

Investigation on the satisfaction degree of scientific research environment of leprosy prevention and control personnel in China

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Abstract

Summary Objective: To understand the situation of scientific research environment of leprosy prevention and control personnel in China, and to provide policy basis for improving its scientific research conditions, improving the scientific research ability of leprosy prevention and control, and then improving the prevention and treatment level of leprosy. **Methods** Through multi-stage stratified random sampling, 95 organizations and 351 leprosy prevention and control personnel were recruited. by using homemade organization interview questionnaire and scientific research environment satisfaction questionnaire. **Results** The overall satisfaction of the scientific research environment of leprosy prevention and control personnel in china was low (14.6%). Single factor analysis shows that the satisfaction of leprosy epidemic areas category II with the use of scientific research funds and the difficulty of applying for the research projects is high; and the satisfaction of scientific research at the county level and below institutions is higher than that of provincial and ministerial institutions; and the standard of scientific research award of the skin disease hospitals (Institutes) is higher than that of the CDCs. The respondents considered that the main problems at present were poor scientific research conditions, lack of scientific research and academic atmosphere, and respondents generally agreed that the construction of scientific research infrastructure was the prioritize issue that needed to be solved urgently at present. **Conclusion** The satisfaction of the current research environment of leprosy prevention and treatment personnel in China is not high. The construction of scientific research infrastructure and scientific research technology platform, as well as the introduction, training and reform of compensation system of leprosy prevention and treatment talents, need to be improved.

Introduction

Leprosy is a chronic infectious disease caused by *Mycobacterium leprosy*.¹ Although the prevalence of leprosy declined considerably in the past 50 years, this old-age and highly contagious disease remains a global endemic that can never be ignored.² By end of 2017, 192,713 cases of leprosy were registered globally, increased by 20,765 cases compared to 2016.^{3,4} Every year, there are a large number of people with leprosy who have been undiagnosed around the world.⁵ Delayed diagnosis may lead to disease transmission to others and/or progression to more serious complications. The causes of delayed diagnosis generally include the neglect of early symptoms, the difficulty of differential identification and other factors,⁶ So it is necessary to develop effective early detection methods for leprosy.

In the field of leprosy control, many countries of the world have established their long-term goal of eliminating leprosy. To achieve this goal, there is an urgent need to devise customized strategies in the prevention and treatment of leprosy, which involve epidemiological studies of leprosy, development of effective tools to detect early infections, predict neurological damage and disability levels, identification of effective ways to monitor drug resistance and develop a range of basic research or health service research issues such as leprosy vaccines.⁷

An effective scientific research environment is a foundation to develop high-quality scientific research for the prevention and treatment of leprosy. The purpose of this paper is to investigate the current situation of leprosy prevention and control institutions in scientific research management system, guarantee support, scientific research work hardware and software environment, and provides the policy basis for improving the scientific research environment of leprosy prevention and control personnel.

Material & Methods

Sampling Method

Through multi-stage stratified random sampling, 18 provinces, including Shanxi, Sichuan, Guangxi, Hunan, Guizhou, Yunnan, Jiangxi, Zhejiang, Jiangsu and Anhui, were selected in the present analysis. According to the National Plan for the Elimination of Leprosy Hazards (2011–2020), it categorized 31 provinces, municipalities and autonomous regions in mainland Chinese into three types of epidemic areas by the prevalence and incidence rate of leprosy. The first category includes Jiangxi, Hunan, Guangxi, etc. The second category includes Jiangsu, Zhejiang, Anhui, Fujian, etc. The third category include Beijing, Tianjin, Hebei, Shanxi, etc.⁸ In this study, 7 provinces were classified as leprosy epidemic areas category I, 9 provinces were category II and 2 provinces were category III. The respondents included the heads of agencies such as CDCs, skin disease hospitals(institutions) and leprosy hospitals (villages); middle-level cadres and general staff.

Source of information

This analysis adopted a mixed qualitative and quantitative approach through questionnaire survey and qualitative interview. Through reference to the relevant previous studies in the literature and expert consultation, we designed a questionnaire on the satisfaction of scientific research environment and an interview guide for the institution of leprosy prevention and control.

In addition to collecting the basic situation of the respondents' leprosy epidemic areas, the level and nature of institutions, job categories, etc., the questionnaire on the satisfaction of scientific research environment include: 1) *Satisfied with the current scientific research environment*, 2) *Satisfied with the research funding of the research group*, 3) *Satisfied with the difficulty of applying for current research projects* 4) *Satisfied with the exchanges and cooperation between the research groups of the units*, 5) *Satisfied with the scientific research management of the unit*,6) *Satisfied with the academic atmosphere of the unit*,7) *Satisfied with the unit's science and technology award criteria*. Subjective evaluation according to 5-point Likert scale evaluation component table score (1 = very unsatisfactory; 2 = not satisfied; 3 = general; 4 = more satisfactory; and 5 = very satisfied). Institutional interview questionnaires, including basic information about institutions and experience in training of leprosy prevention talents, talent introduction and talent incentive policies.

Under the guidance of China Leprosy Association, research was carried out through the distribution of paper questionnaires to the organizations surveyed. Between October and December of 2018, a total of 351

valid questionnaires were collected from 107 agencies, the heads of scientific research departments of 95 institutions were interviewed. This study was approved by the Ethics Committee of the Shanghai Skin Disease Hospital. Written informed consents were obtained from all participants.

Data statistics and analysis

All statistical analyses were performed by using SPSS21.0 and MS-EXCEL for Windows. Descriptive statistics were used to describe respondents' satisfaction of the scientific research environment by four potential factors, such as different epidemic areas, the level and nature of institutions, job categories. This paper compared the difference in satisfaction level of the scientific research environment with each potential factor using one-way ANOVA and then Scheffe post hoc test method for the groups with significant difference. In the case where the overall test F value reached significant, but the post hoc test was not significant, Tukey's honestly significant difference (HSD) post hoc test was applied. The significance level for all statistical analyses was 0.05%.

Ranking questions were analyzed by assignment score, taking the example of " *the issues that should be prioritized in the scientific research environment* ". Concrete steps: (1) by the interviewees through the subjective experience of the current scientific research environment to screen out the most needs to solve the problem, and according to the importance of sorting, 1 indicates the first need to solve the problem, 2 indicates the second need to solve the problem, and so on, (2) each issues in descending order, the first problem to be solved is assigned a value of 8 points, The second problem that be solved is assigned a value of 7 points, and so on; the assignment without tick is 0; and (3) the total score of the problem needs to be solved, sorted by score.

Results

Basic profile

A total of 351 people from 107 institutions completed the satisfaction survey of the scientific research environment. By leprosy epidemic areas points: 175 (49.9%) respondents were recruited from Category I areas, while 151 (43%) and 25 (7.1%) were from Category II and Ⅲ areas, respectively. By institutional level: Provincial and ministerial level 52 (14.9%), Municipal 113 (32.2%), County level and below 186 (53.0%). By Institutional nature: CDCs 188 (53.6%), Skin disease hospitals(institutes) 103(29.3%), Leprosy (village) and others 60 (17.1%). According to the job categories of the investigation: Heads of agencies 37(10.5%), Middle-level cadres 54 (15.4%), General staff 260 (74.1%).

Main difficulties encountered by heads of organization

In the course of scientific research, the main difficulties encountered by the 95 heads of organization surveyed are shown in Figure 1. The top three difficulties are *Poor scientific research conditions* (44.21%,42/95), *Lack of scientific research and academic atmosphere* (40%,38/95) and *It's hard to get a research project* (32.63%,31/95).

[Figure 1]

Satisfaction of scientific research environment

Among the 351 survey respondents, their overall satisfaction of the current scientific research environment was not high (see Table 1). Among them, 30.5% (n = 107) rated as “not satisfied”/ “not very satisfied”; 55.0% (n = 193) rated as “general”; and only 14.6% (n = 51) rated as “more satisfied”/ “very satisfied”.

[Table 1]

As illustrated in Table 2, the average score of the respondents' *satisfaction with the scientific research management of the unit* was the highest at 2.95 (SD = 0.86) and *Satisfied with the research funding of the research group* was the lowest at 2.38 (SD = 0.96).

[Table 2]

One-way ANOVA of satisfaction evaluation of various factors in scientific research environment by respondents with different characteristics

Table 3 shows the results of one-way ANOVA showed that certain items of satisfaction in scientific research environment were significantly different across different epidemic areas, the level and nature of institutions. Result of Scheffe post hoc test found that *the average satisfaction score of the research funding of the research group*, leprosy prevention and control personnel' respondents in epidemic areas of Category Ⅱ and Ⅲ was higher than those in Category Ⅰ (F = 6.419, p = 0.002). *the average satisfaction score of the difficulty of applying for current research projects*, category Ⅱ areas was higher than Category Ⅰ (F = 4.436, p = 0.013). For *the average satisfaction score of the current scientific research environment*, respondents from the county level and below institutions was higher than that of the staff at the provincial and municipal levels (F = 5.278, p = 0.006). Using HSD post hoc tests, it is found that the average satisfaction score of *the unit's science and technology award criteria* for respondents from the skin disease hospitals (Institutes) was higher than that of the CDCs (F = 4.123, p = 0.017) (Table 3).

[Table 3]

Analysis of the issues that should be prioritized in the scientific research environment.

By summarizing the issues that 351 respondents thought were most needed to be solved in the course of scientific research, they sorted them according to the number of people selected (Table 4) and chose to strengthen the construction of scientific research infrastructure, to enhance the flow mechanism of scientific research talents and to enhance the construction of scientific research technology platform and

adjust transfer and distribution mechanism of scientific research funds are relatively large. According to the scoring criteria of sorting questions, the top three issues are *construction of scientific research Infrastructure* (Sum of score = 1831), *transfer and distribution mechanism of scientific research funds* (Sum of score = 1656) and *construction of scientific research technology platform* (Sum of score = 1625).

[Table 4]

Discussions And Recommendations

After decades of development, with China becoming the world's second largest economy, China continues to invest and continue to develop in the field of scientific research, and China's scientific research environment is also facing unique challenges.⁹ This study analyzed survey data obtained from 95 heads of institutions and 351 leprosy prevention and treatment personnel on the satisfaction of the scientific research environment. The results show that in recent years, the scientific research environment of China's leprosy prevention and control personnel has been greatly improvement, but compared with other disciplines or majors, whether from government capital investment or policy support aspects still insufficient.¹⁰

This study found that the scientific research base of most leprosy prevention and control institutions is relatively weak and the channels for financial support are inadequate. In this survey, it is found that *the poor scientific research conditions*(44.21%), *Lack of scientific research and academic atmosphere* (40%) and *it's hard to get a research project* (32.63%) were the main difficulties currently encountered by leprosy prevention and control institutions, which was not considered as a main issue in the 2010 National Survey of Science and Technology workers.¹¹ In our study revealed that 47.37% of the institutions surveyed did not carry out scientific research projects.

The research shows that the evaluation of the use of scientific research funds of the research group, leprosy epidemic areas category Ⅱ and category Ⅲ is higher than that category I. On the evaluation of the difficulty of applying for current scientific research projects, the satisfaction rate of the leprosy epidemic areas category Ⅲ is higher than category I. The evaluation of the academic atmosphere and scientific research environment of the institutions, the satisfaction of the personnel of the county level and below institutions is higher than that of provincial and municipal institutions. which is because the important scientific research tasks were taken by the municipal and provincial level leprosy prevention and control institutions, but the relatively light situation of the county level and below leprosy prevention and control institutions.

China has attained great achievements in the control and elimination of leprosy, the overall incidence of leprosy is currently low, then the prevention and treatment of leprosy is often neglected by society. The social status of the Leprosy worker universal lower, especially in the skin disease hospitals (Institutes), Leprosy prevention and treatment personnel and other medical personnel engaged in the diagnosis and treatment of dermatology people compared to not only lower incomes, expertise limited, and promotion path will be affected. This survey found that leprosy prevention and control personnel on the scientific and

technological reward standard satisfaction evaluation, skin disease hospitals (Institutes) than the CDCs higher.

According to the findings of this survey, combined with our goal of further eliminating leprosy and trying to play China's role in the global goal of "creating a world free of leprosy".¹² It is recommended that relevant government departments for leprosy prevention and control should take the following measures.

- To improve the importance of leprosy prevention and control scientific research work and improve the urgency of leprosy prevention and control scientific research environment knowledge. Decision-makers at all levels and leprosy prevention and control institutions should fully realize that scientific research on leprosy prevention and control is an important means of leprosy prevention and control.
- To effectively increase support for leprosy prevention and research work, strengthen the resource allocation of leprosy prevention and control scientific research. This includes an increased investment on human capital, financial and non-financial resources, which focus on supporting and organizing high-level, original, combined with China's leprosy prevention and treatment of practical basic research and multi-center, large sample clinical trials to ensure leprosy prevention and treatment research work sustainable development.
- Strengthen the classification guidance for leprosy prevention and research, focusing on supporting national sub-centers and regional priorities leprosy illness prevention and control of scientific research institutions, play each institutions advantage. At the same time, we should establish a system and institutional operational mechanism that is conducive to the prevention and control of leprosy, especially to foster multidisciplinary and multi-center research, and encourage the participation of the majority of grass-roots leprosy prevention and control personnel in clinical research. Work on the initiative to improve the output and efficiency of leprosy prevention and treatment research.
- Introduction of relevant policies to promote leprosy prevention and control of scientific research personnel treatment and status, attracting high-level talents to participate in leprosy prevention and research work, thus enhancing our country the level of scientific research in the prevention and treatment of leprosy.

There are some limitations in this study. This study analyzed self-rated satisfaction level of the scientific research environment and major difficulties of the personnel affecting leprosy prevention and control, and lacks empirical evidence on the causality that causes the difference in satisfaction, we hope to carry out further research in the future. To the best of our knowledge, this is the first study of the scientific research environment of leprosy prevention and treatment personnel in China. Despite its limitations, this study has great significance for improving the situation of the scientific research environment.

Declarations

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Conflicts of interest

The authors have no conflicts of interest relevant to this article.

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Disclaimer

This paper reports results obtained from an independent research. The views and opinions expressed in this article are solely the authors' own and do not necessarily reflect the official policy or position of any other agency, organization, employer or company.

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Tables

Table 1. Evaluation of the satisfaction of respondents with different characteristics to the current scientific research environment

Characteristics	Category	not satisfied.	Not very satisfied.	General	More Satisfied	Very satisfied.	N	F	P
Epidemic areas	A1	15 (8.6%)	37 (21.1%)	93 (53.1%)	26 (14.9%)	4 (2.3%)	175	4.205	0.379
	A2	12 (7.9%)	36 (23.8%)	83 (55%)	16 (10.6%)	4 (2.6%)	151		
	A3	0 (0%)	7 (28.0%)	17 (68.0%)	1 (4.0%)	0 (0%)	25		
Institutional levels	B1	6 (11.5%)	13 (25.0%)	30 (57.7%)	3 (5.8%)	0 (0%)	52	13.014	0.011
	B2	10 (8.8%)	34 (30.1%)	53 (46.9%)	16 (14.2%)	0 (0%)	113		
	B3	11 (5.9%)	33 (17.7%)	110 (59.1%)	24 (12.9%)	8 (4.3%)	186		
Institutional nature	C1	11 (5.9%)	40 (21.3%)	110 (58.5%)	22 (11.7%)	5 (2.7%)	188	9.902	0.272
	C2	9 (8.7%)	22 (21.4%)	60 (58.3%)	11 (10.7%)	1 (1.0%)	103		
	C3	7 (11.7%)	18 (30.0%)	23 (38.3%)	10 (16.7%)	2 (3.3%)	60		
Job Categories	D1	6 (16.2%)	9 (24.3%)	19 (51.4%)	3 (8.1%)	0 (0%)	37	15.174	0.056
	D2	6 (11.1%)	9 (16.7%)	29 (53.7%)	6 (11.1%)	4 (7.4%)	54		
	D3	15 (5.8%)	62 (23.8%)	145 (55.8%)	34 (13.1%)	4 (1.5%)	260		
Total		27 (7.7%)	80 (22.8%)	193 (55%)	43 (12.3%)	8 (2.3%)	351		

Description: A1-category□, A2-category□, A3-category □, B1-Provincial and ministerial, B2-Municipal level, B3- County level and below; C1-CDC, C2-Skin disease hospitals (Institutes), C3-Leprosy Hospitals (villages) and others; D1-Head of agency, D2-Middle-level cadre, D3- General staff.

Table 2. Evaluation of various factors of scientific research environment satisfaction

Item		P
1. Satisfied with the current scientific research environment	2.79±0.84	<0.001
2. Satisfied with the research funding of the research group	2.38±0.96	<0.001
3. Satisfied with the difficulty of applying for current research projects	2.48±1.07	<0.001
4. Satisfied with the exchanges and cooperation between the research groups of the units	2.84±0.84	<0.001
5. Satisfied with the scientific research management of the unit	2.95±0.86	<0.001
6. Satisfied with the academic atmosphere of the unit	2.77±0.94	<0.001
7. Satisfied with the unit's science and technology award criteria	2.76±0.91	<0.001

Table 3. One-way ANOVA of the evaluation of various factors in the scientific research environment by respondents with different characteristics

Item	Category	N	±	F	P	Compare the Scheffe method afterwards	Category	N	±	F	P	Compare the Scheffe method afterwards	Category	N	±	F	P	Compare the HSD method afterwards	
No.1	A1	175	2.81±0.87	0.155	0.856		B1	52	2.58±0.78	5.278	0.006	B3>B1, B2	C1	188	2.84±0.81	0.877	0.417		
	A2	151	2.76±0.85				B2	113	2.66±0.83				C2	103	2.74±0.80				
	A3	25	2.76±0.52				B3	186	2.92±0.84				C3	60	2.70±1.00				
No.2	A1	175	2.21±1.01	6.419	0.002	A2, A3>A1	B1	52	2.52±0.90	0.679	0.508		C1	188	2.36±0.96	0.214	0.807		
	A2	151	2.51±0.89				B2	113	2.35±0.95				C2	103	2.36±0.94				
	A3	25	2.76±0.72				B3	186	2.35±0.98				C3	60	2.45±1.02				
No.3	A1	175	2.31±1.07	4.436	0.013	A2>A1	B1	52	2.21±0.98	1.941	0.145		C1	188	2.53±1.08	0.471	0.625		
	A2	151	2.61±1.05				B2	113	2.50±1.05				C2	103	2.43±1.07				
	A3	25	2.80±1.00				B3	186	2.54±1.10				C3	60	2.40±1.03				
No.4	A1	175	2.76±0.88	1.625	0.198		B1	52	2.62±0.91	2.485	0.085		C1	188	2.79±0.82	0.662	0.517		
	A2	151	2.91±0.82				B2	113	2.83±0.76				C2	103	2.90±0.83				
	A3	25	2.96±0.61				B3	186	2.91±0.87				C3	60	2.88±0.94				
No.5	A1	175	2.93±0.90	0.352	0.704		B1	52	2.75±0.93	2.614	0.075		C1	188	2.89±0.85	1.162	.314		
	A2	151	2.95±0.84				B2	113	2.89±0.78				C2	103	3.05±0.84				
	A3	25	3.08±0.76				B3	186	3.04±0.89				C3	60	2.97±0.94				
No.6	A1	175	2.72±0.98	0.531	0.588		B1	52	2.44±0.96	5.719	0.004	B3>B2	C1	188	2.71±0.90	.874	.418		
	A2	151	2.83±0.91				B2	113	2.69±0.92				C2	103	2.84±0.93				
	A3	25	2.76±0.88				B3	186	2.91±0.93				C3	60	2.83±1.09				
No.7	A1	175	2.67±0.95	2.123	0.121		B1	52	2.81±0.89	0.787	0.456		C1	188	2.63±0.92	4.123	.017	C2>C1	
	A2	151	2.87±0.85				B2	113	2.67±0.90				C2	103	2.89±0.86				
	A3	25	2.72±0.89				B3	186					C3	60					
									2.80±0.92										2.93±0.90

Description: A1- category I, A2- category II, A3- category III; B1-Provincial and ministerial level, B2-Municipal level, B3-County level and below; C1-CDCs, C2-skin disease hospitals (Institutes), C3-Leprosy Hospitals(villages) and others

Table 4. The issues that should be prioritized in the scientific research environment

Issue	Sum of score	Rank
Construction of scientific research infrastructure	1831	1
Transfer and distribution mechanism of scientific research funds	1656	2
Construction of scientific research technology Platform	1625	3
The enthusiasm of young researchers to participate in scientific research	1274	4
Reform of science and technology Policy and scientific and technological legislation	1121	5
Research Results/Job Title evaluation system	981	6
Improving the moral quality of scientific research personnel	956	7
The flow mechanism of scientific research talents	605	8

Figures

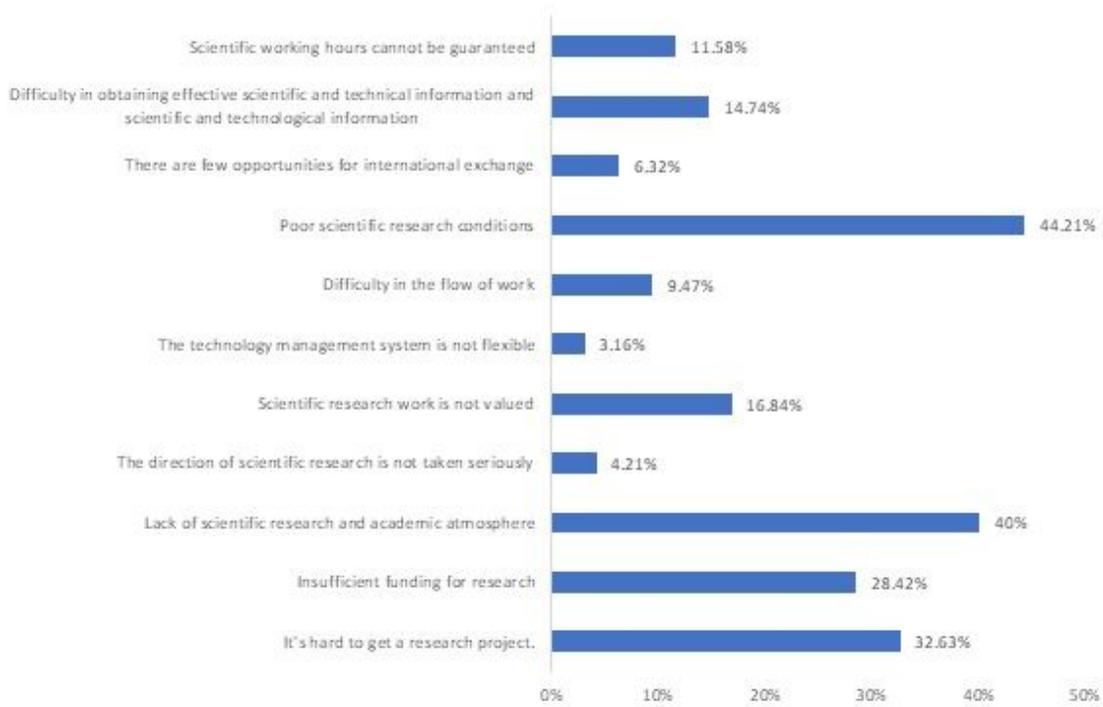


Figure 1

Figure 1 The main difficulties encountered by the 95 organizations surveyed in the research work