The Potential Categories of Rural PE Teachers' Job Burnout and Its Relationship with Teaching Efficacy

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Abstract

This study investigated 613 rural physical education (PE) teachers using an individual-centered latent profile analysis to explore the latent categories of occupational burnout and their relationship with teaching efficacy. Results revealed: (1) Three latent categories of occupational burnout were identified among rural PE teachers: mild (14.36%), moderate (60.52%), and severe (25.12%). (2) Gender, professional title, and teaching experience significantly influenced the latent categories of occupational burnout. (3) Significant differences in teaching efficacy were observed across the three categories, with the low burnout group demonstrating the highest teaching efficacy and the high burnout group showing the lowest. The study elucidates the latent categories of occupational burnout among rural PE teachers and their influencing factors, providing a reference for improving their burnout management.

Keywords

Rural teachers, Occupational burnout, Latent profile, Teaching efficacy

Introduction

Rural education is a vital part of rural revitalisation. In recent years, the state has placed an increasing emphasis on rural education, introducing relevant policies one after another [1]. However, due to the unique nature of teaching in rural areas, rural education commonly faces challenges such as low social recognition, poor salaries and benefits, and unfavourable working conditions. Societal attention has been drawn to the physical and mental health issues of rural teachers [2-4]. Currently, the shortage of rural educators in China has exacerbated the workload of physical education (PE) teachers. Surveys indicate that over 70% of rural PE teachers must take on additional responsibilities. Stigmatising labels such as "Did your maths teacher used to be a PE teacher?" contribute to low job satisfaction and high work pressure among PE teachers, making them a high-risk group for occupational burnout [5]. Since gaining attention in the 1970s, occupational burnout has been interpreted from the perspectives of social psychology, organisational behaviour and clinical studies. Burnout in teachers refers to a fatigue syndrome arising from prolonged work stress, primarily manifested as emotional exhaustion, depersonalisation and a reduced sense of accomplishment [6]. Not only does professional burnout diminish rural PE teachers' enthusiasm for their work and their interpersonal relationships, reducing teaching efficiency, it also impacts their quality of life, their relationships with their students, and their physical and mental health, severely undermining teaching effectiveness [7,8]. This severely hampers the development of China's rural physical education teaching workforce. Consequently, addressing the issue of occupational burnout among rural physical education teachers is imperative for enhancing the quality of education in rural areas.

The extant research on teacher burnout is extensive. On the one hand, studies have covered a broad range of subjects, spanning educators from kindergarten to higher education. Conversely, a methodological framework has emerged, primarily relying on quantitative research methods supplemented by qualitative approaches. A substantial body of research has been conducted on the factors influencing educational burnout. These studies have largely classified these factors into three overarching categories. Firstly, the focus will be on individual-level factors. A plethora of studies have identified significant disparities in the prevalence of burnout among teachers of varying genders, years of

teaching experience, and educational backgrounds [9,10]. These studies have consistently demonstrated that these factors are associated with varying levels of burnout. Research has identified a number of factors that play a significant role in the development of teacher burnout. These include teaching motivation, professional identity, and teaching mindfulness [11,12] Secondly, at the school level, the influence of principal support, work condition support, organisational commitment, and leadership on teacher burnout has also been demonstrated to be significant. In conclusion, extraneous factors such as remuneration, societal expectations and perceived social standing have also been demonstrated to engender teacher burnout to a subtle degree [13]. Research indicates that affective factors at the individual level are the most significant among the factors influencing teacher burnout. The notion of teaching efficacy has attracted considerable attention from researchers in the field. The concept of teaching efficacy is rooted in Bandura's social learning theory, which encompasses teachers' subjective perceptions of their educational competence and the extent to which their teaching practices contribute to student development [14]. The efficacy of teaching profoundly influences teachers' attitudes and behaviours towards their work. As demonstrated in the preceding research, teaching efficacy functions as a protective factor against burnout, exhibiting a significant negative correlation with it [15]. Nevertheless, the effects of these substances vary across different demographic groups. Ishibashi et al. indicated that self-efficacy exerts a relatively minor influence on kindergarten teachers' occupational burnout, manifesting as a negligible effect size [16]. Jeon et al. found that teaching efficacy significantly moderates occupational burnout among special education teachers [17].

Research into teacher burnout has historically centred on the demographic of rural physical education teachers. A plethora of studies have hitherto been conducted on the subject of variables; however, these studies have not explored the distribution of burnout across different categories of teacher. From an individual perspective, where do different individuals stand on the overall spectrum? It is imperative to ascertain the characteristics that define individuals at varying levels. The present study seeks to examine the relationship between professional burnout and teaching efficacy among rural physical education teachers. These questions remain unanswered. Latent profile analysis, an individual-centred approach, addresses the internal combinations of different items at the individual level and identifies possible groupings. Therefore, the present study employs latent profile analysis to explore latent categories of occupational burnout among rural physical education teachers from an individual perspective. The study employs an analytical approach to examine the demographic distribution characteristics across various categories. It further explores the relationship between influencing factors, teaching efficacy, and latent categories of occupational burnout.

Research methods

Research subjects

A convenience sampling method was employed to select 613 rural physical education teachers from four cities - Quanzhou, Zhangzhou, Sanming, and Nanping - as the survey subjects. See Table 1 below for details. As shown in Table 1, the sample included 259 men (42.3%) and 354 women (57.7%), indicating a slightly higher proportion of female teachers. In terms of marital status, the majority of respondents were married (545, 88.9%), while 68 (11.1%) were unmarried.

Regarding living conditions, 475 teachers (77.5%) reported owning private housing, whereas 138 (22.5%) did not, suggesting that most participants had relatively stable residential conditions. Concerning teaching experience (school age), the distribution was relatively balanced across early- to mid-career stages: 1-5 years: 146 (23.8%), 6-10 years: 162 (26.4%), and 11-15 years: 139 (22.7%). A smaller but still substantial proportion had longer tenure: 16-20 years: 81 (13.2%) and >20 years: 85 (13.9%).

With respect to professional ranks and titles, 242 teachers (39.5%) held Level 1 title, and 213 (34.7%) were at the Level 2 title, while 113 (18.5%) were ungraded and 45 (7.3%) held senior titles. Educational attainment was primarily at the undergraduate level, with 350 participants (57.1%) holding an undergraduate degree, 228 (37.2%) having a junior college qualification, and 35 (5.7%) possessing a postgraduate degree.

Overall, the sample covers teachers with diverse gender composition, career stages, professional ranks, and educational backgrounds, which helps improve the

practical relevance of the findings. However, because convenience sampling was used and participants were drawn from four cities within one province, the generalizability of the results should be interpreted primarily in relation to similar rural PE teacher populations in comparable regional contexts.

Table 1. Demographic variables (N=613).

Dimension	Option	Number of people	Percentage (%)
Sex	Man	259	42.3
	Woman	354	57.7
Marital status	Married	545	88.9
	Unmarried	68	11.1
Private housing	Have	475	77.5
	Not have	138	22.5
Teaching experience (school age)	1-5 years	146	23.8
	6-10 years	162	26.4
	11-15 years	139	22.7
	16-20 years	81	13.2
	Over 20 years	85	13.9
Professional ranks and titles	Ungraded	113	18.5
	Level 2 title	213	34.7
	Level 1 title	242	39.5
	Senior	45	7.3
Highest education	Junior college	228	37.2
	Undergraduate course	350	57.1
	Postgraduate	35	5.7

Research tools

(1) Occupational Burnout Scale

The revised Burnout Scale was adopted. This scale comprises 16 items covering three dimensions: emotional exhaustion, depersonalization, and reduced sense of accomplishment. A 7-point scoring method was used, with higher scores indicating stronger professional burnout among teachers. In this study, the Cronbach's α coefficients for each dimension were 0.839, 0.863, and 0.937, respectively. The overall Cronbach's α coefficient for the scale was 0.940.

(2) Physical education teacher's Teaching Efficacy Scale

The physical education teacher's Teaching Efficacy Scale developed by Ma Yongzhan was employed. This scale comprises four dimensions: classroom management, clarity of instructional presentation, teaching strategies and techniques, and teacher-student interaction. It comprises 20 items scored on a 6-point scale, where higher scores indicate greater teaching efficacy. In this study, the Cronbach's α coefficients for each dimension were 0.878, 0.836, 0.844, and 0.840, respectively. The overall Cronbach's α coefficient for the scale was 0.927.

(3) Statistical methods

Data was processed and analyzed using SPSS 26.0 and Mplus 8.3 software. First, latent profile analysis was conducted based on burnout items as manifest indicators. Subsequently, chi-square tests were performed on demographic information and latent categories of appearance anxiety, while analysis of variance (ANOVA) was conducted on total scores and scores across dimensions. Finally, unordered multiple logistic regression analysis was employed to examine the relationships between demographic variables, dimensions of teaching efficacy, and latent burnout categories, with a significance level of α=0.05.

Results and analysis

Common method bias

The Harman single-factor test was selected to examine common method bias. Results revealed the extraction of two common factors (characteristic root >1). The first factor explained 36.513% of variance (below 40.000%),

indicating no significant common method bias in the study.

Cross-sectional analysis of teacher occupational burnout

To explore the heterogeneity of occupational burnout among rural physical education teachers, latent profile analysis was conducted based on the scores of 613 rural PE teachers on the Occupational Burnout Scale. Each profile contained 1-5 distinct categories (as shown in Table 2).

Generally, smaller values for Akaike Information Criterion (AIC), Bayesian Information Criterion (BIC), and adjusted Bayesian Information Criterion (aBIC) are preferable. Entropy values closer to 1 indicate clearer latent category separation. If Lo-Mendell-Rubin likelihood ratio test (LMR) and Bootstrap Likelihood Ratio Test (BLRT) values reach statistical significance, it indicates that the k-category model fits significantly better than the k-1 category model. Table 2 shows that AIC, BIC, and aBIC values decrease monotonically from 1 to 2 categories as the number of categories increases. From 3 to 5 categories, these values gradually plateau, with the highest entropy value (0.895) observed at 3 categories. Category 5 exhibits the smallest AIC, BIC, and aBIC values, yet its LMR fails to reach statistical significance (P>0.05), indicating superior model fit for Category 3 over Category 5. As shown in Table 3, the proportion distribution across the three categories is relatively balanced. The probability distribution for each profile in the three-category classification is presented in Table 4, with the average membership probability for rural physical education teachers ranging between 95 and 98 across all profiles. In summary, the third category was selected as the optimal latent profile model.

Table 2. Comparison of fit indices for latent profile analysis of burnout and efficacy among rural physical education teachers.

Category count	AIC	BIC	aBIC	LMR(p)	BLRT(p)	Entropy
1	39030.35	39171.74	39070.15	/	/	/
2	35438.17	35654.67	35499.11	<0.001	<0.001	0.881
3	33309.89	33601.51	33391.97	<0.001	<0.001	0.895
4	32899.21	33265.93	33002.42	<0.001	<0.001	0.885
5	32626.98	33068.82	32751.34	0.56	<0.001	0.866

Table 3. Number and proportion of individuals per subsurface profile in each model.

Model	C1	C2	C3	C4	C5
One category	613 (100%)	/	/	/	/
Binary classification	453 (73.90%)	160 (26.10%)	/	/	/
Trichotomy	88 (14.36%)	371 (60.52%)	154 (25.12%)	/	/
Fourfold classification	370 (60.36%)	88 (14.36%)	84 (13.70%)	71 (11.58%)	/
Five categories	88 (14.36%)	310 (50.57%)	60 (9.79%)	71 (11.58%)	84 (13.70%)

Table 4. Average probabilities of assignment to different potential categories in the tripartite classification.

Category count	1	2	3
1	0.97	0.02	0.01
2	0.02	0.98	0.00
3	0.00	0.05	0.95

Note: 1 = Mild occupational burnout, 2 = Moderate occupational burnout, 3 = Severe occupational burnout.

Differences in job burnout among different categories of rural physical education teachers

Participants were categorized into three groups based on latent profile analysis results. Scores for the three dimensions of occupational burnout among rural physical education teachers were calculated for each category, as shown in Table 5. Profile plots for the three latent categories are depicted in Figure 1. Significant differences in teacher burnout were observed across the three categories of rural physical education teachers. Integrating Figure 1, the group with the highest scores was designated as “severe burnout”, accounting for 25.12% of the total population; the group with intermediate scores was labeled “moderate burnout”, comprising 60.52% of the total population. The final

category, scoring lowest across all items, was designated as “mild burnout”, comprising 14.36% of the total group. The results of the one-way ANOVA indicated significant differences in professional burnout across the three dimensions among the different groups. Post-hoc tests revealed that the severe burnout group scored significantly higher than the moderate burnout group on emotional exhaustion, depersonalization, and low sense of accomplishment, while the moderate burnout group scored significantly higher than the mild burnout group ($p<0.001$ for all comparisons). These findings highlight the distinct burnout profiles among rural PE teachers.

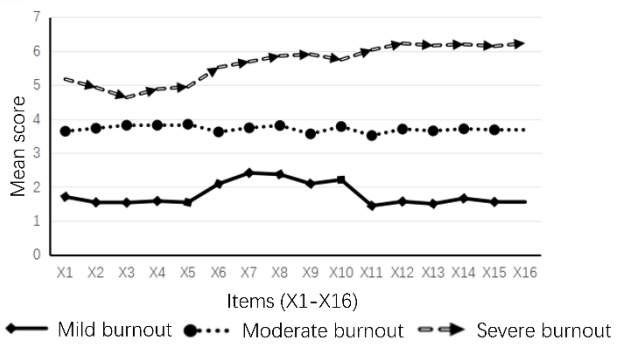

Figure 1. Score distribution of three potential categories of occupational burnout among rural physical education teachers.

Table 5. Comparison of sub-dimensional profiles of occupational burnout among rural PE teachers.

Job burnout	The potential profile of teacher’s occupational burnout			Difference test	Post hoc test
	Low-level occupational burnout	Moderate occupational burnout	High levels of occupational burnout		
	①N=88	②N=371	③N=154	/	/
Emotional exhaustion	1.58	3.77	4.91	404.77***	③>②>①
s test dehumanization	2.24	3.70	5.74	455.10***	③>②>①
Low sense of achievement	1.54	3.66	6.17	2236.80***	③>②>①

Note: N=613, **p<0.01, ***p<0.001, the same below

Differences in distribution characteristics of subjects across different sub-surface profiles and variations in teaching efficacy

First, a chi-square test was conducted to examine whether there were significant differences between groups based on highest educational attainment, gender, marital status, private home ownership, years of teaching experience, and professional title. The results are presented in Table 6. Significant differences were found among participants of different genders: A higher proportion of women exhibited high levels of burnout compared to men, while a higher proportion of men exhibited low levels of burnout compared to women. Significant differences were observed across teaching experience: The highest proportion of high burnout was found among those with 6-10 years of experience, while the lowest proportion of low burnout was among those with 16-20 years. Significant differences also existed by professional title: The highest proportion of high burnout was among those without a designated title, while the highest proportion of low burnout was among those holding a Level 1 title. No significant differences were found in highest educational attainment, marital status, or private home ownership.

Table 6. Chi-square test for demographic variables and potential profiles.

Characteristics		Low-level occupational burnout (n(%))	Moderate occupational burnout (n(%))	High levels of occupational burnout (n(%))	Difference test
Highest education	Junior college	33(14)	141(62)	54(24)	X^2=0.78X
	Undergraduate course	49(14)	209(60)	92(26)	/
	Postgraduate	6(17)	21(60)	8(23)	/

Characteristics		Low-level occupational burnout (n(%))	Moderate occupational burnout (n(%))	High levels of occupational burnout (n(%))	Difference test
Sex	Man	51(20)	161(62)	47(18)	X^2=17.78***X
	Woman	37(10)	210(60)	107(30)	/
Marital status	Married	80(15)	333(61)	132(24)	X^2=2.22X
	Unmarried	8(12)	38(56)	22(32)	/
Private housing	Have	70(15)	278(58)	127(27)	X^2=3.79X
	Not have	18(13)	93(67)	27(20)	/
Teaching experience (school age)	1-5 years	11(7)	99(68)	36(25)	X^2=49.58***X
	6-10 years	14(9)	99(61)	49(30)	/
	11-15 years	13(9)	93(67)	33(24)	/
	16-20 years	25(31)	36(44)	20(25)	/
	Over 20 years	25(29)	44(52)	16(19)	/
Professional ranks and titles	Ungraded	9(8)	55(49)	49(43)	X^2=39.39***X
	Level 2 title	28(13)	137(64)	48(23)	/
	Level 1 title	45(19)	141(58)	56(23)	/
	Senior	6(14)	38(84)	1(2)	/

Second, one-way ANOVA results indicate significant differences in average scores and all dimensions of teaching efficacy among teachers in different burnout groups. As shown in Table 7, post hoc tests revealed that the low professional burnout group scored significantly higher than both moderate and high burnout groups in classroom management, clarity of textbook presentation, teaching strategies and techniques, teacher-student interaction, and overall teaching efficacy ($p<0.001$ for all comparisons). The moderate burnout group also scored significantly higher than the high burnout group ($p<0.001$).

Using the latent categories of occupational burnout among rural physical education teachers as the dependent variable (reference group: severe burnout), variables that were significant in the chi-square tests and one-way ANOVA were entered into an unordered multinomial logistic regression model. The final model included gender (reference: female), years of teaching experience (reference: >20 years), professional title (reference: senior), and the four teaching-related factors (classroom management, clarity of textbook presentation, teaching strategies and techniques, and teacher-student interaction) as independent variables (Table 8).

Table 7. Comparison of occupational burnout latent profiles and teaching efficacy among rural physical education teachers.

Teaching efficacy	The potential profile of teacher's occupational burnout			Difference test	Post hoc test
	Low-level occupational burnout	Moderate occupational burnout	High levels of occupational burnout		
	①N=88	②N=371	③N=154	/	/
Classroom management	5.13	3.50	2.12	416.38***	①>②>③
Textbook presentation clarity	5.12	3.59	3.01	121.76***	①>②>③
Teaching strategies and techniques	4.80	3.69	2.33	195.13***	①>②>③

Teacher-student interaction	5.05	3.69	2.29	230.10***	①>②>③
Mean teaching efficacy	5.03	3.62	2.44	468.32***	①>②>③

Table 8. Multivariate unordered logistic regression with potential categories of teacher occupational burnout as dependent variable.

Variables	Mild occupational burnout			Moderate occupational burnout		
	B	*p*	OR	B	*p*	OR
Man	0.64	0.22	1.89	0.20	0.50	1.22
1-5 years of teaching experience	-2.12	0.01	0.12	-0.26	0.62	0.77
6-10 years of teaching experience	-2.96	<0.001	0.05	-0.64	0.21	0.53
11-15 years of teaching experience	-2.11	0.01	0.12	-0.22	0.68	0.81
16-20 years of teaching experience	-1.04	0.25	0.35	-0.24	0.70	0.78
Ungraded	-2.63	0.06	0.07	-2.95	0.01	0.05
Level 2 title	-2.10	0.11	0.12	-2.40	0.02	0.09
Level 1 title	-0.96	0.47	0.38	-2.02	0.06	0.13
Classroom management	2.84	<0.001	17.09	1.33	<0.001	3.79
Textbook presentation clarity	1.25	<0.001	3.48	0.49	<0.001	1.64
Teaching strategies and techniques	0.56	0.04	1.74	0.29	0.08	1.33
Teacher-student interaction	1.01	<0.001	2.75	0.47	<0.001	1.60

Overall, the regression results suggest that female teachers, those with shorter teaching experience, and those with lower professional titles were more likely to fall into the severe burnout category. In terms of teaching-related factors, higher levels of classroom management, textbook presentation clarity, teaching strategies and techniques, and teacher-student interaction were significantly associated with a greater likelihood of belonging to the moderate or mild burnout groups rather than the severe group.

Specifically, compared with teachers with >20 years of experience, those with 1-5 years were more likely to be in the mild burnout group rather than the severe group (B=−2.12, OR=0.12, p=0.01); teachers with 6–10 years were also more likely to be in the mild group (B=−2.96, OR=0.05, p<0.001), and those with 11-15 years showed a similar pattern (B=−2.11, OR=0.12, p=0.01).

For the teaching-related predictors, classroom management showed a strong association with burnout category membership (mild: B=2.84, OR=17.09, p<0.001; moderate: B=1.33, OR=3.79, p<0.001). Clarity of textbook presentation was also significant (mild: B=1.25, OR=3.48, p<0.001; moderate: B=0.49, OR=1.64, p<0.001).

Teaching strategies and techniques were significant for mild (B=0.56, OR=1.74, p=0.04), whereas the moderate comparison was not statistically significant (p=0.08). Finally, teacher-student interaction was significant in both comparisons (mild: B=1.01, OR=2.75, p<0.001; moderate: B=0.47, OR=1.60, p<0.001). Gender was not significant in the model (mild: p=0.22; moderate: p=0.50).

Discussion

This study adopts a person-centered research perspective and employs cross-sectional analysis to investigate whether rural physical education teachers exhibit distinct latent categories of occupational burnout and whether these latent categories differ in their impact on teaching efficacy. Results indicate that rural physical education teachers' burnout can be categorized into three types: severe burnout (25.12%), moderate burnout (60.52%), and mild burnout (14.36%). The burnout scores varied significantly across each latent category. Overall, moderate burnout was the most prevalent among rural physical education teachers, exceeding the findings

reported by Doss et al. [18]. There are researchers. employed cluster analysis to categorize preschool teachers' burnout into burnout-type (22.17%), low-sense-of-achievement-type (37.17%), and adaptive-type (40.66%), which aligns with the findings of this study. In recent years, the government has successively introduced a series of policies and invested substantial financial, material, and human resources to ensure the steady development of rural education through multiple avenues, including educational resources (funding), environmental support (construction of teaching buildings), and team building (special-post teachers).

On one hand, the labor value and role positioning of rural physical education teachers have been elevated, thereby gaining more social support and improving occupational burnout. On the other hand, the professional environment for rural physical education teachers has improved. Increased training opportunities at various levels have significantly enhanced their educational and teaching capabilities, boosting their sense of teaching efficacy. However, continued attention to the occupational burnout of rural physical education teachers remains necessary.

Research indicates that professional burnout among rural physical education teachers correlates with demographic variables such as gender, years of teaching experience, and professional title. Compared to male teachers, female teachers are more likely to fall into the high professional burnout category, though no significant difference exists in the moderate burnout category. This aligns with previous findings. Teachers with shorter tenure are more likely to fall into the high burnout category than those with longer tenure.

Interestingly, teachers with 6-10 years of experience are most prone to high burnout, rather than those with 1-5 years. According to the career development cycle, the 1-5 years period represents the growth phase for teachers, characterized by relatively lower levels of work accomplishment and emotional exhaustion. Teachers with 6-10 years of experience, however, are in a critical phase of their careers, facing significant work pressure and professional development bottlenecks. This leads to higher levels of burnout. As professional titles advance, the proportion of teachers belonging to the low burnout category shows an upward trend [19,20]. A possible reason is that previous studies adopted an individual-centered approach, overlooking inter-individual heterogeneity. This research employs an individual-centered perspective. Additionally, as professional titles advance, teachers enjoy enhanced benefits and compensation, fostering greater achievement motivation and satisfaction, thereby alleviating burnout [21,22].

The study reveals significant differences in teaching efficacy scores among rural physical education teachers with varying levels of burnout. Higher scores in classroom management, instructional clarity, teacher-student interaction, and teaching strategies/techniques correlate with lower professional burnout levels. This indicates a strong association between professional burnout and teaching efficacy. Individuals with higher teaching efficacy tend to exhibit lower professional burnout, a phenomenon explained by teaching efficacy theory [23,24].

The teaching efficacy theory posits that classroom management skills are pivotal in influencing teachers' self-efficacy. Strong classroom management capabilities effectively boost teachers' confidence while reducing emotional exhaustion and depersonalization. Clear and effective presentation of teaching content serves as the foundation for classroom management skills, representing both a fundamental competency and a hard indicator of physical education teachers' professional competence.

Teacher-student relationships significantly impact teachers' job satisfaction, professional well-being, and career fulfillment. Teaching strategies and techniques provide effective means for teachers to flexibly address instructional challenges. Previous studies centered on variables found teaching efficacy to be negatively correlated with professional burnout [25]. This research categorizes teacher burnout based on latent classifications, yielding similar conclusions. However, it identifies distinct subtypes of burnout among rural physical education teachers and delves into the complex relationships between these subtypes and teaching efficacy. Latent profiling provides a more nuanced segmentation of the teacher population than traditional variable-centered analysis, revealing the impact of teaching efficacy dimensions - including classroom management, instructional clarity, teacher-student interaction, and teaching strategies and techniques - on

professional burnout. This study offers practical guidance for enhancing teachers' teaching efficacy and alleviating professional burnout.

Conclusion

The present study employs latent profile analysis to explore the subgroup characteristics of occupational burnout among rural physical education teachers. The following conclusions can be drawn from the findings:

(1) The occupational burnout experienced by rural physical education teachers can be categorised into three levels: severe burnout (25.12%), moderate burnout (60.52%), and mild burnout (14.36%).

(2) The latent categories of burnout among rural physical education teachers have been found to be associated with teachers' gender, professional title, and years of teaching experience.

(3) As Burnout among rural physical education teachers is closely related to their teaching efficacy, it can be concluded that higher teaching efficacy scores are associated with lower levels of burnout.

(4) The present cross-sectional study is unable to establish causal relationships between the aforementioned factors and burnout. Moreover, the sample was constrained to Fujian Province. It is recommended that future research employ large-scale, multi-stage, and multi-centre investigations.

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Conflict of Interest

The authors declare no conflict of interest.

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