Research article

Knowledge mapping of job burnout and satisfaction of medical staff and a cross-sectional investigation of county-level hospitals in Southern China

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A B S T R A C T

Background: Job burnout is a worldwide public health problem that has rarely been addressed among rural medical staff, particularly in county-level hospitals. Hence, we conducted a bibliometric study to gain global insights and research trends and a cross-sectional study to assess the current situation among medical staff of county-level hospitals in Southern China. By conducting these studies, we aim to identify factors associated with burnout among medical staff of county-level hospitals in China and provide recommendations for improvement.
Methods: Relevant literature on job burnout among medical personnel was searched using the Web of Science Core Collection (WoSCC). CiteSpace was employed for an in-depth cluster analysis to determine research trends and identify the study population. Subsequently, a cross-sectional survey was randomly conducted in three county-level hospitals in Hunan Province of Southern China. Job burnout and satisfaction were assessed using the Maslach Burnout Inventory MBI-Human Services Survey (MBI-HSS) and Job Satisfaction Questionnaire in a total of 362 valid questionnaires collected. The influence factors of the prevalence of job burnout were investigated using logistic regression.
Results: In this bibliometric study, 1626 articles were retrieved from 1999 to 2022. China lags behind the United States (US) in both the number and quality of publications in the field of medical staff burnout compared with the US. However, there is a lack of comparative research on job burnout across different job types. County-level medical staff articles are more in line with research hotspots in the field. In total, 362 valid questionnaires were obtained. The total incidence of job burnout among rural medical staff was 27.3 %. Nurses ($p < 0.01$, OR = 5.95), doctors ($p < 0.01$, OR = 6.43), and those with administrative jobs ($p < 0.01$, OR = 7.79) were more likely to experience burnout than those with technical jobs. Medical staff aged 40–49 years ($p < 0.01$, OR = 0.22) and 50–59 years ($p < 0.05$, OR = 0.14) were less likely to experience burnout than those aged 20–29 years. Job rewards satisfaction showed a positive correlation with job burnout ($p < 0.01$, OR = 1.32), but negative correlations with personal development satisfaction ($p < 0.05$, OR = 0.81) and work internal environment satisfaction ($p < 0.05$, OR = 0.81).
Conclusion: Better working environments, more accessible resources, and higher job rewards contribute to job satisfaction and reduce job burnout among the medical staff of county-level hospitals in China.

1. Introduction

Job burnout refers to a prolonged reaction to ongoing emotional and interpersonal stressors at work, arising from excessive work stress and the accumulation of negative emotions, and it is characterized by three aspects as follows [1]: emotional exhaustion (EE)—

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an increased feeling of fatigue owing to depleted emotional resources [2]; depersonalization (DP)—negative and cynical attitudes toward clients and partners [3]; reduced personal accomplishment (PA) in existing articles regarding job burnout in medical personnel [2]. The problem of job burnout among medical staff has been highlighted in the healthcare industry and is progressively advancing into a global phenomenon [3], which is often accompanied by various issues such as low job satisfaction and a high turnover rate [4,5]. The prevalence of job burnout and its relevant factors have been extensively investigated in different departments (e.g., orthopedic surgery physicians [6], neurologists [7], nurses [8–10], and dentists [11]). In addition, job burnout notably affects both the physical and mental well-being of medical staff, causing emotional exhaustion, rigid attitudes (loss of empathy), decreased sense of accomplishment, and even mental problems (e.g., depression or psychosomatic disorders) [12]. Moreover, it influences patient care and the quality of medical services [3]. Therefore, there is an urgent need to understand the current situation and explore factors influencing job burnout. Unfortunately, few scholars have comprehensively evaluated the developing trends and identified the underlying reasons from a global perspective. Therefore, we conduct a bibliometric study to address this important topic and compensate for the gaps and defects in this research field.

Over the past few years, China has gradually realized the importance of job burnout among medical staff; however, little attention has been paid to burnout among rural medical workers. Official statistics show that 43.9 % of the Chinese population resides in rural
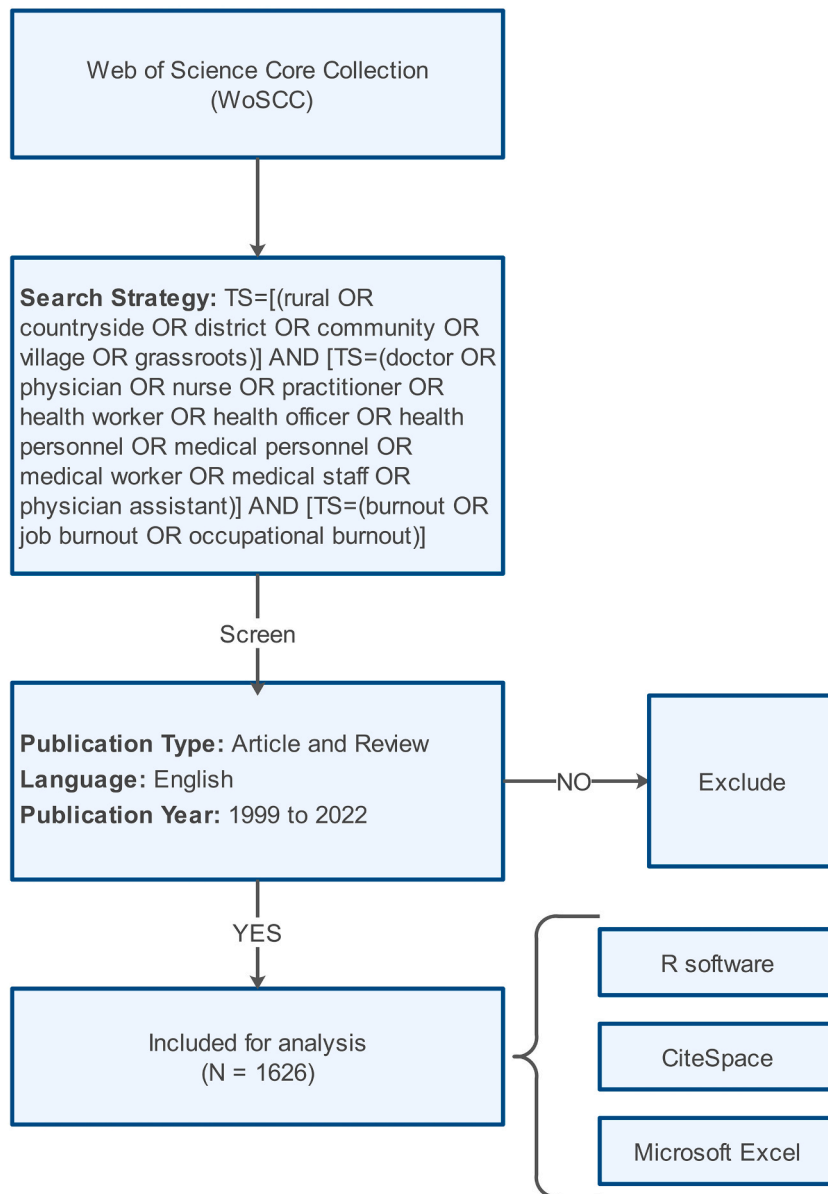

Fig. 1. The flowchart of bibliometric analysis.

areas [13]. Currently, China's rural medical service system operates on a Rural Three-level Health Service Network, primarily comprising public county-level general hospitals, township health centers, and village clinics. County-level hospitals serve as crucial technical and treatment centers in the medical system and play a leading role in China's primary healthcare institutions [14,15].

The prevalence of job burnout among the medical staff in county-level hospitals directly affects the development of primary medical care. Existing research conducted in the Qinghai-Tibet Plateau, China [16] has highlighted the common occurrence of job burnout among healthcare professionals working in county-level health alliances, which is correlated with a wide variety of occupational stressors. These challenges include low incomes, inadequate medical resources, limited career advancement opportunities, insufficient vocational training, and substandard living and working conditions among others. However, there is a significant dearth of research focusing on medical staff in Chinese county-level hospitals.

Moreover, job satisfaction is a vital factor affecting job burnout because higher levels of job satisfaction are conducive to mitigating job burnout [17]. Job satisfaction refers to the pleasant or positive emotional experience that staff feel after assessing their work or work experience. Existing studies indicate that several factors, such as working conditions, compensation, organizational environment, and role conflict, can affect the level of job satisfaction among medical professionals [18,19]. Building on previous questionnaire designs and the results of job satisfaction surveys conducted among Chinese medical workers, we developed a job satisfaction questionnaire to gain a deeper understanding of the difficulties faced by medical staff in three county-level hospitals located in Jianghua County, Yongzhou City, Hunan Province, China.

In summary, we first analyzed the current situation and dilemma of job burnout among medical staff through a bibliometric analysis, which shows that, compared to developed countries, research on job burnout among medical staff in China remains relatively inadequate and that types of work and regional factors are global hotspots. Moreover, because county-level hospitals are considered a major component of the healthcare system in China, we conducted a stepwise cross-sectional study of three county-level hospitals in Hunan Province (part of Southern China) to identify the main problems of job burnout among medical staff and develop targeted interventions to address them.

2. Materials and methods

2.1. Bibliometric research

2.1.1. Literature retrieval

A literature search was conducted based on the Web of Science Core Collection (WoSCC) on December 12, 2022, to search the literature regarding the direction of job burnout in medical personnel. The search terms used were: TS = [(rural OR countryside OR district OR community OR village OR grassroots)] AND [TS=(doctor OR physician OR nurse OR practitioner OR health staff OR health officer OR health personnel OR medical personnel OR medical staff OR medical staff OR physician assistant)] AND [TS=(burnout OR job burnout OR occupational burnout)]. Then we screened the results and selected the English articles whose types were Article and Reviewdd and published from 1999 to 2022. A total of 1626 selected articles were obtained. Fig. 1 presents the steps of literature screening, as well as the inclusion and exclusion criteria.

2.1.2. Data collection and analysis

Bibliometrics is a scientific research field that uses mathematical and statistical methods to analyze the literature, including its production, distribution, and dissemination [20]. It is primarily used to assess research outcomes, monitor academic trends, and evaluate researchers and institutions. Notably, bibliometrics provide an objective and systematic approach to analyzing extensive scientific literature compared with traditional qualitative reviews. This enables researchers to track advancements and predict future trends without personal biases [21].

For the bibliometric analysis, we collected a comprehensive dataset from the WoSCC, including specific metrics such as annual publication count, journal names, participating countries, citation counts, impact factors (IFs), and Hirsch indexes (H-indices). To examine research trends in job burnout among medical personnel, we analyzed annual publication output and average citations per publication using the "bibliometrix" package in R software (version 4.0). We then visualized the precise quantitative data through statistical graphs created using Microsoft Excel to improve clarity and understanding. To comprehensively evaluate the global impact of this research field, we extensively analyzed the total number of publications and average citations per article for each country and institution. Additionally, we utilized the H-index to assess research influence in specific countries and regions. The data was extracted using the "bibliometrix" R package and then organized and presented in Microsoft Excel for improved clarity. Furthermore, the collaborative landscape was depicted through a comprehensive map showing the network of partnerships among countries, regions, and institutions. This map accurately reflects the interconnections within this field of study by utilizing collaboration data extracted from our dataset.

For further analysis, we used the CiteSpace software to categorize references into 14 clusters, allowing for a comprehensive examination of co-cited authors. We then utilized this software to create a timeline visualization of the co-cited literature, enabling the tracking of the research theme evolution over time. Additionally, using the same CiteSpace algorithm, we clustered journals to identify core publication venues and conducted an in-depth thematic and conceptual analysis by the "bibliometrix" R package to describe the overall distribution of related research directions.

2.2. Questionnaires

2.2.1. Participants

Three county-level general hospitals were selected: the People's Hospital of Jianghua County, First People's Hospital of Jianghua County, and Second People's Hospital of Jianghua County, in accordance with the counterpart health support work of Central South University to the Jianghua Yao Autonomous Region in Hunan, China. A survey was conducted among medical staff (including doctors, nursing staff, and auxiliary staff) at the three hospitals described above. The inclusion criteria were as follows: 1) voluntary participation, 2) medical staff on active duty, 3) age >20 years, and 4) no history of mental illness.

2.2.2. Data collection

Electronic questionnaires were distributed randomly among medical staff groups in three primary care hospitals using the online survey software, "Wen Juan Xing" (Ranxing Information Technology Limited, Changsha, China). Electronic questionnaires were completed by participants using their smartphones. The survey was conducted anonymously, and all participants provided informed consent. The study protocol was approved by the Ethics Committee of the authors' institution.

During the questionnaire process, participants were first asked to fill in socio-demographic variables: gender (①male ②female), age, marital status (①single, never married ②married ③divorced), seniority, job title (①Foundation year ②Core training ③Specialty training), education (①≤high school ②Associate degree ③≥bachelor's degree), Position (①doctor ②nurse ③Technical jobs ④Administrative jobs), qualification holding, average monthly income (①< 3000 RMB ②3000–5000 RMB ③5001–10000 RMB ④>10000 RMB)

We used the Chinese version of the Maslach Burnout Inventory -Human Services Survey (MBI-HSS) to examine burnout in participants [22]. The Chinese version of the MBI-HSS has been widely used in articles by Chinese health industry practitioners [23,24]. The scale measures three dimensions of job burnout with three subscales: Emotional Exhaustion (comprising nine entries, primarily assessing job stress-induced emotional reactions; score range: 0–54), Depersonalization (comprising five entries, largely assessing job stress-induced attitudes and feelings toward service recipients; score range: 0–30 points); and Personal Accomplishment (comprising eight items, mainly assessing work stress-induced perceptions of one's own work; score range: 0–48 points) [25]. All items were scored on a scale of 0–6, and the scores of the respective aspects were determined by accumulation. Specifically, EE and DP were scored positively; the higher the score, the stronger the burnout. Moreover, Personal Accomplishment (PA) scored negatively; the lower the score, the higher the burnout. The EE scores of 19–26 were moderate, and EE scores of 26 points or higher were high; the DP score of 6–9 was moderate, and the DP score above 9 points was high; and the PA scores of 34–39 were moderate, and below 34 points were high. A high degree of job burnout was considered when all three factors were high.

For job satisfaction, a 20-item questionnaire was designed with special features for the domestic medical industry and the results of existing articles, focusing on six aspects: 1) Job-itself satisfaction (including professional characteristics, job suitability, work competence), 2) Job rewards satisfaction (including material and spiritual return), 3) Personal development satisfaction, 4) Work internal environment satisfaction (including working conditions such as equipment, resources, information, and working relationships such as departmental cooperation and interpersonal relationships), 5) Medical practicing environment satisfaction (including social assessment, doctor-patient relationship, macro policy), 6) Job stability (including turnover intention, adjustment factors for resignation). The above-mentioned six aspects occupied 2, 3, 4, 4, 3, and 4 of the 20 items. The respective items were scored on a scale of 0–4, and all indicators scored positively except for job stability; specifically, the higher the score, the stronger the career satisfaction, and vice versa for job stability.

2.2.3. Statistical analysis

Descriptive analysis was conducted on sex, age, marital status, seniority, job title, education, position, professional certificate, and average monthly income to gain further insights into the basic characteristics of the participating population. Job satisfaction and job burnout were determined and expressed as mean ± standard deviation (SD). A logistic regression model was used to assess factors affecting job burnout in the participating population. The dependent variable, job burnout, was considered to comprise three variables: EE, DP, and PA. When a dataset simultaneously satisfies high EE(score≥27 points), high DP(score≥10 points), and low PA(PA score≤33 points), the participant is considered to have experienced burnout. The regression model comprised potential predictors (e. g., gender, age, marriage, length of service, title, education, type of job, professional certificate, average monthly income, and satisfaction). R(version4.1.3) statistical software was used for the statistical analysis. $P < 0.05$ achieved statistical significance for. difference.

3. Results

3.1. Bibliometric results

3.1.1. Trend of publications

The number of articles on medical staff job burnout in the WoSCC database from January 1, 1999 to December 12, 2022 was investigated using an information visualization method. Before 2015, the annual publication volume did not exceed 50 articles; however, the overall trend has increased. The annual publication volume from 2015 to 2020 displayed a rapidly increasing trend, accompanied by fluctuations. The publication volumes in 2021 and 2022 exceeded 200, 245, and 254, respectively, and continued to maintain a growth momentum. Overall, the annual number of publications and the average annual number of citations of research on

medical staff job burnout tended to increase over time. The number of articles published and the average number of citations per year increased (Fig. 2).

3.1.2. Country/region publication analysis

The field was distributed somewhat differently by country for articles from 1999 to 2022. In total, the field was distributed across numerous countries and regions, with the US accounting for approximately 40 % of the publications, with 627 articles, making it the most published country. The next four countries were Australia (140 articles, 9 %), the UK (126 articles, 8 %), Canada (119 articles, 7 %), and China (90, 6 %) (Fig. 3A). In general, the US, Australia, the UK, Canada, and China have contributed the most to the research in this area. The US has a more prominent number of research results in this area. China, as a developing country, has also been working to improve the job burnout of medical staff over the past few years, and a growing number of articles in this field have been published. The overall trend is promising to further increase the proportion of results in this field.

As indicated by the statistics of the number of articles published by the respective institutions, all the top 10 institutions were distributed among eight institutions in the US (UNIV WASHINGTON 53, UNIV PENN 47, HARVARD MED SCH 39, MAYO CLIN 38, UNIV COLORADO 38, UNIV MICHIGAN 38, JOHNS HOPKINS UNIV 34, UNIV MINNESOTA 32), one in Canada (UNIV TORONTO 53), and one in the UK (UNIV BRITISH COLUMBIA 38)(Fig. 3B), which also confirms the share of total national publications. The US accounts for the majority of high-volume institutions, while Chinese institutions are not listed, which is something that we must pay attention to currently.

3.1.3. Country/region collaboration analysis

The inter-country cooperation and interagency partnerships were also examined. This figure illustrates the analysis of inter-country cooperation. Countries/regions that cooperate closely are grouped together and given identical colors. The thicker the line, the closer is the cooperation between the two countries. As depicted in the graph, the US and Canada cooperate the most closely in this area. The US, China, and the UK also cooperate relatively closely, which is consistent with the publishing trends discussed above. The network diagram shows the partnerships between major institutions (Fig. 4A). The dots represent institutions and the lines represent partnerships. The thicker the connecting line, the closer are the two institutions. Specifically, MAYO CLIN and HARVARD MED SCH dominate the collaboration of the two larger clusters, and the collaboration of the above-described institutions was both domestic and international (Fig. 4B).

3.1.4. Co-cited author analysis

The top 10 high-output authors and highly co-cited authors of the 1626 articles selected for the study are listed in Table 1. All the top 10 high-output authors produced at least five articles between 1999 and 2022. Specifically, SALYERS MP, the most productive author, published 13 articles, whereas JOHNSON S published 10 articles. Maslach C was the most cited author, with 548 citations, followed by Shanafelt TD with 267 citations. Both authors have articles in the top 10 co-cited references (Table 2), which shows their great contribution to the study of job burnout among health staff. We analyzed the co-citation network of the authors, as depicted in Fig. 5. After cluster analysis of the co-cited authors, most authors were grouped into four clusters: Cluster #0WORK ENGAGEMENT, Cluster #1 MEDICAL STUDENT, Cluster #2 MENTAL HEALTH NURSES, and Cluster #3 COVID-19 PANDEMIC.

3.1.5. Reference co-citation analysis

Using CiteSpace software, the co-cited documents were clustered according to the log-likelihood ratio (LLR) algorithm, and 13 cluster maps were obtained (Fig. 6A). The largest cluster was "covid-19 pandemic" (cluster #0), followed by "community pharmacist" (cluster #1), "staff morale" (cluster #2), "rural mental health nurses" (cluster #3), and "job burnout" (cluster #4). Community pharmacists and rural mental health nurses were the most frequently investigated groups, which may be related to the fact that the stress of the epidemic in the US under the COVID-19 pandemic conditions had a greater impact on staff morale, further aggravating job burnout. For the "community pharmacist" (cluster #1). Clusters 1 and 3 and their mean years of publication were further investigated to infer that both clusters were popular for studying job burnout (Table 3), probably correlated with the nature of their work and ease
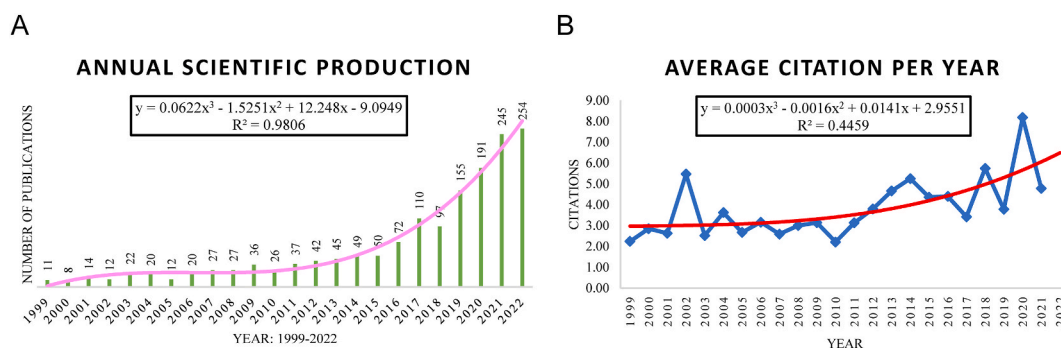

Fig. 2. General distribution of publications. (A) Annual scientific publications. (B) Average citation per year.
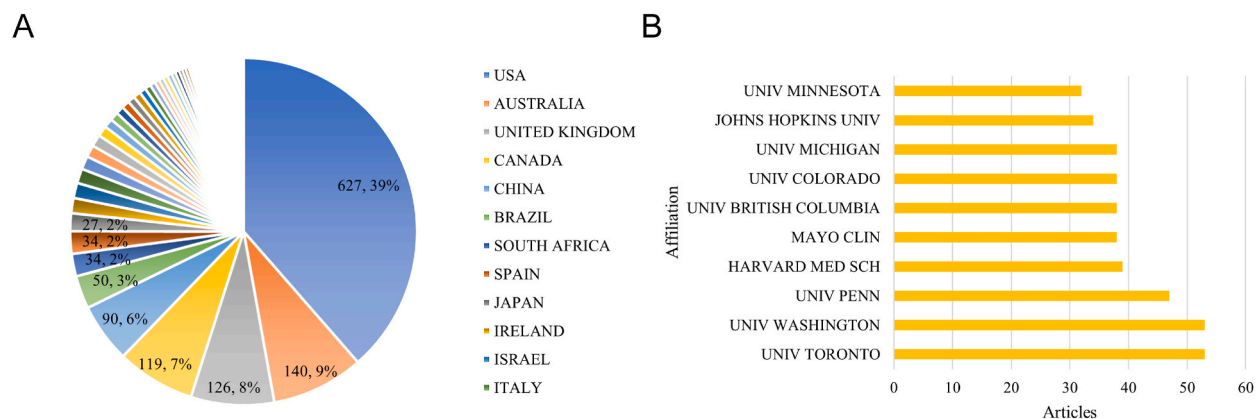
Fig. 3. Publication of documents by countries and institutions. (A) National distribution volume pie chart. (B) Top 10 Institutional Charts by Publication.

of access to information. An in-depth comparison of the years of publication of the two assessments revealed that the main study population may have shifted from rural mental health nurses to community pharmacists over time. These results also suggest that medical staff job burnout varies across specific occupational types.

Furthermore, to illustrate the distribution of topics in the field and investigate thematic trends and their interrelationships with time, a timeline view of the co-cited literature was developed (Fig. 6B). From a timeline perspective, the development of the respective clusters with time can be observed.

3.1.6. Journal analysis

The journals were ranked by the number of articles published and total citations (Table 4). INT J ENV RES PUB HE published the most articles (37), followed by BMC HEALTH SERVICES RESEARCH [26], and HEALTH SOC CARE COMM [27]. For the impact factor (IF) of the above-mentioned journals, ACAD MED had the highest impact factor (IF = 8.034), followed by J GEN INTERN MED (IF = 6.473) and INT J ENV RES PUB HE (IF = 4.614). In addition, six of the above-described 10 journals were in Q1 (top 25 % of IF distribution), three in Q2, and 1 in Q3. In addition, the most co-cited journals were: JAMA-J AM MED ASSOC (475), followed by J ADV NURS (426) and INT J NURS STUD (347). As indicated by the results in the two tables, BMC HEALTH SERV RES, J ADV NURS, PLOS ONE, ACAD MED, and J GEN INTERN MED achieved higher publication and citation counts and contributed more to this field.

3.1.7. Keyword analysis

Keyword contribution and keyword burst analysis for 2019–2022 were performed using CiteSpace. Fig. 7A shows the trends of keyword changes in the field using the dual-image (keyword co-occurrence) approach. The red line in the figure indicates the contribution of keywords beginning in 2022. Fig. 7B shows the major keywords from to 1999–2022, and the top 25 keywords with the strongest citation bursts were detected. Outbreaks varied across keywords, and some of the abovementioned outbreaks overlapped with clusters of co-cited references. The earliest outbreak of keywords was clinical supervision (outbreak in 1999), and the longest outbreak duration was staff (15 years). Outbreaks that have not yet ended by 2022 are SARS, prevalence, outbreak, healthcare workers, and physician burnout, which are most likely to remain the main challenges of future research.

3.1.8. Conceptual structure analysis

Fig. 8A presents a thematic map of relevant research based on keywords in which the concept of themes in the field of medical staff job burnout from 1999 to 2022 was examined in accordance with a theme typology. There were two themes in the upper right quadrant, comprising "model resources performance" and "satisfaction physicians," which were highly central and developed. The underlying themes in the lower right quadrant comprised "burnout stress care," suggesting a high degree of centrality but a low degree of development. The upper left quadrant covered "south-AfricaHIV/AIDS," highly developed but low in centrality and often considered a niche topic. The themes of "services people staff "and "outbreak China SARS" were reported in the lower left quadrant, suggesting a low level of centrality and development.

The conceptual structure of the domains was developed using multiple correspondence analysis (MCA), and all keywords were categorized into green, blue, and red clusters (Fig. 8B). Moreover, the connections among the three clusters are illustrated in (Fig. 8C). The blue words are primarily related to the objective, means, and population of the study, such as "health," "model," and "doctors." The red clusters represent job-related words, including "engagement," "resources," and "jobs.demands." The words in green are primarily problems faced by medical professionals, including: "work.life.balance," "distress," "physician.burnout."
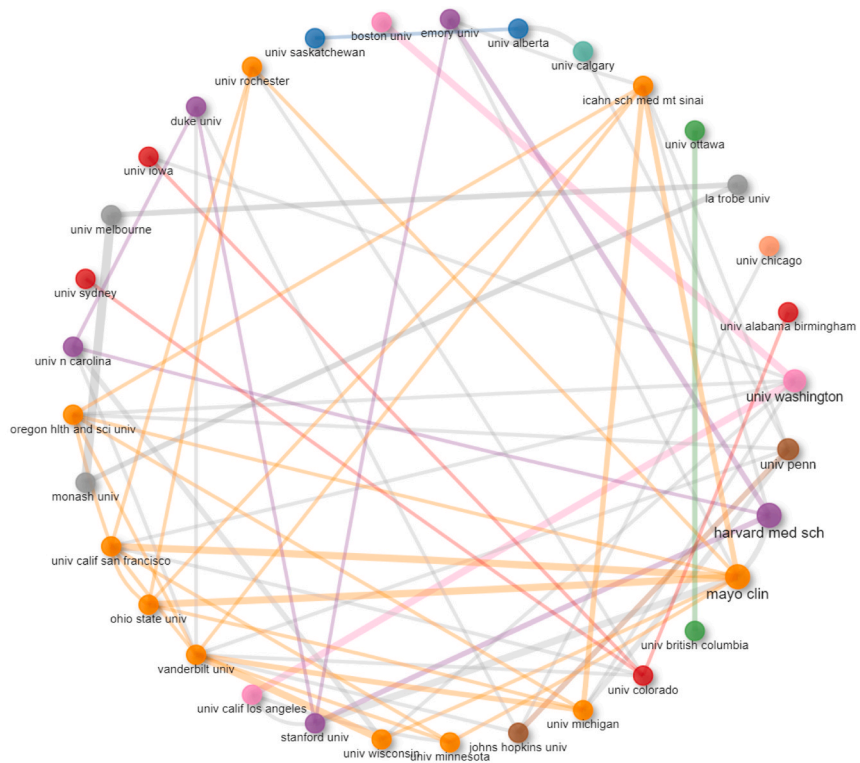
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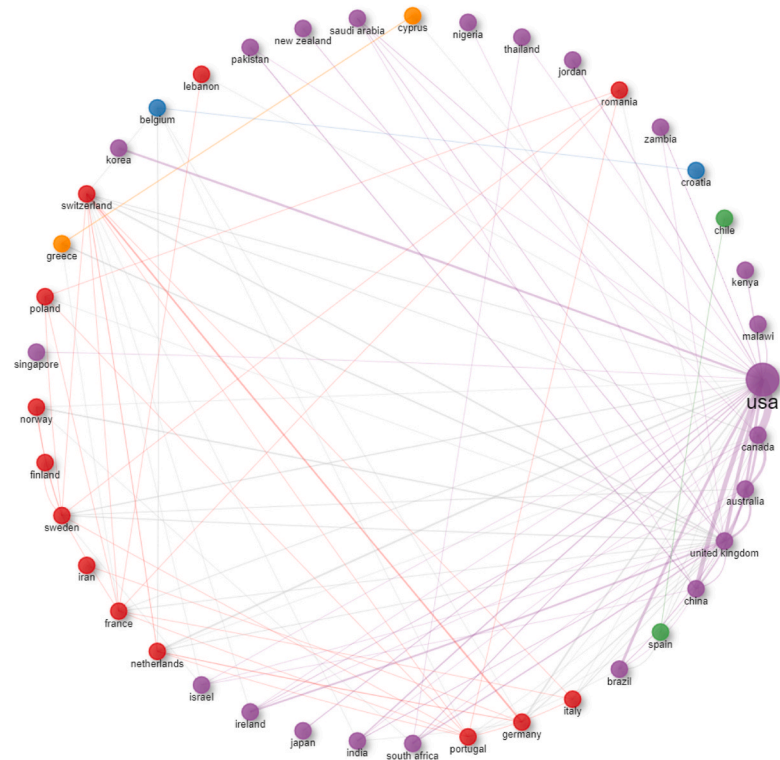
B

Fig. 4. Cooperative network. (A) National cooperation networks. (B) Institutional cooperation networks.

Table 1
Top 10 productive authors and co-cited authors.

Citing authors			Citing authors		
Rank	Author	Count	Rank	Co-cited author	Citation
1	SALYERS MP	13	1	Maslach C	548
2	JOHNSON S	10	2	Shanafelt TD	267
3	FUKUI S	8	3	Schaufeli WB	174
4	ROLLINS AL	7	4	West CP	173
5	THORNICROFT G	7	5	Dyrbye LN	151
6	WEST CP	7	6	**worldhealthorganization	117
7	AARONS GA	6	7	Leiter MP	112
8	GARCIA-CAMPAYO J	6	8	Bakker AB	104
9	PRIEBE S	6	9	Demerouti E	89
10	BEBBINGTON P	5	10	Aiken LH	88

Table 2
Top 10 co-cited references.

| Rank	Count	Year	Author	Title
1	53	2018	West CP	Physician burnout: contributors, consequences and solutions
2	53	2017	Shanafelt TD	Executive Leadership and Physician Well-being: Nine Organizational Strategies to Promote Engagement and Reduce Burnout
3	52	2020	Lai JB	Factors Associated With Mental Health Outcomes Among Health Care Workers Exposed to Coronavirus Disease 2019
4	50	2016	West CP	Interventions to prevent and reduce physician burnout: a systematic review and meta-analysis
5	43	2015	Shanafelt TD	Physicians and the General US Working Population Between 2011 and 2014
6	36	2016	Maslach C	Understanding the burnout experience: recent research and its implications for psychiatry
7	29	2017	Panagioti M	Controlled Interventions to Reduce Burnout in Physicians: A Systematic Review and Meta-analysis
8	27	2014	Dyrbye LN	Burnout among U.S. medical students, residents, and early career physicians relative to the general U.S. population
9	25	2020	Shanafelt T	Understanding and Addressing Sources of Anxiety Among Health Care Professionals During the COVID-19 Pandemic
10	24	2018	Panagioti M	Association Between Physician Burnout and Patient Safety, Professionalism, and Patient Satisfaction: A Systematic Review and Meta-analysis
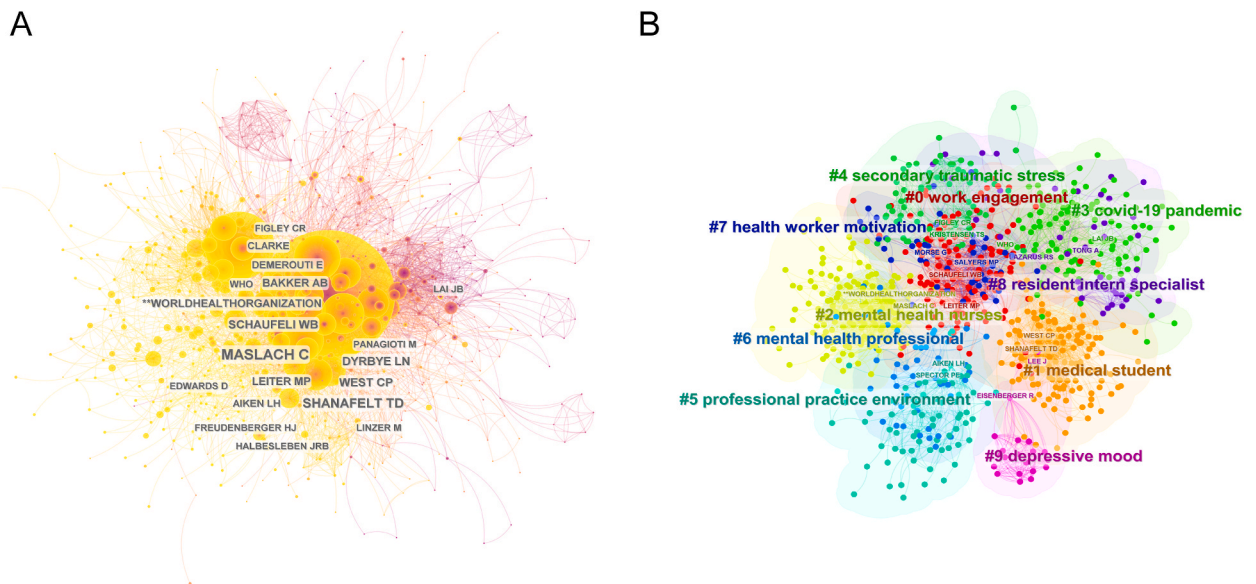
Fig. 5. Co-cited author analysis (A) Author is co-cited on the network. (B) Authors co-cited cluster analysis.

3.2. Survey results

3.2.1. Sociodemographic characteristics

A total of 389 medical workers participated in three county-level hospitals and 362 valid questionnaires were collected, with an effectiveness rate of 93.06 %. Among the 362 participants, the majority were under 40 years old (81.77 %), and only 4.14 % were over
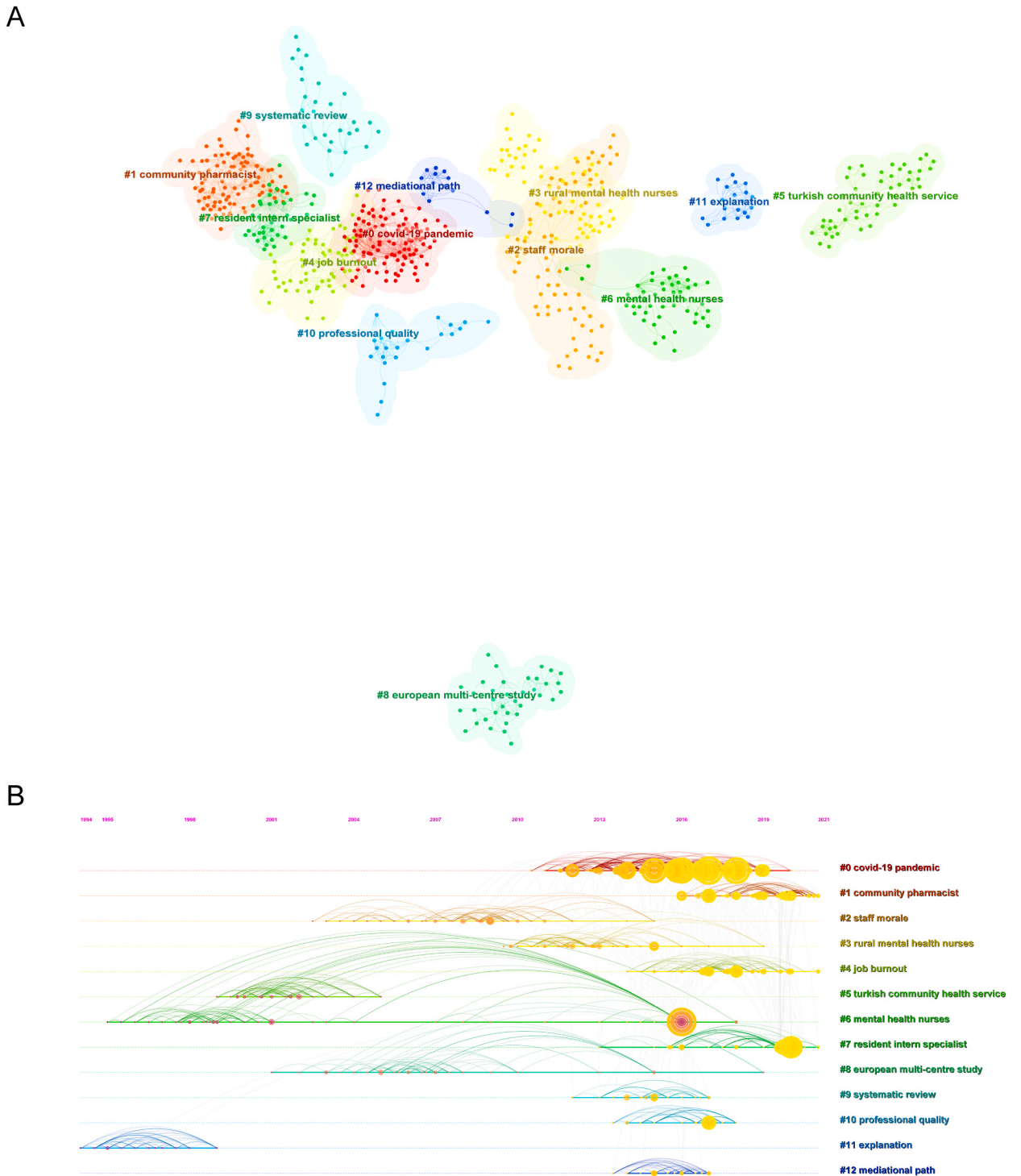
A

B

Fig. 6. Reference co-citation analysis (A) Cluster analysis of co-cited references. (B) Timeline view of co-cited references.

50 years old. Most participants were women (77.62 %). The educational level of most participants was an associate degree (40.88 %) and more than or equal to a bachelor's degree (58.01 %). Among the groups with a bachelor's degree or above, only one person had a master's degree, whereas the others had an undergraduate degree in medicine. Most of the participants were married (72.65 %). Most participants had less than ten years of service. About 1/3 (33.43 %) of the participants worked for less than five years, over 30 % worked for 6–10 years, and only 3.31 % had more than 30 years of service. The main types of work were nurses (47.24 %), doctors
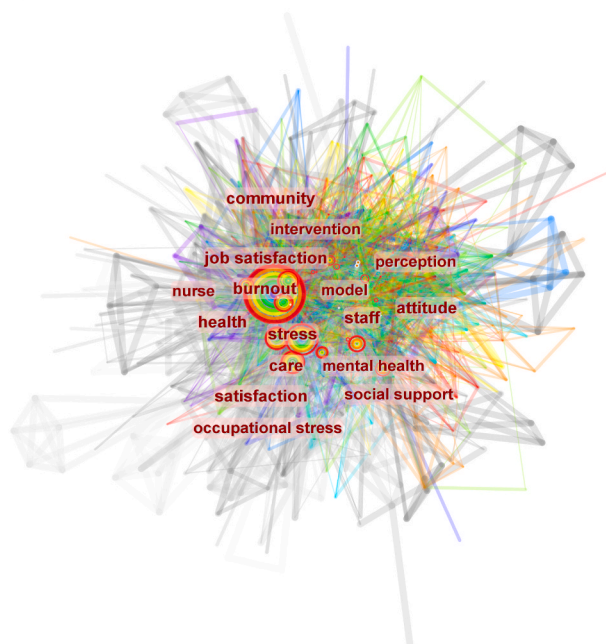
Table 3
Major clusters of co-cited references.

Cluster ID	Size	Silhouette	Average Year	Label (LLR)
0	107	0.886	2014	covid-19 pandemic
1	100	0.839	2019	community pharmacist
2	76	0.986	2008	staff morale
3	68	0.968	2012	rural mental health nurses
4	60	0.705	2017	job burnout
5	49	1	2001	Turkish community health service
6	49	0.963	2002	mental health nurses
7	39	0.94	2018	resident intern specialist
8	36	1	2006	European multi-centre study
9	29	0.958	2014	systematic review
10	23	0.979	2016	professional quality
11	19	0.992	1996	explanation
12	15	0.988	2015	mediational path

Table 4
Top 10 Citing journals and co-cited journals.

Citing journals					Cited journals				
Rank	Journal	Publications	IF	Quartile	Rank	Journal	Co-cited times	IF	Quartile
1	INT J ENV RES PUB HE	37	4.614	Q1	1	JAMA-J AM MED ASSOC	475	157.375	Q1
2	BMC HEALTH SERV RES	33	2.908	Q3	2	J ADV NURS	426	3.057	Q1
3	HEALTH SOC CARE COMM	30	2.395	Q2	3	INT J NURS STUD	347	6.612	Q1
4	BMJ OPEN	29	3.007	Q2	4	LANCET	315	202.731	Q1
5	J CLIN NURS	28	4.423	Q1	5	PLOS ONE	314	3.752	Q2
6	J ADV NURS	26	3.057	Q1	6	J APPL PSYCHOL	295	11.802	Q1
7	PLOS ONE	26	3.752	Q2	7	ACAD MED	262	8.034	Q1
8	ACAD MED	20	8.034	Q1	8	SOC SCI MED	258	5.379	Q1
9	J GEN INTERN MED	17	6.473	Q1	9	J GEN INTERN MED	257	6.473	Q1
10	FRONT PSYCHOL	15	4.232	Q1	10	BMC HEALTH SERV RES	247	2.908	Q3

A

B

Fig. 7. Keyword analysis of the research. (A) Network visualization map of co-occurring keywords. (B) Top 25 burst keywords.
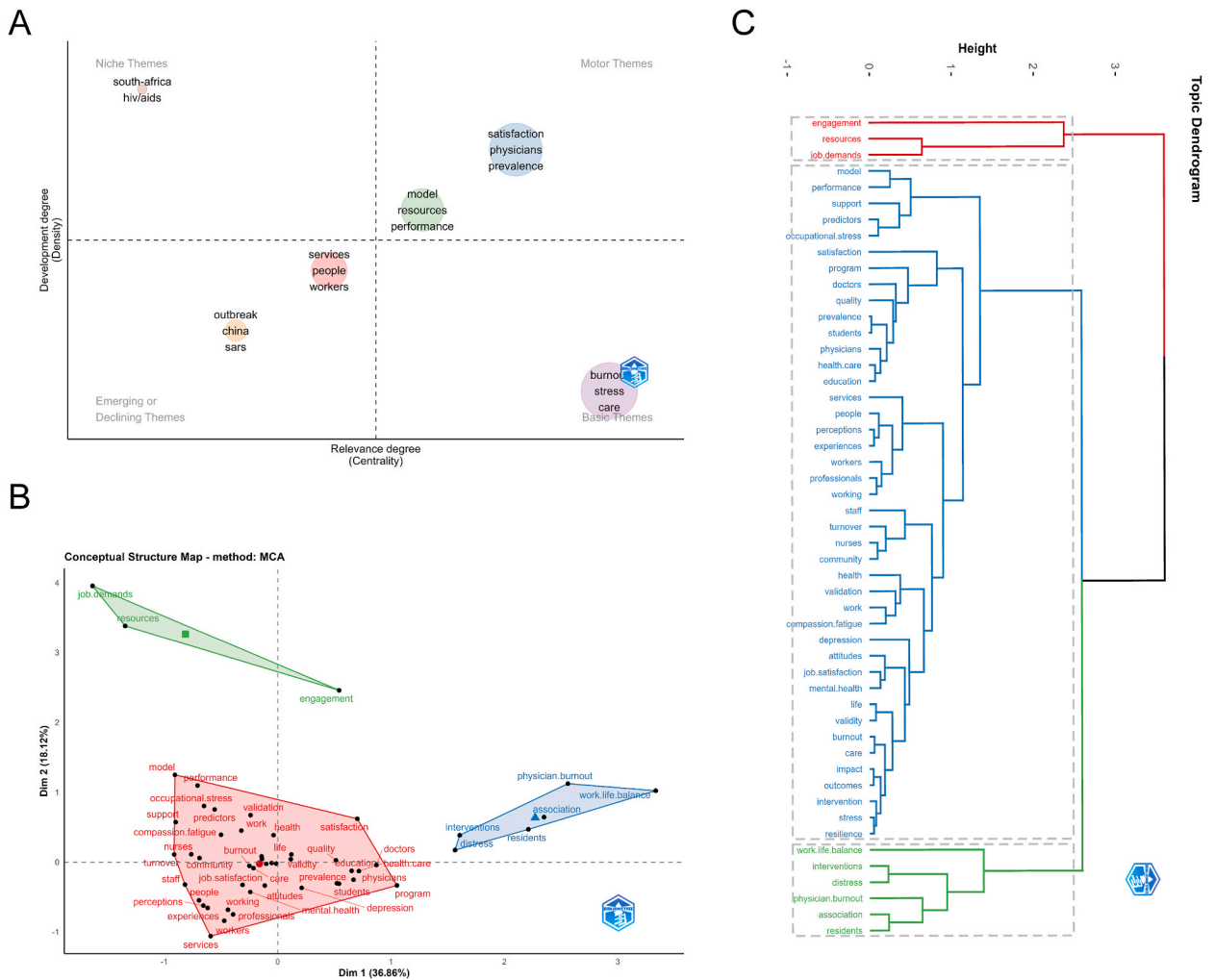
Fig. 8. Conceptual analysis. (A) Thematic map of related research. (B) Word map of factorial analysis. (C) Topic dendrogram of factorial.

(27.35 %), and technical workers (20.72 %). Most participants had relevant qualification certificates (94.2 %). For average monthly income, only 8.01 % of the participants had a monthly income of <3000 RMB, while 51.93 % had an income of 3000–5000 RMB, and less than 5 % had an average monthly income of >10000 RMB. Most of the participants had junior professional titles (50.55 %), but 12.98 % still had lower than junior professional titles (Table 5).

3.2.2. Prevalence of job burnout

Based on the recommendation of the MBI Handbook (Fourth edition) not to accumulate the scores of the three dimensions into a single burnout score [25], we contested the Mean $\pm$ SD of each dimension. As presented in Table 6, the Mean $\pm$ SD for EE, DP, and PA were 21.60 $\pm$ 12.73, 8.00 $\pm$ 6.80, and 28.60 $\pm$ 10.34, respectively. There were 39.2 % of the subjects (142) with an EE score of $\geq$27, 40.1 % of the subjects (145) with a DP score of $\geq$10, and 71.3 % of the subjects (258) with a PA score of $\leq$33 points. Following the definition in the existing literature, 99 participants developed all three symptoms simultaneously, such that they were considered to be subjected to job burnout, and the prevalence rate of job burnout reached 27.3 %. Moreover, 65 people met two of the above-described three indicators (EE score$\geq$27 points, DP score$\geq$10 points, PA score$\leq$33 points), taking up approximately 18.0 %. The 65 participants mentioned above had a relatively high risk of job burnout. As revealed by the above results, over 45 % of the healthcare staff were subjected to job burnout or had a higher risk of job burnout.

3.2.3. Job satisfaction

Table 7 lists the Mean $\pm$ SD of the six indicators of Job satisfaction. The three items with scores ranging from 0 to 16 are Personal development satisfaction, Work internal environment satisfaction and Job stability satisfaction. The Mean $\pm$ SD of Personal development satisfaction is 11.14 $\pm$ 3.89; the Mean $\pm$ SD of Work internal environment satisfaction is 11.56 $\pm$ 3.69 and the Mean $\pm$ SD of Job stability satisfaction is 9.91 $\pm$ 4.03. The range of Job rewards satisfaction and Medical practicing environment satisfaction is 0–12

Table 5
Sociodemographic characteristic.

Variables	n	%
Age group		
20–29	149	41.16
30–39	147	40.61
40–49	51	14.09
50–59	15	4.14
Gender		
Male	81	22.38
Female	281	77.62
Education		
≤high school	4	1.11
Associate degree	148	40.88
≥bachelor's degree	210	58.01
Marital status		
Single, never married	93	25.69
Married	263	72.65
Divorced	6	1.66
Seniority (years)		
0–5	121	33.43
6–10	112	30.94
11–20	79	21.82
21–30	38	10.50
31–40	12	3.31
Position		
Technical jobs	75	20.72
Nurse	171	47.24
Doctor	99	27.35
Administrative jobs	17	4.70
Relevant professional qualification certificates		
Yes	341	94.20
No	21	5.80
Average monthly income (RMB)		
<3000	29	8.01
3001–5000	188	51.93
5001–10000	131	36.19
>10000	14	3.87
Technical title		
Below junior title	47	12.98
Junior title	183	50.55
Intermediate title	101	27.90
Senior/Vice-senior title	31	8.65

Table 6
Scores of dimensions of Maslach Burnout Inventory-Human Services Survey (MBI-HSS) among village doctors.

Dimension	Mean	SD
Emotional exhaustion (EE)	21.60	12.73
Depersonalization (DP)	8.00	6.80
Lack of Personal Accomplishment (PA)	28.60	10.34

Table 7
Scores of dimensions of Job satisfaction.

Job satisfaction	Mean	SD
Job-itself satisfaction	5.87	2.00
Job rewards satisfaction	6.42	2.22
Personal development satisfaction	11.14	3.89
Work internal environment satisfaction	11.56	3.69
Medical practicing environment satisfaction	8.34	2.82
Job stability satisfaction	9.91	4.03
Total satisfaction	53.23	13.97

and their Mean $\pm$ SD is 6.42 ± 2.22 and 8.34 ± 2.32 respectively. Job-itself satisfaction had a score range of 0–8, with Mean $\pm$ SD = 5.87 ± 2.00.

3.2.4. Pearson correlations between job satisfaction, sociodemographic characteristics, and job burnout

In Table 8, nurses ($p < 0.01$, OR = 5.95, 95%CI: 2.45–12.54) and doctors ($p < 0.01$, OR = 6.43, 95%CI: 2.49–18.73) and administrative jobs ($p < 0.01$, OR = 7.79, 95%CI: 1.63–36.59) were more likely to suffer from job burnout than technical ones. Medical staff aged 40–49 years ($p < 0.01$, OR = 0.22, 95%CI:0.07–0.57) and 50–59 years ($p < 0.05$, OR = 0.14, 95%CI: 0.02–0.68) were less likely to experience burnout compared to those aged 20–29 years. For the effect of job satisfaction on the prevalence of job burnout, job rewards satisfaction showed a positive correlation with job burnout ($p < 0.01$, OR = 1.32, 95%CI:1.09–1.61). The higher the job reward satisfaction, the higher the likelihood of job burnout. The opposite is true for Personal development satisfaction ($p < 0.05$, OR = 0.81, 95%CI:0.68–0.97) and work internal environment satisfaction ($p < 0.05$, OR = 0.81, 95%CI:0.67–0.97). The higher these scores, the less likely they are to suffer from job burnout.

4. Discussion

In bibliometric analyses, over the past two decades, there has been a steady increase in the number of articles published on medical staff job burnout, reflecting a growing global interest in this topic. The year 2022 marked a historic peak with 254 articles published. The US has led the world in terms of research on medical staff job burnout. However, the number of research articles and institutions focusing on medical staff job burnout in China remains relatively limited, highlighting a significant gap compared with developed countries.

Following the main clusters of co-cited literature, we found that the hotspots of relevant research primarily focused on the COVID-19 pandemic [28,29], types of work (including community pharmacists, rural mental health nurses, mental health nurses, and resident intern specialists), and regional factors (Turkish community health services and European multicenter study). As revealed by the clusters described above, studies on job burnout among healthcare workers in county-level areas with different job types are in line with international research hotspots.

According to socioeconomic data from our survey, the majority of medical staff in county-level hospitals were young individuals aged under 40 years. Most medical workers hold bachelor's or associate's degrees, with only a few individuals with postgraduate qualifications. However, 94.2 % of medical workers obtained the necessary professional and technical licenses, suggesting a higher level of academic qualifications and standardized professional skills assessment requirements compared to rural clinics and township health centers [14]. Their earnings were concentrated in the range of 3000–5000 RMB per month, with fewer individuals earning higher incomes exceeding 10,000 RMB per month. In general, the income level of medical workers in county-level hospitals is lower than that in large general hospitals located in urban areas [30].

Job burnout rates among medical staff in county-level hospitals reached 27.3 %, suggesting that 27.3 % of medical staff in the sample developed the three symptoms of job burnout simultaneously. Compared with the survey results of Zhao et al. on the current situation of job burnout among 1280 rural medical staff in China (the prevalence of overall job burnout among village doctors was 23.6 %) [25], the incidence of job burnout in our study was relatively high. The possible reason for this situation is, as mentioned earlier, that medical staff in county-level hospitals have higher educational qualifications and professional technical requirements compared to village doctors. Consequently, medical staff in county-level hospitals have higher demands and expectations for career development. Furthermore, our results reveal that 71.3 % of medical staff experience a low sense of personal achievement, which is much higher than those exhibiting symptoms of EE) and DP. A previous study conducted in another province in China showed that Chinese medical staff are more likely to suffer from a low sense of personal achievement, leading to a high risk of depression [23,31]. Enhancing the personal achievements of Chinese medical personnel poses a significant challenge for the Chinese government and researchers need to address it. Future research should explore coping strategies to address job burnout, particularly focusing on strategies targeting the symptoms of low personal achievement.

Our study found statistically significant relationships between age, job type, and job burnout. Young medical staff aged 20–29 years old are more prone to job burnout than those aged 40–59 years old. Furthermore, nurses, doctors, and administrative staff exhibited a higher proportion of job burnout than medical technicians. The correlation between age and job burnout is consistent with previous

Table 8
Logistic regression analysis of influenen factors with job burnout.

Explanatory Variables	Variable	P-Value	OR	(95%CI)
Position(ref. = Technical jobs)	Nurse	<0.01	5.95	(2.45, 16.54)
	Doctor	<0.01	6.43	(2.49, 18.73)
	Administrative jobs	<0.01	7.79	(1.63, 36.59)
age (ref. = 20–29)	30–39	>0.05	0.69	(0.38, 1.24)
	40–49	<0.01	0.22	(0.07, 0.57)
	50–59	<0.05	0.14	(0.02, 0.68)
Job satisfaction subscales				
	Job rewards satisfaction	<0.01	1.32	(1.09, 1.61)
	Personal development satisfaction	<0.05	0.81	(0.68, 0.97)
	Work internal environment satisfaction	<0.05	0.81	(0.67, 0.97)

studies, with younger age being a predictor of low personal accomplishment [27,32]. Based on our data, the majority of staff in county-level hospitals are young individuals under the age of 40 years, which could also be one of the reasons for the high proportion of feelings of low personal achievement, as indicated in our experimental results. There have been some studies in China on the job burnout of doctors, nurses, and specific departmental medical personnel; however, we found very limited studies comparing the job burnout of different types of medical staff. Our results indicate that medical technicians are less likely to experience job burnout, which is consistent with a previous study in Taiwan and China [33]. One study revealed that medical staff consider their relationship with patients and work tasks to be the two primary stressors, and these factors also serve as major indicators of job burnout [26]. We speculate that this result may be related to work pressure, working hours, and frequency of patient contact. In future research, it would be meaningful to include the differences between the diverse types of medical workers within the scope of this study. The varied job requirements and responsibilities of doctors, nurses, medical technicians, and administrative staff result in different sources of stress and symptoms. Incorporating these differences into the research can help us better tailor coping measures for different groups.

In terms of the relationship between job satisfaction and job burnout, we found that job rewards, personal development, and internal work environment are significantly correlated with job burnout. According to our data analysis, higher job reward satisfaction is associated with a higher likelihood of experiencing job burnout. Conversely, higher satisfaction with personal development and internal work environment is associated with a lower likelihood of job burnout. In previous studies, job reward satisfaction has been identified as one of the key influencing factors affecting job burnout and turnover intention among medical personnel [30,34]. Higher levels of job reward satisfaction are often correlated with a reduced likelihood of experiencing job burnout and turnover intention. However, our experiments yielded the opposite conclusion. We conjecture two possible reasons for this discrepancy: first, as mentioned above, medical staff in county-level hospitals generally receive lower salaries compared to those in larger urban hospitals, leading to lower expectations regarding salary satisfaction; second, higher job reward satisfaction may potentially raise the standards medical staff set for themselves, consequently inducing extra stress. These aspects require further investigation in future studies. Our results can guide governments and hospitals to reduce job burnout among county-level medical staff. Necessary measures must be taken to improve medical staff rewards, personal development, and internal work environments.

This study has some limitations. First, questionnaire surveys were conducted in only three county-level hospitals in one province, and the sample size was insufficient to represent the overall situation of county-level hospitals across China. Second, there was a recall bias during the subjective survey completion process. Third, the bibliometric analysis only considered English-language literature, potentially limiting the scope of research representation in China. There may be articles published in Chinese that address job burnout among Chinese medical staff that were not included in the analysis. Finally, the job satisfaction questionnaire used in the study was self-designed and not based on a validated scale, which may have affected our research results. These limitations should be addressed in future research.

5. Conclusion

The number of research articles and organizations focusing on job burnout among medical staff has increased in recent years, and the US has led the field. However, it remains relatively limited in China compared to developed countries. Types of work and regional factors were global hotspots. In county-level hospitals in Southern China, job burnout was significantly correlated with job type, age, job reward satisfaction, personal development satisfaction, and work internal environment satisfaction. Specifically, nurses, doctors, and administrative staff are more likely to suffer from job burnout than technical staff, and young staff (aged 20–29 years old) have a higher risk of job burnout than older staff. Moreover, medical staff were burdened with excessive stress in pursuit of work rewards and were dissatisfied with their development and the internal work environment. Our results highlight that the job burnout of medical staff in county-level hospitals in Southern China continues to be relatively inadequate, and that attempts should be made to prevent and reduce job burnout.

Ethnical consideration

The study involving human participants were reviewed and approved by the Institutional Review Board (Ethics Committee) of the 3rd Xiangya Hospital of Central South University (22280-IRB). The participants provided their written informed consent to participate in this study.

Data availability statement

The data that supports the findings of this study is available on request from the corresponding author. The data is not publicly available due to privacy or ethical restrictions.

CRediT authorship contribution statement

Baoren Tu: Writing – review & editing, Writing – original draft, Project administration, Methodology, Investigation, Data curation. **Yi Yang:** Writing – review & editing, Writing – original draft, Formal analysis. **Qingtai Cao:** Visualization, Methodology, Formal analysis. **Guanghan Wu:** Resources. **Xijun Li:** Resources. **Quan Zhuang:** Writing – review & editing, Supervision, Project administration, Funding acquisition, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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