

CURRENT STATUS AND INFLUENCING FACTORS OF HEALTH LITERACY AMONG RURAL RESIDENTS IN CHINA--A CROSS-SECTIONAL SURVEY

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Abstract: Objective: Research on the health literacy level of rural residents and its influencing factors can help to improve the health level of rural residents, but also promote the development of rural medical and health care, and provide decision-making references for relevant departments to formulate policies.

Method: The health literacy situation of rural residents in Fengqiu County was investigated by questionnaire star using the Chinese Residents' Health Literacy Questionnaire, and this study is a cross-sectional survey.

Results: The overall health literacy level of rural residents in Fengqiu County, Xinxiang City, Henan Province, was 24.17% in 2024. Those with basic knowledge and conceptual ability accounted for 23.54%, those with lifestyle and behavioral ability accounted for 24.75%, and those with health skills accounted for 18.33%. The knowledge and ability of rural residents in Fengqiu County in six categories of health issues, scientific health concepts accounted for 29.20%, infectious disease prevention, and treatment accounted for 18.25%, chronic disease prevention and treatment accounted for 4.23%, safety, and first aid accounted for 30.17%, basic medical care accounted for 20.19%, and health information accounted for 19.55%, which are all lower than the national level.

Among the 1233 respondents, 200 males had health literacy skills with a health literacy level of 67.23%, and 98 females had health literacy skills with a health literacy level of 32.77%, with a statistically significant difference in health literacy levels between the sexes ($\chi^2=18.73$, $P<0.0001$). The health literacy level of rural residents under the age of 18 years was the lowest at 12.96% and the highest in the 18-25 age group was 62.18%, with a statistically significant difference in health literacy levels between different age groups ($\chi^2=34.39$, $P<0.0001$). and the highest in the 18-25 age group was 62.18%, with a statistically significant difference in health literacy levels of rural residents between different age groups ($\chi^2=34.39$, $P<0.0001$). Rural residents with primary school education or less, 385 people, accounting for 31.26%, had the lowest health literacy level, 3.67%, and the difference between different education levels was statistically significant ($\chi^2=284.1$, $P<0.0001$), as the education level increases, the health literacy level of rural residents also increases. Occupation affects the health literacy level, farmers have the lowest health literacy level, 12.11%, and the difference in health literacy level between different occupations is statistically significant ($\chi^2=61.30$, $P < 0.0001$).

Conclusion: The overall health literacy level of rural residents in Fengqiu County, as well as the results in the three aspects of basic health literacy knowledge and concepts, lifestyle and behavior, and health skills, and the six types of health literacy questions, were lower than the national level. Gender, age, education level, and occupation can affect the health literacy level of rural residents, and relevant departments should take strong measures to promote the improvement of the health literacy level of rural residents.

Keywords: Rural residents; Health literacy; Influencing factors; Education level; Occupation

1 INTRODUCTION

With the development of China's economy and the improvement of people's living standards, people's demand for quality of life is also increasing, and health, as an important part of the quality of life, is receiving more and more attention [1,2], with the expectation of higher health awareness and better health quality [3]. Health literacy, as an important influencing factor in improving the health level of residents, is a key indicator to evaluate the ability of individual residents to acquire, use, and process health information [4-6], and there are significant differences in health literacy between urban and rural areas in China [7-8].

In recent years, the level of residents' health literacy has become the focus of scholars' attention, and related studies and surveys have gradually increased. The Action for a Healthy China (2019-2030)[8] explicitly proposes to carry out health literacy activities, to achieve a health literacy level of at least 22% for the entire population by 2022, and no less than 30% by 2030, and the policy also advocates national campaigns to improve the quality of the people's health through a variety of physical activities, competitions, and campaigns of varying forms. The World Health Organization has emphasized that health literacy is an important predictor of the health status of a population and that an increase in literacy can effectively reduce social costs and mitigate health inequities [9]. Several studies have shown that there is a significant association between health literacy levels and health outcomes. There is a significant association between lower levels of health literacy and poor health outcomes. Leak, C. et al. found that lower health literacy was a significant predictor of incomplete study follow-up [10]. McDonald, M. et al. noted that low health literacy is a risk factor for poor health outcomes, including increased hospitalization rates [11]. In addition, health literacy affects

patients' medication adherence and disease control [12]. Whereas, high health literacy contributes to improved health status, fewer medical errors, and higher patient satisfaction [13-14]. Health literacy is particularly important for patients with chronic diseases. Schillinger D et al. showed a significant association between health literacy and diabetes outcomes, with patients with low health literacy more likely to hold health beliefs that interfere with treatment [15]. Similarly, Du, S. et al. found that health literacy was strongly associated with health outcomes in patients with hypertension, and patients with low health literacy were more likely to have poor health outcomes [16].

For the research on the health literacy level of regional residents and its influencing factors, especially for rural residents, Chinese scholars have made some new progress in recent years: a study in Anhui Province in 2022 showed that the overall health literacy level of rural residents was 29.17%, with a low level of health literacy, especially in the prevention and treatment of infectious diseases. Age and literacy were the main factors influencing the level of health literacy [17]. A study in Shandong Province in 2021 found that the health literacy level of rural residents was 21.81% [18]. The level of health literacy is affected by factors such as age, literacy, family income, and whether or not they have chronic diseases. Regional differences are also an important factor, with health literacy levels higher in the eastern region than in the central and western regions. A study in Zhejiang Province from 2016-2021 showed that the health literacy level of rural residents showed an upward trend, with a cumulative increase of 16.32% during the six years [19]. The literacy level of chronic disease prevention and treatment, scientific health concepts, and health information increased year by year, but the health literacy level of the elderly, low-literacy groups, and farmers increased less. A study on grassroots health education in rural Henan Province pointed out that despite a series of health education activities and some improvement in health literacy, there are still problems such as insufficient educational resources and a shortage of health promotion personnel [20]. A health literacy survey of low-income people in rural Henan Province in 2019 found that the literacy level was 20.66%, which was affected by various factors such as gender, age, and literacy level. The study recommended health education based on the characteristics of low-income people, and strengthening health management of chronic diseases [21]. These studies identified the weak points of rural health literacy, which is of great significance in solving these problems.

Although there have been a large number of studies on health literacy, there is still room for improvement. This paper aims to study the health literacy level of rural residents and its influencing factors, which can help improve the health level of rural residents, but also promote the development of rural medical and health care programs, and provide decision-making references for relevant departments to formulate policies.

2 OBJECTS AND METHODS

2.1 Study Population

The study involved a random sample of rural residents, including migrant workers, aged 16 to 59 years in Fengqiu County, Xinxiang City, Henan Province. Health literacy was assessed using a questionnaire distributed between June and July 2024. A total of 1,327 questionnaires were collected, resulting in 1,233 valid responses, yielding a validity rate of 92.9%.

2.2 Measurement Instruments and Evaluation Indicators

The "Chinese Residents' Health Literacy Monitoring Survey Questionnaire" was utilized, which comprises three dimensions: basic knowledge and concepts, healthy lifestyles and behaviors, and health skills. It also addresses six categories of health issues: scientific health concepts; prevention and treatment of infectious diseases; prevention and treatment of chronic diseases; safety and first aid; basic medical care; and health information. Scoring: Each participant receives 1 point for correctly answering judgment, multiple-choice, and scenario questions that align completely with the standard answers. No points are awarded for incorrect responses.

Scoring Criteria: A score of 53 or higher indicates that the individual is considered health literate. Additionally, if a participant's score in a specific area of health literacy (related to a particular health issue) reaches at least 80% of the total points possible for that area, they are regarded as competent in that aspect.

Health Literacy Level Calculation: The health literacy level is calculated using the formula: $(\text{Number of individuals with basic health literacy} / \text{Total number of respondents}) \times 100\%$.

2.3 Statistical Analysis

Statistical analysis was performed using SPSS 26.0. Categorical variables were expressed as percentages, and differences were tested using the chi-squared test, with a significance level of $P < 0.05$.

3 RESULTS

3.1 The basic situation of the research subjects

The survey was conducted by questionnaire star, for the recovery of 1327 questionnaires, of which 1233 were valid questionnaires, with an effective rate of 92.9%. Among them, 685 were male, accounting for 50.55%; 548 were female, accounting for 49.45% (Table 1).

Table 1 Basic Characteristics of the Study Subjects

Variable	n	Composition ratio (%)
Gender	Male	685
	Female	548
age (Year)	≥15	182
	≥18	183
	≥25	202
	≥30	209
	≥40	206
	50-59	251
Educational level	Below primary school	385
	Primary school	313
	Junior high school	273
	High school	208
	University (including college) and above	54
Occupation	Civil servants or public institution personnel	130
	Medical staff	96
	Teacher	108
	Student	247
	Enterprise	305
	Farmer	256
	Other	92

3.2 Health Literacy Level of Rural Residents

The survey shows that the overall health literacy level of rural residents in Fengqiu County, Xinxiang City, Henan Province in 2024 was 24.17%, that is, 24 people out of 100 people had knowledge of health literacy. Those with basic knowledge and conceptual ability account for 23.54%, those with lifestyle and behavioral ability account for 24.75%, and those with health skills account for 18.33%. The knowledgeability of rural residents of Fengqiu County in the six categories of health issues possesses 29.20% of scientific health concept knowledge, 18.25% of infectious disease prevention and control knowledge, 4.23% of chronic disease prevention and control knowledge, 30.17% of safety and first aid knowledge, 20.19% of basic medical knowledge, and 19.55% of health information knowledge (Table 2).

Table 2 Rural Residents' Scores on Health Literacy in General, the Three Dimensions, and the Six Categories of Health Problems (n=1233)

Variable	Health literacy (%)		Health literacy level (%)
	Yes	No	
Health literacy level	298 (24.17)	935 (75.83)	24.17
Three Dimensions of Health Literacy	Availability of health literacy	298 (24.17)	935 (75.83)
	Basic knowledge and concepts	290 (23.54)	943 (76.46)
	Healthy Lifestyle and Behavior health skills	305 (24.75)	928 (75.25)
Six categories of health literacy issues	scientific concept of health	226 (18.33)	1007 (81.67)
	Prevention and control of infectious diseases	360 (29.20)	873 (70.80)
	Prevention and treatment of chronic diseases	225 (18.25)	1008 (81.75)
	Safety and First Aid	52 (4.23)	1181 (95.77)
	basic medical care	372 (30.17)	861 (69.83)
	Health Information	249 (20.19)	984 (79.81)

3.3 Scores and Differential Analysis of Health Literacy by Gender, Age, Occupation, and Education Level

3.3.1 Scores and differential analysis of health literacy among rural residents by gender and age

The study shows that among the 1233 surveyed subjects, 200 males have health literacy ability, with a health literacy level of 67.23%, and 98 females have health literacy ability, with a health literacy level of 32.77%, and the difference in health literacy level among genders is statistically significant ($\chi^2=18.73$, $P < 0.0001$), indicating that gender is a factor that influences the health literacy level of rural residents in Fengqiu County, with males having higher health literacy level than males, and that gender is a factor that influences the health literacy level of rural residents in Fengqiu County. Literacy level, with males higher than females. In terms of age distribution, the health literacy level of those under 18 years old is the lowest, 12.96%, and the 18-25 age group is the highest, 62.18%, and the difference in the health literacy level of rural residents between different age groups is statistically significant ($\chi^2=34.39$, $P < 0.0001$) (Table 3).

Table 3 Differential Analysis of Health Literacy Levels of Rural Residents by Gender and Age

Variable	n (%)	Health literacy n (%)		Health literacy level (%)	χ^2	P
		Yes (298)	No (935)			
Gender	Male	685 (50.55)	200(67.23)	485(51.87)	29.20	< 0.0001
	Female	548 (49.45)	98(32.77)	450(48.13)	17.88	
age (Year)	≥15	108 (8.75)	14(4.75)	94(13.69)	12.96	34.39
	≥18	121 (9.82)	76(25.37)	45(15.94)	62.81	
	≥25	213 (17.24)	52(17.58)	161(16.47)	24.41	
	≥30	234 (18.96)	53(17.62)	181(17.11)	22.64	
	≥40	257 (20.87)	45(15.21)	212(16.26)	17.51	
	50-59	300 (24.36)	58(19.47)	242(20.53)	19.33	

3.3.2 Scores and differential analysis of rural residents' health literacy in different occupations and educational levels

The study showed that 385 rural residents with elementary school education or below, accounting for 31.26%, had the lowest health literacy level of 3.67%, and the difference between different education levels was statistically significant ($\chi^2=284.1$, $P<0.0001$), and as the education level rose, the health literacy level of the rural residents also increased. In terms of occupation, farmers had the lowest health literacy level of 12.11%, and the difference in health literacy level between different occupations was statistically significant ($\chi^2=61.30$, $P < 0.0001$) (Table 4), indicating that occupation is an influential factor affecting health literacy level and that health literacy level of manual labor groups such as farmers and workers is even lower.

Table 4 Differential Analysis of Health Literacy Levels of Rural Residents in Different Occupations and Educational Levels

Variable	n (%)	Health literacy n (%)		Health literacy n (%)	χ^2	P
		Yes (298)	No (935)			
Educational level	Below primary school	385 (31.26)	14 (4.84)	371 (39.68)	3.67	284.1 < 0.0001
	Primary school	313 (25.38)	50 (16.73)	263 (28.13)	15.97	
	Junior high school	273 (22.14)	86 (28.75)	187 (20.00)	31.50	
	High school	208 (16.89)	103 (34.58)	105 (11.23)	49.52	
	University (including college) and above	54 (4.33)	45 (15.10)	9 (0.96)	83.33	
Occupation	Civil servants or public institution personnel	130 (10.54)	57 (19.21)	73 (7.81)	43.85	61.30 < 0.0001
	Medical staff	96 (7.82)	31 (10.27)	65 (6.95)	32.29	
	Teacher	108 (8.73)	35 (11.92)	73 (7.81)	32.41	
	Student	247 (20.00)	66 (22.15)	181 (19.36)	26.72	
	Enterprise	305 (24.72)	63 (21.26)	242 (25.88)	20.65	
	Farmer	256 (20.73)	31 (10.25)	225 (24.06)	12.11	
	Other	91 (7.46)	15 (5.04)	77 (8.24)	16.30	

4 DISCUSSION

4.1 Basic health literacy of rural residents in Fengqiu County

According to the survey, the overall health literacy level of rural residents in Fengqiu County, Xinxiang City, Henan Province, in 2024 was 24.17%, i.e, 24 out of every 100 people were health literate, which was lower than the national rural residents' health literacy level of 26.23% in 2023, and lower than the average health literacy level of Chinese residents of 29.70% in 2023, and lower than that of national urban residents' health literacy level of 33.25%. According to "Health Literacy of Chinese Citizens - Basic Knowledge and Skills", health literacy is divided into 3 aspects, i.e. basic health knowledge and concepts, healthy lifestyle and behavior, and basic skills. Rural residents of Fengqiu County have 23.54% basic knowledge and conceptual ability, 24.75% lifestyle and behavioral ability, and 18.33% health skills, which is also lower than the urban and rural residents' basic knowledge and conceptual literacy level of 42.00%, healthy lifestyle, and behavioral literacy level of 32.21%, and basic skills literacy level of 26.76%. Fengqiu County rural residents of the six categories of health issues knowledge ability to know scientific health concepts accounted for 29.20%, knowledge of infectious disease prevention and control accounted for 18.25%, chronic disease prevention and control knowledge accounted for 4.23%, safety and first aid knowledge accounted for 30.17%, basic medical knowledge accounted for 20.19%, health information knowledge 19.55%, is much lower than the national level of literacy of the six categories of health issues: safety and first aid literacy 59.33%, health information literacy 59.33% and first aid literacy 59.33%. And first aid literacy 59.33%, scientific health concept literacy 54.71%, health information

literacy 41.05%, chronic disease prevention and treatment literacy 30.43%, basic medical care literacy 28.84%, and infectious disease prevention and treatment literacy 28.02% [22].

The health literacy of rural residents in Fengqiu County is lower than the national level mainly because of the following reasons.

First, although Fengqiu County is a place of longevity, it was once a poverty-stricken county at the national level with a relatively low level of economic development. The weak economic foundation of rural Fengqiu County and the limited income of its residents make it difficult to invest in health resources, such as purchasing abundant healthy food, participating in paid fitness activities, or obtaining advanced medical services, which limits the material conditions for improving health literacy [23]. Second, lack of educational resources. Inadequate local educational resources have led to a generally low level of education among residents, and their ability to understand, learn, and apply complex health knowledge is weak, making it difficult for them to deeply understand health concepts and skills [24]. In addition, traditional concepts have far-reaching influence. Some traditional and unscientific health concepts persist in rural areas, such as overreliance on folk remedies and downplaying of preventive health care, which hinders the dissemination and acceptance of modern health knowledge [25]. In addition, the primary health care system is incomplete. Outdated medical facilities and a shortage of specialized medical personnel make it difficult to provide systematic and effective health education, and residents' access to accurate health information is limited [26]. Finally, information dissemination is lagging. Rural residents rely mainly on traditional media, such as television and radio, and underutilize new and informative communication channels, such as the Internet, resulting in untimely and incomplete updates of health knowledge [27].

4.2 Analysis of Differences in Rural Residents' Health Literacy Level by Gender, Age, Education Level, and Occupation

The present study shows that the difference in the health literacy level of rural residents in gender is significant, indicating that gender is a factor affecting the health literacy level of rural residents in Fengqiu County, and males are higher than females; and the difference in health literacy of rural residents between different ages is significant, with the lowest level of health literacy under the age of 18 years old, 12.96%, and the highest level in the age group of 18-25 years old, 62.18%, and with the increase of age, the health literacy level has a decreasing trend, which is consistent with the findings of Wenna Wang et al [28-29]. This may be because in rural areas, the traditional division of gender roles affects the level of health literacy. Men tend to be more involved in social and economic activities and have more access to external resources such as health literacy lectures and training. Women, on the other hand, are mainly responsible for household chores and taking care of the family, so their scope of activities is relatively narrow and their access to health knowledge is limited, resulting in a higher level of health literacy among men than among women. 18-25-year-olds, who grew up in an era of more advanced information dissemination and whose school education included a certain amount of health knowledge education, are more receptive to new knowledge. People under the age of 18 have less accumulated health knowledge. As they grow older, the elderly are influenced by traditional concepts and are less receptive to new health ideas and knowledge, while their ability and channels for acquiring information are not as good as those of young people, leading to a decrease in health literacy with age.

Education level also has an important impact on residents' health literacy, residents with high education levels have significantly higher health literacy levels than those with low education levels, the higher the education level, the higher the health literacy level of the residents, at the same time, occupation also has a significant impact on the level of health literacy, people engaged in certain occupations (e.g, civil servants) have a higher level of health literacy, whereas people engaged in agriculture or manual labor occupations have a lower level. Occupation is an influencing factor on the level of health literacy, and farmers, workers, and other manual labor groups have a lower level of health literacy, which is consistent with the findings of Zhao Y. et al [30-32] and others. This may be because highly educated residents have strong learning ability and knowledge comprehension ability, and can actively acquire health knowledge through a variety of ways, such as reading specialized books and research reports. On the other hand, residents with low educational attainment have difficulties in acquiring and understanding complex health knowledge and lack the awareness and ability to learn health knowledge on their own, thus their health literacy is lower. Civil servants and other professions usually have a better working environment, and their organizations attach importance to the health of their employees and will carry out health-related training and publicity. Farmers and workers, on the other hand, are engaged in long-term physical labor, with high work intensity and working environments that are not conducive to the learning of health knowledge, and they are engaged in occupations that seldom involve health-related training, so the level of health literacy is lower.

5 RECOMMENDATIONS

5.1 Economic Support and Resource Optimization

Relevant departments should increase the economic support for rural areas in Fengqiu County, promote the upgrading and diversification of rural industries, and improve the income level of residents. For example, the development of specialty agricultural products such as honeysuckle and raspberry processing industry extends the agricultural industry chain, and increases the added value of agricultural products, so that farmers can increase their income, and thus have more funds to invest in the field of health. At the same time, the rational allocation of resources increases investment in

rural health infrastructure construction, improves the facilities and equipment of primary medical and health institutions, ensures that residents can conveniently access basic medical services and health checks, and provides material protection for improving health literacy.

5.2 Educational Enhancement and Knowledge Popularization

5.2.1 Strengthen the rural education system and improve the overall quality of education

Increase investment in education, improve school conditions, attract excellent teachers, and provide students with a more comprehensive education, including a systematic health education program, to cultivate health awareness and knowledge from an early age.

5.2.2 For adult residents, carry out various forms of health knowledge popularization activities

Make use of agricultural leisure time to organize health knowledge lectures and trainings, inviting medical professionals to explain the prevention and treatment of common diseases and the adoption of healthy lifestyles. Health knowledge brochures, posters, and other publicity materials are produced and distributed to farm households, with content that is easy to understand and close to the reality of rural life. And make full use of new media platforms, such as the establishment of a public number for rural health knowledge, to regularly push health information suitable for rural residents, and to facilitate residents to learn at any time.

5.3 Conceptual Change and Cultural Guidance

5.3.1 Correct traditional wrong health concepts

Through publicity and case lectures, residents are made to realize the limitations of folk remedies and the importance of scientific preventive health care. For example, carry out health science publicity week activities, focusing on displaying cases comparing scientific health knowledge and misconceptions, and guiding residents to establish correct concepts.

5.3.2 Foster a healthy cultural atmosphere

Organize health-themed cultural activities in rural communities, such as health knowledge contests and healthy lifestyle displays, and reward residents or families with outstanding performance to motivate more people to actively participate, so that health concepts can be deeply rooted in people's minds and a good health culture can be formed.

5.4 Medical Service Improvement and Career Support

5.4.1 Strengthen the construction of the primary medical and healthcare service system

Increase the training of grassroots medical and nursing staff, improve their professionalism and health education capabilities, and encourage medical and nursing staff to go into rural families to provide health guidance. Establishing and improving residents' health records, realizing dynamic management of health information, and providing a basis for personalized health services.

5.4.2 Carry out health literacy promotion work for different occupational groups

For farmers and workers, taking into account their occupational characteristics, training in the prevention and treatment of occupational diseases, labor safety, and health has been carried out, and health bulletin boards have been set up in workplaces to regularly update the content of health knowledge. For occupations such as highly educated groups or civil servants, they are encouraged to play the role of demonstration and leadership, leading those around them to pay attention to their health, and at the same time further provide professional health management training and mental health counseling, etc, to enhance the depth and breadth of their health literacy.

6 CONCLUSION

The overall health literacy level of rural residents in Fengqiu County, as well as the results of the three aspects of basic health literacy knowledge and concepts, lifestyles and behaviors, and health skills, and the six types of health literacy questions, are lower than the national level, gender, age, education level, occupation, etc. can affect the health literacy level of rural residents, and the relevant departments should take strong measures to promote the improvement of the level of health literacy of rural residents.

COMPETING INTERESTS

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