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ORIGINAL RESEARCH

Current Status and Associated Factors of Health Information Literacy Among the Community Elderly in Central China in the COVID-19 Pandemic: A Cross-Sectional Study

Pan Li[1,2], Jiaming Zhong[3], Huiqiong Chen[1], Ting Qin[1], Lingyao Meng[2]

[1]School of Nursing, Xiangnan University, Chenzhou, 423000, People's Republic of China; [2]College of Nursing and Allied Health Sciences, St. Paul University Manila, Manila, Philippines; [3]University Library, Xiangnan University, Chenzhou, 423000, People's Republic of China

Correspondence: Lingyao Meng, College of Nursing and Allied Health Sciences, St. Paul University Manila, 680 Pedro Gil St, Malate Manila, 1004, Philippines, Tel +86 15308463139, Email lingyao.meng@spumanila.edu.ph

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Purpose: COVID-19 posed a threat to the public's physical and mental health, and under outbreak control, the opportunities to go outside of the elderly have been reduced and making it more difficult to access health information and detrimental to their health management. This study aims to assess the current status of health information literacy (HIL) among older adults in the community in the context of COVID-19 and to identify its associated factors.

Methods: A cross-sectional survey was conducted from April to July, 2021, for which 617 community elderly members were recruited in Chenzhou, China. Data were collected through a general information questionnaire, The Chinese residents' HIL self-rated scale and a reliability evaluation form.

Results: The average score of HIL was 75.87 ± 9.85, and after processed by the 100-point system, we found 84.12% (519/617) of the participants scored less than 60 points, which indicates that the overall level of HIL among the community elderly is low. Multiple linear regression showed that age, gender, education, annual family Income, living arrangement, and chronic disease status (β = –0.341, –0.296, 0.384, 0.327, 0.296, 0.356, respectively; all $P < 0.001$) were significantly associated with the level of HIL found among the community elderly, out of which education was the most important associated factor.

Conclusion: The overall HIL level among the community elderly was low in Central China during the COVID-19 pandemic. Our results further prove the need for tailor-made health education programs for this group, with particular attention paid to the low-educated and low-income among them. Those measures must highlight on three aspects of health information search, evaluation, and application skills to offer useful experiences that improve the HIL level of the elderly and strengthen their ability to cope with emerging public health events.

Keywords: awareness, health information literacy, community elderly, information skill, COVID-19, public health emergencies

Introduction

The COVID-19 pandemic has profoundly impacted all aspects of society, including the mental and physical health of its residents.[1–3] According to the Organisation for Economic Co-operation and Development (OECD), from March 2020 onwards, the prevalence of anxiety and depression increased and even doubled in some countries.[4] Not only is there tremendous pressure on our health care system, but also the HIL of our old population is facing serious challenges.[5] Good health information literacy could guide people to adopt scientific protection and choose medical measures, meanwhile, the correct health information awareness and health information behavior are particularly important and even life-relating during the epidemic.[6,7]

The Medical Library Association (MLA) defined Health information literacy (HIL) as a series of abilities that can help individuals identify health information needs, recognize possible information sources, use them to retrieve relevant

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information, assess the quality of information and its specific application scenarios, and make rational health decisions.[8] It is the reflection of an individual's ability to access, evaluate, and apply health information, and its level is related to the effectiveness of health education and the state of health engagement in a given region.[9]

According to the results of the seventh national census of China, the population of China aged 60 and above was 264.02 million (18.70%), and the proportion of the population aged 65 and above was 13.5%.[10] At present, China has become the country with the largest elderly population with the fastest aging rate in the world.[11] Previous studies found that the most important information needs of the elderly in their daily lives are health information needs because the elderly have a higher concern for health issues than other age populations.[12,13] However, it is worth worrying that the elderly in both developed and developing countries have common dilemmas in understanding, identifying, accessing and using health information to solve health problems. Studies have reported that the elderly in both South Korea and the United States are used to accessing health-related information through medical staff and have lower usage of the Internet.[14,15] Huvila et al found that the elderly have difficulties understanding health terms, drug packaging labels, and so on. When comparing information from multiple sources, it is difficult for them to determine their own health information needs.[16] Mcnutt et al found that when faced with health-related decisions, elderly patients have to deal with a large amount of complex treatment information in a short time, which causes great stress.[17] This indicates that the elderly, who are not skilled at analyzing and understanding health information, will be inflicted with a negative mood harming their mental health. During the pandemic of COVID-19, fewer opportunities to go outside reduce the accessibility of traditional means for older adults to obtain health information (eg, by borrowing health books, participating in community healthcare activities, or consulting medical staff at hospitals) and transfer to need to use the social media, such as television, cell phones, and the Internet.[18,19] The elderly often do not provide the health knowledge needed to meet their needs because of their inadequate knowledge and use of information technology.[20,21] On the other hand, the integration of digital applications into life has become a trend in response to national epidemic prevention and control normalization.[22] While the Internet has granted unprecedented convenience and efficiency to people in modern times, the elderly have gradually become a marginal group in the Internet era because they cannot keep up with the rhythm of information updates—like "digital refugees" cut off from the rest of the world.[23,24] Due to the distance between the elderly and digital technology, they cannot quickly keep up with the rhythm of information technology—for example, they have difficulties using health codes and Internet medical care.[25–27] In the face of a huge amount of information on epidemics, improving HIL is key to ensuring that the elderly can effectively access, understand, analyze, screen, and correctly utilize epidemic information.[28] Therefore, it has become an urgent social problem to understand the current situation of HIL among the community elderly and to study the path to improving this literacy among them.

In the literature, a number of studies have explored the status of HIL and its influence factors, and the targeted participants included the public, university students and the medical staff population,[29–31] but less attention focused on the elderly of the community. Further, although nationwide surveys have conducted in China, information on specific regions remains limited. The major objective of this study was to assess the HIL levels of community elderly in Central China and identify the influence factors.

Materials and Methods

Study Design

A descriptive cross-sectional design was used in a survey study conducted from April 2021 to July 2021.

Participants and Sample

After receiving ethical approval from Xiangnan University's committee, six communities in Chenzhou, Central China, were first selected by random sampling. Then, we contacted the managers of these communities, all of whom expressed their willingness to participate in this study. They were, therefore, assigned as representatives of their communities and acted primarily as contractors and liaisons between the communities and our research team. Finally, a convenience sampling method was used to select 120 older adults aged 60 years and more from each community, who were surveyed using the Chinese residents' HIL self-rated

scale,[28] and a self-made sociodemographic questionnaire. The participants were recruited by researchers and community workers based on a questionnaire distributed according to the following inclusion criteria: 1) be aged ≥ 60 years; exhibit consciousness and no language impairment; 3) have inhabited the community for at least one year; and 4) agree to participate in the study. The elderly who refused or were unable to cooperate with the researchers and withdrew in the middle were excluded. The sample size in this study using G * Power resulted in a required minimum sample size of 160 (effect size = 0.15; P = 0.05; Power = 0.95). Assuming a loss of 20% in the sample, the necessary sample size was determined to be at least 200 cases.

Survey Tools

The questionnaire employed in this study consisted of three parts: a general information questionnaire, the Chinese residents' HIL self-rated scale, and the reliability evaluation form.

General Information

The general information questionnaire included age, gender, education, religion, annual family income, living arrangements, chronic disease status, and self-care ability.

The Chinese Residents' HIL Self-Rating Scale

This scale was developed by Wang et al,[32] was used to assess the HIL level of the elderly in the community and included the five dimensions of health information cognition (HIC), health information search (HIS), health information evaluation (HIE), health information application (HIA), and health information moral (HIM), which comprised 29 items and was scored on a 5-Likert scale ("very disagreed" = 1, "disagreed" =2, "unclear" =3, "agreed" =4, and "very agreed" =5 points), and a total score of 145 points. The overall Cronbach's alpha coefficient of this scale was 0.847, and Cronbach's alpha coefficient for the HIC, HIS, HIE, HIA and HIM sub-dimensions were 0.783, 0.917, 0.832, 0.874, and 0.872, respectively. The higher the score gained by the participants, the higher the level of HIC. The scale has good validity and reliability, with Cronbach's alpha coefficient > 0.75.

Reliability Evaluation

A self-made reliability evaluation form was further used to evaluate common health information access sources. All investigators were required to receive training before they began their investigations. First, they obtained some basic health information about the elderly in the community, and after confirming who met the requirements of the study's subjects, they explained the purpose of the survey, precautions, and the technique of filling out the questionnaire in detail. They also assured participants that their privacy would be protected. Some of the participants filled out the questionnaires by themselves on the spot, and the family members or investigators provided those who could not do so independently with the necessary assistance.

A total of 720 questionnaires were distributed. Subsequently, after removing 103 invalid questionnaires that contained continuous repetitions, regular answers, and logical contradictions, among others, 617 valid questionnaires were included in this study, which had an efficiency rate of 85.69% (617/720).

Statistical Analysis

Statistical data were analyzed using SPSS 23.0. Frequencies and percentages were used to describe the basic profile of the elderly in the community and to evaluate the reliability of various health information access channels. An independent two-sample *t*-test and analysis of variance (ANOVA) were used to test the differences between HIL and the demographic characteristics of the community elderly. This was followed by multiple linear regression to identify factors influencing HIL, and the significance level was set at 0.05 (two-sided) for all analyses.

Results

Demographic Characteristics

The sample comprised 617 participants with an average age of 67.45 ± 10.06 years (range: 60–85 years); the majority of the participants were 60–70 years old (58.51%). Further, there were 302 males (48.95%) and 315 females (51.05%). More than two-thirds of the participants (63.86%) had been through middle or high school education, and over four-fifths of them (84.60%) had no religious beliefs. Nearly half of the annual family Income was around 30,000 to 50,000 RMB (49.27%). Almost half of the participants lived with their spouses (46.84%); more than half of the participants reported chronic diseases (58.51%), and nearly two-thirds of the participants had the ability to completely take care of themselves (64.34%). More demographic details are presented in Table 1.

Differences Between the HIL and the Community Elderly's Demographics

In order to represent the results more intuitively, the scores of HIL were processed using the 100-point system. There were 519 people with HIL scores < 60, accounting for 84.12% (519/617). Additionally, among the remaining 98 people, the highest scores did not exceed 75, which shows that the overall level of HIL in the community elderly's population in our city is low. Meanwhile, the HIC score (70.7 points) of the subjects in this study was higher than that of the other four dimensions: HIS (38.38 points), HIE (60.97 points), HIA (55.29 points), and HIM (58.0 points), among which the HIS score was the lowest.

After the *t*-test and ANOVA, the results show there are significant differences in the comparison of HIL total scores and 5 sub-dimensions scores among the community elderly with education, family income, living arrangements, and a chronic disease status ($P < 0.05$). And the elderly with an education level above senior high school, an annual family income > 50,000 yuan, living with children, or without chronic diseases achieved higher scores.

In the aspect of the sub-dimensions score, the bivariate analysis revealed that age and gender were correlated with HIC, HIS, HIE, and HIA dimensions and the total HIL score ($P < 0.05$), and who aged 60–70 years old or the female achieved high scores. It should be highlighted here that the comparison between the HIM dimension was the only exception, yielding no statistically significant difference ($P > 0.05$) (see Table 2).

Table 1 Demographic Characteristics of the Community Elderly (n=617)

Variables	Grouping	n	%
Age group (y old)	60–70	361	58.51
	70–80	232	37.60
	>80	24	3.89
Gender	Male	302	48.95
	Female	315	51.05
Education	≤Primary School	141	22.85
	Junior school/Senior school	394	63.86
	>Senior High School	82	13.29
Religion	Yes	95	15.40
	No	522	84.60
Annual family Income	<30,000	215	34.85
	30,000–50,000	304	49.27
	>50,000	98	15.88
Living arrangement	Alone	191	30.96
	Living with spouse	289	46.84
	Living with children	137	22.20
Chronic diseases status	Yes	361	58.51
	No	256	41.49
Self-care ability	Completely	397	64.34
	Partially	220	35.66

Table 2 Differences Between the HIL and the Community Elderly's Demographics

Variables	Dimensions					
	HIC	HIS	HIE	HIA	HIM	HIL
Score	14.14±2.17	23.03±4.62	15.72±2.25	11.27±2.73	11.71±1.53	75.87±9.85
Age group (y old)						
60–70	14.62±2.31	24.06±5.72	16.12±2.28	11.82±2.91	11.79±1.75	78.41±10.69
70–80	13.54±2.26	22.31±5.67	15.23±2.21	10.46±2.74	11.53±1.68	72.97±11.47
>80	12.79±1.82	20.06±2.94	14.54±1.86	10.91±1.46	12.03±1.57	70.33±6.43
F/P	20.33/<0.001	10.85/<0.001	14.64/<0.001	16.81/<0.001	2.07/0.126	21.16/<0.001
Gender						
Male	13.14±2.13	22.14±5.14	14.37±2.21	10.53±2.73	11.98±1.67	72.16±9.87
Female	14.86±2.43	24.53±2.87	15.86±2.49	11.64±2.83	11.53±1.69	78.42±10.72
t/P	9.334/<0.001	7.091/<0.001	4.636/<0.001	4.955/<0.001	0.369/0.712	7.405/<0.001
Education						
≤Primary School	13.43±1.85	19.65±4.14	14.35±1.76	9.73±2.95	11.42±1.73	68.58±8.76
Middle School	12.94±2.25	23.43±3.85	14.45±2.42	10.53±2.53	11.38±1.41	72.13±8.94
≥High School	14.67±2.36	26.71±5.41	16.03±2.51	11.87±2.67	11.97±1.49	81.25±9.45
F/P	43.88/<0.001	80.42/<0.001	17.45/<0.001	16.88/<0.001	5.32/<0.005	52.81/<0.001
Religion						
Yes	14.03±1.53	23.41±2.24	15.82±1.53	11.03±1.56	11.98±1.15	76.27±9.64
No	14.22±1.58	23.01±2.21	15.69±1.52	11.45±1.58	11.43±1.17	76.02±8.94
t/P	1.108/0.268	0.647/0.517	1.032/0.302	1.023/0.307	1.152/0.249	0.476/0.635
Annual family Income						
<30,000	13.06±1.85	20.52±4.63	14.27±2.23	9.89±2.86	11.53±1.82	69.27±9.42
30,000–50,000	13.43±2.25	23.31±5.13	15.67±2.18	11.38±2.64	11.14±1.63	74.93±9.87
>50,000	14.86±2.38	25.87±5.94	15.97±2.84	13.53±2.58	11.85±1.34	82.08±12.12
F/P	24.41/<0.001	40.69/<0.001	24.05/<0.001	62.03/<0.001	7.88/<0.001	52.22/<0.001
Living arrangement						
Alone	13.16±1.82	21.03±2.43	14.76±1.65	9.21±2.03	10.13±1.53	68.29±9.21
Living with spouse	14.82±1.96	23.06±2.96	15.94±1.72	10.35±2.46	11.25±1.67	75.42±9.67
Living with children	15.73±2.24	24.74±3.41	17.25±2.06	11.79±2.58	12.45±1.89	81.96±10.15
F/P	53.48/<0.001	66.57/<0.001	78.29/<0.001	47.71/<0.001	79.11/<0.001	81.83/<0.001
Chronic diseases status						
Yes	13.47±2.31	22.19±5.34	15.17±2.05	10.82±2.65	11.47±1.65	73.12±9.54
No	15.62±2.43	24.06±5.62	16.43±2.36	11.97±2.71	12.18±1.74	80.26±10.05
t/P	8.754/<0.001	6.541/<0.001	5.613/<0.001	4.782/<0.001	5.669/<0.001	7.351/<0.001
Self-care ability						
Completely	14.29±2.24	23.14±5.35	15.91±2.16	11.07±2.69	11.86±1.74	76.37±9.73
Partially	13.26±2.21	22.98±5.31	15.12±2.14	10.82±2.62	11.71±1.71	73.89±9.64
t/P	1.761/0.079	0.245/0.806	1.879/0.061	1.116/0.265	1.032/0.303	1.644/0.101

Abbreviations: HIC, health information cognition; HIS, health information search; HIE, health information evaluation; HIA, health information application; HIM, health information moral; HIL, health information literacy.

Multivariate Linear Regression Analysis of the Community Elderly

The results of the multiple linear regression analysis show that age, gender, education, annual family income, living arrangement, and chronic disease status were all associated factors for HIL among older adults in the community ($P < 0.05$), as shown in Table 3. (Independent variable assignment rule: age: 1=60–70 years old, 2=70–80 years old, 3≤80 years old; Gender: 1=male, 2=female; Education level: 1=primary school or below, 2=junior high school/senior high school, 3=senior high school or above; Annual family income: 1=less than 30,000 yuan, 2=3~50,000 yuan, 3=above 50,000 yuan; Living arrangement: 1=alone, 2=living with spouse, 3=living with children; Chronic diseases status: 1=yes, 2=no.)

Table 3 Multivariate Linear Regression Analysis of the Community Elderly

Variables	β	S_X	*t* value	*P* value	Standardized Partial Regression Coefficient
Constant	0.903	0.301	23.152	<0.001	–
Age	−0.859	0.286	18.439	<0.001	−0.341
Gender	−0.796	0.265	17.065	<0.001	−0.296
Education	1.034	0.345	22.036	<0.001	0.384
Annual family income	0.947	0.316	20.145	<0.001	0.327
Living arrangement	0.912	0.304	19.874	<0.001	0.296
Chronic diseases status	0.982	0.327	21.335	<0.001	0.356

Table 4 Reliability Evaluation of Common Health Information Access Sources (n/%)

Variables	Common Health Information Access Sources					
	Families and Friends	Consultation from Doctor	Internet	Pharmaceutical Advertising	Health-Related TV Programs	Books and Newspapers
Reliable	334 (54.13)	557 (90.28)	53 (8.59)	45 (7.29)	428 (69.37)	305 (49.43)
Unknown	226 (36.63)	39 (6.32)	465 (75.36)	139 (22.53)	106 (17.18)	236 (38.24)
Unreliable	57 (9.24)	21 (3.4)	99 (16.05)	433 (70.18)	83 (13.45)	76 (12.33)

Reliability Evaluation of Common Health Information Access Sources

The values of respondents' reliability evaluations are ranked from the highest to the lowest, in the following order: doctor consultations (90.28%), health-related TV programs (69.37%), family and friends (54.13%), books and newspapers (49.43%), the Internet (8.59%), and pharmaceutical advertisements (7.29%), as shown in Table 4.

Discussion

The results of this study show that the overall level of HIL in the community elderly population during the COVID-19 pandemic was low, with 84.12% of them scoring < 60, compare to another study using the same scale, which is below the 83.26% of the result obtained by Luo et. al,[33] may be related to the difficulties of access reliable health information have increased because of the range of outdoor activities for the elderly is limited by the background of the COVID-19.

From the dimension perspective, the score of HIC of the elderly in the community is higher than their HIS, HIE, and HIA (70.7 points VS 38.38, 60.97, and 55.29 points). This is probably because they live in communities which have more opportunities to participate in traditional community activities and to learn about the importance of health information and its relation to the maintenance of health from this social participation, so they have developed good health information cognitive. However, they are not skilled at searching for health information from social media, and the limitation of their possibility to participate in outdoor activities because of the COVID-19 pandemic, and the exposure to health information reduced by older adults makes it more difficult to make appropriate health decisions. Meanwhile, a good ability to search for health information is contributed to making correct health evaluations and applications.[34,35] Combined with the results of this study, the community elderly have the lowest score on HIS, we strongly recommend that the community should organize centralized health education programs targeting to teach how to use information technology to search for health-related information and to solve the difficulties encountered in the learning process face to face in time, and ensure the community elderly master the information acquisition ability. This is the basis to improve their evaluation and application abilities about health information, and beneficial to cultivate their ability to apply the health knowledge found on the Internet or social media to their self-management of health.

Our study showed that age, gender, education, annual family income, living arrangement, and chronic disease status were associated with the HIL level of the community elderly. Wang et al[36] reported the highest HIL levels in low-age elderly (60–69 years), followed by the group of 70–79 years, and the lowest in >80 years, which is consistent with the results of our study. The possible explanation could be that as their age increases, their receptiveness and understanding of health information gradually decrease, and they do not have active memory and enough energy to learn and accept new knowledge and skill. Consequently, the ways of accessing health information become limited, resulting in a low level of HIL.[37] This study found that women's health knowledge level is higher than that of men of the same age (β= 0.296; P<0.001), which is consistent with the research results of Aponte et al.[38] This may be related to the fact that women always play a caretaker role in the family and need to take care of daily affairs. Therefore, they may pay more attention to the health status of their families and tend to more actively obtain health information to promote their health management. The impact of educational level on HIL has been previously demonstrated, and participants with a higher level of education achieved higher HIL levels.[39] The elderly who has received a good education show high ability in learning awareness, understanding and communication, they are more active and valid in acquiring health information through communication with the staff of community service centre and hospital and accordingly adjust bad behaviour during their daily lives. Furthermore, those with higher annual family incomes have more ways to access health information and are willing to take medical physician examinations regularly. This may result in them having a good HIL level.[40,41] The elderly who live with their children are meticulously cared for by them and can broaden their access to health information through their children's help. This living arrangement is good for developing a higher level of HIL.[42,43] In addition, the community elderly with chronic diseases have reduced physical functions and are confronted with the difficulty of obtaining health information.[44] On the one hand, elderly people should maintain an open and positive attitude, show initiative to find health information, and focus on their physician and mental health. On the other hand, their children and communities should also offer correct guidance to improve their HIL level, give support to them in their daily lives, help them strengthen their attention toward major public health emergencies, and assist them with taking preventive measures.

The results of this reliability evaluation show that 90.28% of the community elderly members believe consulting a doctor is a highly reliable way of acquiring health information. This reflects the fact that most elderly people regard doctors as a trustworthy source of health information, and the establishment of effective doctor-patient communication can enable patients to obtain more effective health information and meet their health needs. In addition, related studies have shown that the Internet, an important channel for disseminating health information in modern society, can contribute to the improvement of HIL.[45,46] However, only 8.59% of older adults in this study considered the Internet reliable. This may be because of the lack of ability to identify the authenticity of information on the Internet among older adults which led most older adults to consider the Internet unreliable.[47,48] This suggests that the benefits of Internet health services and developing risk-avoidance skills should be further promoted in the future.

Conclusion

In summary, the overall level of HIL among the elderly in the community in the context of COVID-19 is low. And low-age elderly who have higher education and annual family income tended to show good HIL levels. In our study, the elderly showed a low score in 3 aspects of HIS, HIE and HIA, therefore, it's necessary to provide health education training based on information technology and targeted to strengthen their health information search, evaluation, and application skills to upgrade their HIL levels. This is of positive significance in terms of improving medical compliance, reducing treatment costs, relieving social medical pressure, and preparing for future responses to major public health emergencies.

Abbreviations

COVID-19, coronavirus disease 2019; HIL, health information literacy; HIC, health information cognition; HIS, health information search; HIE, health information evaluation; HIA, health information application; HIM, health information moral; MLA, Medical Library Association; OECD, Organization for Economic Cooperation and Development; ANOVA, analysis of variance.

Ethics Approval and Informed Consent

The study was conducted in strict accordance with the Helsinki Declaration. The study protocol was approved by the Ethics Committee of Xiangnan University. All participants who met the inclusion criteria received a questionnaire and provided informed consent. The questionnaires-maintained anonymity and described how confidentiality was ensured.

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Disclosure

The authors declare that they have no conflicts of interest in this work.

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