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Comparative Analysis of Validation of Compassion Fatigue Short Scale and Professional Quality of Life Scale (ProQOL) in China under COVID-19 Pandemic

Yutong Zhang

Master's in Management

Supervisor:
PhD Shaozhuang Ma, Associate Professor,
ISCTE - IUL

September 2021



**BUSINESS
SCHOOL**

Department of Marketing, Strategy and Operations

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Resumo

Objectivo: Comparar e analisar as diferentes escalas de fadiga de compaixão (CF) existentes, e testar a fiabilidade e validade para descobrir uma ferramenta de avaliação mais adequada da CF para o pessoal médico chinês da linha de frente.

Metodologia: Com uma amostra de 252 clínicos chineses (médicos e enfermeiros), este estudo comparou a validação das duas escalas CF mais utilizadas, a CF-Short Scale e a ProQOL Scale no contexto dos cuidados de saúde chineses. Análise exploratória dos factores, análise de correlação, e Cronbach's α were utilizado para examinar a fiabilidade e validade da versão chinesa da escala CF por enfermeiros clínicos e médicos da linha da frente. Por último, foi realizado o teste ANOVA unidireccional para examinar e comparar os resultados da CF do pessoal médico com características diferentes.

Encontrar: A Escala Curta de Fadiga de Compaixão incluiu dois factores, explicando totalmente 64.273 % of a variação total, e Cronbach's α da Escala Curta de C-CF = 0,918, Job Burnout (JB) = 0,892, e Secondary Trauma (ST) = 0,909. A Balança C-ProQOL também tinha uma boa consistência interna, com Cronbach's α de Compassion Satisfaction (CS) = 0,925, ST = 0,925, e Burnout(BO)= 0,705. No entanto, a validade de construção da Escala C-ProQOL foi insatisfatória com alguns itens problemáticos. A pontuação da CF entre o pessoal médico era de nível médio e diferia significativamente pelo número de horas trabalhadas, o número de turnos nocturnos, e outras características do pessoal médico.

Conclusão: A C-CF Short Scale tem melhor aplicabilidade que pode ser usada como uma medição CF fiável para o pessoal médico chinês.

Palavras-chave: Fadiga de compaixão, linha da frente, fiabilidade, validade, COVID-19

Abstract

Objective: To compare and analyze different existing compassion fatigue (CF) scales, and to test reliability and validity to find out a more suitable evaluation tool of CF for Chinese front-line medical staff.

Method: With a sample of 252 Chinese clinicians (doctors and nurses), this study compared the validation of the two most used CF scales, Compassion Fatigue Short Scale (CF-Short Scale) and Professional Quality of Life Scale (ProQOL) in Chinese healthcare setting. Exploratory factor analysis, correlation analysis, and Cronbach's α were employed to examine the reliability and validity of the Chinese version of the CF scale by front-line clinical nurses and doctors. Lastly, One-way ANOVA test was conducted to examine and compare the CF scores of the medical staff with different characteristics.

Finding: The Compassion Fatigue Short Scale included two factors, explaining totally 64.273 % of the total variance, and Cronbach's α of C-CF Short Scale = 0.918, Job Burnout (JB) = 0.892, and Secondary Trauma (ST) = 0.909. The ProQOL (C-ProQOL) Scale also had a good internal consistency, with Cronbach's α of Compassion Satisfaction (CS) = 0.925, Secondary Trauma (ST) = 0.925, and Burnout (BO) = 0.705. However, the construct validity of C-ProQOL Scale was unsatisfactory with some problematic items. The CF scores among medical staff was at a medium level and differed significantly by the number of hours worked, the number of night shifts, and other characteristics of the medical staff.

Conclusion: The C-CF Short Scale has better applicability that can be used as a reliable CF measurement for Chinese medical staff.

Keywords: Compassion fatigue, front-line, reliability, validity, COVID-19

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Glossary of acronyms

BO	Burnout
CF	Compassion Fatigue
CF-Short Scale	Compassion Fatigue Short Scale
C-CF Short Scale	Chinese version of Compassion Fatigue Short Scale
C-ProQOL	Chinese version of Professional Quality of Life Scale
CS	Compassion Satisfaction
JB	Job Burnout
ProQOL Scale	Professional Quality of Life Scale
ST	Secondary Trauma

1. Introduction

As of August 2021, more than two billion people have been diagnosed with infection of the COVID-19, and more than four million people have died from COVID-19. The World Health Organization (WHO) has pointed out that there was no specific medicine for patient but only symptomatic treatment. Because of severe pneumonia-type symptoms leading to extreme breathing difficulties, COVID-19 has caused thousands of people to be hospitalized. In some countries, the health-care levels of some hospitals were difficult to meet the huge hospitalization and care needs, such as the shortage of medical staff, beds and mechanical ventilators, putting more and more serious pressure on clinical nurses and doctors to provide adequate care on very ill and infectious patients. During the COVID-19 pandemic, the ease of transmission of the virus, the lack of immunity of the global population, untimely nucleic acid testing, limited medical equipment, and the general anxiety of infected patients and their families, all of the above factors imposed increasing pressure on entire health care system (Centers for Disease Control & Prevention, 2020). Moreover, working under COVID - 19 conditions, the front-line medical staff were also at risk of various infection at any time. Kang et. al (2015) pointed out that medical staff often have various psychological problems under high pressure and risk environment. Alharbi, Jackson & Usher (2020) argued critical care nurses might be particularly affected by severe emotional distress, which has been associated with the development of compassion fatigue (CF) and/or Burnout (BO). Facing these difficulties, the current situation and severe emotional distress might have imposed a negative impact on mental health. And physical health of medical staff, more or less leading them to compassion fatigue experience. Indeed, research has confirmed that medical staff have high work intensity and were frequently exposed to traumatic situations such as viral infections and patient deaths under the COVID-19 pandemic (Alharbi et al., 2020). The continuous accumulation of work pressure makes nursing staff a high-risk group of compassion fatigue.

First introduced by Joinson in 1992, compassion fatigue was referred to describe the emotional numbness, physical and mental exhaustion of emergency department nurses in long-term nursing work (Joinson, 1992). Later, Figley (1996, 2002) has introduced compassion fatigue as a more 'user-friendly' term to describe the phenomena of secondary

traumatic stress, which was naturally phenomenon that helper was indirectly exposed to the traumatic situation becoming physical emotional exhaustion. Compassion fatigue was considered to be a result of long exposure to the suffering of others, listening to descriptions of traumatic events experienced by others, little to no emotional support in the workplace, and poor self-care (Radley & Figley, 2007).

Literature has established that clinical social worker experiencing compassion fatigue were believed to be at higher risk to make poor professional judgments (e.g., misdiagnosis, poor treatment planning, and abuse of clients) than those not experiencing compassion fatigue (Rudolph et al.,1997). Li et al. (2020) proposed that psychological assessment and intervention of front-line medical staff were essential to the control and prevalence of the pandemic. Therefore, for the front-line medical staff as the main force in the fight against the epidemic, identifying and assessing compassion fatigue at an early stage was particularly important. Accurately and timely assessed the compassion fatigue of medical staff would not only help maintain their health, but also improve the efficiency and quality of clinical treatment during the Covid-19 pandemic.

In order to effectively identify compassion fatigue, commonly used method was using compassion fatigue measurement tools to assess the mental health level of the helper (e.g., front-line doctors and nurses). In the past few years, compassion fatigue has gradually become a new research topic, but it developed late in China; and some of the research theories involved were based on the relevant theories of western countries, not fully applicable to Chinese healthcare settings (Li et al., 2019). There was no study in China comparing the validation of compassion fatigue scales designed by western scholars, such as the Compassion Fatigue Self-Test (CFST) (Figley, 1995), Professional Quality of Life Scale (ProQOL) (Stamm, 2005) and the Compassion Fatigue-Short Scale (Adams et al., 2006). Hence, the main aim of this study was to compare the reliability and validity of these compassion fatigue scales and find out a more suitable evaluation tool of compassion fatigue for Chinese front-line medical staff.

2. Literature Review

2.1 The concept of Compassion Fatigue

As the development of society and psychology, social attention to the mental health of health-care workers gradually increased. Compassion fatigue was first introduced by Joinson (1992) in nursing area, as she used it to describe the emotional exhaustion of emergency care units nurses in demanding caring work of patients, such as forgetfulness, decreased attention span, exhaustion, physical illness, experiencing apathy and anger. Later, Figley(1995, 2002) noted compassion fatigue as a more ‘user friendly’ term to vicarious and secondary trauma’, which was a phenomenon that was caused by indirect exposure to traumatic situations and exhibits overload pressure in behavior and psychology.

While there were multiple and ambiguous understandings between compassion fatigue, vicarious traumatization and secondary traumatic stress. Alkema et al. (2008) proposed compassion fatigue was the result of indirectly exposure to traumatic events. Frank et al. (2007) defined compassion fatigue with attributes similar to, but not identical to secondary trauma syndrome. Stamm (2007) argued that burnout usually has a slow onset and was the result of long-term work-related issues; however, compassion fatigue as the result of specific secondary exposure to traumatic events. Bride et al. (2007) suggested using compassion fatigue as a term to describe the negative emotional effects on clinicians due to work with traumatized clients, they have ‘distinctions’ in terms of ‘the origin and symptoms’. Nimmo, & Huggard (2013) shared the opinion that ‘Compassion fatigue, vicarious traumatization and secondary traumatic stress, these three terms were often used interchangeably’.

In terms of Chinese research, Sun et al. (2011) first published a review that distinguished the difference between compassion fatigue (CF) and Posttraumatic stress disorder (PTSD), secondary trauma (ST), vicarious traumatization (VT) and burnout. He explained compassion fatigue was indirect exposure to traumatic events, which brings about compassion pressure and reduces the capacity and interest in being empathic. Du et al. (2017) described CF as: the helper suffered secondary trauma due to empathy pressure in the process of helping others, which reduced his/her interest and ability to empathize with the recipient, occurring burnout with certain symptoms.

Based on the above literature and personal understanding, this study summarized the

concept of CF as follows: in the process of helping others, the helpers were overwhelmed by empathy paying, helper produces a similar traumatic experience and emotional exhaustion, reducing empathy capacity and leading to a series of negative reaction in emotion, cognitive and behavior (Bride et al. 2007; Sun et al. 2011; Du et al. 2017).

2.2 The consequence of Compassion Fatigue

Many studies have shown that compassion fatigue could have multiple physical, psychological, and work-life effects. This review mainly discusses the impact of compassion fatigue from three aspects: physiological performance, psychological performance and social behavior performance.

2.2.1 Physiological performance

Austin et al. (2009) found nurses might have difficulty sleeping, become distressed and might 'lose balance in their lives' (p. 206). Chen (2004) investigated the mental health status of assistance of the 9.21 earthquake in Taiwan, hospital social workers, nurses, volunteers and clinical and psychological counsellor, and found that they had physical fatigue, involuntary appearance of disaster images, unstable sleep and waking up in dreams. Chinese scholar Yu et al. (2018) comprehensively described the physiological manifestations of empathy fatigue in their research: ① Chronic fatigue, tired. ② Recurrent headache or migraine. ③ Sleep disorders, including insomnia or drowsiness, difficulty falling asleep, waking up early, and not waking up. ④ Tense, pain, discomfort, chest pain, tachycardia, and unexplained syncope in the body muscles. ⑤ Other frequent or persistent diseases.

2.2.2 Psychological performance

Hooper et al. (2010) found in the study of compassion fatigue among nurses that nurses would have psychological distress, such as frustration, frustration, irritability, hopelessness. Du et al. (2017) studied compassion fatigue also includes escape, anxiety, and irritability at the emotional aspect. Portnoy (2017) noted that emotional aspect effect was mainly low mood, unable to feel happy and happy, feeling empty, numb, depressed and unable to help and despair. What's more, the emotional symptoms could become progressively worse related to

Cognitive Change. A literature review showed the cognitive impact include: questioning the meaning and purpose of their lives, feeling apathetic, having difficulty concentrating and functioning in their roles (Sinclair & Hamill 2007).

2.2.3 Social behavior performance

The social behavior of compassion fatigue was mainly reflected in work and interpersonal relationship, which was generally characterized by unwillingness to help others, rejection of normal interpersonal communication and lack of trust in working life. These have a great impact on individual interpersonal relationships and quality of life. For example, Figley (1995) noted the effects of compassion fatigue were believed to impair the ability of clinicians to effectively help those seeking their services. Reports of clinicians experiencing compassion fatigue were often reflected in outcomes of emotional distress, pain, and suffering, and might manifest in increased rates of absenteeism, reduced service quality, low levels of efficiency, high attrition rates and eventually, workforce dropout (Gorman & Brooks, 2009). And Yu et al. (2018) summarized the social behavior of compassion fatigue including: lack of response and compassion, inability to share or alleviate pain, as well as decreased interpersonal interaction, increased interpersonal distance, absenteeism, and drug abuse.

Based on scholars' study, the social behavior of compassion fatigue mainly includes: The increase of alcohol and drug use; Addictive behaviors, such as crazy shopping or work, overeating; Absence from work; The ability to make decisions was impaired; Forgotten, to forget something important; The individual's social will be isolated and lose important social support.

2.3 Measuring tools of Compassion Fatigue

2.3.1 Compassion fatigue self test (CFST)

The CFST (Figley, 1995) with its different versions was one of the first measures developed specifically for testing compassion fatigue purpose. There were two sub-scales, compassion fatigue (23 items) and burnout (17 items), assessing both compassion fatigue and burnout. It adopts Likert-5 grade score (1 = rarely/never, 2 = at times, 3 = not sure, 4 = often, 5 = very often) and the Cronbach's α coefficient of the scale was 0.86-0.94.

Later, Stamm and Figley (1996) developed a revised version, adding Compassion Satisfaction subscale (CS) and expanding it to 66 items, which provided good evidence of reliability with internal consistency alphas of the three subscales, CS=0.87, BO=0.90, CF=0.87. Gentry, Baronowsky and Dunning (2002) used a different version of the CFST, which they called the Compassion Fatigue Scale-Revised Scale (CFS-R). This version was comprised of 30 items, 22 of which measure compassion fatigue and 8 of which measure burnout, without reported the validity and reliability. However, Adams et al. (2006) specifically examined the psychometric indicators of the CFS-R Scale. Based on their factor analysis of the CFS-R Scale, they found that the scale measured multiple underlying factors. Therefore, they questioned the validity of the factors in the scale.

2.3.2 Compassion Fatigue Short Scale (CF-Short Scale)

As noted above, due to doubts about the factor validity of the CFS-R, Adams et al. made data driven refinements to the scale, resulting in a shorter revised version, which they refer to as the Compassion Fatigue Short Scale (CF-Short Scale; Adams et al., 2006). There were 2 dimensions of Secondary Trauma (ST) and Job Burnout (JB) in the short edition scale of compassion fatigue, in total 13 questions. According to his report, each scale has good internal reliability: 0.90 for the JB subscale, 0.80 for the ST subscale, and 0.90 for the combined CF-Short Scale. And he also presented convincing evidence for factors, concurrent and predictive validity of the CF-Short Scale.

In addition, CF-Short Scale has been translated to many languages by scholars in the world. The Chinese version of the CF-Short Scale translated by Lou (2012) uses a 10-point Likert-scoring method from 1 (never) to 10 (very frequent). Cronbach's coefficients were respectively 0.87~0.95, which showed good reliability and validity. Since 2012, roughly 17 papers on the topic of compassion fatigue have used the CF-Short Scale. Zheng et al. (2017) study also reported acceptable Cronbach's α coefficient of the scale (0.785).

2.3.3 Professional Quality of Life Scale (ProQOL Scale)

After Stamm and Figley (1996) more fully developed the CFST, continued development of this version of the CFST has resulted in a renamed instrument, the Professional Quality of

Life Scale (ProQOL; Stamm, 2005). The scale measures ‘the quality one feels towards their work as a helper’ (Stamm, 2010, p.8). There were two main aspects of quality of life: Compassion Satisfaction (CS) and Compassion Fatigue (CF). Compassion fatigue in turn was comprised of two concepts: Secondary Trauma (ST) and Burnout (BO). It was the third revision of the CFST Scale (Figley, 1995), which was structured as a 30-item, three independent sub-scale: ST, BO and CS. And each item was anchored by a 6-point Likert scale (0 = never, 1 = rarely, 2 = a few times, 3 = somewhat often, 4 = often, and 5 = very often); Scoring requires summing the item responses for each 10-item sub-scale. Internal consistency reliability estimates for the subscales were reported as 0.87 for CS, 0.72 for BO, and 0.80 for ST. Notably, the scale requires participant to conduct self-evaluation based on the situation within 30 days.

ProQOL was one of the most widely used compassion fatigue measurement tool in China (Lou, 2012; Tian et al., 2019). Chinese scholar Chen (2013), and Zheng et al. (2013) translated the scale and tested its validity and reliability in China, both showing good reliability and validity. Chen (2013) applied explanatory factor analysis through the maximum variation principle and extracted 5 components, explaining 55.642% of the total variance. The Cronbach's α of the total scale was 0.91.

Recently, Zhuang et al. (2020) used this translated version of ProQOL to investigate the current situation of compassion fatigue of nursing personnel under the COVID-19 pandemic. Zheng et al. (2013) conducted a study of 328 nurses in different clinical departments. The ProQOL Cronbach's α coefficient was 0.71, and Cronbach's α of the three subscales of CS, BO and ST were 0.82, 0.73, 0.76. Chinese scholars adopted this version to analyze the status of CF in psychiatric nurses and found that psychiatric nurses were at a moderate level of CF (Peng and Li, 2018).

2.3.4 Medical Staff Compassion Fatigue Scale

Medical Staff Compassion Fatigue Scale was the Chinese first self-developed local compassion fatigue scale, developed by Li et.al (2011), through the interview and open survey of medical workers. The scale consists of 36 entries, including six dimensions: stress, loss of enthusiasm, negative behavior, emotional indifference, doubt ability and loss of morale. The

Cronbach's α coefficient of the scale was 0.879, showing good reliability. The average structural validity was 0.722, and it was also evaluated by nursing experts, psychology professors and medical experts, which had good content and structural validity. Jiang et al. (2013) and Yu et al. (2018) adopted this scale to carried out empirical research on CF status of the nurse. According to Yu (2018), nearly 62.86% (176/280) of ICU nurses had compassion fatigue, and the overall average score was 2.68.

3. Methodology

3.1 Research context

This research was conducted during the COVID-19 outbreak, the front-line medical staff working in a stressful environment and facing severe stress. These anti-epidemic health care workers were more prone to compassion fatigue, especially for those who work in environments where they were confronted daily with large numbers of people for whom the outcome was terrible; such as the case for those diagnosed with COVID-19 and requiring admission to emergency or intensive care units (Wallace et al., 2020).

3.2 Participants

Adopt a survey questionnaire approach by online survey, targeting clinical first-line medical staffs of designated hospitals which accept COVID-19 infected patients. Potential participating medical staff were invited by WeChat app and Ding talk, a hospital system office software. Online questionnaires were uploaded via a professional platform named 'Wenjuanxing' for data collection questionnaire survey and provided them the link. Three hundred and three (303) completed questionnaires were collected, and the respondents who took less than 3 minutes to perfunctorily answer the questionnaire were eliminated. This left 252 completed questionnaires.

Participant selecting criteria include the following: (1) medical staff who have obtained a doctor's or nurse's qualification certificate; (2) medical staff work in a designated hospital for the treatment of infected patients with COVID-19; (3) work for at least five days in the front-line designated hospital for the treatment of infected patients (4) accept informed consent and voluntary participation in this study.

3.3 Measurement

Through comparison, this study targeted two international compassion fatigue scales frequently used with better reliability and validity. The CF-Short Scale and ProQOL Scale used in this study included 13 and 30 items. Convincing evidence in support of reliability and validity of two scales have been reported (Stamm, 2005; Adams, 2006). Although the ProQOL was originally developed for emergency personnel and trauma counsellor, the scale had been

utilized internationally for various target populations (Stamm, 2010). Besides, the ProQOL and CF-Short Scale had been receiving international attention by researchers and translated into many languages by scholars in many countries. For example, the CF-Short Scale and ProQOL Scale were frequently used in China, showing a good applicability and validity. In addition, for the Medical Staff Compassion Fatigue Scale designed by Chinese scholar (Li et al. 2011), internal consistency coefficient was 0.879; however, this scale was only used in graduate dissertation research, and subsequent scholars who used it did not report the validity and consistency of the scale. The results were doubtful, and we did not adopt this scale.

3.4 Scale Translation and Data collection

Previous Chinese version of the ProQOL Scale was translated mainly for nurses, and the Chinese version of CF-Short Scale was used for emergency workers. In order to ensure the accuracy of the scale translation and applicability to medical staff, the scales were first translated into Chinese by the author and another bilingual professional translator. Secondly, using the back-translation procedure, the original translated version was sent to two bilingual Chinese physicians to translate the Chinese version of the compassion fatigue scale back to English. Then, the authors reviewed the two back-translated versions and previous Chinese versions of compassion fatigue scales to compare and detect inconsistencies. Finally, ask one professional clinic expert, one ICU nurse and one emergency unit nurse as a group to check details and to make sure the questionnaire items were clear and easy to understand. When inconsistencies were resolved, we distributed the final version scales to those medical staff who meet the screening criteria, explaining the purpose of the investigation, providing them the link of questionnaire and finish the test independently.

At the beginning, we collected 200 questionnaires, and the number of healthcare workers who have participated in the treatment of COVID-19 infected patients was about the same as those who have not participated, 102 and 98, respectively. Considering the need to compare the two groups and the existence of some invalid questionnaires, the study needed to expand the scope of the study population to continue collecting data. Data collection continued in a professional discussion group based on the hospital online system. The group was made up of front-line medical workers who have volunteered during the COVID-19 pandemic, and a total

of 303 participants were collected. Some of them were not indirect contact with or treating infected people, but still working on the front lines. After eliminating the questionnaires that were filled in carelessly, there were 252 valid responses.

3.5 Statistical Analyses

After data collection input, in order to compare the applicability of these two CF measurement tools to medical personnel in China, we performed a series of statistical analyses using SPSS.

First, descriptive analysis was performed aiming an understanding of the demographic characteristics of participants in this study. Afterwards, the Principal Component Analysis (PCA) with Varimax rotation was conducted to examine the underlying components and the construct validity of the Chinese version of CF-Short Scale and ProQOL Scale for healthcare workers. The construct validity tests if the variables reflect the construct that is supposed to be measured by means of its structure (Hair et al., 2006). Bartlett's test and KMO analysis tested if the data were suitable for PCA in advance.

Using the loadings for rotated components and composing items, we labeled compassion fatigue scale dimensions, based on the scale items with each (rotated) components correlates the most. Then correlation analysis was used to examine the correlation among the various dimensions of Chinese version of CF-Short Scale and ProQOL Scale. The questionnaires should have a moderate correlation among the various dimensions. If correlation was too high, there was overlap between each dimension and some dimensions might not exist; if correlation was too low, the measurement was some completely different psychological qualities.

Additionally, Cronbach's coefficient alpha was calculated to assess the internal consistency aspect of reliability of the instrument, targeting the whole instrument as well as the CF Scale dimensions separately. Therefore, it could verify whether it was credible as a measurement tool of CF for health-care workers in China.

Finally, t-test and one-way ANOVA test were applied to examine and compare the compassion fatigue scores of the medical staff with different characteristics (e.g., age, gender, working department and working hours). Normality assumption of the sample was also

verified firstly before the two tests.

4. Findings

4.1 Demographics of the participants

Questionnaires were distributed in the designated hospitals of COVID-19 in Xinjiang, Beijing and some other coastal cities. Three hundred and three (303) questionnaires were recovered, after excluding invalid questionnaires, leaving 252 effective questionnaires (effective rate about 83.2%). Table 4.1 reports medical staffs' demographic information. Of 252 respondents, there were 74 males (29.4%) and 178 females (70.6%), and majority of them were doctors (60.3%). Average age for participants was 37.2 (range 22-60) years old. More than half of participants were married (69.0%). The largest proportion of participants had bachelor's degree (63.9%) and junior professional title (50.4%). Participants treat and care for patients in several fields, namely emergency and intensive care department (8.7%), outpatient (4.0%), internal medicine (47.2%), surgical department (15.50%), and other (24.6%). The majority of the respondents had >20 years working experience in current hospital (n=104). Nearly 90% of medical staff worked >40 hours per week and 82.6% of them had 0-10 times night shifts per month on average. The number of health-care workers involved in the treatment of COVID-19 infected patients was comparable to the number of those not involved (117 vs 135). Besides, most respondents (84.9%) work in hospitals in small to medium-sized cities in Xinjiang province.

Table 4. 1 Demographics of participating medical staff (n=252)

Variable	N (%)
Age, years old	
18-30	91 (36.1)
31-45	85 (33.7)
45-60	76 (30.2)
Gender	
Male	74 (29.4)
Female	178 (70.6)
Marital Status	
Married	174 (69.0)
Unmarried	78 (31.0)
Professional position	
Junior	127 (50.4)
Intermediate	48 (19)
Senior	77 (30.6)

Educational background	
College degree or below	38 (15.1)
Bachelor degree	161 (63.9)
Master degree or above	53 (21)
Working years in current hospital, years	
≤ 5	79 (31.3)
6-10	54 (21.4)
11-20	15 (6)
> 20	104 (41.3)
Job position	
Doctor	152 (60.3)
Nurse	100 (39.7)
Participation in the treatment of COVID-19 infected patients	
Yes	117 (46.4)
No	135 (53.6)
Working department	
emergency and intensive care group	22(8.7)
Outpatients	10 (4.0)
Internal medicine	119 (47.2)
Surgical department	39 (15.5)
Other	62 (24.6)
Average number of night shifts per month, times	
0-4	105 (41.7)
5-10	103 (40.9)
>10	44 (17.5)
Working hours per week in the hospital, hours	
≤40	26 (10.3)
40-50	116 (46)
> 50	110 (43.7)
Number of beds in your hospital, beds	
≤500	58 (23)
501-1000	112 (44.4)
1001-1500	44 (17.5)
> 1500	38 (15.1)
City of your workplace	
Capital cities	38 (15.1)
Small and medium sized cities	214 (84.9)

4.2 Analysis of Chinese version of CF-short Scale (C-CF Short Scale)

4.2.1 Exploratory Factor Analysis

KMO of 0.916 indicated a very good sample adequacy and Bartlett's test of sphericity was also significant (Chi-Square = 1993.122, $df = 78$, $p < 0.001$) suggesting appropriate for factor

analysis. Then principal component analysis with varimax rotation was conducted to extract items according to Kaiser’s criterion. The results showed 2 factors with eigenvalues >1, indicating the extraction of 2 principal components and cumulatively accounting for 64.273% of total variance of the 13 original items (Table 4.2).

Table 4. 2 Total variance explained of C-CF Short Scale

Component	Initial Eigenvalues			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.604	50.802	50.802	4.421	34.004	34.004
2	1.751	13.471	64.273	3.935	30.269	64.273
3	0.83	6.388	70.661			
4	0.638	4.906	75.568			
5	0.588	4.525	80.093			
6	0.474	3.647	83.74			
7	0.423	3.255	86.994			
8	0.384	2.95	89.945			
9	0.32	2.458	92.403			
10	0.306	2.355	94.758			
11	0.274	2.108	96.866			
12	0.235	1.807	98.673			
13	0.172	1.327	100			

*Extraction Method: Principal Component Analysis.

Using Varimax Rotation obtained 2 rotated component and each original item’s loading greater than 0.5 on their belonging factors. Items CF1 to CF8 were most correlated to that component 1, and all items relate to “trapped feeling with work”. Thus, the proposed name for this first component could be “Job Burnout” (JB).

The Component 2 was structured by the item CF9 to CF13, which related to negative symptom during patient interactions (e.g., flashback, troubling dreams). So, the name for second component could be “secondary trauma” (ST). Comparing the results of this study with the original version of the CF-Short Scale, the composing items included on each dimension of the scale were consistent. Summary results of factor analysis of data for the 13 items of C-CF Short Scale are reported in Table 4.3.

Table 4.3 Rotated component matrix of C-CF Short Scale

Item	Issue	Component 1 (JB)	Component 2 (ST)
CF4	Felt depressed as a result of work	0.822	
CF6	Sense of worthlessness associated with work	0.771	
CF3	Felt tired due to work as caregiver	0.766	
CF1	I have felt trapped by my work	0.735	
CF8	Thoughts about not achieving goals	0.685	
CF5	Unsuccessful at separating work from personal life	0.666	
CF7	Feel like a “failure” in work	0.631	
CF2	Sense of hopelessness working with clients	0.622	
CF12	Suddenly recalled frightening experience while working with client		0.887
CF13	Losing sleep over client's traumatic experience		0.855
CF11	Intrusive thoughts after working with difficult clients		0.824
CF10	Troubling dreams similar to client's		0.762
CF9	flashbacks connected to clients		0.754
	% Variance	34.004	30.269
	Cumulative %	34.004	64.273

As shown in Table 4.4, the C-CF Scale had high structural validity: the correlation coefficient of JB and ST was 0.587; CF-Short total scale showed positive and significant correlations with JB ($r = 0.931, p < 0.01$) and ST ($r = 0.841, p < 0.01$) subscales.

Table 4.4 Reliability and correlation of C-CF Short Scale

	Cronbach's α	C-CF Short Scale	JB subscale	ST subscale
C-CF Short Scale	0.918	/		
JB subscale	0.892	0.931*	/	
ST subscale	0.909	0.841*	0.587*	/

* significant at the 0.01 level (2-tailed).

4.2.3 Reliability Analysis

Table 4.4 also sums up the Cronbach coefficient α of the C-CF Short Scale as well as its two dimensions. All scales showed acceptable internal consistency reliability estimates. The Cronbach's α coefficient of two subscales were all above 0.80 (JB=0.892, ST=0.909), which was in an strong credible range. And the total scale was also reliable with a Cronbach's alpha

of 0.918. This result showed that the C-CF Short Scale and its dimensions had good reliability.

4.3 Analysis of Chinese version of Professional Quality of Life Scale (C-ProQOL)

4.3.1 Exploratory Factor Analysis

The structure of the ProQOL Scale was examined using exploratory factor analyses. First the data adequacy was examined by KMO test, with a result of 0.875 and Bartlett's Bartlett's test $p < 0.001$ (Chi-Square=4469.007, $df=435$), suggesting correlation matrix was appropriate for factor analysis and PCA was adequate.

A principal component analysis (PCA) was carried out using the varimax rotation, and five components were extracted by Kaiser's criterion, explaining 62.436% of the total variance. Three items (P7, P26, P28) contributed to the C4 factor, but cross-loading phenomenon appeared on item P7 and P26. These two items were not only explained by C4 components, but also explained by C2, C3 at the same time. Both of them had factor loading > 0.4 on the C2 and C3 component. A similar situation occurred in item P19 and P21, which were both explained by component C2 and C3, highlighted in table 4.5. Besides, C5 component contains only one item (P5. "I jump or am startled by unexpected sounds"), which was not suitable to form a single factor alone to represent the underlying characteristics.

Table 4. 5 Rotated component matrix -5 factors of C-ProQOL

Item	Component				
	C1	C2	C3	C4	C5
P18. My work makes me feel satisfied.	0.831				
P20.I have happy thoughts and feelings about those I [help] and how I could help them.	0.801				
P27. I have thoughts that I am a "success" as a [helper].	0.769				
P30. I am happy that I chose to do this work.	0.764				
P24. I am proud of what I can do to [help].	0.759				
P17.1 I am the person I always wanted to be.	0.744				
P22. I believe I can make a difference through my work.	0.721				
P16. I am pleased with how I am able to keep up with [helping] techniques and protocols.	0.706				
P3. I get satisfaction from being able to [help] people.	0.687				
P4. I feel connected to others.	0.682				
P15. I have beliefs that sustain me.	0.678				

P29. I am a very caring person.	0.631				
P12. I like my work as a [helper].	0.551				
P6. I feel invigorated after working with those I [help].	0.539		-0.522		
P1. I am happy.	0.533				
P9. I think that I might have been affected by the traumatic stress of those I [help].		0.864			
P10. I feel trapped by my job as a [helper].		0.837			
P13. I feel depressed because of the traumatic experiences of the people I [help]		0.830			
P23. I avoid certain activities or situations because they remind me of frightening experiences of the people I [help]		0.799			
P14. I feel as though I am experiencing the trauma of someone I have [helped]		0.785			
P25. As a result of my [helping], I have intrusive, frightening thoughts.		0.777			
P8. I am not as productive at work because I am losing sleep over traumatic experiences of a person I [help].		0.763			
P11. Because of my [helping], I have felt "on edge" about various things.		0.745			
P7. I find it difficult to separate my personal life from my life as a [helper].	0.553		0.445		
P21. I feel overwhelmed because my case [work] load seems endless.	0.517	0.636			
P19. I feel worn out because of my work as a [helper].	0.530	0.537			
P2. I am preoccupied with more than one person I [help].		0.528			
P26. I feel "bogged down" by the system.		0.449	0.445		
P28. I can't recall important parts of my work with trauma victims.			0.858		
P5. I jump or am startled by unexpected sounds.				0.778	
% Variance	25.54	21.58	6.09	4.86	4.35
Cumulative %	25.54	47.12	53.21	58.08	62.43

According to the structure of original version of ProQOL Scale (Stamm, 2005), extracted 3 components analysis was performed. The PCA solution included three components with 30 items accounted for 54.843% of total variance, and did not loss too much information.

Component 1 comprehended 15 items about some positive feeling through their work, and it could be named as ‘Compassion satisfaction’(CS). Component 2 focused on 9 items regarding negative feeling driven by fear and work-related trauma which is labeled as

‘Secondary Trauma’(ST). Component 3 that consists of 6 items targeting the negative feelings during the demanding work and therefore labeled as ‘Burnout’(BO).

While compared with English version of ProQOL Scale, the structure of C-ProQOL with three components showed poor fit to our data and some problematic items were found. The positive worded item P1, P4, P15, P17, P29, which originally belonged to the BO subscale, were relocated to the CS subscale, showing high loadings greater than 0.50. Similarly, crossed structure and deviations appeared in the ST and BO subscales. For example, regarding the item P2, P5, P28 originally from the ST subscale, were excluded based on low factor loadings, and they were moved to the BO subscale. The meaning of these items might indicate a symptom of Burnout rather than ST. Originally part of the BO subscale, item P8 and P10 also showed high loadings with the ST subscale instead (Table 4.6).

Moreover, item P19 (“I feel worn out because of my work as a [helper].”) was not very well represented in this solution, which correlates moderately with both component 1 and 3. Original item P28 (“I can't recall important parts of my work with trauma victims”) was very weakly correlated with components 3, loading 0.320. It's too low to explain original item P28 for Component 3.

Table 4. 6 Rotated Component Matrix-3 factors of C-ProQOL

	Component		
	1	2	3
P18. My work makes me feel satisfied.	0.825		
P20. I have happy thoughts and feelings about those I [help] and how I could help them.	0.809		
P24. I am proud of what I can do to [help].	0.771		
P27. I have thoughts that I am a "success" as a [helper].	0.766		
P30. I am happy that I chose to do this work.	0.760		
P17. I am the person I always wanted to be.	0.739		
P22. I believe I can make a difference through my work.	0.728		
P16. I am pleased with how I am able to keep up with [helping] techniques and protocols.	0.725		
P15. I have beliefs that sustain me.	0.691		
P4. I feel connected to others.	0.674		
P3. I get satisfaction from being able to [help] people.	0.669		
P29. I am a very caring person.	0.607		
P6. I feel invigorated after working with those I [help].	0.572		

P12. I like my work as a [helper].	0.560		
P1. I am happy.	0.533		
P9. I think that I might have been affected by the traumatic stress of those I [help].	0.863		
P10. I feel trapped by my job as a [helper].	0.832		
P13. I feel depressed because of the traumatic experiences of the people I [help]	0.824		
P23. I avoid certain activities or situations because they remind me of frightening experiences of the people I [help]	0.784		
P8. I am not as productive at work because I am losing sleep over traumatic experiences of a person I [help].	0.778		
P14. I feel as though I am experiencing the trauma of someone I have [helped]	0.772		
P25. As a result of my [helping], I have intrusive, frightening thoughts.	0.766		
P11. Because of my [helping], I have felt "on edge" about various things.	0.733		
P7. I find it difficult to separate my personal life from my life as a [helper].	0.580		
P21. I feel overwhelmed because my case [work] load seems endless.	0.470	0.600	
P26. I feel "bogged down" by the system.		0.599	
P2. I am preoccupied with more than one person I [help].		0.584	
P19. I feel worn out because of my work as a [helper].	0.491	0.515	
P5. I jump or am startled by unexpected sounds.		0.480	
P28. I can't recall important parts of my work with trauma victims.		0.320	
% Variance	25.803	21.174	7.866
Cumulative %	25.808	46.977	54.843

4.3.2 Correlation Analysis

After obtaining the subscales for the three dimensions, correlation analysis was performed to examine the correlation between these dimensions.

Table 4. 7 Reliability and correlation of 3 dimensions and C-ProQOL Scale

	Cronbach's α	P-CS	P-ST	P-BO	ProQOL Total Scale
P-CS	0.925	/			
P-ST	0.925	-0.229*	/		
P-BO	0.705	-0.217*	0.640*	/	
ProQOL Total Scale	0.835	0.534*	0.652*	0.576*	/

* Significant at the 0.01 level (2-tailed).

As seen in Table 4.7, the C-ProQOL total scale was positively correlated with every

subscale: BO ($r = 0.567, p < 0.001$), ST ($r = 0.652, p = 0.001$) and CS ($r = 0.534, p < 0.001$). BO scale demonstrated a positive correlation with ST scale ($r = 0.640, p < 0.001$). Conversely, CS scale showed negative correlations with BO ($r = -0.217, p = 0.001$) and ST ($r = -0.229, p < 0.001$) scales, but the correlation coefficient was weak. Consequently, some subscales of the C-ProQOL scale did not correlate well and the structure of the scale was not ideal.

4.3.3 Reliability Analysis

The internal reliability of the C-ProQOL and its three subscales were calculated using Cronbach's alpha (Table 4.7). The internal consistency coefficients for the ST and BO subscales were 0.925 and 0.705, and 0.925 for CS subscale. Overall C-ProQOL scale including 30 items had a Cronbach's alpha of 0.835. Therefore, overall C-ProQOL Scale and its subscales showed good and acceptable internal reliability.

Although the internal reliability was acceptable, the correlations of the C-ProQOL Scale with 3 dimensions indicated an unclear structure. Consequently, there might still be some problems about the reliability and applicability of the C-ProQOL Scale in China.

4.4 Comparison of different medical staff groups with C-CF Short Scale

The C-CF Short Scale had two dimensions, including 8 items on JB subscale and 5 items on ST subscale, which was in line with the two subscales of the original CF-Short Scale (Adam, 2006). The internal consistency coefficients were ST=0.909, JB=0.892, and CF-Short Scale=0.918. A series of statistical tests showed that C-CF Short Scale has good reliability and validity. Moreover, the total score of compassion fatigue was the sum of the two subscales' score, and the higher the score, the higher the risk of suffering from compassion fatigue. In order to compare the status of compassion fatigue in different groups of medical staff, this study analyzed the level of CF by using C-CF short Scale and conducted statistical analysis.

ANOVA analysis was used to carried out to test whether the C-CF Short Scale scores differed as age, professional position, educational background, working departments, working hours and working years, etc. And independent-samples t-tests were performed to examine compassion fatigue score differences in gender, marital status, job position, city of the workplace, and the group of medical staff who participate in the treatment of infected patients

or not. Mean scores and standard deviations of compassion fatigue for medical staff in different demographic categories are reported in Table 4.8.

Table 4. 8 Group Comparisons on Scores of the C-CF Short Scale

Variable		Mean	Std. Deviation	Sig.
Age, years old				
CF total	18-30	36.27	12.06	0.385
	31-45	38.53	12.04	
	45-60	38.18	10.60	
JB	18-30	23.82	8.08	0.579
	31-45	24.92	8.20	
	45-60	23.84	6.88	
ST	18-30	12.45	5.09	0.060
	31-45	13.61	5.44	
	45-60	14.34	5.02	
Gender				
CF total	Male	37.91	10.66	0.796
	Female	37.49	12.04	
JB	Male	24.64	7.53	0.566
	Female	24.02	7.87	
ST	Male	13.27	4.74	0.781
	Female	13.47	5.43	
Marital Status				
CF total	Married	38.21	11.46	0.225
	Unmarried/Divorced	36.28	11.97	
JB	Married	24.18	7.53	0.951
	Unmarried/Divorced	24.24	8.32	
ST	Married	14.03	5.34	0.005*
	Unmarried/Divorced	12.04	4.72	
Professional position				
CF total	Junior	36.18	12.71	0.085
	Intermediate	40.42	9.81	
	Senior	38.22	10.52	
JB	Junior	23.70	8.35	0.444

	Intermediate	25.38	7.45	
	Senior	24.29	6.91	
ST	Junior	12.48	5.40	0.008*
	Intermediate	15.04	4.67	
	Senior	13.94	5.01	
Educational Background				
CF total	College degree or below	38.16	13.00	0.949
	Bachelor degree	37.48	11.33	
	Master degree or above	37.62	11.71	
JB	College degree or below	24.32	8.00	0.995
	Bachelor degree	24.18	7.70	
	Master degree or above	24.17	7.94	
ST	College degree or below	13.84	6.31	0.846
	Bachelor degree	13.30	4.95	
	Master degree or above	13.45	5.29	
Working years in current hospital, year				
CF total	≤ 5	35.43	11.96	0.248
	6-10	38.22	13.43	
	11-20	38.87	10.95	
	>20	38.77	10.33	
JB	≤ 5	23.51	8.26	0.815
	6-10	24.65	8.43	
	11-20	24.67	7.46	
	>20	24.42	7.11	
ST	≤ 5	11.92	4.91	0.017*
	6-10	13.57	5.92	
	11-20	14.20	4.90	
	>20	14.35	4.93	
Job position				
CF total	Doctor	36.66	11.69	0.109
	Nurse	39.06	11.45	
JB	Doctor	23.53	7.74	0.090
	Nurse	25.22	7.73	
ST	Doctor	13.13	5.20	0.293
	Nurse	13.84	5.26	
Working department				

CF total	Emergency and intensive care group	37.05	8.62	0.590
	Section for Outpatients	38.30	11.17	
	Internal medicine	38.47	12.43	
	surgical department	38.38	9.78	
	Other	35.56	12.15	
JB	Emergency and intensive care group	23.31	6.71	0.792
	Section for Outpatients	23.10	6.84	
	Internal medicine	24.77	7.99	
	surgical department	24.38	6.84	
	Other	23.47	8.45	
ST	Emergency and intensive care group	13.72	4.26	0.197
	Section for Outpatients	15.20	5.16	
	Internal medicine	13.70	5.76	
	surgical department	14.00	4.32	
	Other	12.10	4.88	
Average number of night shifts per month, times				
CF total	0-4	35.66	11.36	0.007*
	5-10	37.63	11.84	
	>10	42.23	10.66	
JB	0-4	22.66	7.87	0.003*
	5-10	24.45	7.69	
	>10	27.30	6.80	
ST	0-4	13.00	5.06	0.102
	5-10	13.18	5.39	
	>10	14.93	5.08	
Working hours per week, hours				
CF total	≤40	32.88	12.52	0.035*
	40-50	37.12	11.46	
	>50	39.25	11.34	
JB	≤40	20.35	8.99	0.003*
	40-50	23.61	7.58	
	>50	25.73	7.31	
ST	≤40	12.54	5.53	0.668
	40-50	13.51	5.11	
	>50	13.52	5.30	
Participate in the treatment of infected patient				
CF total	Yes	38.15	10.92	0.50

	No	37.15	12.23	
JB	Yes	24.45	7.59	0.63
	No	23.98	7.93	
ST	Yes	13.69	5.15	0.43
	No	13.17	5.30	
Number of beds in your hospital, beds				
CF total	≤500	38.34	10.65	0.719
	501-1000	37.02	11.59	
	1001-1500	38.95	11.42	
	>1500	36.68	13.52	
JB	≤500	24.57	7.42	0.538
	501-1000	24.54	7.82	
	1001-1500	24.30	7.67	
	>1500	22.50	8.30	
ST	≤500	13.78	4.91	0.064
	501-1000	12.47	5.22	
	1001-1500	14.66	4.66	
	>1500	14.18	6.00	
Job location				
CF total	Capital cities	37.58	11.98	0.985
	Small and medium sized cities	37.62	11.60	
JB	Capital cities	24.55	7.99	0.761
	Small and medium sized cities	24.14	7.74	
ST	Coastal capital cities	13.03	5.16	0.622
	Small and medium sized cities	13.48	5.25	

The analysis showed that the overall Compassion Fatigue score, Secondary Trauma and Job Burnout scores had no significant difference in groups of age, gender, educational background, job position, working department, participation in treatment of infected patients, number of beds in their working hospital and job location.

Significant difference of Secondary Trauma (ST) score was found in marital status ($t_{250} = 2.8, p = 0.005$), showing that married medical staff ST scoring ($M = 14.03, SD = 5.34$) higher than unmarried/divorced group ($M = 12.04, SD = 4.72$). A one-way ANOVA analysis with

multiple comparisons showed that Secondary Trauma scores of medical staff with different professional position were significant ($F = 4.88, p = 0.008$). Medical staff with junior professional position has lower Secondary Trauma score than the intermediate professional position ($M = 12.48, SD = 5.40$ vs. $M = 15.04, SD = 4.67$), $p = 0.014$.

The mean Secondary Trauma score of medical staff with < 5 years work experience was lower than the score of medical staff with >20 years of work experience (11.92 ± 4.91 vs. $14.35 \pm 4.93, P = 0.017$). There were also significant differences in Compassion Fatigue total score ($F = 5.11, p = 0.007$) and Job Burnout scores ($F = 5.84, p = 0.003$) among medical staff with different numbers of night shifts. Through post-hoc analysis, we found that medical staff with an average night shift >10 times monthly ($M = 42.23, SD = 10.66$) had significantly higher levels of Compassion Fatigue than medical staff with ≤ 4 -night shifts monthly ($M = 35.66, SD = 11.36$), $p = 0.007$. For Job Burnout, medical staff who had “>10-night shifts per month” ($M = 27.30, SD = 6.80$) scored higher than those had “ ≤ 4 -night shifts monthly” ($M = 22.66, SD = 7.87$), $p = 0.004$.

Similarly, the longer working hours, the higher the risk of compassion fatigue for the health-care workers. The mean score significant differences in Compassion Fatigue ($F = 3.40, p = 0.035$) and Job Burnout subscales ($F = 5.88, p = 0.003$) were found in the groups of different working hours. Further pairwise comparisons indicated that, Compassion Fatigue mean scores for the group of “working hours ≤ 40 h/week” ($M = 32.88, SD = 12.52$) was significantly lower than those working hours >50 h/week” ($M = 39.25, SD = 11.34$), $p = 0.042$. And for Job Burnout subscale, mean scores for the group of “working hours ≤ 40 h/week” was $M = 20.35$ ($SD = 8.99$), which was significantly lower than medical staff who worked >50 hours per week ($M = 25.73, SD = 7.31$), $p = 0.006$.

5. Discussion and Conclusion

5.1 Findings

There were many existing good measurement tools to assess compassion fatigue in the world, especially the CF-Short Scale and ProQOL Scale were widely used by western scholars. However, it was uncertain whether all these scales had good applicability in China, or which types of scales were more applicable to the Chinese medical staff. Thus, this study aimed to compare the validity and reliability of the C-CF-Short Scale and C-ProQOL Scale for Chinese medical workers, to identify a more appropriate Compassion Fatigue Scale in China.

Result showed that the CF-Short Scale translated into Chinese had good construct validity and internal consistency. In particular, two dimensions emerged in the exploratory factor analysis, Secondary Trauma subscale (8 items) and Job Burnout subscale (5 items), which was consistent with the English version of the CF-Short Scale revised by Adam et al. (2006). The Cronbach's coefficient also demonstrated excellent internal reliability among the group of health worker during the COVID-19 epidemic: the internal consistency coefficients of JB subscale was 0.892, ST subscale 0.909, CF total scale 0.918. Additionally, there were significant correlations between the dimensions and the total scale. All the above showed that hypothesis one holds, the C-CF Short Scale had good applicability in China, which could be an effective measurement tool for assessing the level of Compassion fatigue. The reliability and validity of the C-CF Scale were also validated in another compassion fatigue study by Chinese scholars Sun et al. (2014).

In terms of Chinese version of ProQOL Scale, the internal consistency reliability estimates for the subscales were shown as 0.925 for the Compassion Satisfaction subscale, 0.705 for the Burnout subscale, and 0.925 for the Secondary Trauma subscale, suggesting that it has a good re-measure reliability. While based on the principal component analysis, three-components structure of the C-ProQOL originally proposed presented a poor fit to our sample. For example, contents of some items might not be specific relate to Secondary Trauma but have high correlation loading with component-Burnout. Additionally, the factor loading of item 28 "I can't recall important parts of my work with trauma victims" was only 0.328, indicating the structural validity was not ideal. And the correlation of the CS subscale with ST and BO subscales were very weak, with correlation coefficients of -0.217 and -0.22.

It could be seen that the reliability and applicability of the C-ProQOL Scale might still have some problems under the influence of Chinese cultural background. This finding was consistent with the research finding by scholar Zheng et al. (2013).

By reviewing the Chinese Wan Fang Med Online database, there were 230 publications related to the keyword ‘Compassion Fatigue Scale’ during the year 2019 to 2021. And a number of CF studies that have used the ProQOL Scale. For example, Guan et al. (2021) explored the current status of compassion fatigue of nursing staff in the oncology department, but they only cited the Cronbach’s α of the ProQOL Scale reported by foreign scholars. Liu et al. (2020) also investigated CF status among medical staff working in Fangcang shelter hospital during the COVID-19 outbreak by using Chinese version ProQOL Scale translated by Chen et al. (2013). However, as mentioned above, we found that the structural validity of C-ProQOL Scale was unsatisfactory. This might be due to differences in translation understanding and differences in Chinese culture. There might still be some problems with the reliability and applicability of the Chinese version of ProQOL Scale. Similarly, same problems arose with the original version of the ProQOL-5 translated by a Portuguese scholar (Joana, 2017). Therefore, in the comparison to the C-ProQOL Scale, this study showed that the C-CF Short Scale had a better performance in assessing the status of compassion fatigue, because of the good reliability and appropriate correlation between the scales and acceptable validity. In conclusion, results from this study provide preliminary support for the use of C-CF Short Scale as a reliable instrument to measure the level of compassion fatigue of medical staff in China.

Additionally, we also investigated the level of compassion fatigue among front-line medical staff during the COVID-19 outbreak by using C-CF Short Scale. The overall level of compassion fatigue among medical staff was moderate level, but they were at higher risk of Job Burnout, relating to the desperation feelings and difficulties of handling the work. Data showed significant differences in Compassion Fatigue (CF) total scores, Job Burnout (JB) and Secondary Trauma (ST) scores among some groups of medical workers with different characteristic. Overall, the married group have higher Secondary Trauma scores than unmarried group; and ST score for medical staff with intermediate position were higher than those for junior position; Medical staff with more years of experience, especially with >20

years working experience, also had higher ST scores. Medical staff who had higher number of night shifts per month and longer working hours, would have higher mean scores for ST and CF, implying more risks of compassion fatigue and secondary trauma.

Additionally, Medical staff with other different demographic characteristics did not differ significantly in Compassion Fatigue total score and its subscales' score. It might indicate a high degree of consistency among all medical staff on the front line of emergency response actively fighting the Covid-19 virus during the outbreak, regardless of whether they were in which department or whether directly treating patients.

5.2 Contribution and Implications

As research on compassion fatigue originated abroad, the compassion fatigue scales were usually designed based on a foreign cultural context, which is very different from our cultural background, medical situation and social system. With continues research development on compassion fatigue, there are a variety of compassion fatigue scales that have been translated and used by scholars around the world. While the research on the Chinese version of the compassion fatigue scale is still in its early stages in China, and there are few analyses comparing the reliability and validity of different compassion fatigue measurement tools.

This study took into account the cultural context and the level of medical care in China, translating two frequently used compassion fatigue scale, ProQOL Scale and CF-Short Scale, then applying them on front-line medical staff during the COVID-19 pandemic. Through a series of comparative analyses, results from this study showed that the C-CF Short Scale had better reliability and validity, which could provide preliminary support for using it as an applicable and reliable measure to assess compassion fatigue status for medical staff in China.

Under COVID-19 situation, it is vital to pay attention on the psychological situation of front-line medical staff. In this study, we found that staff were at moderate risk of compassion fatigue, regardless of whether they were directly involved in treating infected patients. And as medical staff grow in working experience, working more hours, and more night shifts, the higher Compassion Fatigue scores, indicating the greater risk of getting compassion fatigue; and the same trend of increasing scores on the secondary trauma and job burnout subscales. This may be due to the increasing workload as the working hours, night shifts and work

experience increase, and the accumulation of negative emotions and bad mood in the face of patients. Therefore, medical managers should continue to pay attention to and encourage clinical front-line medical staff to maintain good psychological stress ability. Measures can be taken to help reduce the risk of compassion fatigue and maintain the physical and mental health by strengthening training related to public health emergencies, rationalizing human resources management, providing humanistic care and social supporting for front-line health care workers.

5.3 Limitations and suggestions for further research

Although this study achieved some development in terms of research objectives, there were still limitations in the following aspects.

First, the sample was smaller than desired for comparing groups of medical staff with different characteristics. At the same time the main sample of this study was concentrated in small or middle-sized city in Xinjiang province, which had strong geographical limitations and could not fully reflect the overall workload stress of medical workers in China during the Covid-19 epidemic. Since different regions of China have different conditions of the epidemic, and medical staff in different cities faced with different levels of workload and accident response level. Subsequent studies could be concerned with increasing the breadth of geography by sampling a wide range of cities in different situations of outbreak, which could enhance the representative of the study.

Second, the research method used in this study was limited to the questionnaire method and could not be combined with other research methods as an aid. In this study, only CF-Short Scale and ProQOL Scale were adopted to measure compassion fatigue and the results might be limited. Although they were frequently used by scholars both nationally and internationally, the applicability of other CF measurement tools in their application to different populations were not sufficiently explored during the analysis. In future studies, we can try to extend the types of CF scale and apply them to different industry to discuss their applicability in the Chinese context. For the future research, it would be interesting to develop a valid and reliable CF scale that was most suitable for the Chinese context and focus on the mental health of medical staff.

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Appendixes

Appendixes A-1

Professional Quality of Life Scale (ProQOL)

When you [help] people you have direct contact with their lives. As you may have found, your compassion for those you [help] can affect you in positive and negative ways. Below are some questions about your experiences, both positive and negative, as a [helper]. Consider each of the following questions about you and your current work situation. Select the number that honestly reflects how frequently you experienced these things in the last 30 days.

0 = never, 1 = rarely, 2 = a few times, 3 = somewhat often, 4 = often, and 5 = Very often

1. I am happy.
2. I am preoccupied with more than one person I [help].
3. I get satisfaction from being able to [help] people.
4. I feel connected to others.
5. I jump or am startled by unexpected sounds.
6. I feel invigorated after working with those I [help].
7. I find it difficult to separate my personal life from my life as a [helper].
8. I am not as productive at work because I am losing sleep over traumatic experiences of a person I [help].
9. I think that I might have been affected by the traumatic stress of those I [help].
10. I feel trapped by my job as a [helper].
11. Because of my [helping], I have felt "on edge" about various things.
12. I like my work as a [helper].
13. I feel depressed because of the traumatic experiences of the people I [help].
14. I feel as though I am experiencing the trauma of someone I have [helped].
15. I have beliefs that sustain me.
16. I am pleased with how I am able to keep up with [helping] techniques and protocols.
17. I am the person I always wanted to be.
18. My work makes me feel satisfied.
19. I feel worn out because of my work as a [helper].
20. I have happy thoughts and feelings about those I [help] and how I could help them.
21. I feel overwhelmed because my case [work] load seems endless.
22. I believe I can make a difference through my work.
23. I avoid certain activities or situations because they remind me of frightening experiences of the people I [help].
24. I am proud of what I can do to [help].
25. As a result of my [helping], I have intrusive, frightening thoughts.
26. I feel "bogged down" by the system.
27. I have thoughts that I am a "success" as a [helper].
28. I can't recall important parts of my work with trauma victims.
29. I am a very caring person.
30. I am happy that I chose to do this work

Source: Stamm B. H. (2005)

Appendixes A-2

C-ProQOL (ProQOL Scale translated in Chinese)

以下是您作为医护人员帮助患者时可能有过的一些想法或经历，包括积极的和消极的。请考虑以下关于您和您目前工作情况的每一个问题，选择能如实反映您在过去 1 个月内经历这些事情的频率的数字，并在数字上打勾。

注意：选项 1 代表“从来没有”，6 代表“非常频繁”，数字越大代表出现这些想法或经历的次数或频率越高/多。（例：1=从来没有→2=几乎没有→3=很少→4=偶尔→5=经常→6=总是）

		1=从来没有→6=总是					
1	我是快乐的	1	2	3	4	5	6
2	我忙于应对一个以上需要帮助的病患	1	2	3	4	5	6
3	我能从帮助病患中获得满足感	1	2	3	4	5	6
4	我能感到与病患之间的心连心	1	2	3	4	5	6
5	突如其来、意想不到的声音会让我吓一跳	1	2	3	4	5	6
6	在完成帮助病患的工作后，我感到精力充沛	1	2	3	4	5	6
7	我感觉我很难将我的私人生活和作为救助者的生活分开	1	2	3	4	5	6
8	我在工作中效率不高，因为我会为我的救助对象的创伤经历而失眠	1	2	3	4	5	6
9	我想，我或许已经受到了那些我所救助的创伤病患的影响	1	2	3	4	5	6
10	从事救助者的工作，让我感到陷入了困境	1	2	3	4	5	6
11	因为我的“救助”工作，我对各种各样的事感到“紧张/一触即发”	1	2	3	4	5	6
12	我喜欢我作为“帮助者”的工作	1	2	3	4	5	6
13	我帮助的病患所经历的创伤，让我感到沮丧	1	2	3	4	5	6
14	我觉得我正在经历我帮助过的病患的伤痛	1	2	3	4	5	6
15	我有信念支撑着我	1	2	3	4	5	6
16	我很高兴自己能跟上（与帮助患者有关的）技术手段和工作规范	1	2	3	4	5	6
17	我是那个我一直想要成为的人	1	2	3	4	5	6
18	我的工作让我感到满意	1	2	3	4	5	6
19	作为一名救助他人的医护人员，我觉得筋疲力尽	1	2	3	4	5	6
20	想起那些我要帮助的病患以及如何帮助到他们，我就感觉到积极和开心	1	2	3	4	5	6
21	我感到不堪重负，因为我的工作量似乎无穷无尽	1	2	3	4	5	6
22	我相信我可以通过我的工作让情况改善。	1	2	3	4	5	6
23	我避免某些活动或情况，因为它们让我想起我所帮助过的患者的可怕经历。	1	2	3	4	5	6
24	我为能够（力所能及地）帮助别人而自豪	1	2	3	4	5	6
25	由于救助患者的工作，我有了让我不安和令我害怕的想法	1	2	3	4	5	6
26	我感觉我困在体制之中	1	2	3	4	5	6
27	我想作为救护者，我是成功的	1	2	3	4	5	6
28	我不记得我工作中那些与创伤患者有关的重要内容	1	2	3	4	5	6

29	我是一个非常有爱心的人	1	2	3	4	5	6
30	我很高兴我选择了这份工作	1	2	3	4	5	6

Appendixes B-1

CF-Short Scale

10-point Likert scale ranging from 1(rarely/never) to 10 (very often)

1. I have felt trapped by my work
2. Sense of hopelessness working with clients
3. Felt tired due to work as caregiver
4. Felt depressed as a result of work
5. Unsuccessful at separating work from personal life
6. Sense of worthlessness associated with work
7. Feel like a “failure” in work
8. Thoughts about not achieving goals
9. Flashbacks connected to clients
10. Troubling dreams similar to client's
11. Intrusive thoughts after working with difficult clients
12. Suddenly recalled frightening experience while working with client
13. Losing sleep over client's traumatic experience

Source: Adams, et al.(2006)

Appendixes B-2

C-CF Short Scale (CF-Short Scale translated in Chinese)

以下是您可能有过的一些经历或感想，请根据您的实际情况，判断您出现以下经历或想法的频率，选择与您最相近的一项，并在相应的数字上打√

注意：选项 1=从来没有，6=总是，数字越大代表出现这些想法或经历的次数或频率越高/多。（例：1=从来没有→ 2=几乎没有→ 3=很少→ 4=偶尔→ 5=经常→ 6=总是）

	1=从来没有→6=总是					
1 我感觉我的工作困扰着我	1	2	3	4	5	6
2 救助患者让我对工作感到绝望	1	2	3	4	5	6
3 我对作为医护人员的工作感到疲惫	1	2	3	4	5	6
4 我因自己的工作而感到沮丧	1	2	3	4	5	6
5 我没有成功地将个人生活和工作分开	1	2	3	4	5	6
6 我的工作让我觉得没有价值	1	2	3	4	5	6
7 我觉得在工作中我是一个失败者	1	2	3	4	5	6
8 我会产生无法实现我的目标的想法	1	2	3	4	5	6
9 我会想起和患者有关的痛苦画面	1	2	3	4	5	6
10 我会做与病患痛苦经历相关的噩梦	1	2	3	4	5	6
11 在救治情况危机的患者后，我会胡思乱想产生消极情绪	1	2	3	4	5	6
12 在救治患者时，我会不经意的回想起病患可怕的经历	1	2	3	4	5	6
13 我会因为患者的创伤/病痛经历而失眠	1	2	3	4	5	6