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Impact of workplace incivility against new nurses on job burnout: the mediation role of anxiety and moderation effect of resilience

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Complete List of Authors:	Shi, Yu; Department of Health Management, College of Public Health of Harbin Medical University, Guo, Hui; Department of Human Resource Management, Fourth Affiliated Hospital of Harbin Medical University, Harbin, China Zhang, Shue; The Third Affiliated Hospital of Harbin Medical University Xie, Feng zhe; Department of Health Management, College of Public Health of Harbin Medical University Wang, Jinghui; Department of Health Management, College of Public Health of Harbin Medical University Sun, Zhinan; College of Humanities and Social Science of Harbin Medical University Dong, Xinpeng; Department of Outpatient Operating Room, First Affiliated Hospital of Harbin Medical University Sun, Tao; Harbin Medical University School of Public Health,
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2 **Impact of workplace incivility against new nurses on job burnout: the mediation role of anxiety and**
3 **moderation effect of resilience**

4
5 Shi Yu ¹*, Guo Hui²*, Zhang Shu'e ³*, Xie Fengzhe ¹, Wang Jinghui ¹, Sun Zhinan ⁴, Dong Xinpeng ⁵, Sun Tao ^{1*}

6
7 1. Department of Health Management, College of Public Health of Harbin Medical University, China

8
9 2. Department of Human Resource Management, Fourth Affiliated Hospital of Harbin Medical University, Harbin,
10
11 China

12
13 3. Department of Pharmacy, Third Affiliated Hospital of Harbin Medical University, Harbin, China

14
15 4. College of Humanities and Social Science of Harbin Medical University, Harbin, China

16
17 5. Department of Outpatient Operating Room, First Affiliated Hospital of Harbin Medical University, China

18
19 ©These authors contributed equally to this work.

20
21 *corresponding author: hysuntao@126.com (Sun Tao).

22
23 **Keywords:** new nurses, workplace incivility, anxiety, resilience, job burnout

24
25 Number of words: 3992

26
27 **Abstract**

28
29 **Objectives:** This study had three objectives: (1) to investigate the impact of workplace incivility on job burnout of
30
31 new nursing staffs and (2) to verify the partial mediating role of anxiety on the relationship between workplace
32
33 incivility and job burnout. (3) to examine the resilience mediate the relations between workplace incivility and job
34
35 burnout.

36
37 **Design:** A cross-sectional online survey was conducted in May 2016 in China.

38
39 **Setting:** The survey was conducted among 54 cities across 29 provinces of China.

40
41 **Participants:** A total of 903 participants were invited. Ultimately 696 new nurses (<3 service years) completed
42
43 valid questionnaires. The effective response rate was 77.1%. Entry criteria: voluntary participation, less than 3
44
45 service years and registered nurses. Exclusion criteria: irregular nurses, more than 3 service years and those who
46
47 refused to participate in this work.

48
49 **Outcome measures:** An anonymous questionnaire was distributed among new nurses. The relationships and
50
51 mechanism among the variables were explored through using the descriptive statistical analysis, Pearson
52
53 correlation coefficient and Multiple linear regression analysis.

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55 **Results:** The findings proved that the workplace incivility was positively correlated with anxiety and job burnout
56
57 of new nurses. The positive relation between anxiety and job burnout was also significant. Moreover, the anxiety
58
59 partially mediated and resilience moderated the relationship between workplace incivility and job burnout.

60
61 **Conclusion:** New nurses experienced workplace incivility would be more likely to generate the anxiety as the

1
2 victims. Further, the increased anxiety state elevates their level of job burnout. New nurses with high level of
3
4 resilience could buffer the negative influence of the workplace incivility by using a positive coping style.

6 **Strengths and limitations of this study:**

7
8 This is the first study investigating the relationship between workplace incivility and anxiety, resilience, and job
9
10 burnout of new nurses in China.

11 The finding that the anxiety partially mediated the relationship between workplace incivility and job burnout is
12
13 first reported among new nurses in China.

14
15 This research has examined innovatively the resilience mediate the relations between workplace incivility and job
16
17 burnout.

18
19 The method to self-reports of new nurses in an online survey may led to response bias.

20
21 Causation is unable to be established due to cross-sectional study design.

22
23 The regional data source ratio would existed imbalance.

24 25 **Introduction: (Background/literature review)**

26
27 Workplace incivility was regarded as a dark behavior launched from the organization members, which was clearly
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29 proposed by Katz in 1964, but this kind of behavior and its negative consequences did not arouse the management
30
31 researchers' attention at that time¹. After nearly 30 years of exploration practice, Andersson and Pearson formally
32
33 defined the workplace incivility in 1999, namely, "*it is a kind of behavior that a lesser degree with violation of*
34
35 *mutual concern respect the norms in the workplace, is damage purpose is not obvious, employees sometimes*
36
37 *intentionally and implementation of rude behavior, sometimes for no offensive behavior*²". In 2002, a new concept
38
39 of workplace incivility was put forward by western researchers. Lauer considered that the incivility behavior was
40
41 a kind of hurt on employees' self-esteem in the organization, causing harm to employees by disrespectful
42
43 behavior³, but it is completely distinct from physical aggression and violence. Workplace incivility has the
44
45 characteristics similar to subtle spiral infiltration model. It would be accumulated at a low level for a long time,
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47 and the final outcome rises to a high level of harm to employees. and the harm sustains over with a long period,
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49 thereby the physical and mental damage of victim is difficult to recover during short-term⁴. According to previous
50
51 reports, the influence of workplace incivility on mental health of employees mainly included anxiety, cognitive
52
53 dissonance, excessive worry, stress and mental depression, etc⁵; Impact on physical health includes the migraine
54
55 headaches, stomach ulcers, high blood pressure, etc⁵. Typically, the uncivilized behaviors are unobserved and add
56
57 up over time. Moreover, if a hospital organization can't respond properly, these uncivilized behaviors may lead to
58
59 some adverse effects in the organizational and individual aspects.^{2 6}Over time, the organizational conflict caused

1
2 by incivility behavior would emerged, and then some serious consequences will gradually appeared in large
3 numbers in the group, such as the absenteeism⁷, fewer organizational citizenship behavior⁸, productivity
4 slowdown⁹, lower job satisfaction¹⁰, lower organizational loyalty¹¹ and even heightened turnover intentions¹², and
5 so on.
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7

8
9 In recent years, the resident's expectation towards medical service continue to rise¹³. Due to the large population
10 in China, an appropriate number of nurses are needed to deliver health care services to meet the health needs¹⁴. So
11 the sustainable recruitment of nurses and acceleration of their career development is crucial for nursing field.
12 Improving the skills of nursing staff rely on healthy career development which is a key task for China's health
13 care service system. The active adaption, good job involvement and physical and mental health of the new nurses
14 are regarded as motives force to encourage them , greatly beneficial to their career success in long-term. An active,
15 enthusiastic and happy attitude towards nursing work at the beginning of career is necessary for the new nurses¹⁵.
16 But new nurses at early career are likely to encounter variously offensive behaviors which violates the principle of
17 equality and respect among organization members and are hurtful and with low-intensity⁴. These adverse
18 behaviors under long-term generation must lead to irreversible damage on the new nurses' physical and mental
19 health. In the meanwhile, it must also severely hinder the construction of medical and nursing team. Unfortunately,
20 there are no related experts and researchers focused on the phenomenon of workplace incivility against new
21 nurses in China.
22
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25 Job burnout is an individual reaction to emotional and interpersonal stress and it is related to work pressure and
26 occupational stress¹⁶. Previous study showed a high incidence in the nursing group¹⁷. Worse still, job burnout can
27 result in a series of adverse outcomes for nursing staff and hospital organization, such as disappearance of
28 organization belonging¹⁸, decline of nursing group cohesion¹⁹, poor nursing work efficiency and lower job
29 performance. It may even lead to the loss of nursing talents²⁰. The reasons caused job burnout had been analyzed,
30 mainly including excess workload²¹, lack of support and resources²², impeded information and less sense of
31 control²¹, organizational injustice²³, interpersonal roles conflict²⁴, interpersonal emotional stress at work²⁵, etc. In
32 addition, some researchers had conducted many studies to explore the relationship between incivility and job
33 burnout in the nursing workplace²⁶. However, previous studies exhibited a complete lack of concern for new
34 nurses. What's more, during recent years, although the researchers had successfully explained the role mechanism
35 of job burnout under the resource perspective, there are no researchers illustrating the mechanism of the
36 relationship between workplace incivility and job burnout.
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40 Additionally, the awareness of workplace incivility has been greatly enhanced nowadays, especially of the
41 effects of uncivilized workplace behavior on psychological health of employees²⁷. The new study also sheds light
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1 on the workplace incivility experienced by Australian adult workers. The finding indicates that workplace
2 incivility is positively linked with anxiety²⁸. Anxiety is seen as an adaptive motivational behavior that help
3 individuals cope with threatening situations²⁹. From the evidence of another study, anxiety refers to an unpleasant
4 emotional state that mainly includes such feelings as apprehension, tension and worry³⁰. Anxiety is considered to
5 be caused by stimuli from external environmental. When people suffer workplace incivility, they may feel
6 anxious³⁰. For example, their work performances are not been respected, or they get other people's unreasonable
7 malicious evaluations. Anxious employees are more apt to emotional exhaustion, body fatigue, reduced work
8 involvement and lower job satisfaction, with the continuous depletion of psychological resources. In other words,
9 anxiety could increase the risk of employees' job burnout. However, resilience is nurses' ability to successfully
10 adjust and recover in adversity, which plays an important role when employees experience workplace incivility³¹.
11 One study indicated that resilience was a moderator between work stress and job burnout³². Some scholars pointed
12 out that workplace incivility was associated with job burnout among restaurant service employees³³. Therefore,
13 the following hypothesis are proposed in this study regarding the group of new nurses.

14 **Hypotheses1.** Workplace incivility has a positive prediction function to generate anxiety among new nurses

15 **Hypotheses2.** Anxiety has a positive prediction function to generate job burnout among new nurses

16 **Hypotheses3.** Workplace incivility has a positive prediction function to generate job burnout among new nurses

17 **Hypotheses4.** Anxiety mediates the relationship between workplace incivility and job burnout

18 **Hypotheses5.** Resilience moderates the relationship between workplace incivility and job burnout

19 as is shown in Figure 1.

20 **The study**

21 **Sample/participants**

22 The new nurses working less than 3 years were recruited as the sample of current research from the hospital in
23 China in 2016. 903 questionnaires (including the Workplace Incivility Scale, Anxiety Scale, Resilience Scale and
24 Job Burnout Scale) were distributed among new nurses. 696 questionnaires were returned. The effective response
25 rate was 77.1%.

26 **Data collection**

27 An anonymous online questionnaire was completed by nurses with less than 3 years of working througho
28 ut the country in May 2016 in China. First, approximately 50 new nurses from the authors' unit were se
29 lected as the original deliverers of the survey. Subsequently, the colleagues or classmates of "the original
30 deliverers" were invited to participate in our online survey. A web page link to our questionnaire-survey
31 (<https://www.wenjuan.com/>) was sent by mobile phone to the subjects during nurses' rest breaks. Moreo

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2 ver, the questionnaires were self-administered. Inclusion criteria: voluntary participation, less than 3 ser
3 vice years and registered nurses. Exclusion criteria: irregular nurses, more than 3 service years and t
4 hose who refused to participate in this work.
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6

7 **Ethical considerations**

8
9 The Ethic Committee approval was obtained from the Harbin Medical University research ethics board and
10 individual consent was received from every participant nurses. To ensure anonymity, participants were informed
11 the anonymity and they were requested to avoid using names of their colleagues or superiors during the interview.
12
13 Written informed consent could not be received due to the anonymous survey approach. Hence, oral informed
14 consent for the survey was approved by the ECHMU and it was obtained from each doctor. Once a questionnaire
15 was completed, it was identified that the nurses had orally agreed to participate in our survey.
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20 **Research method**

21 **Instrument**

22 **Workplace incivility**

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24 Workplace incivility was assessed using 12 items developed by Cortina et al.'s (2013)³⁴, which were selected to
25 represent workplace incivility on a 5-point Likert scale, ranging from 1 to 5 (1= never, 2= one time, 3= two and
26 three times, 4= more than four times, 5= frequently). Higher scores represented a higher occurrence rate of
27 workplace incivility. The Cronbach's alpha coefficients for this scales was 0.893.
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33 **Anxiety**

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35 Anxiety is evaluated with one item, namely, "*Your work let you feel anxious or not*". This item was scored on a
36 5-point Likert scale, ranging from 1 to 5 (1= never, 2= one time, 3= two and three times, 4= more than four times,
37 5=many times). According to past literature³⁵, an item measurement also had adequate reliability and validity.
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41 **Resilience**

42
43 A instrument with 4-items scale was used to measure the aspects of resilience suggested by Sinclair and
44 Wallston³⁶, including one dimension. The subjects of the study were requested to respond their options ranging
45 from 'never' to 'every day' on 5-point scale, higher scores indicating more higher resilience. The Cronbach's
46 alpha coefficients for this scales was 0.797.
47
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50 **Job burnout**

51
52 Job burnout was measured by using the Chinese version of Maslach Burnout Inventory-General Survey (MBI-GS),
53 which has been widely applied across different occupational groups³⁵. The subjects of this study were requested
54 to respond using 7-point scaled response options from 0 (never) to 6 (frequently). The whole scale consists of
55 three dimensions: emotional exhaustion, cynicism and reduced personnel accomplishment. Higher scores
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1 indicated the significantly elevated degree of job burnout. The Cronbach's alpha coefficients for his scales was
2 0.791.
3

4 **Data analysis**

5 Descriptive statistical analysis was used to display the demographic variables and incidence rate of workplace
6 incivility. Pearson's correlation coefficients were computed to examine the relationship between workplace
7 incivility and other variables. We got the data through the questionnaires above. Meanwhile, the data was
8 transferred from the network and the multivariate techniques also were adopted ($P < 0.05$) for the difference was
9 statistically significant. All analyses of the data were carried out using SPSS version 19.0 (IBM Corp, BM SPSS
10 Statistics for Windows, Armonk, NY).
11

12 **Results**

13 **2.1 Descriptive results**

14 The demographic characteristics are showed in Table 1. The data indicate that a majority of the sample is female
15 (90.4%), with an average age of 24.6 years, almost 85.3% of them are unmarried. Among the subjects surveyed,
16 83.3% of the participants are from the Tertiary hospitals, 57.6% are undergraduates. Approximately 45.1% of the
17 participants have worked at current hospital from six months to one year. The participants are primarily
18 distributed into eight clinical departments.
19

20 The means, standard deviations and Pearson correlation coefficients of continuous variables are showed in Table 2.
21 As results exhibited, all variables were significantly correlated with each other. Workplace incivility was
22 positively correlated with anxiety ($r=0.371, P < 0.01$) and job burnout ($r=0.238, P < 0.01$). On the contrary,
23 workplace incivility was negatively related to resilience ($r = -0.191, P < 0.01$).
24

25 **2.2 Hierarchical linear regression models**

26 Several multiple linear hierarchical regression analyses were performed to examine the influence of workplace
27 incivility on job burnout, anxiety and resilience of new nurses (Table 3). To examine this research we conducted
28 three mediation analyses using the methods based on linear regression published by Baron and Kenny³⁷.
29 Workplace incivility was posed as a dependent variable in this study, anxiety as a mediator variable, job burnout
30 as an independent variable. Besides, the resilience was seen as a moderating variable in these models. At the same
31 time, to eliminate the effects of demographic variables around these regression models, the age, gender, hospital
32 level, working years and situation of education and department distribution was posed as control variable.
33

34 As is shown in Table 3.

35 The results showed that workplace incivility had a positive prediction function to generate anxiety ($\beta = 0.364,$
36 $P < 0.01, M_2$) and job burnout ($\beta = 0.440, P < 0.01, M_3$) of new nurses. Hypotheses 1 and Hypotheses3 were proved.
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1
2 Anxiety also had a positive influence on job burnout ($\beta= 0.405, P<0.01, M_6$), which confirmed Hypotheses 2.
3
4 What's more, the regression coefficient $\beta= 0.093$ in Model 6 decreased obviously compared with previous $\beta=$
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6 0.240 (in the Model 5) after controlling the mediation variable (anxiety), according to the method to test
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8 mediating effect proposed by Muller, Judd and Yzerbyt (2005)³⁸. The mediating effect of anxiety and its
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10 significance were further tested by Sobel test, referring to the inspection procedures developed by PREACHER
11
12 and others³⁹. The mediation effect was calculated as follows: $ab=0.564\times 0.057=0.032, P<0.01, t= 7.807$.
13
14 Therefore, anxiety partly mediated the relationship between workplace incivility and job burnout of new nurses.
15
16 Thus, Hypotheses 4 was also confirmed. In the last two models, the results showed that the resilience had a
17
18 negative impact on job burnout ($\beta=0.030, P<0.01, M_7$). Moreover, the influence of the interaction between
19
20 incivility and resilience on job burnout was significant ($\beta=-0.564, P<0.01, M_8$). The moderator effect was
21
22 estimated by referencing a previous study⁴⁰. It showed that resilience moderated the relationship between
23
24 incivility and job burnout. Thus, Hypotheses 5 was confirmed. This interaction effect is illustrated clearly in
25
26 Figure 2.

27 **3 Discussion**

28 **The effect and mechanism on the new nurses' job burnout caused by workplace incivility**

29
30 New nurses exposed to workplace incivility had a higher level of anxiety ($\beta=0.364, P<0.01$) and job burnout
31
32 ($\beta=0.240, P<0.01$). This conclusion is consistent with previous researches^{12 41}. Moreover, new evidence were
33
34 also produced in this study that anxiety ($\beta=0.405, P<0.01$) played a part of mediating role, and resilience ($\beta=3.111,$
35
36 $P<0.01$) had a moderator effect on the relationship between workplace incivility and job burnout. That is to say,
37
38 the exposure to workplace incivility can result in increased degree of anxiety, which in turn, cause job burnout.
39
40 The new nurses with high-level of resilience can effectively buffer of the negative effect caused by workplace
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42 incivility to a certain degree, which in turn reduce the level of job burnout. The possible mechanism is described
43
44 below.

45 **3.2 The mediating role of anxiety on the relationship between workplace incivility and job burnout**

46
47 Recent years, increased interest was paid to incivility in working setting. Although many previous studies on this
48
49 topic had focused on the adverse effects of incivility behavior¹², for the studies on the mediators and moderators
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51 were insufficient. In this study, we tried to investigate the subtle mechanism of incivility against the new nurses.
52
53 Clearly, workplace incivility is similar to language violence which exists extensively¹². The new nurses are in
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55 need of various resources for the support of career, including the material resources, human resources and mental
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57 resources and others⁴². Generally speaking, workplace incivility is inevitable for new nurses as a part of work
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59 events launched from dissatisfied patients. In addition, because of lack of work experience and skills, new nurses

1
2 are likely to encounter a series of disgruntled emotions from their superiors or colleagues; hence, the image called
3 “kick cats effect⁴³”. The theoretical “snow-balling effect” on incivility showed that it is inevitable to generate
4 ripple effect infected by some negative emotions at workplace⁴⁴. Therefore, most of new nurses are more likely to
5 generate anxiety, restlessness, sense of injustice and helplessness⁴⁵. As time goes by, a state of the physical and
6 mental exhaustion and working weariness under the stress from work and the society will attack the new nurses⁴⁵.
7
8 Job burnout as a reflection of the chronic and interpersonal stress at the work setting, including the emotion
9 exhaustion, depersonalization and ineffectiveness can cause various manifestations such as depression, creativity
10 failure, lower sense of personal worth, lower job satisfaction and so on^{46 47}. Anxiety, as a basic human emotion,
11 developed in the combat between human-being and environment and the process of survival adaptation⁴⁸. The
12 Affective Events Theory pointed out that the employees can generate emotional reactions to what is going on, and
13 these reactions would influence their job performances and satisfaction⁴⁹. Once the perception of anxiety appeared,
14 new nurses are likely to consume their own physical and mental energy for the defense, followed by the sense of
15 self-denial, inferiority and helpless feeling. The sense of low achievement and energy exhaustion and an
16 emotional response to ineffectiveness effort could be highlighted, which easily result in the increased risk of job
17 burnout. If they can't control and address the problems after the exposure to workplace incivility, anxiety ensues
18 with negative emotions, for example, getting burnout. Therefore, anxiety was defined as a partial mediating role
19 (shown in Table 3) on the relationship between workplace incivility and job burnout.
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33 **3.3 The Moderating effect of resilience in the relationship between workplace incivility and job burnout**

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35 The results of this study showed that, compare to new nurses with low level of resilience, those with high level of
36 resilience were less affected by workplace incivility under the same working environment (Table 3). A concept
37 called the “schema” in Constructivism Theory is an individual perception about the world and a way of thinking⁵⁰,
38 and a frame or an organization structure of psychological activity. Schema is the starting point and the core of
39 cognitive structure, or the basis of human knowledge⁵¹. Therefore, the formation and transformation of schema is
40 an essence for the cognition development of individuals. Cognitive development is affected by three processes:
41 assimilation, hue, and balance⁵². Resilience represents a positive cognitive, individual with high level of resilience
42 is more likely to recover from negative experiences and better adapt to the current environment⁵³. Resilience is
43 also a necessary mental defensive ability when facing workplace incivility. As the theoretical kernel of edge angle,
44 it is the positive selection and processing method under adversity⁵⁴. People with higher resilience can possess a
45 positive attitude in the face of adversity. In this study, workplace incivility is seen as a working adversity for new
46 nurses exposed to the unfriendly atmosphere. New nurse with higher level of resilience could adjust their
47 psychological cognition with positive emotions⁵⁵ and thereby the consequence of incivility on the physical and
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2 psychological harm and job burnout turn slightly. For example, when their working ability is questioned, new staff
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4 with higher the level of resilience are more be likely to try their best to improve, and win the approval and respect
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6 from the patients or colleagues by their efforts without negative emotions. In addition, the resilience presents the
7
8 property of positive psychological traits⁵⁶. Fredrickson's Expand-Construction Theory explains that the positive
9
10 emotional experience not only reflect the individual's mental well-being, but also promote the growth and
11
12 development of the individuals⁵⁷. Further, positive emotions have two core functions: first, instantaneous
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14 expansion function, which can expand instant thinking. Second, long-term function of construction, which can
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16 construct long-term physical, psychological, social resources and other resources⁵⁸. According to the two
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18 functions, new nurses with high-level resilience is good at converting the pressure into motive force, therefore, the
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20 negative emotions may be converted to positive emotions to reduce the loss of physical and mental energy of new
21
22 nurses. Hence, new nurses with high-level of resilience can alleviate the negative impact of workplace incivility
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24 on job burnout (shown in Table 3). As a consequence, resilience makes a positive adjustment by reducing the loss
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26 of mental health and decreasing the risk of job burnout of new nurses. This study suggests that hospital managers
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28 should increase training to enhance the resilience of new nurses, so as to improve their ability to cope with
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30 negative events at the initial stage of their career.

31 **Limitations**

32 The survey collect the data by the online questionnaire ,the questionnaire contains a large number of questions,
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34 there may be reporting bias. This research adopted a snowball sampling method, thus, the regional data source
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36 ratio would existed imbalance, the data was restricted by regional results. Therefore, a rigorous sampling
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38 technique and a larger sample are needed in future researches. This study is based on a cross-sectional design
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40 which prevents the causal relationship between variables. We used several scales from abroad with cultural
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42 differences which needs more academic concerns in Chinese context. The data were collected from the
43
44 self-reports of nurses from online survey with less monitoring which may led to response bias due to social
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46 desirability or negative effect.

47 **Conclusion**

48 This study focused on workplace incivility in China's nursing field, using "anxiety" and "resilience" as a new
49
50 interpretation path to analyze the mediating and moderating mechanism of the effects on new nurses' job burnout
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52 caused by workplace incivility. Firstly, this study verified that workplace incivility have a significant predictive
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54 function on job burnout of new nurses in China's hospital setting. Secondly, anxiety played a partial mediating
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56 role on the relationship between workplace incivility and job burnout. Finally, resilience played a moderation role
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58 on the relationship between workplace incivility and job burnout. Workplace incivility in hospital towards new
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nurses could increase their psychological anxiety⁵⁹, and in turn gradually generate job burnout. New nursing staff with high-level resilience can effectively buffer the negative effects caused by workplace incivility, and the resilience can also repair psychological trauma to a certain degree after exposure to rude behavior. The study provides a new theoretical contribution and practical guidance on maintaining physical and mental health of the Chinese new nurses. In turn, potential loss of nursing organization can be prevented.

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Conflict of interest

No conflict of interest has been declared by the authors.

Author contributions

Conceived and designed the experiments: SunTao, ShiYu, GuoHui. Performed the experiments: SunZhinan, ZhangShue, Analyzed the data: XieFengzhe, WangJinghui, DongXinPeng. Contributed reagents/materials/analysis tools: SunTao, ZhangShue, DongXinPeng. Wrote the paper: ShiYu, GuoHui, SunZhinan

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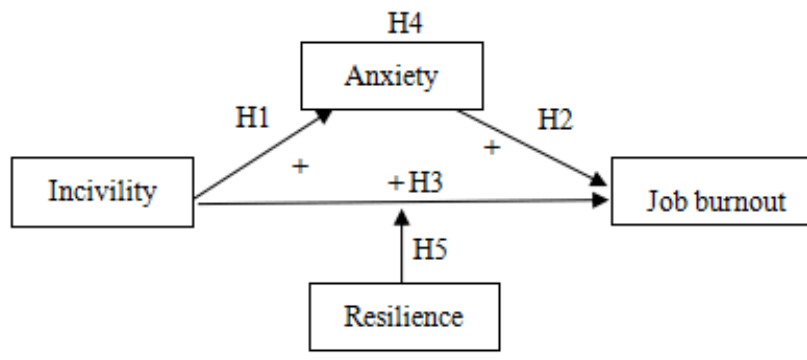


Figure 1. The conceptual framework of study

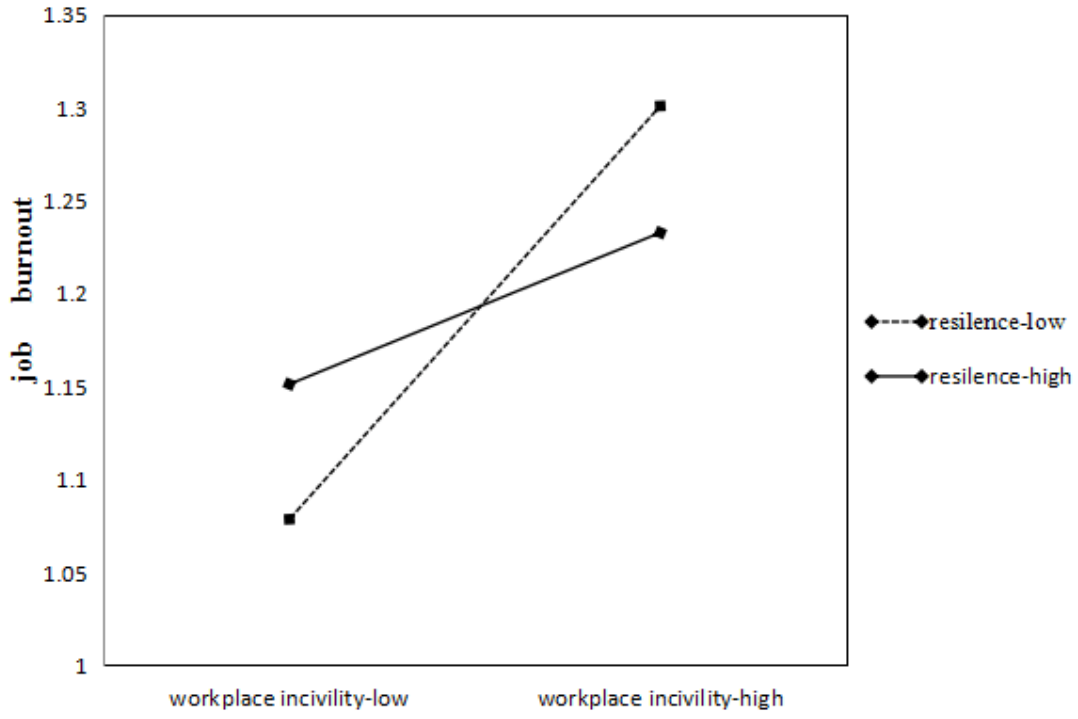


Figure 2. Effect of moderation

Table 1 .Characteristics of the Respondents (n = 696)

Characteristic	Classes	N	%	M±SD
Age	19-29	672	96.55	24.55±2.1
	30-35	24	3.45	
Gender	Male	67	9.60	-
	Female	629	90.40	
marital status	Unmarried	594	85.34	-
	Married	99	14.22	
	Other	3	0.44	
Hospital level	Tertiary hospitals	580	83.30	-
	The secondary hospital	90	12.90	
	First-level hospital	26	3.70	
	Technical secondary school	17	2.40	
Education level	College	253	36.35	-
	Undergraduate course	426	61.20	
	0-1 year	357	51.29	
Service Years	1-2 years	181	26.01	1.71±0.81
	2-3 years	158	22.70	
	Rotation	102	14.66	
	Internal medicine	165	23.70	
Distribution department	Surgery	178	25.57	-
	Emergency	3	0.44	
	Medical technology	25	3.59	
	Outpatient service	30	4.31	
	Gynecology	41	5.89	
	Paediatrics	29	4.17	
	Others	123	17.67	

Table 2 The means, standard deviation, Pearson's correlation coefficient and reliability coefficient of variables

Variables	M	SD	α	1	2	3
workplace incivility	1.893	0.532	0.893			
anxiety	2.770	0.862	-	0.371**	-	
resilience	3.515	0.812	0.797	-0.191**	-0.240**	-
job burnout	3.194	0.841	0.791	0.238**	0.436**	-0.026**

** $P < 0.01$; Correlation is significant at the 0.01 level (2-tailed)

M, Mean; SD, Standard deviation; α , Cronbach's alpha

Table 3 Hierarchical linear regression models of variables

Variables	Anxiety		Job burnout					
	M_1	M_2	M_3	M_4	M_5	M_6	M_7	M_8
Control variables								
age	-0.012	-0.019	0.027	0.033	0.023	0.031	0.022	0.023
gender	-0.085	-0.094**	0.005	0.042	-0.001	0.037	0.000	-0.002
hospital level	-0.102**	0.087	-0.034	0.011	-0.024	0.011	-0.023	-0.025
service years	0.067	0.084	0.092	0.062	0.103	0.069	0.106**	0.106**
education level	0.107**	0.064	0.041	-0.006	0.012	-0.014	0.012	0.017
department distribution	-0.004	-0.006	-0.011	-0.01	-0.013	-0.011	-0.014	-0.014
cause variable								
workplace incivility		0.364**			0.240**	0.093**	0.242**	0.724**
mediating variable								
anxiety				0.440**		0.405**		
moderating variable								
resilience							0.020	0.400**

incivility*resilience									-0.564**
F	4.217**	19.379**	1.543	24.535**	7.367**	22.426**	21.003**		17.095**
R ²	0.035**	0.165**	0.013	0.200**	0.070**	0.207**	0.057**		0.069**
ΔR^2	0.027**	0.156**	0.005	0.192**	0.060**	0.198**	0.054**		0.065**

** $P < 0.01$; * $P < 0.05$

M1: explains the influence of demographic variables on anxiety;

M2: explains the influence of workplace incivility on anxiety;

M3: explains the influence of demographic variables on job burnout;

M4: explains the influence of anxiety on job burnout;

M5: explains the influence of workplace incivility on job burnout;

M6: explains the influence of workplace incivility on job burnout after bringing into the explanatory power of anxiety.

M7: explains the influence of workplace incivility on job burnout after bringing into the explanatory power of resilience.

M8: explains the influence of workplace incivility on job burnout after bringing into the explanatory power of resilience and resilience-Interaction

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	Page 1, line 14-24;
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	P.1; line 25-31 P.2; line 1-14
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	p.2, line 15-30; p.3, line 1-31 p.4, line 1-15
Objectives	3	State specific objectives, including any prespecified hypotheses	P.4, line 16-21;
Methods			
Study design	4	Present key elements of study design early in the paper	P.1, line 12
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	p.4, line 23-31
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants	P.5, line 1-5
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	no
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	p.5, line 13-31; p.6, line 1-4
Bias	9	Describe any efforts to address potential sources of bias	no
Study size	10	Explain how the study size was arrived at	no
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and	P.6, line 5-11

		why	
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	P.6, line 24-31
		(b) Describe any methods used to examine subgroups and interactions	no
		(c) Explain how missing data were addressed	no
		(d) If applicable, describe analytical methods taking account of sampling strategy	P.4, line29-31 P.5, line1-5
		(e) Describe any sensitivity analyses	no
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	P.4, line 24-27
		(b) Give reasons for non-participation at each stage	no
		(c) Consider use of a flow diagram	No
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	P.6, line 14-22 P.6, line 28-31
		(b) Indicate number of participants with missing data for each variable of interest	no
Outcome data	15*	Report numbers of outcome events or summary measures	P.6,line 14-16 P.6,line 20-22 P.7,line 9 P.7,line 13-15
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	p.6,line 14-31 p.7,line 1-15
		(b) Report category boundaries when continuous variables were categorized	no
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	no
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	no

Discussion			
Key results	18	Summarise key results with reference to study objectives	p.7;line16-31 p.8;line1-31 p.9;line1-17
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	P.9, Line 18-26;
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	p.9,line 27-31 p.10,line 1-7
Generalisability	21	Discuss the generalisability (external validity) of the study results	no
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	P.10, line 8-11

*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.

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Impact of workplace incivility against new nurses on job burnout: A cross-sectional study in China

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Complete List of Authors:	Shi, Yu; Department of Health Management, College of Public Health of Harbin Medical University, Guo, Hui; Department of Human Resource Management, Fourth Affiliated Hospital of Harbin Medical University, Harbin, China Zhang, Shue; The Third Affiliated Hospital of Harbin Medical University Xie, Feng zhe; Department of Health Management, College of Public Health of Harbin Medical University Wang, Jinghui; Department of Health Management, College of Public Health of Harbin Medical University Sun, Zhinan; College of Humanities and Social Science of Harbin Medical University Dong, Xinpeng; Department of Outpatient Operating Room, First Affiliated Hospital of Harbin Medical University Sun, Tao; Harbin Medical University School of Public Health, Fan, Lihua; Harbin Medical University, Department of Health Management , School of Public Health
Primary Subject Heading:	Nursing
Secondary Subject Heading:	Medical education and training, Medical management
Keywords:	new nurses, workplace incivility, anxiety, resilience, job burnout

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Manuscripts

Impact of workplace incivility against new nurses on job burnout: A cross-sectional study in China

Shi Yu ¹*, Guo Hui²*, Zhang Shu'e ³*, Xie Fengzhe ¹, Wang Jinghui ¹, Sun Zhinan ⁴, Dong Xinpeng ⁵, Sun Tao ^{1*},
Fan Lihua ^{1*}

1. Department of Health Management, College of Public Health of Harbin Medical University, China

2. Department of Human Resource Management, Fourth Affiliated Hospital of Harbin Medical University, Harbin, China

3. Department of Pharmacy, Third Affiliated Hospital of Harbin Medical University, Harbin, China

4. College of Humanities and Social Science of Harbin Medical University, Harbin, China

5. Department of Outpatient Operating Room, First Affiliated Hospital of Harbin Medical University, China

© These authors contributed equally to this work.

*corresponding author: hydstantao@126.com (Sun Tao), lihufan@126.com (Sun Tao)

Keywords: new nurses, workplace incivility, anxiety, resilience, job burnout

Number of words: 4461

Abstract

Objectives: This study had three objectives: (1) to investigate the impact of workplace incivility on job burnout of new nursing staff, (2) to verify the partial mediating role of anxiety in the relationship between workplace incivility and job burnout, and (3) to examine the resilience **moderating** the relations between workplace incivility and job burnout.

Design: A cross-sectional online survey was conducted in May 2016 in China.

Setting: The survey was conducted in 54 cities across 29 provinces of China.

Participants: A total of 903 participants were invited. Ultimately, 696 new nurses (<3 service years) completed valid questionnaires. The effective response rate was 77.1%. Entry criteria: voluntary participation, having less than three service years, and being a registered nurse. Exclusion criteria: being an irregular nurse, having more than three service years, and refusing to participate in this work.

Outcome measures: An anonymous questionnaire was distributed among new nurses. The relationships and mechanism among the variables were explored using descriptive statistical analysis, Pearson's correlation coefficient, and multiple linear regression analysis.

Results: The findings showed that workplace incivility was positively correlated with anxiety ($r = 0.371$, $P < 0.01$) and job burnout ($r = 0.238$, $P < 0.01$) of new nurses. The positive relation between anxiety ($\beta = 0.364$, $P < 0.01$) and job burnout ($\beta = 0.240$, $P < 0.01$) was also significant. Moreover, anxiety partially mediated ($z = 7.708$, $P < 0.01$) and resilience moderated ($\beta = -0.564$, $P < 0.01$) the association between workplace incivility and job

1
2 burnout.

3
4 **Conclusion:** Experience of workplace incivility by new nurses would likely generate anxiety in the victims.

5
6 Further, the increased anxiety state **could elevate** their level of job burnout. New nurses with high levels of
7
8 resilience could buffer the negative influence of workplace incivility by using a positive coping style.

9
10 **Keywords:** new nurses, workplace incivility, anxiety, resilience, job burnout

11
12 **Strengths and limitations of this study:**

- 13
14 • This is the first study investigating the relationship of workplace incivility with anxiety, resilience, and
15
16 job burnout of new nurses.
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18 • The finding that anxiety partially mediated the relationship between workplace incivility and job burnout
19
20 is first reported among new nurses.
- 21
22 • This research has innovatively examined the resilience moderating the relations between workplace
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24 incivility and job burnout.
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26 • The method to self-reports of new nurses by an online survey may have led to response bias, and
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28 causation cannot be established due to the cross-sectional study design.
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30 • The regional data source ratio would be unbalanced.
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INTRODUCTION: (BACKGROUND/LITERATURE REVIEW)

Workplace incivility was regarded as a negative behavior by organization members, which was clearly proposed by Katz in 1964. However, this kind of behavior and its negative consequences did not attract attention from management researcher at that time¹. After nearly 30 years of exploration practice, Andersson and Pearson formally defined workplace incivility in 1999 as follows: “Workplace incivility is low-intensity deviant behavior with ambiguous intent to harm the target, in violation of workplace norms for mutual respect. Uncivil behaviors are characteristically rude and discourteous, displaying a lack of regard for others²”. In 2002, a new concept of workplace incivility was put forward by Western researchers. Lauer considered that uncivil behavior harmed employees' self-esteem in the organization, causing harm to employees by disrespectful behavior³,but it is completely distinct from physical aggression and violence. Workplace incivility has characteristics similar to the subtle spiral infiltration model. It would be accumulated at a low level for a long time, and the final outcome rises to a high level of harm to employees. The harm is sustained over a long period, and, therefore, the physical and mental damage to the victim is difficult to recover in the short term⁴. According to previous reports, the influence of workplace incivility on mental health of employees mainly included anxiety, cognitive dissonance, excessive worry, stress and mental depression, and so on.⁵The impact on physical health includes migraine headaches, stomach ulcers, high blood pressure, and so on.⁵Typically, uncivil behaviors are unobserved and add up over time. Moreover, if a hospital organization cannot respond properly, these uncivil behaviors may lead to adverse organizational and individual effects.² Over time, the organizational conflict caused by uncivil behavior would emerge⁶, and serious consequences will gradually appeared in large numbers in the group, such as the absenteeism⁷,less organizational citizenship behavior⁸, productivity slowdown⁹,lower job satisfaction¹⁰,lower organizational loyalty,¹¹and even heightened turnover intentions.¹²

In recent years, residents' expectations regarding medical service continue to rise¹³. Due to the large population in China, an appropriate number of nurses is needed to deliver health care services to meet the health needs¹⁴. Therefore, the sustainable recruitment of nurses and acceleration of their career development is crucial for the nursing field. Improving the skills of nursing staff relies on healthy career development, which is a key task for China's health care service system. Further, the Chinese health system faces problems such as weak medical service capacity in primary hospitals, health human resources of insufficient quality, rising health care costs, fragmented medical services, and so on.¹⁵Novice nurses (working service less than three years) as the new force of the nursing team is the basis for the prosperity and development of the nursing team. These new nurses have the characteristics of young age, lack of work experience, and weak psychological coping ability. Yet there is a high

1
2 degree of job stress of new graduates in the Chinese healthcare climate. Therefore, new nurses often lack the skills
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4 to cope with problems in the new working conditions. The active adaption, good job involvement, and physical
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6 and mental health of the new nurses are regarded as motivating forces to encourage them and are greatly
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8 beneficial to their career success in the long term. An active, enthusiastic, and positive attitude towards nursing
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10 work at the beginning of one's career is necessary for new nurses¹⁶. However, new nurses early in their career are
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12 likely to encounter variously offensive behaviors, which violate the principle of equality and respect among
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14 organization members and are highly hurtful with low intensity⁴. These adverse behaviors under long-term
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16 generation must lead to irreversible damage to the new nurses' physical and mental health. Meanwhile, they must
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18 also severely hinder the construction of the medical and nursing team. Unfortunately, there are no related experts
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20 and researchers focused on the phenomenon of workplace incivility against new nurses in China.

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22 Some scholars pointed out that workplace incivility was associated with job burnout among restaurant service
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24 employees¹⁷. Job burnout is an individual reaction to emotional and interpersonal stress and is related to work
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26 pressure and occupational stress¹⁸. Previous study showed a high incidence in the nursing group¹⁹. Worse still, job
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28 burnout can result in a series of adverse outcomes for nursing staff and hospital organizations, such as
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30 disappearance of sense of organization belonging²⁰, decline of nursing group cohesion²¹, poor nursing work
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32 efficiency, and lower job performance. It may even lead to the loss of nursing talents²². The reasons for job
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34 burnout have been analyzed and mainly include excess workload²³, lack of support and resources²⁴, impeded
35
36 information and reduced sense of control²³, organizational injustice²⁵, interpersonal roles conflict²⁶, and
37
38 interpersonal emotional stress at work²⁷. In addition, some researchers have conducted many studies to explore the
39
40 relationship between incivility and job burnout in the nursing workplace²⁸. However, previous studies exhibited a
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42 complete lack of concern for new nurses. Further, during recent years, although researchers have successfully
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44 explained the role mechanism of job burnout under the resource perspective, there are no researchers illustrating
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46 the mechanism of the relationship between workplace incivility and job burnout.

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48 Additionally, the awareness of workplace incivility has been greatly enhanced recently, especially of the effects of
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50 uncivilized workplace behavior on the psychological health of employees²⁹. A new study also sheds light on the
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52 workplace incivility experienced by Australian adult workers. The finding indicates that workplace incivility is
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54 positively linked with anxiety³⁰. Anxiety is seen as an adaptive motivational behavior that helps individuals cope
55
56 with threatening situations³¹. From the evidence of another study, anxiety refers to an unpleasant emotional state
57
58 that mainly includes such feelings as apprehension, tension, and worry³². Anxiety is considered to be caused by
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60 stimuli from the external environment. When people experience workplace incivility, they may feel anxious³². For
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62 example, their work performances are not being respected, or they receive other people's unreasonable malicious

1
2 evaluations. Anxious employees are more apt to experience emotional exhaustion, body fatigue, reduced work
3 involvement, and lower job satisfaction with the continuous depletion of psychological resources. In other words,
4 anxiety could increase the risk of employees' job burnout. Resilience is the ability to bounce back or cope
5 successfully despite adverse circumstances³³. It is used to describe when a person recovers easily and quickly
6 from setbacks that occur during his or her life. It is worth mentioning that the core of resilience is strength, and
7 people who are described as resilient are said to be able to persist in overcoming challenging obstacles. Therefore,
8 resilience is nurses' ability to successfully adjust and recover in adversity, which plays an important role when
9 employees experience workplace incivility³⁴. One study indicated that resilience was a moderator between work
10 stress and job burnout³⁵. Therefore, the following hypothesis are proposed in this study regarding the group of
11 new nurses.

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13 **Hypothesis 1.** Workplace incivility has a positive prediction function to generate anxiety among new nurses.

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15 **Hypothesis 2.** Anxiety positively predicts job burnout among new nurses.

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17 **Hypothesis 3.** Workplace incivility has a positive prediction function to generate job burnout among new nurses.

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19 **Hypothesis 4.** Anxiety mediates the relationship between workplace incivility and job burnout.

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21 **Hypothesis 5.** Resilience moderates the relationship between workplace incivility and job burnout as shown in
22 Figure 1.

23 24 25 26 27 28 29 30 31 32 **METHOD AND ANALYSIS**

33 34 **Sample/participants**

35 New nurses who had been working less than three years were recruited as the sample of current research from a
36 hospital in China in 2016. A total of 903 questionnaires (including the Workplace Incivility Scale, Anxiety Scale,
37 Resilience Scale, and Job Burnout Scale) were distributed among new nurses; A total of 696 questionnaires were
38 returned. The effective response rate was 77.1%.

39 40 41 42 43 **Data collection**

44 An anonymous online questionnaire was completed by nurses with less than three years of working throughout the
45 country in May of 2016 in China. In this study, the method of snowball sampling was used to collect the sample
46 data. In the network survey, original deliverers used in this survey are alumni who maintain friendly contact with
47 us, who work in nursing positions in various hospitals. Before a formal online survey begins, we have provided
48 comprehensive survey training to these initial contacts. Then encourage them to invite their colleagues or
49 classmates to fill out the questionnaire. This survey is to use their network of relationships for continuous
50 expansion. The amount of data collected can be monitored in real time on the website's management platform.
51 First, approximately 50 new nurses from the authors' unit were selected as the original deliverers of the survey.

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2 Subsequently, the colleagues or classmates of “the original deliverers” were invited to participate in our online
3 survey. A webpage link to our questionnaire-survey (<https://www.wenjuan.com/>) was sent by mobile phone to the
4 participants during nurses’ rest breaks. Moreover, the questionnaires were self-administered. Inclusion criteria:
5 voluntary participation, having less than three service years, and being registered nurses. Exclusion criteria:
6 being irregular nurses, having more than three service years, and refusing to participate in this work.
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10 11 **Ethical considerations**

12 Ethics Committee approval was obtained from the Harbin Medical University research ethics board, and
13 individual consent was received from every participant nurse. To ensure anonymity, participants were informed of
14 the anonymity and were asked to avoid using names of their colleagues or superiors during the interview. Written
15 informed consent could not be received due to the anonymous survey approach. Hence, oral informed consent for
16 the survey was approved by the ECHMU and was obtained from each new nurse. Once a questionnaire was
17 completed, it was identified that the nurses had acquiescently agreed to participate in our survey.
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24 **Instrument**

25 Workplace incivility

26 Workplace incivility was assessed using 12 items developed by Cortina³⁶, which were selected to represent
27 workplace incivility on a 5-point Likert scale, ranging from 1 to 5 (1 = never, 2 = one time, 3 = two and three
28 times, 4 = more than four times, 5 = frequently). Higher scores represented a higher occurrence rate of workplace
29 incivility. The Cronbach’s alpha coefficient for this scale was 0.893.
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34 Anxiety

35 Anxiety was evaluated with one item: “Does your job make you feel anxious?” This item was scored on a 5-point
36 Likert scale ranging from 1 to 5 (1 = never, 2 = seldom, 3 = occasionally, 4 = often, 5 = frequently). According to
37 past literature³⁷, item measurement also had adequate reliability and validity.
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42 Resilience

43 An instrument with a 4-item scale was used to measure the aspects of resilience suggested by Sinclair and
44 Wallston³⁸, including one dimension. The participants in the study were asked to respond to their options ranging
45 from “never” to “every day” on 5-point scale, and higher scores indicated higher resilience. The Cronbach’s alpha
46 coefficient for this scale was 0.797.
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51 Job burnout

52 Job burnout was measured using the Chinese version of the Maslach Burnout Inventory-General Survey, which
53 has been widely applied across different occupational groups³⁹. The participants in this study were asked to
54 respond using 7-point scaled response options from 0 (never) to 6 (frequently). The whole scale consists of three
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dimensions: emotional exhaustion (5 items), cynicism (4 items), and reduced personnel accomplishment (6 items). The whole questionnaire consists of 15 items. Higher scores indicated a significantly elevated degree of job burnout. The Cronbach's alpha coefficient for his scales was 0.791.

Data analysis

Descriptive statistical analysis was used to display the demographic variables and incidence rate of workplace incivility. Pearson's correlation coefficients were computed to examine the relationship between workplace incivility and other variables. We obtained the data through the questionnaires above. Meanwhile, the data were transferred from the network, and multivariate techniques also were adopted ($P < 0.05$); the difference was statistically significant. All analyses of the data were carried out using SPSS version 19.0 (IBM Corp, BM SPSS Statistics for Windows, Armonk, NY).

RESULTS

Descriptive results

The demographic characteristics are shown in Table 1. The data indicate that a majority of the sample is female (90.4%) with an average age of 24.6 years; almost 85.3% are unmarried. Among the participants surveyed, 83.3% are from the Tertiary hospitals, and 61.2% had bachelor or above. Approximately 51.3% of the participants' service years less than one year at their current hospital. The participants are primarily distributed into eight clinical departments.

Table 1 .Characteristics of the Respondents (n = 696)

Characteristic	Classes	N	%	M±SD
Age	19-29	672	96.55	24.55±2.1
	30-35	24	3.45	
Gender	Male	67	9.60	-
	Female	629	90.40	
marital status	Unmarried	594	85.34	-
	Married	99	14.22	
	Other	3	0.44	
Hospital level	Tertiary hospitals	580	83.30	-
	The secondary hospital	90	12.90	
	First-level hospital	26	3.70	
Education level	Secondary or below	17	2.40	-

	Associate degree	253	36.35	
	Eachelor or above	426	61.20	
	0-1 year	357	51.29	
Service Years	1-2 years	181	26.01	1.71±0.81
	2-3 years	158	22.70	
	Rotation	102	14.66	
	Internal medicine	165	23.70	
	Surgery	178	25.57	
	Emergency	3	0.44	
Distribution department	Medical technology	25	3.59	-
	Outpatient service	30	4.31	
	Gynecology	41	5.89	
	Paediatrics	29	4.17	
	Others	123	17.67	

The means, standard deviations, and Pearson's correlation coefficients of continuous variables are shown in Table 2. As results exhibited, all variables were significantly correlated with each other. Workplace incivility was positively correlated with anxiety ($r = 0.371$, $P < 0.01$) and job burnout ($r = 0.238$, $P < 0.01$). On the contrary, workplace incivility was negatively related to resilience ($r = -0.191$, $P < 0.01$). Compared to previous studies^{40,41}, the level of job burnout of Chinese new nurses (3.19 ± 0.84) was significantly higher than that of British (2.71 ± 0.97) and Italian nurses (2.31 ± 0.88).

Table 2 The means, standard deviation, Pearson's correlation coefficient and reliability coefficient of variables

Variables	M	SD	α	1	2	3
workplace incivility	1.893	0.532	0.893			
anxiety	2.770	0.862	-	0.371**	-	
resilience	3.515	0.812	0.797	-0.191**	-0.240**	-
job burnout	3.194	0.841	0.791	0.238**	0.436**	-0.026**

** $P < 0.01$; Correlation is significant at the 0.01 level (2-tailed)

M, Mean; *SD*, Standard deviation; *a*, Cronbach's alpha

Hierarchical linear regression models

Several multiple linear hierarchical regression analyses were performed to examine the influence of workplace incivility on job burnout, anxiety, and resilience of new nurses (Table 3). To examine this research, we conducted three mediation analyses using the methods based on linear regression published by Baron and Kenny⁴². Workplace incivility was posed as a dependent variable in this study, anxiety as a mediator variable, and job burnout as an independent variable. Besides, the resilience was seen as a moderating variable in these models. At the same time, to eliminate the effects of demographic variables around these regression models, age, gender, hospital level, working years, and situation of education and department distribution were posed as control variables, as shown in Table 3.

The results showed that workplace incivility had a positive prediction function to generate anxiety ($\beta = 0.364$, $P < 0.01$, M_2) and job burnout ($\beta = 0.440$, $P < 0.01$, M_5) of new nurses. Hypotheses 1 and 3 were supported. Anxiety also had a positive influence on job burnout ($\beta = 0.405$, $P < 0.01$, M_6), which confirmed Hypothesis 2. Further, the regression coefficient $\beta = 0.093$ in Model 6 decreased obviously compared with previous $\beta = 0.240$ (in the Model 5) after controlling for the mediation variable (anxiety), according to the method to test mediating effect proposed by Muller, Judd, and Yzerbyt⁴³. The mediating effect of anxiety and its significance were further tested by a Sobel test, referring to the inspection procedures developed by PREACHER and others⁴⁴. The mediation effect was calculated as follows: $ab = 0.564 \times 0.057 = 0.032$, $P < 0.01$, $z = 7.807$. Therefore, anxiety partly mediated the relationship between workplace incivility and job burnout of new nurses. Thus, Hypothesis 4 was also confirmed. In the last two models, the results showed that the resilience had a negative impact on job burnout ($\beta = 0.030$, $P < 0.01$, M_7). Moreover, the influence of the interaction between incivility and resilience on job burnout was significant ($\beta = -0.564$, $P < 0.01$, M_8). The moderating effect was estimated by referencing a previous study⁴⁵. It showed that resilience moderated the relationship between incivility and job burnout. Thus, Hypothesis 5 was confirmed. This interaction effect is clearly illustrated in Figure 2.

Table 3 Hierarchical linear regression models of variables

Variables	Anxiety		Job burnout					
	M_1	M_2	M_3	M_4	M_5	M_6	M_7	M_8

Control variables

age	-0.012	-0.019	0.027	0.033	0.023	0.031	0.022	0.023
gender	-0.085	-0.094**	0.005	0.042	-0.001	0.037	0.000	-0.002
hospital level	-0.102**	0.087	-0.034	0.011	-0.024	0.011	-0.023	-0.025
service years	0.067	0.084	0.092	0.062	0.103	0.069	0.106**	0.106**
education level	0.107**	0.064	0.041	-0.006	0.012	-0.014	0.012	0.017
department distribution	-0.004	-0.006	-0.011	-0.01	-0.013	-0.011	-0.014	-0.014
cause variable								
workplace incivility		0.364**			0.240**	0.093**	0.242**	0.724**
mediating variable								
anxiety				0.440**		0.405**		
moderating variable								
resilience							0.020	0.400**
incivility*resilience								-0.564**
F	4.217**	19.379**	1.543	24.535**	7.367**	22.426**	21.003**	17.095**
R ²	0.035**	0.165**	0.013	0.200**	0.070**	0.207**	0.057**	0.069**
ΔR ²	0.027**	0.156**	0.005	0.192**	0.060**	0.198**	0.054**	0.065**

** $P < 0.01$; * $P < 0.05$

M1: explains the influence of demographic variables on anxiety;

M2: explains the influence of workplace incivility on anxiety;

M3: explains the influence of demographic variables on job burnout;

M4: explains the influence of anxiety on job burnout;

M5: explains the influence of workplace incivility on job burnout;

M6: explains the influence of workplace incivility on job burnout after bringing into the explanatory power of anxiety.

M7: explains the influence of workplace incivility on job burnout after bringing into the explanatory power of resilience.

M8: explains the influence of workplace incivility on job burnout after bringing into the explanatory power of resilience and resilience-Interaction

DISCUSSION

The effect and mechanism on the new nurses' job burnout caused by workplace incivility

New nurses exposed to workplace incivility had a higher level of anxiety and job burnout. This conclusion is

1
2 consistent with previous research^{12 46}. Moreover, new evidence was also produced in this study that anxiety played
3 a mediating role, and resilience had a moderating effect on the relationship between workplace incivility and job
4 burnout. That is, exposure to workplace incivility can result in increased degree of anxiety, which, in turn, can
5 cause job burnout. The new nurses with high levels of resilience can effectively buffer the negative effect caused
6 by workplace incivility to a certain degree, which, in turn, can reduce the level of job burnout. The possible
7 mechanism is described below.

13 **The mediating role of anxiety in the relationship between workplace incivility and job burnout**

14 In recent years, increased interest was paid to incivility in work settings. Although many previous studies on this
15 topic focused on the adverse effects of uncivil behavior¹², the studies on the mediators and moderators were
16 insufficient. In this study, we attempted to investigate the subtle mechanism of incivility against new nurses.
17 Clearly, workplace incivility is similar to language violence which, exists extensively¹². The new nurses are in
18 need of various resources for career support, including material resources, human resources, mental resources, and
19 others⁴⁷. Generally speaking, workplace incivility is inevitable for new nurses as a part of work events launched
20 from dissatisfied patients. In addition, because of lack of work experience and skills, new nurses are likely to
21 encounter a series of disgruntled emotions from their superiors or colleagues—hence, the image called the “kick
22 cats effect.”⁴⁸ The theoretical “snow-ball effect” on incivility showed that it is inevitable to generate a ripple effect
23 infected by some negative emotions in the workplace⁴⁹. Therefore, most new nurses are more likely to generate
24 anxiety, restlessness, sense of injustice, and helplessness⁵⁰. As time goes by, a state of physical and mental
25 exhaustion and working weariness under stress from work and society will attack the new nurses⁵⁰. Job burnout as
26 a reflection of the chronic and interpersonal stress at the work setting, including emotional exhaustion,
27 depersonalization, and ineffectiveness, can cause various manifestations such as depression, creativity failure,
28 lower sense of personal worth, lower job satisfaction, and so on^{51 52}. Anxiety, as a basic human emotion, developed
29 in the combat between human and environment and the process of survival adaptation⁵³. The Affective Events
30 Theory pointed out that employees can generate emotional reactions to what is going on, and these reactions
31 influence their job performances and satisfaction⁵⁴. Once the perception of anxiety appears, new nurses are likely
32 to consume their own physical and mental energy for defense, followed by the sense of self-denial, inferiority, and
33 helplessness. The sense of low achievement and energy exhaustion and an emotional response to ineffectiveness
34 effort could be highlighted, easily resulting in the increased risk of job burnout. If employees cannot control and
35 address the problems after the exposure to workplace incivility, anxiety ensues with negative emotions—for
36 example, burnout. Therefore, anxiety was defined as having a partial mediating role (shown in Table 3) in the
37 relationship between workplace incivility and job burnout.

The moderating effect of resilience in the relationship between workplace incivility and job burnout

The results of this study showed that, compared to new nurses with low levels of resilience, those with high levels of resilience were less affected by workplace incivility under the same working environment (Table 3). A concept called the “schema” in Constructivism Theory is an individual perception about the world and a way of thinking⁵⁵ and a frame or an organization structure of psychological activity. A schema is the starting point and the core of cognitive structure or the basis of human knowledge⁵⁶. Therefore, the formation and transformation of schema is essential for the cognitive development of individuals. Cognitive development is affected by three processes: assimilation, hue, and balance⁵⁷. Resilience represents positive cognition, and individuals with high levels of resilience are more likely to recover from negative experiences and better adapt to the current environment⁵⁸. Resilience is also a necessary mental defensive ability when facing workplace incivility. From the theoretical kernel of edge angle, it is the positive selection and processing method under adversity⁵⁹. People with higher resilience can possess a positive attitude in the face of adversity. In this study, workplace incivility is seen as a working adversity for new nurses exposed to the unfriendly atmosphere. New nurses with higher levels of resilience could adjust their psychological cognition with positive emotions⁶⁰ and thereby curb the consequence of incivility for physical and psychological harm and job burnout slightly. For example, when their working ability is questioned, new staff with higher levels of resilience are more likely to try their best to improve and win the approval and respect of the patients or colleagues by their efforts without negative emotions. In addition, resilience presents the property of positive psychological traits⁶¹. Fredrickson’s Expand-Construction Theory explains that the positive emotional experience not only reflects the individual’s mental well-being but also promotes the growth and development of the individual⁶². Further, positive emotions have two core functions: first, instantaneous expansion function, which can expand instant thinking, and second, long-term function of construction, which can construct long-term physical, psychological, social resources, and other resources⁶³. According to the two functions, new nurses with high levels of resilience are good at converting the pressure into motivating force; therefore, the negative emotions may be converted to positive emotions to reduce the loss of physical and mental energy of new nurses. Hence, new nurses with high levels of resilience can alleviate the negative impact of workplace incivility on job burnout (shown in Table 3). Consequently, resilience makes a positive adjustment by reducing the loss of mental health and decreasing the risk of job burnout of new nurses. This study suggests that hospital managers should increase training to enhance the resilience of new nurses. The strategies used by nurses to build resilience mainly included cognitive reframing, emotional toughness, emotional connections and work–life balance, and compassionate behavior³³. First, nursing managers should regularly provide communication skills and interpersonal adaptation training for new nurses and help new nurses to

1
2 establish a correct cognitive of workplace incivility and improve their emotional toughness. Second, nursing
3 administrators should encourage nurses to establish a work-family balance and expand their social networks.
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5 Third, nursing management should also increase organizational care such as timely discovery, adequate
6 understanding, and communication for new nurses who face workplace incivility.
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9 **Limitations**

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11 The survey collected data through an online questionnaire. The questionnaire contains many questions, and there
12 may be reporting bias. This research adopted a snowball sampling method; thus, the regional data source ratio
13 would have been unbalanced, and the data were restricted by regional results. Therefore, a rigorous sampling
14 technique and a larger sample are needed in future research. This study is based on a cross-sectional design, which
15 prevents determining the causal relationship between variables. We used several scales from abroad with cultural
16 differences, requiring additional academic concern in a Chinese context. The data were collected from the
17 self-reports of nurses from an online survey with less monitoring, which may have led to response bias due to
18 social desirability or negative effect.
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26 **Conclusion**

27
28 This study focused on workplace incivility in China's nursing field, using "anxiety" and "resilience" as a new
29 interpretation path to analyze the mediating and moderating mechanism of the effects on new nurses' job burnout
30 caused by workplace incivility. First, this study verified that workplace incivility has a significant predictive
31 function in job burnout of new nurses in China's hospital setting. Second, anxiety played a partial mediating role
32 in the relationship between workplace incivility and job burnout. Finally, resilience played a moderating role in
33 the relationship between workplace incivility and job burnout. Workplace incivility in hospitals towards new
34 nurses could increase their psychological anxiety⁶⁴ and, in turn, gradually generate job burnout. New nursing staff
35 with high levels of resilience can effectively buffer the negative effects caused by workplace incivility, and the
36 resilience can also repair psychological trauma to a certain degree after exposure to workplace incivility. The
37 model theoretically extends the study of workplace incivility, especially to the Chinese new nursing group. This
38 model suggests that nursing managers should pay attention to the growth and development of new nurses in the
39 practice of nursing management, improving the resilience of new nurses and reducing their anxiety. This will help
40 to reduce job burnout of new nurses, thereby promoting the work efficiency and saving management cost. The
41 study also provides a new theoretical contribution and practical guidance on maintaining physical and mental
42 health of the Chinese new nurses. In turn, potential loss of nursing organization can be prevented.
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COMPETING INTEREST

No conflict of interest has been declared by the authors.

AUTHOR CONTRIBUTIONS

Conceived and designed the experiments: SunTao, ShiYu, GuoHui. Performed the experiments: SunZhinan, ZhangShue, Analyzed the data: XieFengzhe, WangJinghui, DongXinPeng. Contributed reagents/materials/analysis tools: SunTao, ZhangShue, DongXinPeng. Wrote the paper: ShiYu, GuoHui, SunZhinan, Fan Lihua

DATA SHARING

No additional data are available.

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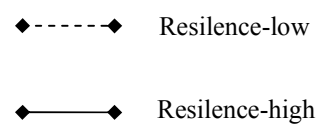
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Figure 1. The conceptual framework of study

Figure 2. Effect of moderation



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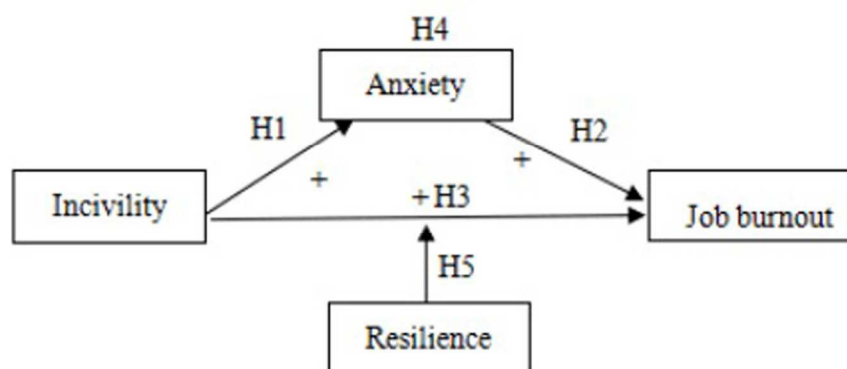


Figure 1. The conceptual framework of study

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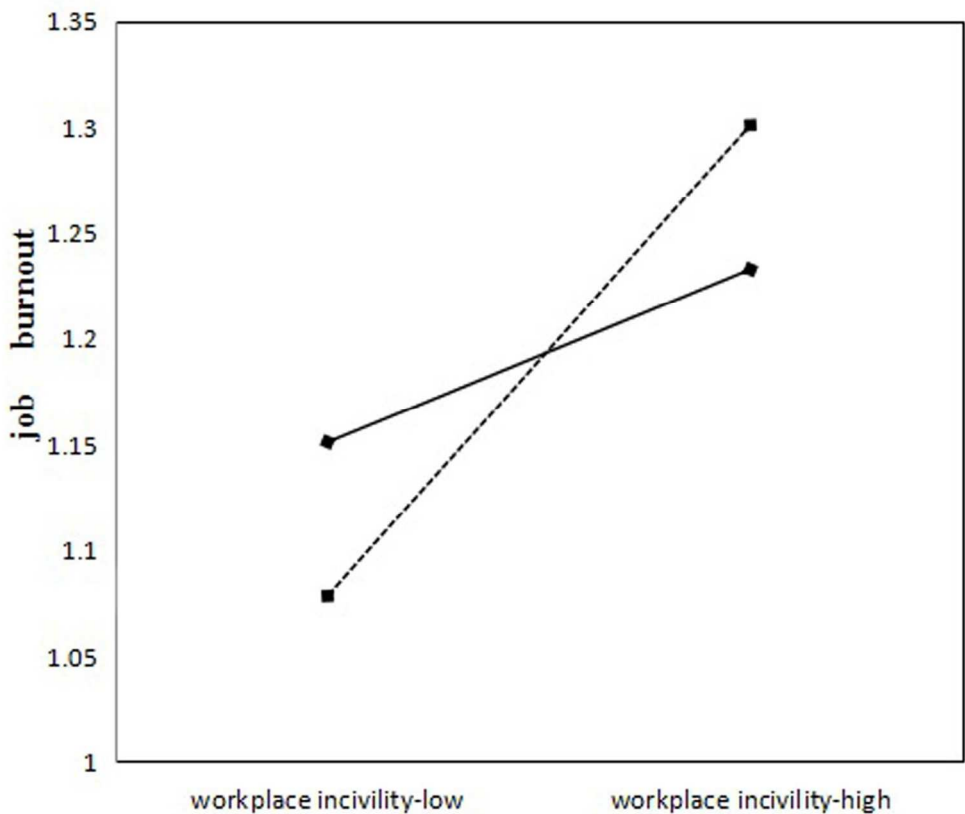


Figure 2. Effect of moderation

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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	Page 1, line 14-24;
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	P.1; line 25-31 P.2; line 1-14
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	p.2, line 15-30; p.3, line 1-31 p.4, line 1-15
Objectives	3	State specific objectives, including any prespecified hypotheses	P.4, line 16-21;
Methods			
Study design	4	Present key elements of study design early in the paper	P.1, line 12
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	p.4, line 23-31
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants	P.5, line 1-5
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	no
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	p.5, line 13-31; p.6, line 1-4
Bias	9	Describe any efforts to address potential sources of bias	no
Study size	10	Explain how the study size was arrived at	no
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and	P.6, line 5-11

		why	
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	P.6, line 24-31
		(b) Describe any methods used to examine subgroups and interactions	no
		(c) Explain how missing data were addressed	no
		(d) If applicable, describe analytical methods taking account of sampling strategy	P.4, line29-31 P.5, line1-5
		(e) Describe any sensitivity analyses	no
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	P.4, line 24-27
		(b) Give reasons for non-participation at each stage	no
		(c) Consider use of a flow diagram	No
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	P.6, line 14-22 P.6, line 28-31
		(b) Indicate number of participants with missing data for each variable of interest	no
Outcome data	15*	Report numbers of outcome events or summary measures	P.6,line 14-16 P.6,line 20-22 P.7,line 9 P.7,line 13-15
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	p.6,line 14-31 p.7,line 1-15
		(b) Report category boundaries when continuous variables were categorized	no
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	no
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	no

Discussion			
Key results	18	Summarise key results with reference to study objectives	p.7;line16-31 p.8;line1-31 p.9;line1-17
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	P.9, Line 18-26;
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	p.9,line 27-31 p.10,line 1-7
Generalisability	21	Discuss the generalisability (external validity) of the study results	no
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	P.10, line 8-11

*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.