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Big Data Analysis of Psycho-Cardiology Journal Articles in China

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Abstract: *We conducted a comprehensive statistical analysis of journal articles in the field of Psycho-Cardiology in China. The results of the data analysis show that the annual publication volume of these articles is generally on the rise, with a significant number of publications in traditional Chinese medicine (TCM) journals. A core group of authors has not yet formed, and the connections between research institutions are relatively loose. The academic community is focusing on topics such as the improvement of negative emotions through the application of the Psycho-Cardiology medical model, the efficacy mechanisms of TCM in treating Psycho-Cardiology diseases, and the impact of nursing on patients' psychological states. Coronary heart disease, Psycho-Cardiology nursing, and TCM are the hot research directions in this field. We predict that the future research trend will be a "new" Psycho-Cardiology medical model integrating traditional Chinese and Western medicine.*

Keywords: *Psycho-Cardiology; coronary heart disease; Psycho-Cardiology nursing; TCM; big data analysis*

1. Introduction

Psycho-Cardiology, also known as Psychocardiology, is an interdisciplinary field primarily focused on the emotional, social, and behavioral issues related to heart disease. The term "Psycho-Cardiology" refers to a medical concept and model that centers on cardiovascular conditions, aiming to comprehensively, holistically, and systematically address related factors to achieve better treatment outcomes and social value [1]. In 2019, the State Council's "Opinions on Implementing the Healthy China Action" highlighted psychological health as a crucial component of overall health, underscoring the significance of psychological factors in influencing general health conditions[2]. In November 2023, the publication of the "Consensus on Psycho-Cardiology Outpatient Construction Standards in China" provided standardized guidance for clinical diagnosis and treatment in the field of Psycho-Cardiology, promoting the establishment of Psycho-Cardiology clinics across various medical institutions and fostering tiered medical treatment. Increasing evidence from evidence-based medicine shows that the application of Psycho-Cardiology can improve cardiac conditions, effectively alleviate psychological issues, reduce rehospitalization rates, and enhance patients' quality of life, offering a new treatment paradigm for cardiovascular diseases.

Within this field, Dr. Meiyan Liu, Director of the Psycho-Cardiology Center at Beijing Anzhen Hospital, collaborated with experts from various medical institutions nationwide and Professor Zhanguo Li from China Jiliang University, among others, to release the "Cognitive Clinical Diagnosis and Treatment Guidelines for Coronary Heart Disease with Depression and Anxiety." This is the first standard issued in China's field of Psycho-Cardiology, providing specific guidance for the clinical diagnosis and treatment of cognitive impairments and delirium in patients with coronary heart disease combined with depression and anxiety, applicable to cardiologists at all levels of hospitals, general practitioners at primary hospitals, and nursing staff. This publication marks a milestone in the clinical application of Psycho-Cardiology. To promote academic dissemination in the field of Psycho-Cardiology and reveal its knowledge connections with other research areas, this article employs visualization tools such as Citespace and VOSviewer to analyze related literature from China, scientifically evaluating research outcomes and trends in the field, thereby offering a reference for relevant scholars.

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2. Materials and Methods

2.1. Data Collection

The author has accumulated a substantial amount of primary literature in the field of Psycho-Cardiology through long-term data collection. This research is further enriched by utilizing database retrieval methods, sourcing data from four major databases: China National Knowledge Infrastructure (CNKI), VIP Chinese Scientific Journals Database, Wanfang Academic Papers Database (COJ), and Superstar Journals Database. Using advanced search functions, the search terms included "Psycho-Cardiology," "Psycho-Cardiology," "Psycho-Cardiology medical model," "Psycho-Cardiology intervention model," "Psycho-Cardiology disease," "Psycho-Cardiology clinic," "Psycho-Cardiology treatment," "Psycho-Cardiology therapy," "Psycho-Cardiology diagnosis and treatment," "Psycho-Cardiology patients," or "Psycho-Cardiology co-treatment." The search period extended from the establishment of the databases to December 31, 2023. A total of 1352 relevant documents were retrieved, including 10 monographs. Since academic dissertations have limited impact, the focus was on journal articles, and the data was imported into Excel for further analysis.

2.2. Data Processing

After filtering out duplicates, non-medical related topics, and non-journal articles, 1021 relevant documents remained. All data was cross-checked by two individuals. The selected documents were imported into an Excel spreadsheet, providing information on the distribution of publication years, journals, authors, institutions, and keywords, and data charts were created. The extracted plain text data was then imported into Citespace 6.2.R4 and VOSviewer 1.6.19 to perform co-occurrence and clustering analysis of the keywords, identifying research hotspots in Psycho-Cardiology over the past 20 years and predicting future trends.

3. Results

3.1. Publication Volume Information

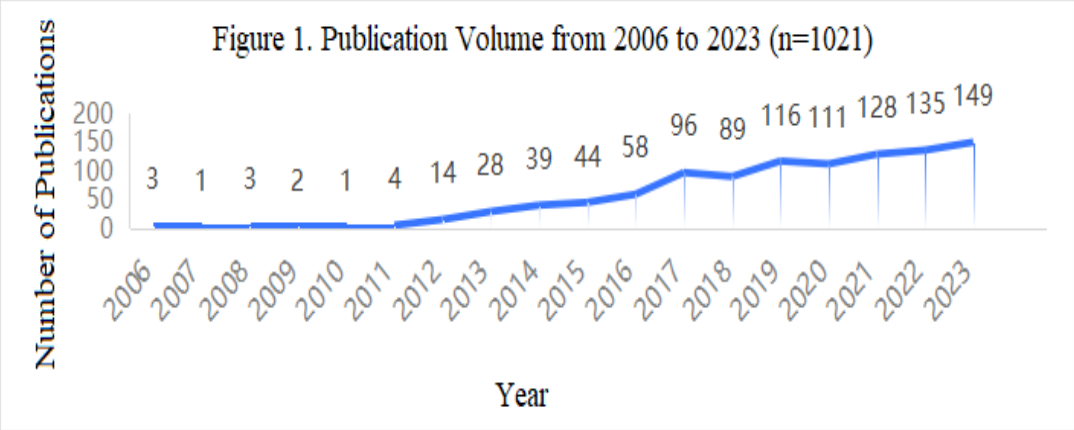

Figure 1: Publication Volume from 2006 to 2023 (n=1021)

As shown in Figure 1, Psycho-Cardiology-related papers began to be published in 2006. Early research primarily focused on theoretical discussions and preliminary clinical observations of the Psycho-Cardiology model, representing a slow start. After 2012, the number of related papers increased significantly as researchers began to explore more systematic diagnostic and treatment methods, including psychological interventions, drug treatments, and lifestyle adjustments. In 2019, the annual number of published papers exceeded 100 for the first time. The research content covered basic biological mechanisms, clinical medication patterns, and TCM treatment strategies, expanding from the management of single diseases to a comprehensive discussion of the co-treatment of multiple diseases.

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3.2. Journal Information

Table 1: Number of Papers Published in Core Journals

Journal Name	Number of Papers
Journal of Cardiovascular and Cerebrovascular Diseases with Integrated Traditional and Western Medicine	54
Electronic Journal of Cardiovascular Diseases with Integrated Traditional and Western Medicine	29
World Latest Medical Information Abstracts	21
Cardiovascular Disease Prevention Knowledge	20
Journal of Liaoning University of Traditional Chinese Medicine	17
China Medical Herald	16
Practical Journal of Traditional Chinese Internal Medicine	15
Psychological Monthly	14
Liaoning Journal of Traditional Chinese Medicine	14
Clinical Medicine Research and Practice	13

As shown in Table 1, the number of papers published in core journals represents the key issues in this field. According to Bradford's Law[3], journals can be divided into three zones based on publication volume. The core zone contains one-third of the total number of papers, i.e., 1021/3 = 340.3. Therefore, the core journals include the top 24 journals, such as the Journal of Cardiovascular and Cerebrovascular Diseases with Integrated Traditional and Western Medicine, which tops the list with 57 papers. Due to space limitations, only the top 10 journals by publication volume are listed in Table 1. Among the top 10 journals, one is related to cardiovascular disease, one is psychological, and the remaining eight are TCM or integrated TCM and Western medicine journals, reflecting the high research interest in Psycho-Cardiology within the TCM field.

3.3. Author Information

High-productivity authors are the backbone of disciplinary development. According to VOSviewer statistics, a total of 2449 authors (including co-authors) published papers, with 2091 authors publishing one article each, accounting for 85.38% of the total. The famous scholar Price proposed a law regarding scientific productivity in 1963, stating that about half of the publications in a specific scientific field or on the same research topic are written by a group of high-productivity authors[4]. The size of this group of authors is approximately the square root of the total number of authors, denoted as $\sum_{m+1}^{I} n(x) = \sqrt{N}$. According to Price's Law, the threshold m can be estimated by multiplying the square root of I by a constant (approximately 0.749). Zhao Haibin, the top publisher, published 30 papers, as shown in Table 2. n_{max}=30 papers, Therefore, $m = 0.749 \times \sqrt{n_{max}} \approx 4.10$. Authors who published five or more papers are considered the core author group in the field. This group of 35 core authors published a total of 284 papers, accounting for 27.8% of the total publications, which does not reach the 50% standard proposed by Price, indicating that the core group of authors in the field of biaxial medical science has not yet formed and is still in the developmental stage.

Table 2: List of Authors by Publication Volume from 2006 to 2023 (Publication Volume ≥ 5), Unit: Articles

No.	Author	Publications	No.	Author	Publications	No.	Author	Publications	No.	Author	Publications
1	Zhao Haibin	30	10	Zhao Mingjun	9	19	Ren Lu	6	28	Ning Bin	5
2	Hu Dayi	14	11	Yu You	8	20	Yao Zupei	6	29	Jiao Xiaomin	5
3	Hou Jiqiu	13	12	Liu Xiang	8	21	Ning Bo	6	30	Wang Ying	5
4	Wang Fengrong	13	13	Liu Ping	8	22	Li Qiuzhi	6	31	Xiao Changjiang	5
5	Chen Xiaohu	12	14	Liu Yuanyuan	7	23	Wang Min	6	32	Ge Teng	5
6	Wang Chao	12	15	Tang Zhuoran	7	24	Wang Jie	6	33	Chen Yali	5
7	Yu Rui	11	16	Sun Yize	7	25	Ding Wanli	5	34	Tao Guizhou	5
8	Zhang Huan	10	17	Zhang Yan	7	26	Shi Jinyu	5	35	Qi Xin	5
9	Liu Meiyan	10	18	Wang Shuai	7	27	Wu Yongqing	5			

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3.4. Institutional Information

Collaboration between research institutions is an effective way to enhance research capabilities. As shown in Table 3, Liaoning University of Traditional Chinese Medicine has the highest number of publications with a total of 40 papers, followed by Beijing University of Traditional Chinese Medicine with 37 papers. Beijing University of Traditional Chinese Medicine, together with its affiliated Dongfang Hospital, the China Academy of Chinese Medical Sciences, and Nanjing University of Traditional Chinese Medicine, forms the largest collaborative network. This indicates that their research teams have extensive experience and strong research capabilities in the field of Psycho-Cardiology. In contrast, other nodes are scattered, mostly representing independent research institutions, suggesting that the connections between institutions are relatively loose and stable cooperative relationships have not yet formed.

Table 3: Top 5 Institutions by Publication Volume

No.	Institution	Province	Publications	Centrality
1	Liaoning University of Traditional Chinese Medicine	Liaoning	40	0
2	Beijing University of Traditional Chinese Medicine	Beijing	37	0.02
3	Affiliated Hospital of Liaoning University of Traditional Chinese Medicine	Liaoning	22	0
4	Dongfang Hospital, Beijing University of Traditional Chinese Medicine	Beijing	20	0.01
5	Xiyuan Hospital, China Academy of Chinese Medical Sciences	Beijing	17	0.01

3.5. Keyword Analysis

*Table 4: Top 10 Keywords in Psycho-Cardiology Research by Frequency***

No.	Keyword	Frequency	Total Link Strength
1	Coronary Heart Disease	275	426
2	Psycho-Cardiology Nursing	206	282
3	Anxiety	166	359
4	Depression	158	368
5	Quality of Life	70	134
6	Cardiovascular Disease	62	82
7	Chronic Heart Failure	38	38
8	Review	28	46
9	Cardiac Function	27	60
10	Hypertension	25	34

3.5.1. Keyword Frequency and Co-occurrence Analysis

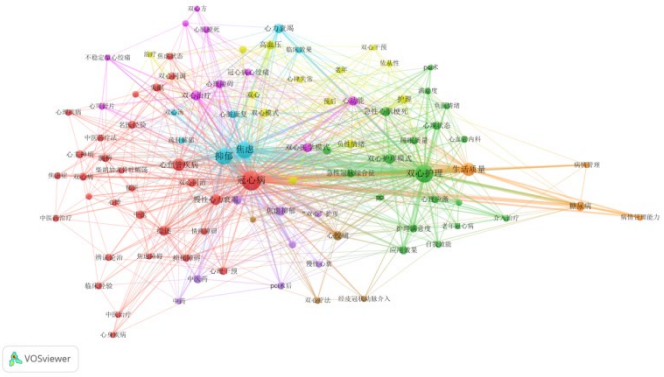

Figure 2: Keyword Co-occurrence Network

Keywords encapsulate the core themes of a paper. Co-occurrence analysis of keywords can reveal the connections between research themes, highlighting the research hotspots in the field. Using VOSviewer, we performed a statistical analysis of the included keywords and visualized 95 keywords with a frequency of 7 or more. The results are shown in Figure 2. The size of the circular nodes is proportional to the frequency of keyword occurrences, the thickness of the lines represents the strength of associations, and the colors of the nodes represent different research themes. Excluding keywords directly related to the research topic, the top 10 high-frequency keywords are listed in Table 4. As shown in Figure 2 and

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Table 4, high-frequency keywords such as coronary heart disease, Psycho-Cardiology nursing, anxiety, depression, and quality of life constitute the representative terms in this field. Most scholars focus on the treatment effects of Psycho-Cardiology medical models on coronary heart disease patients, particularly the positive impacts of Psycho-Cardiology nursing on psychological and quality of life aspects after PCI surgery.

3.5.2. Keyword Clustering Analysis

Keyword clustering analysis can explore the hot issues within the field of Psycho-Cardiology. We imported the literature data into Citespace for keyword clustering analysis, obtaining a Q value of 0.54 and an S value of 0.8223, indicating that the clustering structure of the network is significant and the results are convincing. As shown in Figure 3, there are 12 different color clusters representing themes such as #0 Psycho-Cardiology disease, #1 Psycho-Cardiology nursing, #2 Psycho-Cardiology, #3 Psycho-Cardiology treatment, #4 psychological disorders, #5 medication patterns, #6 heart-nourishing and mind-calming, #7 anxiety and depression, #8 coronary intervention, #9 Xin Ke Shu tablets, #10 psychological diseases, and #11 revascularization. The overlapping of research directions suggests that current scholars' related studies in this field can be categorized into two main aspects: the integration of nursing models and psychological interventions, and the combination of TCM dialectical disease treatment with pathological and pharmacological studies.

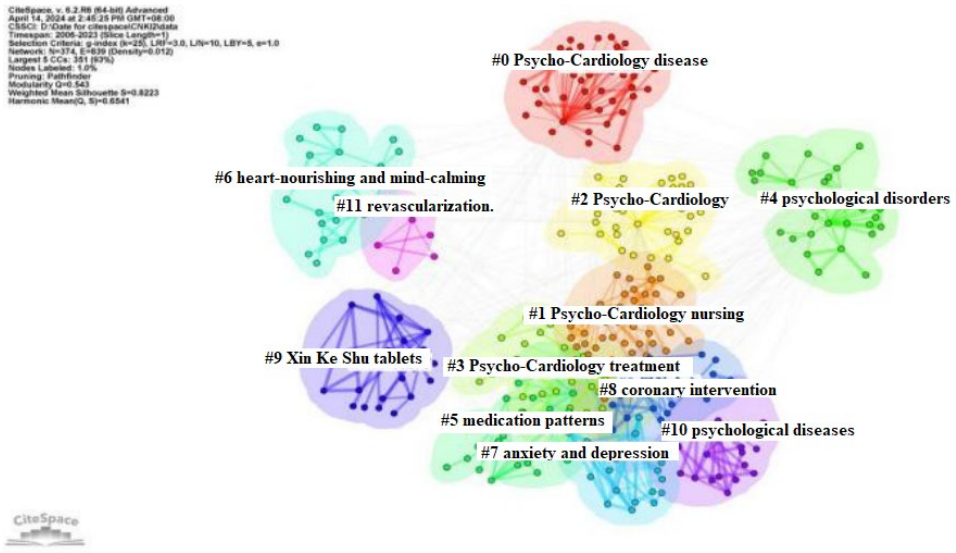

Figure 3: Keyword Clustering Network

4. Discussion and Conclusion

4.1. Current Status of Psycho-Cardiology Research

In terms of publication volume, since the 2013 symposium on integrated traditional Chinese and Western medicine's Psycho-Cardiology medical model, which called for the implementation of the new Psycho-Cardiology concept, the number of publications in this field has shown a steady increase. The research interest is growing, and the release of the "Clinical Diagnosis and Treatment Guidelines for Cognitive Disorders in Coronary Heart Disease with Comorbid Depression and Anxiety" will further boost the field's activity. From the distribution of journals, the journals with the highest number of publications tend to focus on TCM and integrated traditional Chinese and Western medicine, reflecting the current recognition by scholars in this field of the therapeutic effects of traditional medicine on modern diseases and their active exploration of combining TCM and Western medicine resources to enhance treatment efficacy.

Regarding authors and institutions, authors with a single publication were categorized based on their research content. An Liping, Zhang Junling, and others focused on the improvement of negative emotions through the application of the Psycho-Cardiology medical model; Liu Minghuai, Yu Cheng, and Liu Yan systematically summarized the relevant research on Psycho-Cardiology in TCM; Liu Yajong, He Yan, and Liu Liang conducted in-depth studies on the efficacy and mechanisms of TCM in treating Psycho-

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Cardiology diseases; He Aimin, Feng Li, and Ding Lan emphasized the importance of patients' psychological state from a nursing perspective. From the application of the medical model to TCM treatments and attention to nursing aspects, different scholars have various focuses in the field of Psycho-Cardiology, reflecting the interdisciplinary and multidimensional nature of Psycho-Cardiology disease research.

Hu Dayi from the Heart Center of Peking University People's Hospital is an authoritative figure in the field of Psycho-Cardiology. He was the first to propose the concept of "Psycho-Cardiology," actively promoted the popularization of the Psycho-Cardiology concept, and deepened this concept in practical applications. His "Five Prescriptions" approach—covering diet, exercise, smoking cessation and alcohol limitation, psychological adjustment, and medication treatment—provides a specific practical pathway for cardiovascular disease prevention and rehabilitation. He also utilizes the "Internet+" to collect and analyze case data, summarize experiences, and use big data to advance the development of Psycho-Cardiology.

The research team at Beijing University of Traditional Chinese Medicine is at the forefront of TCM Psycho-Cardiology research. Zhao Haibin is the proposer and architect of the TCM Psycho-Cardiology theory, with notable research achievements including the TCM pathogenesis theory of "stagnation of blood heat and deficiency," data mining-based treatment prescription patterns and medication experience analysis, and treatment experiences based on classical prescriptions[5]. Hou Jiqiu collaborates closely with Zhao Haibin, focusing on the study of TCM treatment for arrhythmia, exploring the clinical effects of the "Psycho-Cardiology formula," and conducting in-depth research on the theory and practice of Psycho-Cardiology diagnosis and intervention for post-myocardial infarction depression[6]. The involvement of TCM not only enriches the theoretical system of Psycho-Cardiology but also provides new pathways for the treatment of cardiovascular diseases.

4.2. Hotspots and Trends in Psycho-Cardiology

Based on the keyword co-occurrence map, the research subjects in the field of Psycho-Cardiology primarily include coronary heart disease, chronic heart failure, and hypertension. The main treatment methods involve TCM treatment, interventional surgery, and postoperative care, with key efficacy indicators including anxiety, depression, quality of life, and cardiac function. Coronary heart disease, which has the highest frequency and total link strength, is at the core of the entire map. In recent years, the incidence of coronary heart disease has been gradually increasing and showing a trend toward younger populations, which may explain its sustained research interest. With the practice and development of "Psycho-Cardiology clinics" and "Psycho-Cardiology ward rounds," there has been an increase in studies on Psycho-Cardiology conditions in patients post-PCI or post-myocardial infarction. Many scholars have further explored the efficacy of TCM syndrome differentiation and treatment, integrated TCM and Western medicine therapies, as well as the application of Chinese patent medicines, classical compound decoctions, and non-drug TCM therapies in treating coronary heart disease with emotional disorders[7-8].

Based on the keyword clustering map, the development trend of Psycho-Cardiology is reflected in the integration of nursing models and psychological interventions, and the combination of TCM syndrome differentiation and pharmacological cases.

Psycho-Cardiology nursing requires comprehensive interventions addressing both the physical and mental aspects of patients, extending beyond traditional physiological care to include psychological counseling and emotional support as non-drug treatment methods. Negative emotions can adversely affect the prognosis and disease progression of cardiovascular conditions, and patients with heart diseases often have concurrent psychological disorders. This necessitates necessary and appropriate identification and intervention by healthcare professionals during clinical care. A randomized controlled trial conducted by Lu Li and colleagues on 300 patients with angina pectoris of coronary heart disease found that the Psycho-Cardiology nursing approach significantly alleviated psychological distress in 83% of patients with coronary atherosclerotic heart disease, with the lowest scores for anxiety and depression[9]. In the study by Liu Rongli et al., the treatment compliance in the experimental group was 100%, and the effective rate of cardiac function improvement was 75.76%, proving that Psycho-Cardiology nursing significantly alleviates negative emotions in patients with chronic heart failure and ventricular arrhythmias[10]. Research on acute myocardial infarction also indicates that factors such as old age, female gender, long working hours, and having a spouse or direct relatives with chronic major illnesses are risk factors for anxiety and depression in acute myocardial infarction patients. Psycho-Cardiology nursing can alleviate patients' anxiety and depression and improve overall quality of life[11]. These

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findings suggest that the development of Psycho-Cardiology has significantly promoted innovations in nursing models, making Psycho-Cardiology nursing a new hotspot in clinical research [12].

Psycho-Cardiology diseases are complex conditions with diverse clinical manifestations and complicated diagnoses. In TCM treatment, the principle of "treating diseases based on syndrome differentiation" is adopted, meaning that treatment methods are selected based on syndrome differentiation rather than solely relying on disease diagnosis. TCM believes that the main pathogenesis of Psycho-Cardiology diseases involves qi mechanism disorders and disharmony of qi and blood, often presenting as a complex mix of deficiency and excess[13]. In treatment strategies, the importance of syndrome differentiation and treatment based on the organs, eight principles, and qi and blood is emphasized, with a focus on replenishing the kidney and warming yang, as well as invigorating blood and nourishing the heart. Pharmacological research has focused on Bupleurum and its related prescriptions in the treatment of Psycho-Cardiology diseases. Systematic analysis by Hao Panpan and Zhang Yun of high-quality randomized controlled placebo clinical studies on integrated TCM and Western medicine treatment of cardiovascular diseases found that this approach is significantly associated with improvements in surrogate endpoints for hypertension, atherosclerotic cardiovascular disease (ASCVD), arrhythmias, and chronic heart failure[13], further confirming that integrated TCM and Western medicine treatment can improve clinical manifestations and prognosis of cardiovascular diseases, demonstrating significant development potential.

4.3. Conclusion

Through in-depth discussion, this study found that with the deepening understanding of the interrelationship between heart diseases and psychological states, research in Psycho-Cardiology has entered a rapid development phase. High-productivity authors often have their own research teams with close internal connections, but communication and cooperation between different research institutions need to be strengthened. Coronary heart disease, Psycho-Cardiology nursing, and TCM are recent research hotspots, indicating that Psycho-Cardiology is showing vigorous vitality and development momentum in both TCM and Western medicine fields. In recent years, the "new" Psycho-Cardiology medical model guided by the integration of TCM and Western medicine has been proposed. Methods of combining TCM prescriptions, Chinese patent medicines and intravenous preparations, single TCM herbs, and their extracts with Western medicine treatments for cardiovascular diseases have been deeply explored. This provides new ideas for improving the treatment efficacy of cardiovascular diseases and reducing complications. Future research is expected to place greater emphasis on interdisciplinary collaboration, combining the holistic treatment of TCM with the precise interventions of Western medicine to achieve more comprehensive Psycho-Cardiology treatment outcomes.

References

[1] Hu D Y .From "Psycho-Cardiology" to "Five Prescriptions for Cardiovascular Health"[J]. Chinese Journal of Cardiology, 2021, 49(11):1061-1062.DOI:10.3760/cma.j.cn112148-20210823-00720..
[2] The Central People's Government of the People's Republic of China. Opinions of the State Council on Implementing the Healthy China Initiative [EB/OL]. (2019-06-24) [2024-04-02]. https://www.gov.cn/zhengce/content/2019-07/15/content_5409492.htm
[3] Bradford SC. Sources of information on specific subjects [J]. Engineering, 1934, 137: 85-86.
[4] Lotka AJ. The frequency distribution of scientific productivity [J]. Journal of the Washington Academy of Sciences, 1926, 16(12): 317.
[5] Li RY, Ding WL, Zhao WZ, et al. Professor Zhao Haibin's Clinical Experience in Treating Post-heart Failure Mental Disorders from "Deficiency, Blood Stasis, and Heat Stagnation" [J]. China Medical Herald, 2023, 20(35):136.
[6] Tang ZR, Hou JQ, Chen YL, et al. Theoretical Origins of Psycho-Cardiology Diagnosis and Treatment Intervention for Post-myocardial Infarction Depression [J]. Global Traditional Chinese Medicine, 2021, 14(01):32.
[7] Liu X, Yu JX, Qu C, et al. Study on the Mechanism of Bupleurum-Scutellaria Pair in Treating Coronary Heart Disease Based on Psycho-Cardiology Theory and Molecular Docking Technology [J]. Journal of Liaoning University of Traditional Chinese Medicine, 2023, 25(02):184.
[8] Tian M, Chen ZH, Wang FR. Summary of Wang Fengrong's Clinical Experience in Treating Cardiovascular Diseases with Modified Tongmai Jiangzhuo Decoction [J]. Liaoning Journal of Traditional Chinese Medicine, 2020, 47(06):40.
[9] Li L, Tan P, Li G, Yang S, Guo M, Zhang C. The application of Psycho-Cardiology nursing mode in

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patients with coronary heart disease and angina pectoris and its impact on anxiety, depression, and quality of life [J]. Medicine (Baltimore). 2023 Dec 29; 102(52):e36530.
[10] Liu RL, Deng XC, Guo MC, et al. Observation on the Effect of Psycho-Cardiology Nursing Mode in Patients with Chronic Heart Failure Complicated with Ventricular Arrhythmia [J]. Jilin Medical Journal, 2020, 41(11):2790.
[11] Ren L, Ning B, Ma Z, et al. Randomized Controlled Study on Psycho-Cardiology Medical Intervention in 86 Patients with Acute Myocardial Infarction Complicated with Anxiety and Depression [J]. Chinese Journal of Clinical Psychology, 2021, 29(04):887.
[12] Duan WH, Shi DZ. Traditional Chinese Medicine Understanding of Psycho-Cardiology Diseases [J]. Journal of Cardiovascular and Cerebrovascular Diseases with Integrated Traditional and Western Medicine, 2017, 15(09):1131.
[13] Hao PP, Zhang Y. Clinical trials of integrated Chinese and Western medicine in treating cardiovascular disease: the past and the future [J]. Chinese Journal of Cardiology, 2019, 47(9):697.