=389) of social status to answer this question.	

When being asked whether they hope their children chose medicine as an occupation, most tHPs were uncertain (n = 542, 43.67%) or opposed (n = 547, 44.08%); a few HPs supported (n = 152, 12.25%) (Table 2). Different ages, professionals and hospital-levels have their own views of children's medical career ( $P = 0.035, 0.002, 0.000$ ) (Table 1). Most participants thought social status of medical staffs was in middle level (n = 717, 57.78%), or low level (40.45%); only a few thought it was at top of society (n = 22, 1.77%). After the outbreak of 2019-nCoV pneumonia, most of the participants thought the social status of HPs was not changed (n = 829, 66.8%). Among participants who thought their social status was improved (n = 389, 31.35%) during this special period, 57.28% (n = 236) thought the change would not last for more than 3 years (Table 2).

## Characteristics and influences of WPV and the 2019-nCoV pandemic on mental stress

More than a half of the participants felt a little stress in face of WPV (n = 779, 62.77%) and the 2019-nCoV pandemic (n = 772, 62.21%). More participants thought there was no stress under the 2019-nCoV pandemic (n = 303, 24.42%) comparing with that of WPV (n = 48, 3.87%). WPV (Stress index = 3.23) put more stress on HPs than the 2019-nCoV pandemic did (Stress index = 2.33) with significant difference ( $P = 0.006$ ). Negative effect (n = 937, 75.5%) of WPV was stronger than positive effect (n = 191, 15.39%) on HPs. The positive, none, and negative effect of the 2019-nCoV pandemic was 35.13% (n = 436), 26.51% (n = 329), 38.36% (n = 449), respectively (Table 3).

Table 3  
Experiences of WPV, 2019-nCoV epidemic and occupational stress.

	Medical violence n(%)	2019-nCoV epidemic n(%)
<b>Occupational Stress</b>		
No stress	48(3.87)	303(24.42)
A little bit stress	779(62.77)	772(62.21)
Greater stress	319(25.71)	150(12.09)
Very high stress	95(7.66)	16(1.29)
<b>Stress Level</b>		
1	24(2.01%)	29(3.09%)
2	150(12.57%)	201(21.43%)
3	529(44.34%)	436(46.48%)
4	355(29.76%)	209(22.28%)
5	135(11.32%)	63(6.72%)
Mean*	3.23	2.33
<i>P</i>	0.0059	
<b>Practice Influence</b>		
Positive impact	191(15.39)	436(35.13)
No effect	113(9.11)	329(26.51)
negative effect	937(75.5)	476(38.36)
* Mean scores for participants' stress scores in violence and 2019-nCoV epidemic. $P < 0.05$ .		

## The influences of WPV and the 2019-nCoV pandemic on occupational stress

The different influences of WPV and the 2019-nCoV pandemic on occupational stress was provided in Table 4. Both WPV and the 2019-nCoV epidemic were negatively associated with physical and mental health ( $E=1$ ,  $P=0.000$ / $E=1$ ,  $P=0.000$ ), personal safety ( $E=1$ ,  $P=0.000$ / $E=0.9$ ,  $P=0.000$ ), and confidence of employees ( $E=0.8$ ,  $P=0.000$ / $E=0.4$ ,  $P=0.000$ ). WPV also had a significant positive relation with doctor-patient conflict ( $E=0.5$ ,  $P=0.000$ ), negative relation with HPs' willingness to improve ( $E=-0.2$ ,  $P=0.000$ ) and the public's concern for HPs ( $E=-0.2$ ,  $P=0.000$ ). The 2019-nCoV epidemic was positively associated with

ego-enhancement (E=0.09, P=0.006), the public's concern for HPs (E=0.1, P=0.002), and reform of medical system (E=0.1, P=0.000).

Table 4  
Correlations among WPV,2019-nCoV epidemic and occupational stress

	Estimate	Std.Err	z-value	P(> z )
<b>Medical violence</b>				
Threaten the physical and mental health of medical staff	1.000			
Threaten the personal safety of medical staff	1.006	0.026	38.520	0.000
Promote medical staff to improve medical technology	-0.239	0.054	-4.429	0.000
Shake the confidence of medical practitioners and weaken their enthusiasm	0.801	0.036	22.441	0.000
Promote the public to understand and sympathize with the medical staff	-0.219	0.047	-4.620	0.000
Deterioration of doctor-patient relationship	0.543	0.047	11.594	0.000
Promote the reform of national medical system	0.025	0.047	0.528	0.597
<b>2019-nCoV epidemic</b>				
Threaten the physical and mental health of medical staff	1.000			
Threaten the personal safety of medical staff	0.934	0.045	20.628	0.000
Promote medical staff to improve medical technology	0.095	0.035	2.728	0.006
Shake the confidence of medical practitioners and weaken their enthusiasm	0.442	0.041	10.844	0.000
Promote the public to understand and sympathize with the medical staff	0.108	0.035	3.122	0.002
Harmonious doctor-patient relationship	0.053	0.035	1.503	0.133
Promote the reform of national medical system	0.134	0.035	3.825	0.000

## Discussion

To the best of our knowledge, this is the first study to investigate the differences in occupational stress between WPV and the 2019-nCoV pandemic among Chinese HPs. Compared with WPV, the 2019-nCoV pandemic posed more personal risks and less psychological stress to HPs. WPV weakened working enthusiasm and significantly intensified doctor-patient conflict. The 2019-nCoV pandemic increased the practicing enthusiasm and was unrelated to doctor-patient conflict. Our findings also indicated that most HPs believed that the current practice environment for Chinese medical workers was poor. Work-related

stress account for the first place of occupation risk. Most participants regard their social status as the middle level and the social status of HPs has not changed after the outbreak .

Compared with WPV, the 2019-nCoV pandemic posed more physical risks to HPs. Jia, H. et al.<sup>15</sup> indicated that the prevalence rate of psychological violence in WPV was 34.6%-62.03%, while that of physical violence was 3.77%-4.73%. High infectivity of the 2019-nCoV, obscure diagnosis and treatment plan, and the shortage of protective materials increased the infection risk of HPs. Korth, J. et al.<sup>16</sup> confirmed that the front-line workers (nurses and allied clinical services, 28%) had a significantly higher 2019-nCoV prevalence rate than administrative workers did (19%).

This study found that WPV significantly increased the psychological stress of HPs, weakened the practicing enthusiasm, and intensified the doctor-patient conflict. Once WPV occurs, HPs may face the risk of being abused or assaulted by patients<sup>9,17,18</sup>. Verbal and physical violence can significantly increase HP's anxiety and depression. There is evidence that HPs are at the highest risk of threats and physically abuses at workplace<sup>19,20</sup>. WPV can significantly increase absenteeism, tension the working atmosphere, and lower staff morale. These not only weaken practicing confidence and enthusiasm but also aggravate negative emotions of both doctors and patients.

The 2019-nCoV pandemic brought less psychological stress compared with WPV did. Meanwhile, it increased the practicing enthusiasm, and was unrelated to doctor-patient conflict. During the 2019-nCoV pandemic, HPs rushed to the frontline regardless of personal safety and took risks in spite of difficulties. Their selfless actions were widely praised and shared by Chinese public on social media<sup>21</sup>. HPs received widespread social support. Xiao, H. et al.<sup>22</sup> indicated that social support reduced anxiety and stress, improved mood and self-efficacy, and led to more understanding, respect, encouragement, courage, and a sense of professional achievement to HPs<sup>23</sup>. In our study, the 2019-nCoV pandemic didn't weaken HPs' enthusiasm and confidence in clinical work. On the contrary, most HPs showed a sense of collective honor, and they also believed that the 2019-nCoV pandemic might be beneficial for the medical system to reform.. Wang, W. et al<sup>12</sup> indicated that during the 2019-nCoV period, the prevalence of WPV was relatively lower (20.4%)<sup>12</sup> than it used to be in previous studies in China (59.64% -76.2%)<sup>24,25</sup>. The 2019-nCoV pandemic improves the mutual consideration between doctors and patients. During the 2003 SARS outbreak, promoted relationships between patients and HPs were also noted but was temporary. This crisis can provide an opportunity for the public to regain their trust in HPs.

This study found that the current environment for Chinese medical occupation was not good and at high risk. This may be related to frequent occurrence of physical conflicts, long-term overloaded work, poor treatment and so on<sup>26</sup>. In this study, doctors thought that their environment was worse than that of nurses. Falfiora, E. et al.<sup>27</sup> showed that nurses were more likely to experience verbal violence than doctors. Anand, T. et al.<sup>28</sup> showed that doctors were more often victims of physical violence. The possible reason is that the most serious harm may be resulted from physical violence which is primarily related to doctors. In our study, HPs between 31-60 years old, with low educational background (junior and

bachelor), or with a junior professional title thought that the occupational risk was higher. A study from the University of Oslo<sup>29</sup> also pointed out that young doctors are more vulnerable than senior doctors under WPV. J. Sun's indicated that the older, lower-educated physicians with lower titles often have more psychological pressure, less self-confidence, and fewer social support<sup>30</sup>.

Work-related stress ranked the first of occupational risk. The possible reason is that HPs are mostly dealing with difficult tasks and heavy pressure. Meanwhile, competition for a promotion is fierce. The frequent occurrences of discourteous behaviors such as medical disputes, insults and physical harm, bring much stress to HPs. Furthermore, in Chinese healthcare reform, doctors and nurses are under heavier stress to cure more patients, meet with more administrative requirements, and comply with more government regulations.

In China, the labor shortage of HPs is becoming more and more serious<sup>31,32</sup>. In a survey, only 4.5% physicians wanted their children to be medical doctors in the future (in 2014)<sup>33</sup>. In our study, the proportion was 12.25%, which was higher than that in previous studies, possibly on account of the reduction of WPV against HPs in China since the institution of new laws and policies with stricter enforcement in 2015 (Chinese Medical Doctor Association (CMDA), 2015)<sup>34</sup>. The trust between doctors and patients has been improved through continuous medical reform, equitable diagnosis and treatment and positive media portrayal<sup>33,35</sup>.

The middle and temporarily stable social status of HPs was concluded from this study. This may also be the result of increasing negative medical events in recent years, selective coverages of the media as for the one-sided pursuit of sensational effects, failure of the legal rights and profits of clinicians being not well protected<sup>7</sup>. Feng, D. et al.<sup>36</sup> showed that most HPs had a relatively negative understanding of their occupational status.

This study has limitations. Most of the participants are not on the front line against the 2019-nCoV pandemic, which limits generalizability. Future studies should attempt to increase this population.

## Conclusions

Most HPs believe that the current practice environment for Chinese medical workers is abominable and at high risk. The primary occupation risk factor is work-related stress. In HPs' opinion, their social status is at the middle level and has not changed after the outbreak. Compared with WPV, the 2019-nCoV pandemic posed more personal risks and less psychological stress to HPs. WPV weakened working enthusiasm and significantly intensified doctor-patient conflict. The 2019-nCoV pandemic increased the practicing enthusiasm and was unrelated to the doctor-patient conflict.

## Abbreviations

2019 Novel Coronavirus: 2019-nCoV

healthcare professionals: HPs

workplace violence: WPV

uniformresourcelocator: URL

Statistical Product and Service Solutions: SPSS

## Declarations

### Ethics approval and consent to participate

Not applicable

### Consent for publication

Not applicable

### Availability of data and materials

The datasets are available from the corresponding author on reasonable request.

### Competing interests

The authors declare that they have no competing interests

### Funding

Not applicable

### Authors' contributions

Q.L. conceived and designed the study. C.S., L.Z. wrote and modified the questionnaire. L.H. did the data analysis. Z. M., J. Z., W.J., Q.L., L.G., J.D. did the distribution and recovery of questionnaires.

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## Figures

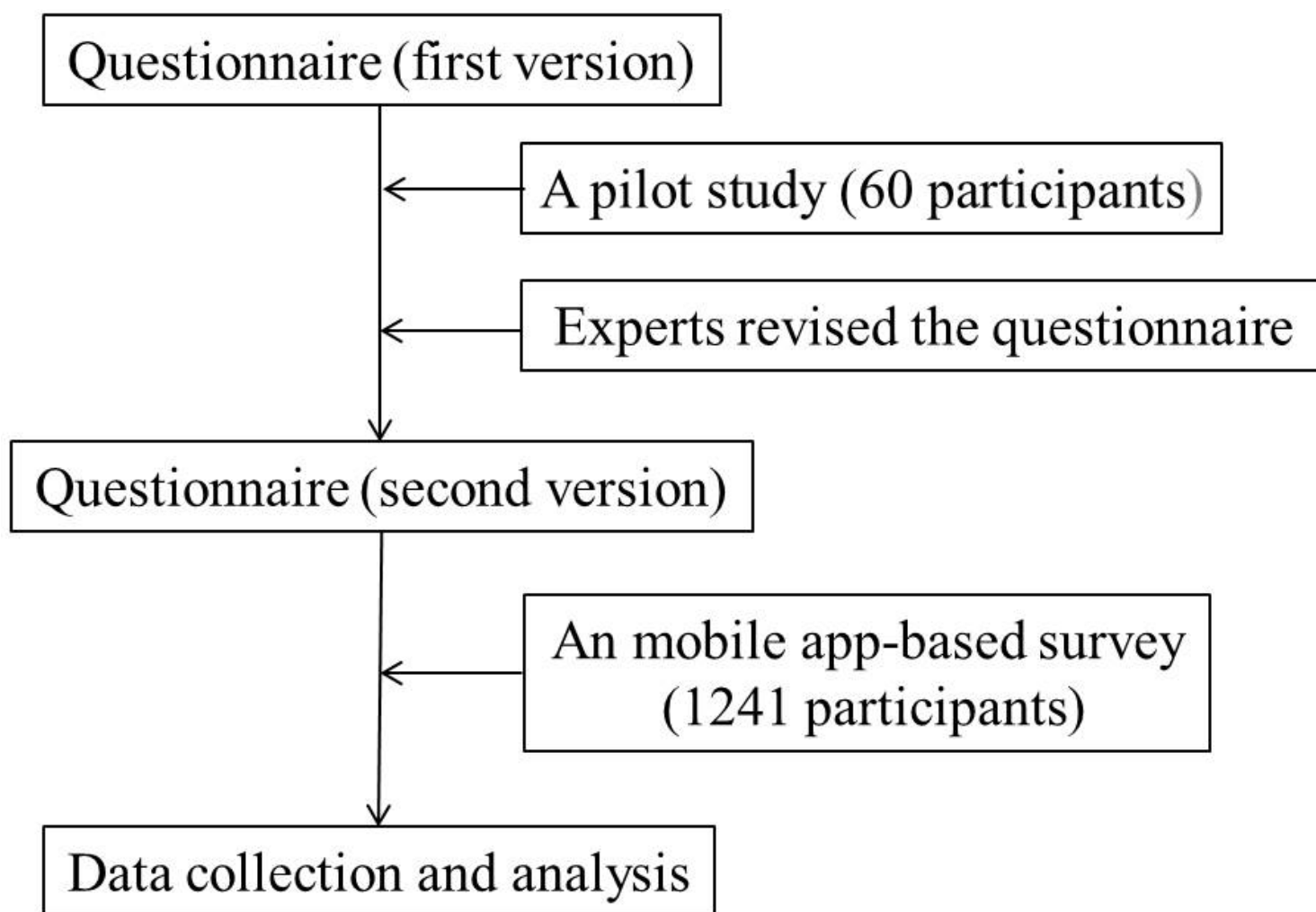


Figure 1

A flow chart of the questionnaire.