A Study on the Relationship Between Online Health Information Usage Patterns and E-Health Literacy Among Middle-Aged and Elderly Residents: A Case Study of Permanent Residents in Selected Shanghai Communities (Postprint)

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Abstract

Background Both supply and demand sides of health science popularization are increasingly dependent on the Internet, and e-health literacy should become an essential skill for patients with chronic diseases to master.

Objective To analyze the current status, relationship, and existing problems of online health information usage habits and e-health literacy among middle-aged and elderly residents, and to provide references for improving their e-health literacy and developing suitable Internet-based health science popularization services.

Methods From June to September 2021, a stratified random sampling approach was employed to conduct a questionnaire survey among 1019 middle-aged and elderly community residents in Shanghai, with multiple linear regression used for multivariate analysis.

Results Middle-aged and elderly residents primarily sought online health information by following health-related accounts; utilization of search functions or engines, health management apps or mini-programs, and online health communities was relatively low. The use of information disseminated by medical institutions and healthcare professionals was also limited. The weak components of e-health literacy were the ability to use the Internet to answer health questions and information evaluation capacity. Multiple linear regression analysis indicated that, aside from age <70 years and enrollment in commercial supplementary medical insurance, having a positive attitude toward online health information (β=0.186), frequently forwarding and sharing online health information (β=0.178), participating in collective online learning (β=0.129), diversi-

fying channels for seeking online health information (β=0.149), and diversifying sources of online health information used (β=0.108) were protective factors for e-health literacy.

Conclusion Online health information usage habits influence the e-health literacy of middle-aged and elderly residents. Efforts should be made to popularize authoritative information integration and retrieval platforms, emphasize regulatory review and age-friendly adaptation, and leverage resources such as communities, families, health associations, and commercial medical insurance to help middle-aged and elderly individuals better utilize online health information and improve their e-health literacy.

Full Text

Analysis on the Relationship between Online Health Information Use Habits and eHealth Literacy among Middle-Aged and Elderly Residents—A Case Study of Permanent Residents in Selected Shanghai Communities

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Abstract

Background: Both suppliers and consumers of health popularization increasingly depend on the Internet, making eHealth literacy an essential skill for patients with chronic diseases. **Objective:** This study analyzes the current status, relationships, and existing problems regarding online health information use habits and eHealth literacy among middle-aged and elderly residents, providing insights for improving their eHealth literacy and developing appropriate

Internet-based health popularization services. **Methods:** From June to September 2021, a stratified random sampling method was used to survey 1,019 middle-aged and elderly community residents in Shanghai. Multiple linear regression was employed for multivariate analysis. **Results:** Middle-aged and elderly residents primarily sought online health information by following health-related accounts, while utilization of search functions or engines, health management apps or mini-programs, and online health communities remained limited. Information from medical institutions and healthcare professionals was underutilized. The weakest aspects of eHealth literacy were the ability to use the Internet to answer health questions and the capacity to evaluate information quality. Multiple linear regression analysis revealed that, aside from being under 70 years old and having commercial supplementary medical insurance, having a positive attitude toward online health information (β=0.186), frequently forwarding and sharing online health information (β=0.178), participating in collective online learning (β=0.129), using diverse channels to seek online health information (β=0.149), and utilizing multiple sources of online health information (β=0.108) were protective factors for eHealth literacy. **Conclusion:** Online health information use habits influence eHealth literacy among middle-aged and elderly residents. We recommend promoting authoritative information integration and retrieval platforms, strengthening supervision and aging-friendly adaptations, and leveraging community, family, health associations, and commercial medical insurance resources to help older adults better utilize online health information and improve their eHealth literacy.

Keywords: middle-aged and elderly; eHealth literacy; health information; Internet

Introduction

The rapid rise of the Internet has transformed health popularization, offering advantages in speed, reach, interactivity, cost-effectiveness, and freedom from temporal and spatial constraints. Consequently, both suppliers and consumers of health information increasingly rely on digital platforms. The "Healthy China Action (2019-2030)" explicitly calls for widespread use of new media for Internet-based health popularization [1], a trend further accelerated by the regularized COVID-19 prevention and control measures. eHealth literacy refers to the comprehensive ability to seek, understand, evaluate online health information, and apply it to address personal health problems. This competency positively correlates with health behaviors [2-3] and is considered a primary skill that contemporary chronic disease patients must master [4-5]. While international research on eHealth literacy began earlier, domestic scholars have increasingly focused on this area in recent years [6].

As population aging accelerates, middle-aged and elderly individuals—as high-risk groups for chronic diseases—constitute a massive user base for online health

information. However, their eHealth literacy qualification rate remains low [7-8], and they face difficulties and risks in using online health information [9]. Their usage habits also differ from younger cohorts, yet good online health information use habits may correlate with higher eHealth literacy. This study analyzes the current status, relationships, and existing problems of online health information use habits and eHealth literacy among middle-aged and elderly residents, aiming to provide references for improving their eHealth literacy and developing suitable Internet-based health popularization services. We hope to promote the widespread adoption of Internet health popularization among more middle-aged and elderly populations, thereby facilitating healthy aging.

Methods

Study Subjects

We employed stratified random sampling to select participants from June to September 2021 in Shanghai. Two central urban districts and two suburban districts were randomly selected. From each district, 8-11 subdistricts/towns were randomly chosen, and from each subdistrict/town, 1-2 communities were selected, yielding a total of 51 communities. Inclusion criteria were: permanent community resident, age $ $45 years, mentally healthy, basic reading and communication ability, voluntary participation, and signed informed consent.

Survey Methods

We conducted on-site centralized questionnaire surveys. Surveyors were community health education staff from community health service centers who received unified training from the research team. They instructed participants to complete questionnaires independently and performed on-site quality control. For those unable to complete independently, surveyors read questions item-by-item and recorded responses. Data were double-entered and analyzed independently by two researchers using uniform rules. A total of 1,061 questionnaires were distributed, with 1,019 valid questionnaires recovered (effective rate: 96.0%).

General Information Based on literature review, we developed a questionnaire covering: gender, age, household registration, education level, annual per capita household income, self-rated health status, medical insurance status, co-residents, channels for seeking online health information, sources of online health information used, habits of forwarding/sharing online health information, attitudes toward online health information, and participation in collective online learning.

eHealth Literacy Scale We used the Chinese version of the eHEALS scale revised by Guo Shuaijun et al., comprising 3 dimensions and 8 items. Each

item was scored 1-5, with total scores ranging from 8-40; higher scores indicated higher eHealth literacy [10]. In this study, the scale demonstrated good reliability and validity (Cronbach' s α=0.956, KMO=0.926).

Statistical Methods We used EpiData 3.1 to establish the database for data entry and SPSS 24.0 for statistical analysis. Categorical data were described using frequencies and percentages; continuous data were expressed as (mean±standard deviation). Mean comparisons used t-tests or ANOVA. Multivariate analysis employed multiple linear regression. P<0.05 was considered statistically significant.

Results

General Characteristics

A total of 1,019 valid questionnaires were collected (recovery rate: 96.0%). The sample comprised 868 urban residents (85.2%) and 151 rural residents (14.8%); 428 males (42.0%) and 591 females (58.0%). Ages ranged from 45-89 years, with a mean age of 63.74$±$9.21 years. Education levels were predominantly junior high school (33.6%) and high school (34.9%). In the past year, 585 participants (57.4%) rated their health as good or relatively good; 156 (15.3%) had both basic and commercial medical insurance; and 491 (48.2%) lived with younger generations.

Current Status of eHealth Literacy

The total eHealth literacy score was 27.62$±$8.57. The three lowest-scoring items were: "knowing how to use the Internet to answer my own health questions," "having the skills to evaluate the quality of online health resources," and "being able to distinguish high-quality from low-quality health resources online." See .

Online Health Information Use Habits

Residents primarily sought online health information by following health-related accounts (40.3%). Use of search functions or engines (33.0%), health management apps or mini-programs (24.9%), and online health communities such as forums and medical consultation platforms (6.4%) was limited. Only 29.2% used two or more of these channels. Information sources were mainly commercial media (57.3%) and government official media or public health institutions (55.7%), while information from medical institutions and individual healthcare professionals was underutilized. Regarding sharing behaviors, 337 participants (33.1%) frequently shared online health information, 810 (79.5%) held positive attitudes toward online health information, and see for details.

Univariate Analysis of eHealth Literacy

Twelve factors showed statistically significant differences in eHealth literacy scores: age, household registration, education level, annual per capita household income, self-rated health status, medical insurance status, co-residence with younger generations, participation in collective online learning, number of channels for seeking online health information, number of information sources used, forwarding/sharing habits, and attitudes toward online health information. See .

Multivariate Analysis of eHealth Literacy

Using eHealth literacy score as the dependent variable and the 12 statistically significant variables from univariate analysis as independent variables, we performed multiple linear stepwise regression after dummy variable assignment. No multicollinearity was detected. eHealth literacy was influenced by age, medical insurance status, collective online learning participation, number of channels for seeking online health information, number of information sources used, forwarding/sharing habits, and attitudes toward online health information. Specifically, having commercial supplementary medical insurance (participating in both basic and commercial insurance), participating in collective online learning, holding positive attitudes toward online health information, using multiple channels and sources, and frequently forwarding/sharing online health information were protective factors. Being $ $70 years old was a risk factor. See and .

Discussion

Current online health popularization services predominantly target younger populations, creating an urgent need to break down barriers and expand coverage among middle-aged and elderly groups. Domestic research on eHealth literacy and online health information use habits among older adults remains limited. This study focuses on community-dwelling middle-aged and elderly individuals in the context of population aging and regularized pandemic prevention and control, analyzing their information-seeking, communication, and sharing habits alongside eHealth literacy status and correlations. We propose strategies to improve their online health information use habits to enhance eHealth literacy, providing insights for large-scale online health popularization practices and intervention effectiveness.

Shanghai' s middle-aged and elderly residents exhibited lower eHealth literacy than adult Internet users with an average age of 33 [11], but higher than elderly residents in other regions [7], possibly due to regional demographic differences and rapid Internet health development under regularized pandemic control [12]. Being $ $70 years old emerged as a risk factor for eHealth literacy. Due to declining birth rates and increasing life expectancy, China' s elderly population

is characterized by rapid growth, large scale, and advanced age [13]. For instance, Shanghai' s population aged 70+ accounts for 45.7% of the elderly population [14], generating substantial health information demand. However, older adults began using the Internet later in life and experience physical and visual decline, making it difficult to adapt to complex operational processes and interfaces.

The ability to use the Internet to answer health questions and evaluate information quality represents key weaknesses in eHealth literacy among middle-aged and elderly individuals. Using multiple channels to seek information and holding positive attitudes toward online information were protective factors, consistent with findings from outpatient and cancer patient studies [15-16]. This study further revealed that using more diverse sources of online health information correlated with higher eHealth literacy. Seeking information through multiple channels and sources enables individuals to acquire and understand information from different perspectives and levels—prevention, treatment, policy resources—while comparison and review enhance evaluation skills [17]. Different channels such as online health communities and health management programs also provide peer support, doctor-patient interaction, and assistive tools that improve self-efficacy and skills in using the Internet to solve health problems [18].

Participation in collective online learning, frequent forwarding/sharing of online health information, and enrollment in commercial supplementary medical insurance were protective factors for eHealth literacy. Shanghai has established health self-management groups across communities [19], most of which have explored collective online learning under healthcare professional guidance. Wang et al. [6] found that teaching older adults to acquire and evaluate information through collective learning may improve eHealth literacy. When using online health information, older adults often forward it to children, trusted relatives, or professionals to verify reliability [20-21]. Studies have reported that commercial medical insurance alone is a protective factor for eHealth literacy among older adults [8][22]. In this study, besides commercial insurance enrollees having higher health awareness and greater openness to new things, dual insurance coverage may also improve healthcare accessibility [23] and relate to commercial insurers' development of "health insurance + Internet health management" models [24].

Based on these findings, we recommend the following policy strategies: (1) Multi-departmental collaboration to promote aging-friendly hardware and software adaptations, such as providing voice interaction functions and larger, more intuitive interfaces [25]; (2) Popularize authoritative information integration and retrieval platforms, such as "health science popularization resource databases" that coordinate medical institutions, public health agencies, and news media resources [1], encourage healthcare institutions and professionals to conduct online health popularization, strengthen digital health market development and access supervision [26], and enhance user recognition to facilitate access to high-quality, multi-channel, multi-source information; (3) Promote digital development of health associations, establish online health information use courses in

elderly universities, and collaborate with nearby universities, social work groups, and information centers to encourage older adults to use, communicate, and share online health information, fostering critical thinking and evidence-seeking habits to avoid misinformation; (4) At the family level, advocate for "digital feedback" and establish dialogic communication models for equal exchange and sharing of online health information [27]; (5) Encourage commercial medical insurance to cooperate with health institutions in developing health services and assume social responsibility for public health promotion [28-29], helping improve users' eHealth literacy to promote healthy behaviors, increase user stickiness, and improve health outcomes for mutual benefit.

The authors declare no conflicts of interest.

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Note: Figure translations are in progress. See original paper for figures.