

The Influence of Personality, Alexithymia and Work Engagement on Burnout among Village Doctors in China: A Cross-sectional Study

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Abstract

Background:

In China, grass-roots village doctors, as the gatekeepers of rural residents' health, play an important role in guaranteeing and serving the health level of rural residents. However, the serious burnout and high turnover rate of village doctors threaten the stability of village medical teams. This research evaluated the influence of personality, alexithymia and work engagement on the burnout of village doctors in an in-depth and detailed way, and explored the mediating role of work engagement and alexithymia between personality and the burnout of village doctors in China.

Methods:

During May and June 2019, 2,684 rural doctors in 1,345 rural clinics in Jining city, Shandong Province, were studied using a quantitative study self-administered questionnaire. The questionnaire included demographic and sociological characteristics, personality, alexithymia, work engagement and burnout, and was measured by 5-7 Likert scale. One-way ANOVA, Person correlation analysis, and Structural Equation Modelling (SEM) were used for statistical analysis.

Results:

Up to 54.3% of the surveyed rural doctors showed moderate to severe emotional exhaustion, 90.5% of them had moderate to severe sense of low personal achievement and 33.9% of them had moderate to severe depersonalization burnout. Personality has a direct positive effect on work engagement ($\beta=0.50$, $p<0.001$), but has a direct negative effect on alexithymia ($\beta=-0.52$, $p<0.001$) and burnout ($\beta=-0.50$, $p<0.001$) respectively. Work engagement has a direct negative effect on burnout ($\beta=-0.10$, $p<0.001$), while alexithymia has a direct positive effect on burnout ($\beta=0.16$, $p<0.001$). In the path between personality and burnout, both work engagement, 95%CI:(-0.17)-(-0.08), and alexithymia 95%CI:(-0.36)-(-0.09), have significant mediating effects. The above results strongly confirmed that personality, alexithymia, and work engagement were early, powerful predictors of burnout.

Conclusion:

According to the results, medical administrators should pay attention to the personality characteristics of village doctors in their professional training, practice selection and job assignment and encourage doctors to actively reflect on their own personality and to reduce job burnout by obtaining necessary social support, constructing reasonably achievable career expectations, improving time management and participating in psychological counselling programs.

Background

In China, village doctors refer to those who have obtained the "rural doctor qualification certificate" and work in village-level clinics, including those who have obtained the qualification of practicing (assistant)

doctors and those who have not obtained the above qualification. China's Sixth National Population Census Data showed that the rural population accounts for 50.3% of the national population, still accounting for a large proportion. Village doctors are "guardians" of the health of rural residents, responsible for providing comprehensive and continuous basic medical and public health services for rural residents, including prevention, health care, rehabilitation and health management. Therefore, as the most grass-roots and most widely existing medical service providers in rural areas, village doctors play a very important role in ensuring and improving the health level of rural residents.

With the implementation of the new medical reform and the hierarchical medical system, the service mode of village doctors has changed from the passive "patient seeking medical treatment" to the active "health management service", and from the combination of prevention and treatment to the comprehensive and whole-of-the-life-cycle health services. The work of village doctors in village clinics is facing new challenges. They not only need to carry out daily medical treatment, but also public health, family doctor contract, family planning, chronic disease management and other services, which requires village doctors to continuously improve their service capacity and quality, and master a wider range of knowledge and skills. However, in recent years, the situation of village doctors in China is facing severe challenges, including the difficulty of obtaining the qualification certificate of practicing doctors due to the low level of overall education; the poor level of wages and treatment, the difficulty of ensuring old-age insurance; the low social status, the difficulty of introducing young talents, and the overall instability of the ranks. The above problems seriously affect the survival of village doctors and the stability of the overall team. A survey of 2,682 village doctors showed that village doctors had a low job satisfaction rate of 64.62%, especially in terms of income (24.98%), workload (39.34%), personal development (47.05%) and social status (50.34%)[1]. Poor satisfaction leads to high job burnout among village doctors. 68.60% of village doctors have moderate or above job burnout, and 45.3% of village doctors have high turnover intention[2]. In 2019, there were two demission groups of village doctors in Henan province, once 36 and once 28.

In 2019, there were two resignation incidents of village doctors in Henan province, once 36 and once 28. As a result, the total number of village doctors and the number of rural clinics in China has been decreasing year by year. In May 2019, the statistical bulletin on the development of health undertakings showed that compared with 2017, China's village doctors decreased by 62,000 in 2018, and the number of village clinics decreased by 5,101. At the same time, there are 1022 administrative villages without clinics, 6,903 clinics without qualified village doctors. Thus it can be seen that the job satisfaction, job burnout and turnover intention of village doctors have been related to the stability of the village doctors, closely related to the health level of farmers and the steady development of rural health undertakings, and has become the weakness and weakest link of China's medical and health service system.

Burnout, known as the epidemic of medical personnel[3], has long become an international and universal research hotspot in the field of medical and health services. Maslach, in 2003, defined job burnout as a long-term, chronic response to work stress, and a persistent, harmful state syndrome related to work characteristics and working conditions. However, the most widely accepted definition is Maslach &

Jackson's three-dimensional syndrome of burnout, including emotional exhaustion (EE), depersonalization (DP), and low personal achievement (PA). Among them, EE refers to a person who often shows a state of pessimism, depression, helplessness, hopelessness and depression at work; DP refers to a person who often treats patients or colleagues with negative, negative attitude and indifferent emotion at work; and PA refers to a person's slow decline in meaning and evaluation of the work performed and the feeling of being incompetent. By the World Health Organization (WHO) in June 2019," burnout "was included in its International Classification of Diseases Manual and defined as" a syndrome caused by the failure of successful management of long-term job stress ", and it was noted that if patients showed three symptoms, doctors could give the diagnosis of burnout: fatigue, cynicism about work, and difficulty in successfully completing work. This means job burnout has become an international occupational health problem and needs to attract people's attention.

Job burnout is a reflection of the long time mismatch between workers and work, which is manifested by the negative response of their work stress[4]. Serious burnout of doctors usually cause negative self-image and psychological problems such as anxiety and depression; low attendance and efficiency; and reduce the communication time between doctors and patients, which will lead to the decline of the quantity and quality of medical services[5], as well as the increase of the incidence of medical disputes and risks. When job burnout cannot be well treated and intervened, it may force doctors to leave the doctor's post, long-term accumulation will be harmful to the doctor's psychosomatic and social interaction. Therefore, doctor's job burnout, as the focus of occupational medical health, is a great subject related to people's health and happiness[6]. Current research suggests that the causes of doctors' job burnout stem from three dimensions: social system, organization and individual factors. Firstly, social factors include lack of social support, strict and cumbersome laws and regulations, aging, lack of social security, excessive income gap, patient satisfaction[7], etc. Secondly, organizational factors include management style, excessive workload, type of occupation, organizational change, fierce competition, endless overtime, inappropriate working conditions, low organizational efficiency, lack of sense of achievement, insufficient career development opportunities, and excessive working hours each time. Finally, individual factors include: gender, age, relationship between husband and wife, whether there are young children, role conflicts, personality, self-esteem, ways to deal with difficulties[5, 8-10], etc. However, the influence of personality and alexithymia on burnout of village doctors has not been studied. At the same time, although the study believes that work engagement is an effective measure to interfere with job burnout of village doctors[6], the impact of work engagement on burnout is still lack of empirical research. Meanwhile, existing studies have mostly used chi-square test, t-test, Analysis of Variance (ANOVA) and, multiple linear or multiple logistic regression analysis, to analyze the factors influencing job burnout[5, 10-16]. Compared with the above research, structural equation modeling (SEM) can not only measure the correlation between research variables, but also dig the correlation between potential variables, and even explain the causal relationship between variables. Therefore, the introduction of SEM to study the quantitative regression relationship can make up for the limitations of current research to some extent[17, 18].

Although burnout comes from three aspects, it does not occur in all people, even in the face of the same organizational and social factors, which is related to the individual factors of burnout. On the aspect of individual factors, Swider and Zimmerman believed that personality, the sum of characteristics such as temperament, ability and character was closely related to burnout and turnover, and basing on modern personality theory, they assumed that individuals' personality can influence their cognition and response to the environment. For example, when team members conflict, individuals with neuroticism may have different assessments of conflict from other participating individuals.

Many researches usually adopt the famous personality model proposed by Costa and McCrae [10], namely five factor model, which defines five groups of interdependent personality traits: neuroticism, extroversion, openness, easygoing and conscientiousness. Neuroticism reflects a person's emotional instability and fear, people with high scores are usually worried, unhappy and insecure; Extroversion reflects a person's self-confidence and positive, and those with high scores tend to have better social abilities. People with open personalities tend to be curious and playful, and they like new and unconventional ideas; Agreeableness represent the individual's orientation to others' experience, interest and goal, the higher the score is, the more modest, kind and compassionate; Conscientiousness refers to a person with a cautious attitude to guide their daily behavior, therefore, serious people are often reliable and prudent. Many empirical studies have found that personality is negatively correlated with burnout and affects it directly and indirectly. Okan Taycan et al. through a survey of 139 doctors in semi-urban and rural areas in Turkey, found that their level of job burnout was slightly higher than that of urban doctors, and the neuroticism dimension in personality was a significant predictor of burnout[19]. Doctors with personality characteristics such as high hostility, introversion, neuroticism, aimlessness, hostility, and unwillingness to accept new things had higher occupational burnout according to Cheng-Chieh Lin et al. found in a study of 2230 doctors in Taiwan[14]. Further research found that neuroticism, agreeableness and friendliness, and openness and friendliness were found to be predictors of emotional exhaustion, and individual achievement was determined by neuroticism, openness, conscientiousness, and hostility[20]. Personality can influence job burnout through the mediating effect of subjective well-being. Individuals with personality traits such as emotional instability, neuroticism, anxiety and irritability had lower levels of happiness and higher levels of emotional burnout[21].

As a multi-dimensional personality structure, alexithymia represents a defect in emotional cognitive processing, which is frequently associated with major depression and anxiety disorders[22]. Even some researchers suggest that alexithymia secondary to depression, and is a manifestation of "state dependence." [23]. Many researches indicated that people with alexithymia are more likely to develop the feeling of tension when staying in a high-pressure working environment, which may lead to the heavier emotional exhaustion, depression and depersonalization[22, 24], and even physiological diseases such as gastroenterology and hepatology disorders[25]. But no matter in the field of psychology or occupational health, few researches focus on the relationship and mechanism between burnout and alexithymia. In a few studies A study of 95 nurses in Greece by Aikaterini Moulou et al. found that alexithymia was positively associated with depersonalization and emotional exhaustion in burnout and could influence overall burnout scores through personal achievement and family support. After

investigating 159 nursing assistants in 10 nursing homes in northern Spain, Erkuden Aldaz et al found that, after strictly controlling the mixed effect of work characteristics, alexithymia made a moderate contribution to the depersonalization and personal accomplishment dimensions of burnout[26].

High level of work engagement is essential no matter what occupation you are engaged in. Work engagement is defined as a positive, fulfilling, work-related state of mind including three dimensions of vigor, dedication and absorption[27]. Tatenda S.Mhlanga et al. believe that although researchers have now found many beneficial and positive consequences of work engagement—such as, improving work efficiency, however, few people know the multiple antecedents that lead to work engagement, in which personality is an important antecedent. A study covering 1,236 nurses showed that neuroticism was negatively correlated with work engagement, thus, extroversion, openness, easygoing and conscientiousness were positively correlated with work engagement[28]. At the same time, a Chilean study found that people with higher personality scores tend to have higher work engagement, and such people gain a lower level of job burnout even when working under high pressure.

After a comprehensive analysis of the above-mentioned theories and literature conclusions, the research is the first attempt to propose assumptions among personality, work engagement, alexithymia and job burnout and construct a double mediation model presented in Table 1 and Figure 1. We hypothesize that village doctors' personality, work engagement and alexithymia could have direct effects on burnout. Furthermore, personality could influence indirectly on the rural medical staff's burnout through work engagement and alexithymia.

Table 1
The Theoretical Hypotheses

Hypotheses
1. Village doctors' work engagement has a negative impact on burnout.
2. Village doctors' alexithymia has a positive impact on burnout.
3. Village doctors' personality has a positive impact on work engagement.
4. Village doctors' Personality has a negative impact on alexithymia.
5. Village doctors' Personality has a direct negative impact on burnout.
6. Village doctors' Personality has an indirect negative impact on burnout through the mediating effect of work engagement.
7. Village doctors' personality has an indirect negative impact on burnout through the mediating effect of alexithymia.

Methods

Setting and Participants

Jining, located in the southwest of Shandong Province, is relatively backward in economic development compared to eastern coastal cities. In 2019, the total population of the city was 8.356 million, including 3.3683 million in rural areas. There were 6489 villages, with 5307 village clinics. At the end of 2018, the total number of medical personnel in the city reached 80800, an increase of 2100 compared with 2017, but there were only 11715 village doctors, 870 fewer than 2017. The average number of village doctors per village was only 1.81. However, the number of diagnosis and treatment in village clinics reached 21.262 million, with an average of 4006.41 per village clinic and 1814.94 per village doctor. Due to the heavy workload of village doctors, it is of great significance to take Jining city as the research site to understand the burnout status of village doctors and its influencing factors.

According to the method of stratified cluster random sampling, the cross-sectional study was carried out in the rural clinic of Jining City. First, according to the level of economic development, the 11 counties (districts) under the jurisdiction of Jining City were divided into three levels: better, medium and poor. Secondly, we randomly selected a county (District) as our sample source area in each level, and then all village doctors in the selected county (district) were taken as our research objects.

Ethics and Consent to Participate

Our research group submitted an application for ethical review to the Institutional Review Board (IRB) of Jining Medical College. Based on the principle of informed consent and privacy protection, the expert group believed that this study did not involve medical intervention and human biological samples, and the individual cannot be tracked according to the research data. Therefore, the expert group of IRB approved that this study can collect data based on the oral consent of the participant. Before the on-site questionnaire survey, each participant was told that his participation was voluntary and anonymous and he / she had the right to refuse to participate and to terminate at any time during the course of the investigation. Questionnaires filled out by respondents who withdrew from the survey were destroyed in front of them.

Since the respondents were village doctors with a certain level of education and reading comprehension, the data were collected through the self-completed questionnaire, which included three parts: cover letter, personal general sociological characteristics, and research scale. In order to reduce the bias of the survey, we explained the significance of the research in the cover letter, as well as the anonymous survey did not involve personal information, thus increasing the response rate. Secondly, we set special personnel at each level of county, township and village to manage and verify the questionnaire, so as to ensure the quantity and quality of the questionnaire. 2,789 village doctors from 1,345 rural clinics were surveyed in this study. Among them, 2693 questionnaires were returned, However, some of the survey subjects lacked too much filling in the scale related to this study, so 2,684 questionnaires were valid in the end, with an effective rate of 96.2%.

Measures

The questionnaire consists of five parts. According to the Questionnaire on Human Resources for Health of the National Health Commission[29], in the first part, we designed relevant questions including the demographic characteristics (age, gender, educational background, marital status) and job characteristics (major, title, salary, working years, average working hours per week) of village doctors. Questions related to personality, alexithymia, work engagement and burnout were in the second to fifth parts of the questionnaire.

personality

The international Big Five Inventory (BFI) was used to evaluate village doctors' personality traits. The reliability and validity of the big five scale were tested in different populations. Among them, the Cronbach's alpha coefficient of the five dimensions measured in the Chinese population were 0.770 for extraversion, 0.694 for agreeableness, 0.737 for conscientiousness, 0.766 for neuroticism, and 0.738 for openness[30]. The whole set of big five inventory contains 44 questions, 5 dimensions, neuroticism (8 items), extroversion (8 items), openness (10 items), agreeableness (9 items), conscientiousness (9 items). Using a 5-point Likert scale ranging from 1 (totally disagree) to 5 (totally agree) to calculate and evaluate all these items, and some of which were scored in reverse. The higher the individual dimension scores, the stronger the personality traits of village doctors.

Alexithymia

Using the 20-Item Toronto Alexithymia Scale (TAS-20) to measure the alexithymia status of village doctors. The scale, with a Cronbach's alpha value of 0.87[31] was verified to have a good reliability and validity in the Chinese population. The whole scale consists of 3 subscale scales for identifying difficulties, describing emotional difficulties and extroverted thinking difficulties. A 5-point Likert scale, from 1 (total disagreement) to 5 (fully agree), was used to assess items, of which 5 items were negative. The total scores of 20 items ranged from 20 to 100, the higher the score, the more serious the level of alexithymia. Basing on experience, the researchers determined cutoff scores, and greater than 60 points were highly alexithymia and less than 52 points were lack of alexithymia[32].

Work engagement

The current status of work engagement of village doctors was measured by Utrecht Work Engagement Scale (UWES) with 17 items. The Cronbach's alpha value of Chinese version of the scale was 0.782[2]. The whole scale was divided into three dimensions, including 6 items for work absorption and 6 items for work vigour, and 5 items for work work dedication. Each item was measured and scored though a 7-point Likert scale ranging from 0 (never) to 6 (always). The higher the score, the higher the enthusiasm of village doctors for rural medical work[33].

Burnout

The most used burnout assessment tool, with a Cronbach's alpha as high as 0.95[34], MBI (Maslach Burnout Inventory), was used to measure the burnout of village doctors. MBI has three subscales, including emotional exhaustion, depersonalization, and low personal achievement (reverse score). The answers for items were 7 Likert score ranging from 0 (never) to 6 (daily), and each subscale was summed to show burnout. The higher the score of emotional exhaustion and depersonalization, the lower the score of personal achievement, indicating the higher the degree of burnout[33].

Statistical Analysis

In this study, the reliability and validity of the whole questionnaire were scientifically evaluated by exploratory factor analysis (EFA). The socio-demographic and work characteristics of 2684 village doctors were described by descriptive statistics. Then, a descriptive analysis of personality, alexithymia, Work engagement and job burnout was conducted and the results were presented as mean and standard deviation (SD). Correlation between the values of the main observed variables was measured by Pearson correlation and quantified by correlation coefficient. On the basis of the above research results, using the structural equation model (SEM), we further explored and quantified the relationship between the four dimensions of personality, alexithymia, work engagement and job burnout, and applied the bootstrap-based maximum likelihood model in the SEM. Several key metrics to measure model fit with data, including normed fit index (NFI), goodness of fit index (GFI), comparative fit index (CFI), adjusted goodness of fit index (AGFI), Tucker-Lewis index (TLI) and incremental (IFI) were all greater than 0.90, while root mean square error of approximation (RMSEA) is 0.078, below 0.8, reflecting that this is an acceptable model consistent with the fit between current data and assumptions.

Reliability and Validity

Exploratory factor analysis (EFA) showed that KMO (kaier-meyer-olkin) of the questionnaire was 0.825, greater than 0.70, which met the requirements of factor analysis. Bartlett test of sphericity was also significant ($\chi^2=23750.004$, $P<0.001$). In the factor load analysis, the maximum coefficient of variation method was used for orthogonal rotation (varimax), and the result of factor load matrix after rotation was obtained as follows: The characteristic roots of the four evaluation indexes were all greater than 1, and the contribution rate of the accumulated variance was 80.092%. The load value of each item in the corresponding dimension is greater than 0.758, which proves that the structural validity of the whole questionnaire is good. Meanwhile, the Cronbach's α of the whole questionnaire is 0.741, which indicates that the reliability of internal consistency is better [7].

Results

Demographic and working characteristics of participants

Among the 2864 village doctors, the minimum age was 21, the maximum age is 87, and the average age was 44.64 ± 7.248 years. The proportion of male doctors was 64.4%. Age stratification showed that only 1.3 % were under 30 years of age and only 2.6% were university and above. As many as 62.4% of village doctors do not have the professional qualification of village doctors, only 3.8% of them have middle and senior professional titles. Nearly half of them earn less than 2000 yuan a month, but nearly 70% work more than 60 hours a week.

Table 2
Demographic characteristics of participants (n =2693)

Socio–Demographic	N	%
Gender		
Male	1729	64.4
Female	920	34.3
Missing	35	1.3
Age, Group		
<30 years	35	1.3
30–39 years	622	23.2
40–49 years	1298	48.4
≥50 years	683	25.4
Missing	46	1.7
Level of education		
University or above	70	2.6
Junior College	656	24.4
Technical secondary school	1830	68.2
High school education or below	91	3.4
Missing	37	1.4
Practicing requirements		
Rural general practitioner	334	13%
Rural assistant physician	442	17.2
Chinese medicine assistant physician	192	7.5
Unqualified	1607	62.4
Missing	109	4.1
Professional ranks		
Middle or high profession	101	3.8
Primary title	1306	48.7
No title	1157	43.1
Missing	120	4.5

Monthly income (yuan)		
<2000	1247	46.5
2000–2999	767	28.6
≥3000	505	18.8
Missing	165	6.1
Weekly working hours		
<40	388	14.5
40–59	336	12.5
≥60	1875	69.9
Missing	85	3.2

Quantitative descriptive analysis of main variables

The total scores of job burnout, personality, alexithymia and work engagement of village doctors were 42.46 ± 21.099 , 145.71 ± 13.002 , 55.11 ± 9.714 , 66.15 ± 20.255 respectively. The scores for each dimension of each variable are detailed in Table 4.

According to the results, 708(26.4%) of the village doctors surveyed had moderate emotional exhaustion and 748(27.9%) had severe emotional exhaustion; 186(6.9%) had moderate low personal achievement and 2245(83.6%) of village doctors had severe low personal achievement; 402(15%) had moderate depersonalization burnout, and 508(18.9%) had severe depersonalization burnout. Meanwhile, 1112(41.4) of village doctors had suspected alexithymia and 679(25.3%) had apparent alexithymia.

Table 3
Item scores in burnout, personality, alexithymia, and work engagement.

Items	Mean±SD
Burnout	42.46±21.099
Emotional exhaustion	18.97±12.281
Personal achievement	17.53±13.419
Depersonalization	5.96±6.913
Personality	145.71±13.002
Neuroticism	26.30±4.338
Extraversion	26.04±3.879
Openness	32.37±4.826
Agreeableness	33.22±5.189
Conscientiousness	32.53±5.252
Alexithymia	55.11±9.714
Difficulty describing feelings	14.21±2.836
Difficulty recognizing feelings	19.25±5.427
Externally oriented thinking	22.36±18.758
Work engagement	66.15±20.255
Work vigor	23.57±7.023
Work dedication	19.70±6.280
Work absorption	22.88±7.628

Correlations of Study Variables

Pearson correlation of the main observed variables was shown in Table 5. Personality is negatively correlated with burnout and alexithymia, and positively correlated with work engagement, which is negatively correlated with alexithymia and burnout. Alexithymia was positively correlated with burnout.

Table 4
Correlation coefficients among study variables.

Items	Personality	Alexithymia	Work engagement	burnout
Personality				
Alexithymia	-.0308**			
Work engagement	0.450**	-0.265**		
Burnout	-0.380**	0.512**	-0.389**	

Testing of the constructed study model

The SEM was built to connect, test, and evaluate the interrelationships among the four variables (burnout, personality, alexithymia and work engagement). The generalized least square method based on the optimization model was used to fit the data and the theoretical model, and the theoretical model was modified according to the fitting results. The final fit-corrected model (figure 2) shows the interrelation, valid path, and effect values between the four variables. The final modified hypothesis model fit index indices were AGFI=0.923, GFI=0.934, NFI=0.946, CFI=0.948, IFI=0.948, TLI=0.924, RMSEA=0.078, all conformed to the reference values given by acceptable model fit.

(Locate Figure 2. The final model and standardized model paths)

Using maximum likelihood estimation, each path was guided by the 200 repetitions of Bias-corrected bootstrap, mediation analysis path as well as effect values were shown in Table 5. Personality has a direct positive effect on work engagement ($\beta=0.50$, $p<0.001$), but has a direct negative effect on alexithymia ($\beta=-0.52$, $p<0.001$) and burnout ($\beta=-0.50$, $p<0.001$) respectively. Work engagement has a direct negative effect on burnout ($\beta=-0.10$, $p<0.001$), while alexithymia has a direct positive effect on burnout ($\beta=0.16$, $p<0.001$).

Table 5
Significance test of the mediating test.

Model Pathways	Estimated	95% CI
Total effects		
Work engagement ← Personality	0.50	0.46 - 0.54
Alexithymia ← Personality	-0.52	(-0.56) - (-0.48)
Burnout ← Personality	-0.50	(-0.54) - (-0.47)
Burnout ← Work engagement	-0.10	(-0.14) - (-0.06)
Burnout ← Alexithymia	0.16	0.12 - 0.21
Direct effects		
Work engagement ← Personality	0.50	0.46 - 0.54
Alexithymia ← Personality	-0.52	(-0.56) - (-0.48)
Burnout ← Personality	-0.37	(-0.42) - (-0.32)
Burnout ← Work engagement	-0.10	(-0.13) - (-0.06)
Burnout ← Alexithymia	0.16	0.11 - 0.21
Indirect effects		
Burnout ← Personality	-0.13	(-0.17) - (-0.10)

Table 6 shows the significant test results of two mediated pathways. In the path between personality and burnout, both work engagement, 95%CI:(-0.17)–(-0.08), and alexithymia 95%CI:(-0.36)–(-0.09), have significant mediating effects.

Table 6
Significance test of every mediating pathway.

Model Pathways	95% CI
Burnout ← Work engagement ← Personality	(-0.17) – (-0.08)
Burnout ← Alexithymia ← Personality	(-0.36) – (-0.09)

Discussion

The purpose of this study is to explore the current situation of village doctors' burnout in China and the impact of personality, alexithymia, and work engagement on burnout. The important unique value of this study lies not only in the selection of Chinese village doctors, the most basic doctors, as our research subjects, but also in the incorporation of these four variables into the structural model for the first time.

The results showed that in the three dimensions of job burnout, the proportion of village doctors' low personal achievement was higher than that of the other two dimensions,

There were 2,245(83.6%) village doctors with a serious low personal achievement. Meanwhile, 748 (27.9%) had severe emotional exhaustion, 508(18.9%) had severe depersonalization. Compared with other doctors, the burnout of village doctors was more serious and should be concerned. A cross-sectional study by Hui Wu et al. of 1,202 specialists in affiliated hospitals of medical universities in china found that the high degree of burnout in the three dimensions accounted for 12.1% of the surveyed doctors[35]. And a recent meta-analysis by Carolina s. et al. found that low achievement was the most important factor affecting nurses' burnout in primary health care Settings, accounting for 31% of the sample, followed by emotional exhaustion (28%), and depersonalization (15%)[15]. Thus, as medical staff of primary health services, the ranking of the effects of the three dimensions of job burnout among village doctors in our study sample was similar to that of the meta-analysis, but the positive rate of each dimension was much higher than that of primary nurses in this meta-analysis

According to the American Physician Burnout and Depression Report (2018), doctors aged 45 to 54 have the highest rate of burnout among all working age groups, at 50 percent. Before the age of 45-54, burnout rate increased with age, and after that, burnout rate decreased again. The 40-49 age group in the village doctors we surveyed accounted for almost half of the total village doctors and under the age of 30 accounted for only 1.3%, so it is assumed that age is also a cause of high burnout among village doctors. Only 2.6% of village doctors with university or above education and Only 37.7% of village doctors had rural (assistants) doctors or rural Chinese medicine practitioner qualifications and less than 4% of them had intermediate or higher professional titles. Although in recent years national policies have lowered the difficulty of the village doctors 'vocational qualification exams, many village doctors still fail to pass the exam due to the restrictions of their education and technical level, which also limit their promotion of professional titles. Which in turn make rural residents lack trust in the medical work of village doctors, and doctor-patient disputes often occur[36]. Meanwhile, they have a heavy workload, of which 69.9% need to work 60 hours or more, however, their income is below the normal salary level, with 46.5% of them earning less than 2,000 yuan a month. All these factors lead to severe burnout among existing doctors. Therefore, in order to alleviate the phenomenon of village doctors' job burnout in China, more research is urgently needed to explore the key factors of village doctors' burnout and its influencing mechanism.

The equation model proved that personality affect the burnout of village doctors through direct and indirect paths. At present, the research objects of the relationship between personality and burnout of medical staff mostly focused on nurses in pediatrics, oncology department, emergency diagnosis and serious illness department, and the research on doctors, especially the primary doctors, is very rare. A

cross-sectional study of 1,236 nurses found that job burnout in nurses was negatively correlated with extroversion, agreeableness, conscientiousness and openness, and positively correlated with neuroticism[37]. A meta-analysis of the relationship between nurses' personality and burnout found that the personality characteristics of the five-factor model could explain the significant differences in each burnout dimension[38]. A further study found that neuroticism was the most important personality trait to affect job burnout, while conscientiousness and neuroticism were the most significant personality traits to predict job burnout[39]. Although these studies focused on the influence of personality on burnout, the methods used were mostly limited to descriptive statistics, Pearson correlation analysis and hierarchical linear regression analysis to evaluate the linear relationship, and few mediating factors were introduced to measure the indirect influence of personality on burnout[39, 40].

The model also proves that work engagement plays a mediating role between personality and job burnout, although the relationship between burnout and work engagement is still controversial in academic circles[41]. While some researchers suggest that burnout is both the opposite and an extreme concept of work engagement[42]. A study of 4457 British medical staff found that doctors' burnout was associated with high neuroticism in personality, while their work engagement was closely related to extroversion and conscientiousness in personality, and doctors with high levels of participation still suffer from burnout[43]. Although some relevant studies have shown the weak relationship between work engagement and personality, burnout, but there is still a lack of quantitative analysis especially the intermediary exploration, between these factors, and our research can make up for this limitation. Through correlation analysis, we found that work engagement of village doctors was negatively correlated with alexithymia and burnout, and positively correlated with personality. Through in-depth SEM analysis, we found that work engagement of village doctors not only directly had a negative impact on burnout, but also played a significant mediating role between personality and burnout of village doctors.

Known as "emotional dysphoria", alexithymia is not an independent disease, but a personality trait. At present, academic research on the relationship between alexithymia and job burnout is relatively rare. Our finding, more than a quarter of village doctors have obvious alexithymia, which show a direct positive effect of alexithymia on burnout, is similar to a Finnish study of 3,322 employees aged 30-64 years, which showed that alexithymia may be an independent risk factor for burnout after controlling for possible confounding factors[44]. Our in-depth SEM study shown that alexithymia can also mediate the relationship between personality and burnout. D Lazzari's study of 238 medical workers also found that alexithymia played an intermediary role in organizational environment and burnout. Depersonalization in burnout was the main influencing factor of alexithymia, so the concept of alexithymia should be included in the prediction model of various dimensions of job burnout.[45]

To sum up, our study used structural equations to reveal the three influencing pathways of village doctors' job burnout. Personality, work engagement and alexithymia are all accurate predictors of village doctors' job burnout. The results further verified the complex influence of village doctors' personality on their burnout. The reason is that personality can not only have a direct positive effect on burnout, but also indirectly affect burnout through the intermediary effect of job participation and alexithymia. So, Hence,

this suggests may be a more sophisticated and in-depth mechanism in the relationship between personality and burnout. However, there is still a lack of research on the burnout of village doctors. In the future, we should not only pay attention to the factors that lead to burnout, but also study effective intervention measures. From the perspective of predictive factors, we should construct perfect intervention measures for village doctors' work status, so as to reduce burnout and increase work engagement. In addition, as job burnout is a subjective and complex multi-dimensional variable, it is difficult to analyze it in detail through quantitative research. Qualitative research method should be used to explore the burnout of village doctors in micro and deep level in the future.

Two limitations of the study should be addressed. First of all, although this study used SEM to verify the relationship between variables, it cannot draw a clear conclusion based on the cross-sectional design. Secondly, we collected data by self-filling rather than face to face investigation.

Conclusions

Doctors' job burnout is costly for organizations, individuals, and patients. Therefore, it is the responsibility of organizations and individuals to ensure a high degree of "fit" between work and individuals. It is very important to control and cultivate the personality traits of medical students in the education and training stage. At the same time, it is also very important to test the personality of doctors before they enter the job. To ensure the accuracy of personality testing, it is important to establish the reliability and validity of personality testing tools suitable for village doctors, and to ensure that the effects of personality in different situations are consistent. The Big Five can meet this requirement. The personality characteristics of village doctors are closely related to burnout, and medical administrators should pay attention to the personality characteristics of village doctors in their professional training, practice selection and job assignment, so as to improve the medical quality and reduce the level of job burnout. To encourage doctors to actively reflect on their own personality which causes job burnout and stress, and to improve their personal personality characteristics and reduce job burnout by obtaining necessary social support, constructing reasonably achievable career expectations, improving time management and participating in psychological counseling programs[46]. In view of the positive effect of neuroticism on burnout, it is suggested that village doctors should learn to control their emotions in their daily work life, at the same time learn to talk, but also learn to divert attention. Trying to distract oneself when one's emotions are out of control is the best way to control one's emotions and reduce burnout.

More than a quarter of village doctors in our study have obvious alexithymia, which can not only have a direct positive effect on burnout, but also play a mediating role between personality and burnout. many studies have also shown that alexithymia is associated with neuroticism in personality, which is the definitive cause of burnout. Therefore, with the increasing demand for medical care by rural residents, village doctors have a strong work intensity, low pay, insecure old-age care, and occupational pressure is also increasing. Village doctors' alexithymia characteristics and psychological conditions have changed greatly, becoming an early warning and intermediary factor of burnout. Early identification of alexithymia in village doctors is helpful to predict the degree of personality improvement and to implement

psychological intervention as soon as possible. These can reduce job burnout and improve the quality of medical services.

Abbreviations

20-Item Toronto Alexithymia Scale (TAS-20); Big Five Inventory (BFI); SD: Standard Deviation; EFA: exploratory factor analysis; SEM: Structural Equation Modeling; AGFI: adjusted goodness of fit index; NFI: normed fit index; GFI: goodness of fit index; CFI: comparative fit index; TLI: Tucker-Lewis index; IFI: incremental; RMSEA: root mean square error of approximation; ANOVA: Analysis of Variance; Institutional Review Board: IRB

Declarations

Ethics approval and consent to participate

All participants provided oral consent before any data were collected. Oral consent was obtained instead of written consent, because the survey was anonymous and did not involve personal privacy.

Consent for publication

Not applicable.

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Author Contributions

XZ and NL conceptualized the idea. XZ performed the analyses and wrote the first draft of the manuscript. LB, MW and XB checked and entered the data. MW and XZ critically revised the manuscript. All the authors read and approved the final manuscript.

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References

1. Xin L, Lu X, Tian X, Qiu H, Guo W. A Survey of Influencing Factors to Rural Doctor'Satisfaction in Liaoning Province. *Chinese general practice*. 2010;13(4):397–8.
2. Zhang W, Hongdao M, Shujuan Y, Danping L. **The Influence of Professional Identity, Job Satisfaction, and Work Engagement on Turnover Intention among Township Health Inspectors in China.** *International Journal of Environmental Research & Public Health*, 15(5):988-.
3. Rotenstein LS, Torre M, Ramos MA, Rosales RC, Guille C, Sen S, Mata DA. **Prevalence of Burnout Among Physicians: A Systematic Review.** *The Journal of the American Medical Association*, 320.
4. Whippen DA, Canellos GP. **Burnout syndrome in the practice of oncology: results of a random survey of 1,000 oncologists.** *Journal of Clinical Oncology*, 9(10):1916–1920.
5. Amiri M, Khosravi A, Eghtesadi A, Sadeghi Z, Abedi G, Ranjbar M, Mehrabian F. Burnout and its Influencing Factors among Primary Health Care Providers in the North East of Iran. *PLOS ONE*. 2016;11:e0167648.
6. Bacon W, Mullner R. National health care surveys and health care management. Examples from the National Center for Health Statistics. *Journal of medical systems*. 1984;7:469–79.
7. Yeob K, Kim S, Park B, Shin D, Yang H, Park K, Cho J, Park J-H. Burnout Among oncologists in the Republic of Korea: A nationwide survey. *Curr Probl Cancer*. 2019;44:100535.
8. Fletcher C. Hospital RNs??? Job Satisfactions and Dissatisfactions. *J Nurs Adm*. 2001;31:324–31.
9. Gandhi K, Sahni N, Padhy SK, Mathew PJ. **Comparison of stress and burnout among anesthesia and surgical residents in a tertiary care teaching hospital in North India.** *Journal of Postgraduate Medicine* 2017, 64.

10. Craiovan PM. Correlations between Perfectionism, Stress, Psychopathological Symptoms and Burnout in the Medical Field. *Procedia - Social Behavioral Sciences*. 2014;127:529–33.
11. Guillaume P. Antoine, Guedon, Fanny, Moulinet, Matthieu, Schuers: **Influence of medical shortage on GP burnout: a cross-sectional study**. *Family Practice*.
12. Kupcewicz E, Józwiak M. **Association of burnout syndrome and global self-esteem among Polish nurses**. *Archives of Medical Science* 2019, 16.
13. Li H, Yuan B, Meng Q, Kawachi I. Contextual Factors Associated with Burnout among Chinese Primary Care Providers: A Multilevel Analysis. *International Journal of Environmental Research Public Health*. 2019;16:3555.
14. Lin C-C, Lin BY-J, Lin C-D. Influence of clerks' personality on their burnout in the clinical workplace: a longitudinal observation. *BMC Med Educ*. 2016;16(1):30.
15. Monsalve C, San Luis C, Gómez Urquiza J, Albendin L, Aguayo R. Cañadas-De la Fuente G: **Burnout syndrome and its prevalence in primary care nursing: A systematic review and meta-analysis**. *BMC Family Practice* 2018, 19.
16. Pérez-Fuentes M, Molero Jurado MDM, Martínez Á, Gázquez Linares J: **Analysis of the risk and protective roles of work-related and individual variables in burnout syndrome in nurses**; 2019.
17. Hair JF, Ringle CM, Sarstedt M. PLS-SEM: Indeed a Silver Bullet. *Journal of Marketing Theory Practice*. 2011;19(2):139–52.
18. Preacher KJ, Zyphur MJ, Zhang Z. A General Multilevel SEM Framework for Assessing Multilevel Mediation. *Psychol Methods*. 2010;15(3):209–33.
19. Taycan O, Erdogan S, Çelik C. Relationship of Burnout With Personality, Alexithymia, and Coping Behaviors Among Physicians in a Semiurban and Rural Area in Turkey. *Arch Environ Occup Health*. 2014;69:159–66.
20. Geues N, Bogaert P, Franck E. **Vulnerability to burnout within the nursing workforce-The role of personality and interpersonal behaviour**. *Journal of clinical nursing* 2017, 26.
21. Zhao W, Yuan J, Li Y, Peng Y. An Exploration of the Relationship between the Subjective Well-being of the Doctors and Nurses and the Job Burnout and personality Characteristics in Tangshan City. *The world's latest medical information abstracts* 2015(26):16–18.
22. Mattila AK, Ahola K, Honkonen T, Salminen JK, Huhtala H, Joukamaa M. **Alexithymia and occupational burnout are strongly associated in working population**. *Journal of Psychosomatic Research*, 62(6):0–665.
23. Mori E, Drago A, Ronchi D, Serretti A. Alexithymia, personality and outcome: A naturalistic study in patients with major depression and anxiety disorders. *Journal of Psychopathology*. 2012;18:138–44.
24. Bratis D, Tselebis A, Sikaras C, Moulou A, Giotakis K, Zoumakis E, Ilias I. **Alexithymia and its association with burnout, depression and family support among Greek nursing staff**. 7(1):72.
25. Carrozzino D, Porcelli P. **Alexithymia in Gastroenterology and Hepatology: A Systematic Review**. *Frontiers in Psychology* 2018, 9.

26. Aldaz E, Aritzeta A, Galdona N. **The association between alexithymia, emotional intelligence and burnout among nursing assistants working in nursing home settings: A cross-sectional study.** *Journal of Advanced Nursing* 2019.
27. Schaufeli WB, Salanova M, González-romá V, Bakker AB. **The Measurement of Engagement and Burnout: A Two Sample Confirmatory Factor Analytic Approach.** *Journal of Happiness Studies*, 3(1):71–92.
28. Pérez-Fuentes MdC, Molero Jurado MdM, Martos Martínez Á, Gázquez Linares JJ: **Burnout and Engagement: Personality Profiles in Nursing Professionals.** *Journal of Clinical Medicine* 2019, 8(3):286.
29. The Central People's Government of the People's Republic of China. <http://www.nhc.gov.cn/ewebeditor/uploadfile/2016/10/20161026163512679.pdf>. Accessed 17 August 2020.
30. Carciofo R, Yang J, Song N, Du F, Zhang K. Psychometric Evaluation of Chinese-Language 44-Item and 10-Item Big Five Personality Inventories, Including Correlations with Chronotype, Mindfulness and Mind Wandering. *PloS one*. 2016;11:e0149963.
31. Ling Y, Zeng Y, Yuan H, Zhong M. **Cross-cultural validation of the 20-item Toronto Alexithymia Scale in Chinese adolescents.** *Journal of Psychiatric & Mental Health Nursing*, 23(3–4):179–187.
32. Seo SS, Chung US, Rim HD, Jeong SH. Reliability and validity of the 20-item toronto alexithymia scale in korean adolescents. *Psychiatry Investig*. 2009;6(3):173–9.
33. Chao SF, McCallion P, Nickle T. **Factorial validity and consistency of the Maslach Burnout Inventory among staff working with persons with intellectual disability and dementia.** 55(5):529–536.
34. Jelodar ZK, Rad AM, Foroushani AR, Pooyan EJ. Investigating the relationship between spiritual leadership and professional burnout among the staff of Ardebil hospitals. *Journal of Medical Ethics History of Medicine*. 2016;9(1):74–85.
35. Wu H, Liu L, Wang Y, Gao F, Wang L. Factors associated with burnout among Chinese hospital doctors: A cross-sectional study. *Bmc Public Health*. 2013;13(1):786.
36. Wang M, Chen X, Zhang S. Prevention and treatment of major medical disputes in primary hospitals. *Management of rural health service in China* (06):52–54.
37. María D, Carmen, Pérez-Fuentes. María, Del, Mar, Molero, Jurado, África: **Burnout and Engagement: Personality Profiles in Nursing Professionals.** *Journal of Clinical Medicine*.
38. Alarcon G, Eschleman KJ, Bowling NA. **Relationships between personality variables and burnout: A meta-analysis.** *Work & Stress*, 23(3):244–263.
39. Garrosa E, Rainho Co, Moreno-Jiménez B, Monteiro MJo. **The relationship between job stressors, hardy personality, coping resources and burnout in a sample of nurses: A correlational study at two time points.** 47(2):205–215.
40. Kim HJ, Kang HS, Swanger N. **Burnout and engagement: A comparative analysis using the Big Five personality dimensions.** *International Journal of Hospitality Management*, 28(1):0–104.

41. Konstantinou AK, Bonotis K, Maria S, Vasileios S, Dardiotis E. Burnout Evaluation and Potential Predictors in a Greek Cohort of Mental Health Nurses. *Arch Psychiatr Nurs.* 2018;32(3):449–56.
42. Maricuțoiu LP, Sulea C, Iancu A. Work engagement or burnout: Which comes first? A meta-analysis of longitudinal evidence. *Burnout Research.* 2017;5:35–43.
43. Mcmanus IC, Jonvik H, Richards P, Paice E. **Vocation and avocation: leisure activities correlate with professional engagement, but not burnout, in a cross-sectional survey of UK doctors.**
44. Mattila AK, Ahola K, Honkonen T, Salminen JK, Huhtala H, Joukamaa M. Alexithymia and occupational burnout are strongly associated in working population. *J Psychosom Res.* 2007;62(6):657–65.
45. Lazzari D, Pisanti R, Avallone F. [Perception of organizational climate and burnout amongst health care workers: the role of alexithymia as a moderator]. *G Ital Med Lav Ergon.* 2006;28(1 Suppl 1):43–8.
46. Bruce SP. **Recognizing stress and avoiding burnout.** *Currents in Pharmacy Teaching & Learning,* 1(1):57–64.

Figures

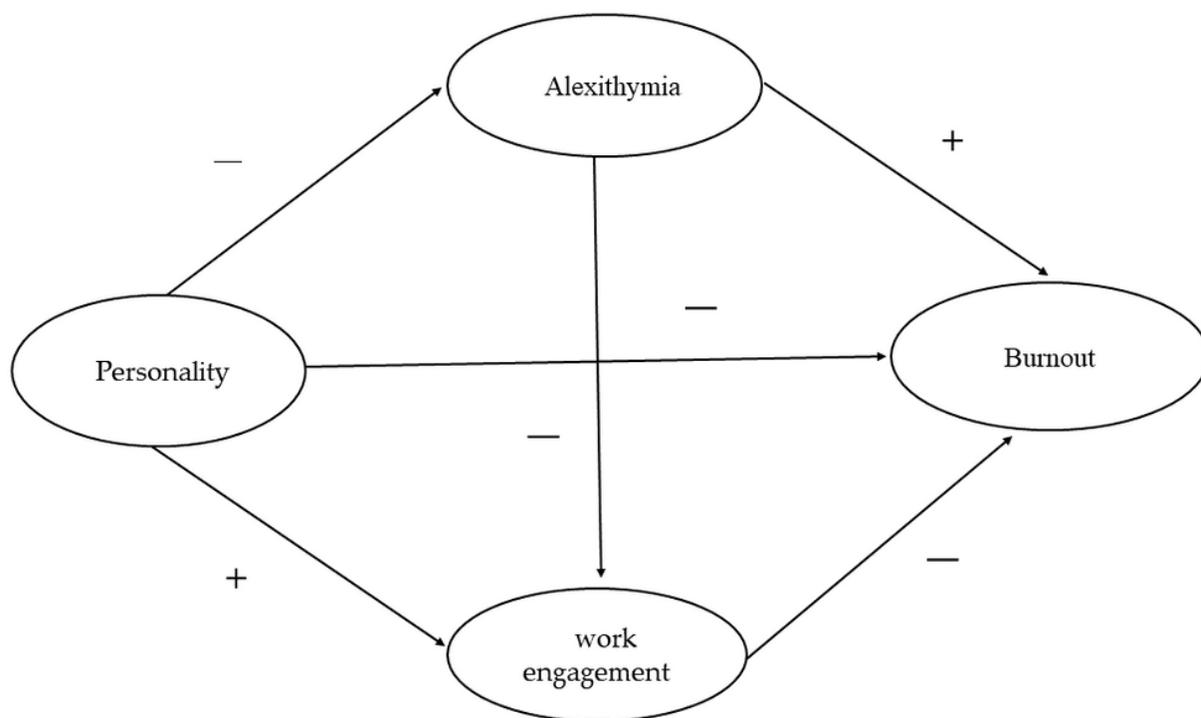


Figure 1

The theoretical model and hypotheses.

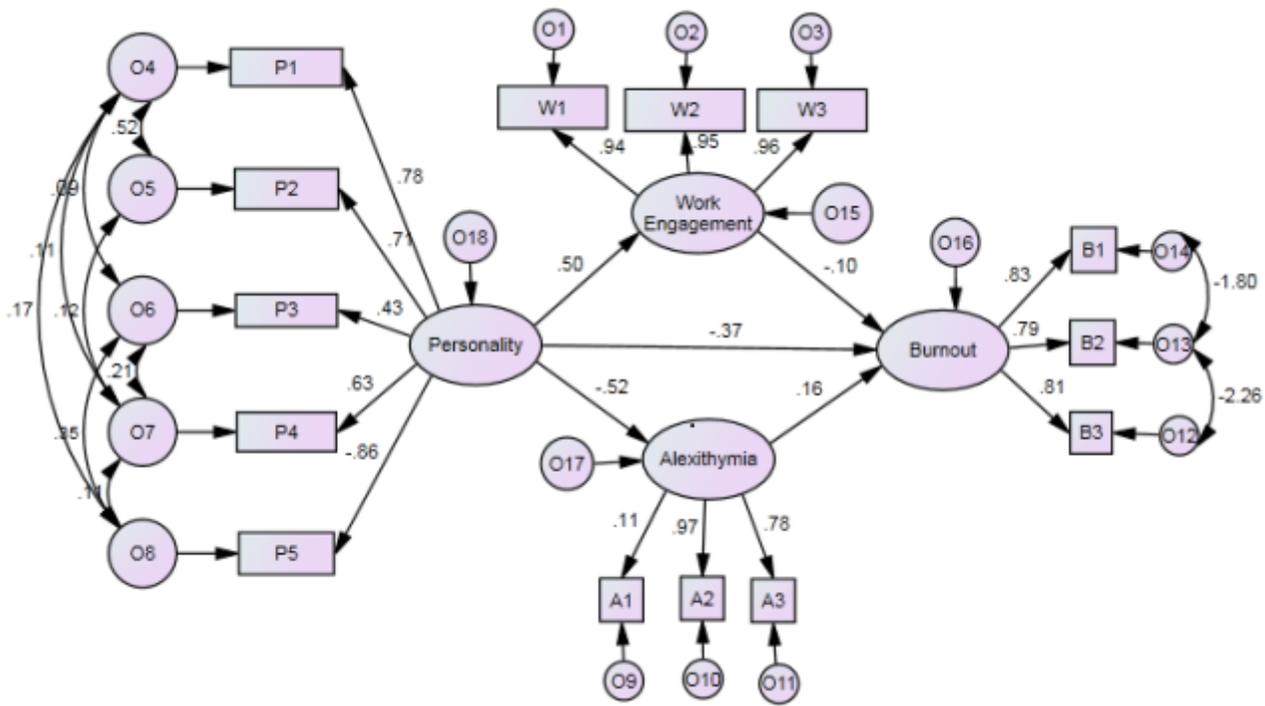


Figure 2

The final model and standardised model paths.

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