

Association between physician burnout and self-efficacy among rural physicians in Liaoning, China

Short title: Physician burnout and self-efficacy among rural physicians

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ABSTRACT

Since the high turnover intention is prevalent among rural physicians and job burnout has been proved to be related to the high turnover intention of the health professionals. There is a great need to identify protective factors from burnout among rural physicians. One of them may be self-efficacy. This study examines the connection between burnout and self-efficacy among rural physicians in Liaoning, China. 367 rural physicians in Liaoning Province (184 in high-resource areas and 183 in low-resource areas) were selected as a sample using the convenience sampling method.

The survey instruments were two questionnaires which included: (1) Maslach Burnout Inventory– General Survey and (2) General Self-Efficacy Scale (GSE). Both instruments showed good reliability and validity. Data was analyzed using Multiple ordinal logistic regression analysis. The findings revealed that self-efficacy is significantly related to all the components of burnout among rural physicians. In conclusion, the study detected that self-efficacy was negatively correlated with job burnout. Self-efficacy plays a protective factor role against the components of burnout in rural physicians. So, special attention should be paid to improving self-efficacy as an important part of burnout prevention programs in rural physicians.

Keywords: Burnout, Self-efficacy, Rural physicians, Primary care, China

INTRODUCTION

Traditionally, China is a dual society composed of urban and rural areas. Its rural population totaled 630 million in 2013, accounting for 46% of the total population and 9% of the world population.^[1] For a long time, millions of rural physicians are rooted at the grassroots level in the vast rural areas and are the "guardians" of the health of hundreds of millions of rural residents in China. They have undertaken about 30% of the country's diagnosis and treatment services and about 40% of the basic public health services, who plays an irreplaceable role in ensuring the basic medical care of rural residents.^[2]

In recent years, high turnover intention in physicians has become a critical problem. In China, about half of clinical physicians in public hospitals had turnover intention because of concerns about burnout, lack of support and chance of promotion. A survey implemented in Liaoning Province, China indicated that 41.4% of physicians intended to leave their workplace because of high work stress. Sun Jianhua *et al.* reported that 86.40% of rural physicians in Huailai County, Hebei Province, China had turnover intention.^[3] Job burnout was proved to be related to the higher turnover intention of the health professionals.^[4-7]

The World Health Organization's definition of about burnout can be found in the reports of Dyrbye, L.N. and colleagues.^[8] Therefore, understanding and prevention of burnout will have a significant role in improving the quality of health services. Measures should be taken to prevent job burnout to ensure the stability of the rural physicians team.

Recent study showed that burnout was associated with work-related factors, social support from co-workers, individual factors, and self-regulatory factors. The self-regulatory factors include optimism, locus of control, and self-efficacy.^[9] Self-efficacy is, according to psychologist Albert Bandura who originally proposed the concept, a personal judgment of "how well one can execute courses of action required to deal with prospective situations".^[10] Self-Efficacy is correlated to emotion, optimism, work satisfaction, negative coefficients were found for depression, stress, health complaints, burnout, and anxiety.^[11,12] Previous studies have shown that self-

efficacy can be used as a resource to prevent the serious consequences of stress and promote recovery from work stress. Self-efficacy-enhancing intervention can reduce stress among employees.^[9,13,14]

Few studies have explored the self-efficacy among rural physicians, who were susceptible to burnout. This study aimed at exploring antecedent factors associated with burnout and it attempted to determine the association between the burnout and self-efficacy among rural physicians in Liaoning of China.^[15] We need to identify protective factors from burnout among rural physicians. One of these could be self-efficacy.^[16]

METHODS

Study Design and Participants

We conducted a cross-sectional study among rural physicians in Liaoning province, China, between November 2018 and January 2019. Stratified sampling was used to select samples according to the regional GDP per capita ranking. In total, 367 rural physicians from 14 regions in Liaoning were asked to participate in this survey. We organized trained investigators to distribute the paper questionnaire at each survey site. Investigators were able to answer any questions raised by participants on the content of the survey. All rural physicians voluntarily participated in the survey and signed written informed consent forms. Participants were able to withdraw from the survey at any time. All questionnaire information was used only for the purpose of this study and are kept confidential.

Instruments and Variables

Socio-demographic variables: Data (age, sex, work experience, marital status, smoking status, unhealthy alcohol using status, monthly income) was collected using anonymous self-report social demographic questionnaires. The unmarried category included single, widowed and divorced status in the questionnaires.

Maslach Burnout Inventory– General Survey (MBI-GS): Burnout was measured using the Chinese version of the MBI-GS, which comprises 16 items of which five each

refer to exhaustion (EX) and cynicism (CY), and six to professional efficacy (PE). Exhaustion measures feelings of being overextended and exhausted by one's work. Cynicism measures an indifference or a distant attitude towards your work. Professional Efficacy measures satisfaction with past and present accomplishments, and it explicitly assesses an individual's expectations of continued effectiveness at work. The three-dimensional concept of the MBI-GS has been confirmed across nations.^[17] Higher scores on the exhaustion and cynicism subscales and lower scores on the professional efficacy subscale are indicative of burnout, whereby items for professional efficacy are reversed (low professional efficacy). Each item is scored on a 7-point Likert scale from 0 (never) to 6 (daily). Item scores were added up to obtain scores for each subscale.^[18]

Three subscale scores of MBI-GS (EX, CY, and PE) were calculated and subjects categorized into one of the three groups—high, moderate, or low level of burnout. The classification of low and high scores is usually based on established cut-off scores. Since the Chinese version of MBI has no established burnout cut-off score, the score distribution of each scale is equally divided into quartiles. A high score means a score in the 75th percentile or higher, and a low score means a score in the 25th percentile or lower.^[19]

General Self-Efficacy Scale (GSE): The scale was created to assess a general sense of perceived self-efficacy with the aim in mind to predict coping with daily hassles as well as adaptation after experiencing all kinds of stressful life events. In this study, self-efficacy was measured using the validated Chinese version of the GSE. The GSE consisted of 10 items scored on a 4-point Likert scale, and participants' responses ranged from 1: "not at all true" to 4: "exactly true". The total score is calculated by finding the sum of the all items. For the GSE, the total score ranges between 10 and 40, with a higher score indicating more self-efficacy.^[11]

Data Analysis

The preliminary analysis included a descriptive study of the categorical variables and scores of MBI and GSE. The results were summarized as frequencies and percentages (categorical variables), and medians and percentiles (numerical variables). Multiple

ordinal logistic regressions were conducted to examine the relationship between burnout dimensions (exhaustion, cynicism, and reduced professional efficacy) and self-efficacy, socio-demographic variables (age, sex, work experience, marital status, smoking status, unhealthy alcohol using status, monthly income). Each burnout dimension was entered as the dependent variable in three separate analyses, all variables were simultaneously entered into each of the regression models. Odds ratios (OR) and 95% confidence intervals (95% CI) were estimated for all variables. A two-tail P value <0.05 was considered to be statistically significant. All data analyses were performed using SPSS version 24.

Ethical and Confidentiality Aspects

The study protocol and questionnaire were approved by the China Medical University Ethics Committee. Before participating in the study, participants obtained written informed consent. According to the terms of agreement agreed by the participants, personal details were kept confidential for the study purpose only. The assessment was self-administered, participation was voluntary, and participants were not compensated. All data in this study was anonymous and participants were assigned numerical codes.

RESULTS

Reliability and Validity of Instruments

The reliability of the instruments was tested by calculating Cronbach α , which was 0.906 for the GSE and 0.796 for the MBI. The validity of the instruments was tested by calculating Kaiser-Meyer-Olkin (KMO), which was 0.933 for GSE and 0.808 for the MBI. Bartlett's test was $P < 0.05$ for both scales.^[20]

Description of Sample

The sample was consisted by 367 rural physicians working in Liaoning Province, China. 184 came from high-resource areas (Shenyang, Dalian, Anshan, Fushun, Benxi, Yingkou, Liaoyang, Panjin) and 183 came from low-resource areas (Dandong,

Jinzhou, Fuxin, Tieling, Chaoyang, Huludao). Areas with a per capita GDP exceeding 40,000 yuan were classified as high-resource areas, and areas below 40,000 yuan were classified as low-resource areas.

The median age of the sample is 42 years. There were 150 men (40.9%) and 217 women (59.1%). The median years of work experience is 19 years. Table 1 summarizes the social-demographics characteristics of the sample.

Table 1. Socio-demographic Variables and Scores of GSE on the Sample of Rural Physicians

Variables	
Sex, n (%)	
Male	150 (40.9)
Female	217 (59.1)
Age, median (IQR)	42(38-45)
Marital status, n (%)	
Married	340 (92.6)
Unmarried	27 (7.4)
Unhealthy alcohol use, n (%)	
yes	138 (37.6)
no	229 (62.4)
Cigarette smoking, n (%)	
Yes	43 (11.7)
No	324 (88.3)
Work experience(years), median (IQR)	19(12-22)
Monthly income(yuan), median (IQR)	3000(3000-4000)
GSE (scores)	28(23-33)

Note. GSE= General Self-Efficacy

Levels of Burnout in Rural Physicians

Table 2 summarizes the cut-off points and levels of burnout for each of the

dimensions based on the 25th and 75th percentiles. These percentages form groups of low, moderate, and high burnout levels for each MBI dimension. The group with moderate levels of burnout was represented by half of the participants as it included rural physicians whose scores lay between the 25th and the 75th percentile.^[19] It was observed that 27.5% of the participants presented high EX, while 43.1% had a medium score for this dimension. Additionally, 27.5% of the participants scored highly for CY and 45.8% of them had a medium score in this respect. For PE, 30.8% showed high levels of lack of personal efficacy, while 40.6% had a medium score for this dimension.^[21] Out of the 367 rural physicians who participated in the study, 212 (57.8%) presented high levels of burnout in at least one dimension, 57(15.5%) in at least two dimensions.

Table 2. Cutoff Points and Categories of Low, Moderate, and High Levels of Burnout per Burnout Dimension.

MBI dimensions	Low		Moderate		High	
	scores	n (%)	scores	n (%)	scores	n (%)
Exhaustion (EX)	≤8	108(29.4)	9-13	158(43.1)	≥14	101(27.5)
Cynicism (CY)	≤5	98(26.7)	6-9	168(45.8)	≥10	101(27.5)
Reduced professional efficacy	≤8	105(28.6)	9-13	149(40.6)	≥14	113(30.8)

Explanatory Models for Each of the Dimensions of Burnout

The model obtained for each dimension of burnout includes the eight explanatory variables. These variables included age, sex, work experience, monthly income, smoking, unhealthy alcohol use, marital status and self-efficacy. Since the dependent variable had three layers (low, moderate and high levels of burnout), ordinal logistic regression model was used.^[7]

The test of parallel lines was not significant for exhaustion ($P = 0.372$), cynicism ($P = 0.844$), and professional efficacy ($P = 0.531$), which indicated that the slope coefficients were the same across burnout response categories in each of the burnout dimensions. The log-likelihood test for each model produced the following results: χ^2

= 31.939, $P = 0.000 < 0.05$ for exhaustion (EX); $\chi^2 = 58.969$, $P = 0.000 < 0.05$ for cynicism (CY); and $\chi^2 = 24.878$, $P = 0.002 < 0.05$ for professional efficacy (PE). When these variables were included in the three models, the fit improved significantly compared to a model that only takes the constant into account. The following results were obtained by the Pearson chi-square goodness-of-fit test for each model: $\chi^2 = 728.400$, $P = 0.386 > 0.05$ for EX; $\chi^2 = 718$, $P = 0.357 > 0.05$ for CY and $\chi^2 = 747.106$, $P = 0.219 > 0.05$ for PE. We concluded, therefore, that the model produced a good populational fit with the three dimensions of burnout.^[21]

Table 3. Ordinal Logistic Regression for the Exhaustion Model

	Estimate	SE	OR (95% CI)	Wald	<i>P</i>
Variables					
Age	-0.02	0.03	0.98 (0.92-1.05)	0.40	0.525
Work experience(years)	0.00	0.03	1.00 (0.94-1.05)	0.03	0.859
Monthly income(yuan)	0.00	0.00	1.00 (1.00-1.00)	2.30	0.129
Male vs Female	0.10	0.25	1.11 (0.68-1.79)	0.17	0.681
Smoking vs Non-Smoking	0.21	0.34	1.23 (0.63-2.42)	0.36	0.546
Unmarried vs Married	-0.81	0.39	0.44 (0.21-0.95)	4.33	0.037
Non-Drinking vs Drinking	-0.07	0.24	0.93 (0.59-1.48)	0.09	0.764
Self-Efficacy	-0.07	0.01	0.93 (0.91-0.96)	21.57	0.000
Threshold					
Low EX	-3.56	1.15	0.03 (0.00-0.27)	9.55	0.002
Moderate EX	-1.59	1.14	0.20 (0.02-1.89)	1.96	0.162

Note. OR=odds ratio; CI=confidence interval; EX=exhaustion

Exhaustion (EX): Results indicated that the self-efficacy and marital status were significant predictors of exhaustion response category. Improvement in self-efficacy resulted in lower odds of high exhaustion versus combined low and moderate exhaustion, $OR = 0.93$, 95% CI [0.91-0.96], $P < 0.001$. Additionally, unmarried participants had lower odds of high emotional exhaustion versus combined low and moderate emotional exhaustion, $OR = 0.44$, 95% CI [0.21-0.95], $P = 0.037$, compared to those married. The results from the full model are displayed in Table 4.

Table 4. Ordinal Logistic Regression for the Cynicism Model

	Estimate	SE	OR (95% CI)	Wald	<i>P</i>
Variables					
Age	-0.07	0.03	0.93(0.87-1.00)	3.85	0.050
Work experience(years)	0.05	0.03	1.06(1.00-1.11)	3.97	0.046
Monthly income(yuan)	0.00	0.00	1.00(1.00-1.00)	2.37	0.123
Male vs Female	0.70	0.25	2.02(1.23-3.32)	7.68	0.006
Smoking vs Non-Smoking	0.10	0.35	1.10(0.55-2.20)	0.08	0.778
Unmarried vs Married	-0.89	0.40	0.41(0.19-0.90)	4.99	0.025
Non-Drinking vs Drinking	0.07	0.24	1.08(0.67-1.72)	0.10	0.757
Self-Efficacy	-0.10	0.02	0.91(0.88-0.94)	38.08	0.000
Threshold					
Low CY	-5.02	1.19	0.01(0.00-0.07)	17.72	0.000
Moderate CY	-2.79	1.17	0.06(0.01-0.61)	5.69	0.017

Note. OR=odds ratio; CI=confidence interval; CY=cynicism

Cynicism (CY): Results indicated that significant concurrent predictors of cynicism response category included the Work experience and Self-Efficacy in addition to the sex and Marital status. Specifically, improvement in self-efficacy resulted in lower odds of high cynicism versus combined low and moderate cynicism, OR = 0.91, 95% CI [0.88-0.94], $P < 0.001$. Increases in work experience resulted in greater odds of high cynicism versus combined low and moderate cynicism, OR = 1.06, 95% CI [1.00-1.11], $P = 0.046$. Unmarried participants had lower odds of high cynicism versus combined low and moderate cynicism, OR = 0.41, 95% CI [0.19-0.90], $P = 0.025$, compared to those married. Men had higher odds of high cynicism versus combined low and moderate cynicism, OR = 2.02, 95% CI [1.23-3.32], $P = 0.006$, compared to women. The results from the full model are displayed in Table 5.

Table 5. Ordinal Logistic Regression for the Reduced Professional Efficacy Model

	Estimate	SE	OR (95% CI)	Wald	<i>P</i>
Variables					
Age	-0.02	0.03	0.98 (0.91-1.04)	0.54	0.463
Work experience(years)	0.06	0.03	1.06 (1.00-1.11)	4.30	0.038
Monthly income(yuan)	0.00	0.00	1.00 (1.00-1.00)	0.04	0.836
Male vs Female	0.37	0.25	1.45 (0.90-2.35)	2.31	0.129
Smoking vs Non-Smoking	-0.20	0.34	0.82 (0.42-1.59)	0.36	0.549
Unmarried vs Married	-0.24	0.38	0.78 (0.37-1.65)	0.41	0.521
Non-Drinking vs Drinking	-0.31	0.24	0.73 (0.46-1.16)	1.73	0.188
Self-Efficacy	-0.05	0.01	0.95 (0.92-0.97)	13.88	0.000
Threshold					
Low R-PE	-2.63	1.14	0.07 (0.01-0.67)	5.35	0.021
Moderate R-PE	-0.81	1.13	0.45 (0.05-4.07)	0.51	0.474

Note. OR=odds ratio; CI=confidence interval; R-PE=reduced professional efficacy

Reduced professional efficacy (R-PE). Results indicated that the Self-efficacy and work experience were significant predictors of reduced professional efficacy category. improvements in self-efficacy resulted in lower odds of high reduced professional efficacy versus combined low and moderate reduced professional efficacy, OR = 0.95, 95% CI [0.92-0.97], $P < 0.001$. Increases in work experience resulted in greater odds of high reduced professional efficacy versus combined low and moderate reduced professional efficacy, OR = 1.06, 95% CI [1.00-1.11], $P = 0.038$. The results from the

full model are displayed in Table 7.

DISCUSSION

This study examined two primary research questions: (1) Burnout of rural physicians and its influencing factors (socio-demographic variables); and (2) What is the relationship between job burnout and self-efficacy among rural physicians. To our knowledge, this study was the first to examine the associations between all the components of the burnout and self-efficacy in rural physicians in China. This investigation was not easy, because rural physicians were very scattered in Liaoning, China.

According to the findings, Marital status showed a significant relationship with level of exhaustion and cynicism, which is inconsistent with the findings of Ahola *et al.*,^[22] Kim *et al.*,^[23] Alacacioglu *et al.*,^[24] Bargellini *et al.*^[25] and Canadas-De *et al.*^[26] Their studies showed that a higher level of burnout was significantly associated with single marital status, however, our finding showed that married people were more prone to becoming exhausted and cynical, which is consistent with the finding of Chinese Li D and colleagues.^[27] This may be related to different cultural and social backgrounds. In fact, rural physicians in China generally had low incomes, unclear career development prospects and increased pressure on the economy, children's education and the support of the elderly after marriage, which gradually made them unwilling to actively communicate and seek changes, so they gradually become exhausted and cynical. The health administration department should focus on considering and taking care of the needs of married people, such as providing more career advancement opportunities, increasing salary, etc. After all, married people account for more than 90% in rural physicians.

The findings of this study further indicated a significant relationship between work experience and cynicism, reduced professional efficacy. Work experience was positively correlated with cynicism and reduced professional efficacy, however, Previous systematic reviews showed that older age or more years of work experience may be related to lower levels of burnout.^[9] This may be related to Chinese unique

cultural background, obviously, rural physicians lack career advancement opportunities, have low technical level, undertake many daily tasks, lack training and are older, so many of them show higher levels of cynicism and reduced professional efficacy as they age and experience. On the dimension of cynicism, male rural physicians scored significantly higher than female rural physicians. As primary health care provider in China, Male physicians faced more professional pressure and female physicians knew how to enjoy life, at the same time female rural physicians were more patient and loving, so, the male physicians reported a higher level of cynicism at the present study.

However, no correlation between age, unhealthy alcohol use, cigarette smoking, monthly income and all the components of burnout was observed in the study, which is not entirely consistent with the findings of other studies.^[28-33]

The results of the study showed a negative correlation between self-efficacy and all the components of burnout in rural physicians, which suggested that rural physicians with low self-efficacy had high burnout. This is consistent with the findings of Amiri *et al.*^[34] Milam *et al.*^[35] and Smeds *et al.*^[36,37] This is because individuals with low self-efficacy do not have much control over their behavior and actions, they are more prone to burnout. There is a negative correlation between self-efficacy and exhaustion. This means that exhaustion is high or low depending on low or high self-efficacy. Self-efficacy was also negatively correlated with cynicism. This means that if individuals have low self-efficacy, then cynicism will be high. Reduced professional efficacy is also negatively correlated with self-efficacy. High self-efficacy leads high professional efficacy³⁸. Rural physicians with lower self-efficacy more often experienced symptoms of burnout, whereby, rural physicians with higher self-efficacy experienced less burnout, which is also consistent with the research on the relationship between burnout and self-efficacy among teachers and students.^[39-42]

LIMITATION

There were some limitations in this study, which should be taken into account when interpreting the results. Firstly, the design used makes it impossible to draw

conclusions about causality. In future research, longitudinal design could be used to reflect the progress of the burnout process of rural physicians. Secondly, our findings are mainly based on the answers to questionnaires, and there is also a risk that the answers of participants may be affected by deviations in answers and social expectations.

Future research should explore other factors that may affect job burnout and self-efficacy. Finally, achieving the goal of effectively improving self-efficacy, reducing job burnout and reducing the turnover rate of rural physicians.

CONCLUSION

The findings indicated that self-efficacy may play a protective factor role against all the components of burnout in rural physicians. Humans are the biggest development factor, the health administration department should pay special attention to the group of rural physicians and carry out targeted improving self-efficacy projects to prevent burnout.^[43,44] The findings also had an implication: interventions aiming at burnout preventions may have different effects in male and female, long and short work experience, married and unmarried rural physicians.

Authors' Contributions

DW, ND, HL and JG designed the research. JG and XS collected the data. JG and XS performed the statistical analyses. JG, XS, and HL wrote the manuscript. All authors read and approved the final manuscript.

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Conflict of Interest

None.

Ethics Approval and Consent to Participate

The ethical review board of the Academic Committee of China Medical University approved this study. After explaining the aim and purpose of the study, the voluntary nature and the confidentiality of participants, we obtained the informed consent for all procedures.

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