The Relationship Between Online Health Information Usage Habits and e-Health Literacy Among Middle-aged and Elderly Residents: Postprint

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Abstract

Background Both suppliers and consumers of health science popularization services are increasingly dependent on the Internet, and e-health literacy should become a primary skill for chronic disease patients to master. Objective To analyze the current status and existing problems of online health information usage habits and e-health literacy among middle-aged and elderly residents, explore the relationship between their online health information usage habits and e-health literacy levels, and provide references for improving their e-health literacy and developing suitable Internet health science popularization services. Methods From June to September 2021, using stratified sampling, 1,061 middle-aged and elderly individuals from communities in Shanghai were selected as research subjects. They were surveyed using a general information questionnaire and the Chinese version of the eHealth Literacy Scale (eHEALS) to understand their online health information usage habits and e-health literacy levels. Multiple linear stepwise regression was used to analyze the influence of online health information usage habits and other potential candidate factors on e-health literacy levels. Results A total of 1,019 valid questionnaires were collected, with an effective response rate of 96.04%. Regarding channels for seeking online health information, middle-aged and elderly residents primarily obtained information through following health-related accounts [411 cases (40.33%)], with less utilization of search functions or engines [336 cases (32.97%)], health management apps or mini-programs [254 cases (24.93%)], and online health communities [65 cases (6.38%)]. Regarding sources of online health information used, the information was less frequently obtained from medical institutions [397 cases (38.96%)] and individual medical professionals [187 cases (18.35%)]. The average total score on the Chinese version of eHEALS for the 1,019 middle-

aged and elderly residents was (27.62$\pm$8.57)*points.Therelativeweaklinksine−healthliteracywerelowerawarenessofhowtousetheInternettoanswertheirownhealthquestions*[*averagescoreo*points]. Multiple linear regression analysis showed that age, simultaneous participation in basic medical insurance and commercial medical insurance, whether the number of channels for seeking online health information was $ $2, whether the number of sources of online health information used was $ $2, forwarding and sharing of online health information, participation in collective online learning, and having a positive attitude toward online health information were influencing factors of e-health literacy levels among middle-aged and elderly residents. Conclusion The e-health literacy of middle-aged and elderly residents is at a moderate level, and various factors including online health information usage habits affect their e-health literacy. It is recommended to promote authoritative information integration and retrieval platforms among middle-aged and elderly residents, emphasize supervision and review of online health information platforms and age-friendly adaptations, and help middle-aged and elderly residents better utilize online health information and improve their e-health literacy levels by mobilizing multi-party resources including communities, families, health associations, and commercial medical insurance institutions.

Full Text

Habits of Using Online Health Information and eHealth Literacy in Middle-aged and Elderly Residents

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Abstract

Background
As both suppliers and consumers of health popularization increasingly depend on the Internet, eHealth literacy has become an essential skill for patients with chronic diseases.

Objective
This study analyzes the current status and challenges of online health information usage habits and eHealth literacy among middle-aged and elderly residents, explores the relationship between their online health information habits and

eHealth literacy levels, and provides evidence for improving eHealth literacy and developing appropriate Internet-based health popularization services.

Methods
From June to September 2021, a questionnaire survey was conducted among 1,061 middle-aged and elderly community residents in Shanghai selected through stratified sampling. The survey used a general information questionnaire and the Chinese version of the eHealth Literacy Scale (eHEALS) to assess online health information habits and eHealth literacy levels. Stepwise multiple linear regression was employed to analyze the influence of online health information habits and other potential factors on eHealth literacy.

Results
A total of 1,019 valid questionnaires were collected (96.04% response rate). For seeking online health information, residents primarily followed health-related accounts [411 (40.33%)], while less frequently using search functions or engines [336 (32.97%)], health management apps or mini-programs [254 (24.93%)], and online health communities [65 (6.38%)]. Information sources were predominantly commercial media [584 (57.31%)] and government or public health agencies [568 (55.74%)], with fewer using medical institutions [397 (38.96%)] or individual healthcare professionals [187 (18.35%)]. The mean total eHEALS score was (27.62$\pm$8.57).*RelativeweaknessesincludedlowawarenessofhowtousetheInternettoanswerhealthquestions*[*it*
Multiple linear regression revealed that age, concurrent basic and commercial medical insurance, using $ $2 information-seeking channels, using $ $2 information sources, forwarding/sharing online health information, participating in collective online learning, and having a positive attitude toward online health information were significant influencing factors (P<0.05).

Conclusion
Middle-aged and elderly residents have moderate eHealth literacy, influenced by online health information habits and other factors. Strategies should include promoting authoritative information integration and retrieval platforms, strengthening supervision and age-friendly adaptation of online health platforms, and mobilizing community, family, health associations, and commercial insurance institutions to help residents better utilize online health information and improve eHealth literacy.

Keywords: Middle-aged and elderly; eHealth Literacy; Health information; Usage habits; Internet; Community health services; Shanghai

Introduction

The rapid rise of the Internet has transformed health popularization, with both suppliers and consumers increasingly dependent on online platforms due to their speed, reach, interactivity, cost-effectiveness, and freedom from temporal and spatial constraints. The "Healthy China Action (2019–2030)" advocates ex-

tensive use of new media for Internet-based health popularization [1], and the implementation of routine COVID-19 prevention measures has further accelerated this trend. eHealth literacy refers to the comprehensive ability to seek, understand, and evaluate online health information, and to apply it to address personal health problems. It positively correlates with health behaviors [2-3] and is considered a primary skill for chronic disease patients [4-5]. While international research on eHealth literacy began earlier, Chinese scholars have increasingly focused on this area in recent years [6].

Against the backdrop of accelerating population aging in China, middle-aged and elderly individuals—as high-risk groups for chronic diseases—have become important target audiences for online health information. However, their eHealth literacy qualification rate remains low [7-8], creating difficulties and risks in using online health information effectively [9]. Studies suggest that individuals' eHealth literacy may be associated with their online health information usage habits [10-11], but existing research has primarily focused on younger populations and patients with specific chronic diseases, leaving a gap in studies on community-dwelling middle-aged and elderly groups. This study analyzes the current status and challenges of online health information habits and eHealth literacy among middle-aged and elderly residents, examines the relationship between their habits and eHealth literacy levels, and proposes strategies to improve their online health information usage habits and eHealth literacy, thereby providing guidance for large-scale Internet-based health popularization practices and enhancing intervention effectiveness.

Methods

Study Subjects

From June to September 2021, we conducted a stratified sampling of middle-aged and elderly residents from Shanghai communities. First, two central urban districts and two suburban districts were randomly selected from Shanghai. Then, 8–11 subdistricts/towns were randomly chosen from each district, followed by 1–2 communities from each subdistrict/town, yielding 51 communities total. Finally, convenience sampling was used to recruit 20 residents from each community for the questionnaire survey. Based on previous research indicating an 11.80% eHealth literacy qualification rate among middle-aged and elderly residents [7], we calculated the required sample size using the cross-sectional study formula $N = Z^2\alpha/2 \times P(1\text{-}P)/E^2$, with $\alpha = 0.05$ ($Z\alpha/2 = 1.96$), $P = 0.118$, and $E = 0.02$, resulting in $N = 999$.

Inclusion criteria: (1) Permanent community resident (living in the community for >6 months cumulatively in the past year); (2) Age $ $45 years; (3) Mental health stability; (4) Basic reading and communication ability; (5) Voluntary participation with signed informed consent. **Exclusion criterion:** Severe cardiopulmonary disease. This study was approved by the Ethics Review Committee of Shanghai Municipal Center for Health Promotion (Approval No.:

SHPERC-202201).

Survey Tools

1.2.1 General Information Questionnaire

Developed by the researchers based on literature review, this questionnaire collected data on gender, age, household registration location, education level, annual per capita household income, self-rated health status, medical insurance participation, co-residents, channels for seeking online health information (following health accounts, search functions/engines, health management apps/mini-programs, online health communities), sources of online health information (commercial media, government/public health agencies, medical institutions, individual healthcare professionals), forwarding/sharing habits, participation in collective online learning, and attitudes toward online health information.

1.2.2 Chinese Version of the eHealth Literacy Scale (eHEALS)

We used the Chinese version of eHEALS translated and revised by Guo Shuaijun et al. [12] to assess eHealth literacy. The scale comprises three dimensions (application, evaluation, and decision-making abilities regarding online health information and services) with eight items scored on a 5-point Likert scale from "strongly disagree" to "strongly agree" (1–5 points). Total scores range from 8 to 40, with higher scores indicating better eHealth literacy. In this study, the scale demonstrated good reliability (Cronbach' s $\alpha = 0.956$) and validity (KMO = 0.926).

Data Collection

Community health center staff and subdistrict health education personnel served as surveyors. Before the survey, the research team provided unified training on the survey purpose, questionnaire content, instructions, and completion requirements. Participants completed questionnaires on-site independently; those unable to do so received assistance through interviewer-administration. Surveyors checked all questionnaires for completeness, legibility, and logical errors, with immediate correction of any issues. Questionnaires with uniform responses, obvious patterns, or incomplete information were deemed invalid and excluded.

Statistical Methods

Data were entered using EpiData 3.1 and analyzed with SPSS 24.0. Double parallel entry was employed, with two researchers independently analyzing the data according to unified rules. Categorical data were described using relative frequencies, and continuous data using ($\bar{x}\pm s$). Two-group comparisons used independent samples t-tests, while multi-group comparisons used one-way ANOVA. Stepwise multiple linear regression ($\alpha\{entry\} = 0.05$, $\alpha\{\text{exit}\} = 0.10$) analyzed the influence of online health information habits and other factors on eHealth literacy. $P<0.05$ was considered statistically significant.

Results

General Characteristics

Of 1,061 distributed questionnaires, 1,019 valid responses were collected (96.04% validity). The 1,019 participants included 591 females (58.00%), aged 45–89 years with a mean age of (63.7$±$9.2) years. Most had urban household registration [868 (85.18%)], high school education [356 (34.94%)], and good or relatively good self-rated health [585 (57.41%)]. The majority [863 (84.69%)] did not concurrently participate in both basic and commercial medical insurance, and 491 (48.18%) lived with younger generations.

Online Health Information Habits

Information-seeking channels: Residents primarily followed health-related accounts [411 (40.33%)], with less utilization of search functions/engines [336 (32.97%)], health management apps/mini-programs [254 (24.93%)], and online health communities [65 (6.38%)]. Only 29.24% (298/1,019) used $ $2 channels.

Information sources: Commercial media [584 (57.31%)] and government/public health agencies [568 (55.74%)] were the main sources, while medical institutions [397 (38.96%)] and individual healthcare professionals [187 (18.35%)] were less common. Most residents [58.29% (594/1,019)] used $ $2 information sources.

Sharing and learning: 337 (33.07%) frequently forwarded/shared online health information, 379 (37.19%) occasionally did so, and 303 (29.74%) rarely did. 459 (45.04%) participated in collective online learning, and 810 (79.49%) held positive attitudes toward online health information.

eHealth Literacy Status

The mean total eHEALS score was (27.62$±$8.57).$The three lowest-scoring items were: "I know how to use the Internet to answer my health questions"[(3.36±1.27)], "I have the skills to$ $quality from low-quality health resources on the Internet"[(3.39±$1.22)] (Table 1).

Comparisons by Characteristics

Significant differences in eHEALS scores were found across age groups, household registration, education level, annual per capita income, self-rated health status, concurrent basic and commercial medical insurance, co-residence with younger generations, number of information-seeking channels, number of information sources, forwarding/sharing habits, collective online learning participation, and attitudes toward online health information ($P<0.05$). No significant gender difference was observed ($P>0.05$) (Table 2).

Regression Analysis

Using eHEALS scores as the dependent variable and significant factors from Table 2 as independent variables, stepwise multiple linear regression revealed no multicollinearity (all VIF <10.000; VIF_{min}=1.016, VIF_{max}=1.758). eHealth literacy was significantly influenced by age, concurrent basic and commercial medical insurance, using $ $2 information-seeking channels, using $ $2 information sources, forwarding/sharing habits, collective online learning participation, and positive attitudes toward online health information (P<0.05). Compared to residents aged 70–89 years without dual insurance, using <2 channels, <2 sources, rarely forwarding/sharing, not participating in collective learning, and holding negative attitudes, those aged 45–<60 or 60–<70 years with dual insurance, using $ $2 channels, $ $2 sources, frequently forwarding/sharing, participating in collective learning, and holding positive attitudes had significantly higher eHealth literacy (Table 3).

Discussion

Current Internet-based health popularization services primarily target younger populations, necessitating removal of audience barriers to reach more middle-aged and elderly individuals. Domestic research on eHealth literacy and online health information habits among older adults remains limited. This study focuses on community-dwelling middle-aged and elderly residents in the context of population aging and routine COVID-19 prevention, analyzing their information-seeking and sharing habits, eHealth literacy status, and the relationship between habits and literacy to inform large-scale Internet health popularization practices.

Shanghai residents demonstrated higher eHealth literacy than those in Tai' an, Shandong [7], possibly due to higher urban household registration rates and rapid development of Internet health services during COVID-19 [13]. Residents aged $ $70 years showed lower eHealth literacy than those aged 45–<60 or 60–<70 years. With declining birth rates and increasing life expectancy, China' s elderly population is growing rapidly, becoming larger and older [14]; for instance, Shanghai' s population aged $ $70 years accounts for 45.7% of the elderly population [15], creating substantial health information demands. However, older adults often struggle with complex online platform operations and interfaces due to late Internet adoption and declining physical and visual abilities [16], highlighting the need to address their health "digital divide."

The study identified relative weaknesses in knowing how to use the Internet to answer health questions and evaluating online health resource quality. Residents using $ $2 information channels and holding positive attitudes toward online health information showed higher eHealth literacy, consistent with findings among outpatients and cancer patients [11,17]. Diversified information sources also correlated with higher literacy. Using multiple channels and sources helps residents obtain comprehensive information on prevention, treatment, and pol-

icy resources, deepening understanding and improving evaluation skills through comparison and verification [18]. Peer support services, doctor-patient interaction platforms, and assistive tools from online health communities and management programs can further enhance self-efficacy and skills [19].

Residents participating in collective online learning, frequently forwarding/sharing information, and concurrently holding basic and commercial medical insurance showed higher eHealth literacy. Shanghai has established community-based health self-management groups [20] that conduct collective online learning guided by community health professionals. Wang et al. [6] found that teaching older adults information retrieval and evaluation skills through collective learning may improve eHealth literacy. Forwarding information to children, trusted relatives, or professionals allows older adults to verify reliability with younger or medically knowledgeable individuals [21-22]. Studies report commercial medical insurance as a protective factor for eHealth literacy [8,23]. The advantage of dual insurance coverage may stem from higher health awareness, greater openness to new technologies, improved healthcare accessibility [24], and the development of "health insurance + Internet health management" models by commercial insurers [25].

Based on these findings, we recommend: (1) Multi-sectoral collaboration to advance age-friendly hardware and software modifications, such as voice interaction, large-font options, and simpler interfaces [16]; (2) Promoting authoritative information integration and retrieval platforms (e.g., creating a "health popularization resource database" coordinating medical institutions, public health agencies, and media) [1], encouraging Internet health popularization by medical institutions and professionals, and strengthening digital health market supervision [26] to improve information credibility and access; (3) Advancing digital development of health associations through courses at senior universities and partnerships with universities, social work groups, and information centers to promote information use, exchange, and critical thinking; (4) At the family level, advocating "digital feedback" from younger generations and establishing dialogue-based communication for equitable information sharing [27]; (5) Encouraging collaboration between commercial insurers and medical institutions to develop health services and share public health promotion responsibilities [28-29], thereby improving eHealth literacy, promoting healthy behaviors, increasing user engagement, and improving health outcomes for mutual benefit.

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