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Digital Affinity and Health Literacy for Mental Health in A Stratified Chinese Population – A Scoping Review

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Abstract: This scoping review examines the impact of digital affinity and health literacy on mental health self-management in China. From 1,457 articles, 10 key studies were identified, showing how digital interventions, especially during COVID-19, have enhanced mental health literacy. The review highlights gaps in understanding long-term effects and the need for culturally tailored strategies to improve mental health outcomes.

Keywords: Digital Health Literacy, Mental Health Self-Management, Digital Interventions, Chinese Population Stratification, Culturally Tailored Health Strategies

1. Introduction

The significance of mental health has been universally acknowledged, reflecting on an individual's emotional, psychological, and social well-being[1]. In China, the importance of mental health is particularly emphasized due to significant disparities in access to mental health care and outcomes across different socio-economic strata, rural and urban populations, and age groups[2,3]. For example, because mental health services are not fully covered by the medical insurance system in China, it is more difficult for low-income groups to afford treatment costs; Medical resources in urban areas are concentrated, and the number of psychiatrists and psychological counselors is much higher than that in rural areas [4]. Social attention to children's mental health problems is insufficient, and relevant treatment resources are still very limited [5].These disparities are often exacerbated by the country's vast and stratified population demographics, leading to uneven distribution of mental health resources and services.

The rapidly expanding digital landscape in China offers a promising avenue to mitigate these disparities by providing more accessible mental health interventions. However, the effectiveness of these digital solutions is highly dependent on individuals' digital affinity and health literacy[6]. Digital affinity refers to the predisposition and capacity to engage with digital technologies, while health literacy is defined as the ability to access, understand, and utilize health-related information to make informed health decisions[2]. Together, these factors play a critical role in the self-management of mental health, particularly within a diverse and stratified population.

This scoping review aims to elucidate the impact of digital affinity and health literacy on mental health within China's stratified population, specifically focusing on variations across socio-economic status, rural versus urban residency, and age groups. It seeks to explore how digital tools

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and platforms are leveraged for mental health services and the extent to which different demographic segments access and benefit from these digital interventions.

To address these concerns, this review poses several focused research questions:1)How do variations in digital affinity and health literacy across different Chinese populations affect mental health self-management?2)What specific digital interventions are most effective at increasing health literacy and improving mental health outcomes for certain subgroups, such as rural versus urban populations?3)What barriers exist in optimizing the effectiveness of digital mental health interventions across diverse demographic groups?

Through examining these specific questions, the review intends to provide insights into the optimization of digital health strategies tailored to the diverse capacities and needs of China's population. This exploration is situated within the broader context of increasing reliance on digital health solutions and aims to contribute to the development of more inclusive and effective mental health interventions.

2. Methods

2.1. Data Sources

This scoping review utilized a comprehensive range of databases, including PubMed, Web of Science, CNKI, and WanFang, as well as reports, white papers, and other gray literature from pertinent governmental and non-governmental organizations. The inclusion of gray literature, such as policy reports and white papers, was intentional to capture a wide spectrum of perspectives and data, thereby providing a holistic understanding of digital affinity, health literacy, and mental health self-management within stratified Chinese populations. The preprint was deliberately excluded in order to maintain the integrity of the review and reduce bias, as it does not meet the outcome indicators, on the one hand, lack peer review and may contain undetect errors or imperfect analyses, on the other hand, due to the early stage of the study, the data integrity and accuracy and the stability of the results were questionable.

2.2. Search Strategy

The search strategy was meticulously designed to cover a broad array of relevant literature. Key terms, including “digital affinity, ” “health literacy, ” “mental health self- management, ” and “stratified Chinese population, ” were strategically combined to reflect the multifaceted nature of the research focus. The search encompassed publications from January 2010 to May 2024, ensuring the inclusion of both contemporary studies and significant prior research. This approach was applied across both English and Chinese language databases, emphasizing the inclusion of region-specific studies that provide a nuanced understanding of the Chinese context.

2.3. Inclusion and Exclusion Criteria

Inclusion criteria were rigorously defined to encompass studies that specifically addressed mental health interventions within stratified populations in China, with a focus on evaluating the impact of digital affinity and health literacy. Eligible studies included those with robust methodologies, such as randomized controlled trials, cohort studies, and well-designed observational studies.

Exclusion criteria were established to safeguard the academic rigor and relevance of the review. Non-peer-reviewed materials, including case reports, commentary articles, and editorials, were excluded to avoid reliance on anecdotal or non-empirical evidence. Additionally, studies were excluded if they did not present clear outcome measures related to digital affinity, health literacy, or

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mental health self-management. Research that failed to distinguish between different stratified populations or lacked sufficient data on the efficacy of digital interventions was also excluded.

2.4. Data Extraction and Analysis

Data were systematically extracted using a standardized form to capture critical elements such as study design, participant demographics, intervention specifics, and primary outcomes. A qualitative synthesis was conducted to integrate the findings, allowing for the identification of common themes and variances across the selected studies. This rigorous methodological approach facilitated a thematic analysis that not only highlighted prevailing trends and gaps within the existing literature but also elucidated the nuanced ways in which digital affinity and health literacy interventions influence mental health outcomes in stratified Chinese populations. The analytical framework developed through this process provides a comprehensive foundation for guiding future research directions and informing policy development.

3. Results

3.1. Selection Process

The selection process for this scoping review on digital affinity, health literacy, and their impacts on mental health self-management in a stratified Chinese population was conducted through several meticulous stages, as illustrated in Figure 1. Initially, a comprehensive search across databases, including MEDLINE, PsycINFO, EMBASE, Web of Science, CNKI, WANFANG, and VIP, yielded 1,457 articles.

Following a preliminary screening, which focused on relevance to the core themes— particularly the intersection of digital technology and mental health literacy within the Chinese context—874 articles were excluded. This exclusion was primarily based on titles and abstracts that did not directly pertain to the Chinese demographic or lacked direct relevance to the review's focus.

Subsequently, a full-text review of the remaining 583 articles was conducted with rigorous criteria to identify studies that precisely aligned with the objectives of this review. This stage resulted in the exclusion of an additional 411 articles due to various factors, including the absence of peer-review status, a focus on case reports or editorials without original research contributions, or insufficient data regarding the efficacy of digital interventions on mental health literacy.

Further scrutiny of the 172 articles that advanced past the initial rounds of selection led to the exclusion of 137 more studies. These were excluded due to reasons such as duplicative data, lack of specific focus on stratified population groups within China, or inadequate outcome data.

Ultimately, 10 articles were selected for inclusion in this review. These studies employed a variety of research designs and methodologies, including randomized controlled trials, observational studies, and qualitative research. The selected studies covered a dynamic range of digital mental health interventions in China, such as web- based educational tools, social media campaigns, and app-based mental health support. They provided valuable insights into the efficacy of digital health literacy initiatives across various segments of the Chinese population, including urban and rural residents, students, and individuals with specific mental health conditions.

This rigorous selection process not only ensured the relevance and quality of the included studies but also laid a robust foundation for analyzing the role of digital health literacy in enhancing mental health outcomes within China's diverse population.

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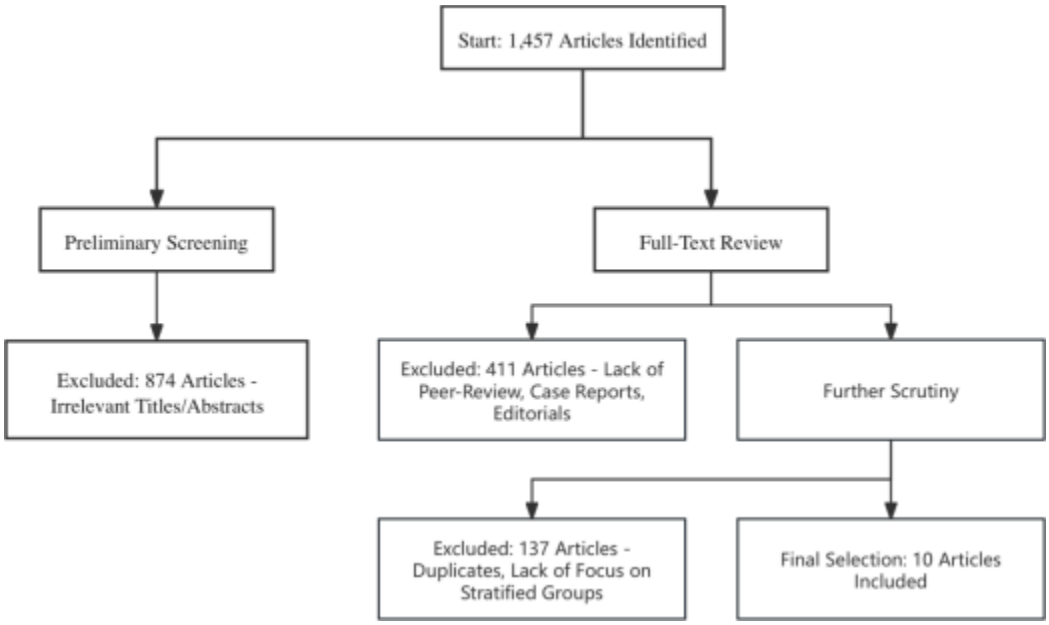

Figure 1: Flow chart of study selection.

3.2. Study Characteristics

The studies included in this review represent a variety of research designs, including randomized controlled trials (RCTs), non-randomized controlled trials (non-RCTs), cross-sectional studies, case series, and qualitative research. The research was conducted across diverse populations in mainland China, encompassing university students, elementary and middle school students, rural left-behind children, and patients with severe mental health issues (SMI). The geographical spread of these studies included major urban centers as well as remote rural areas, providing a comprehensive view of the digital health landscape in China.

The intervention characteristics were similarly diverse, ranging from web-based social network games and digital health clinics to smartphone applications and online mental health education platforms. These interventions were designed to enhance mental health knowledge, improve mental health conditions, boost health literacy, and promote healthy behaviors. Notably, several studies focused on the context of the COVID-19 pandemic, underscoring the critical role of digital health interventions in addressing sudden public health crises. Additionally, some studies explored the mechanisms through which mental health literacy is transmitted and impacted within family and school environments, emphasizing the roles of parent-child relationships and school mental health services.

3.3. Main Findings

This review examines the impact of digital affinity and health literacy on the mental health of various populations in China. A summary of the key characteristics of the selected studies is presented in Table 1. The findings indicate that electronic games on social networking platforms can significantly enhance young people's mental health knowledge and problem-solving skills[7]. During the COVID-19 pandemic, it was observed that university students with higher levels of digital health literacy exhibited better mental health outcomes, suggesting that robust digital health literacy can mitigate psychological stress[8].

For rural left-behind children, there was a notable gap in the ability to correctly identify depression when compared to their non-left-behind peers, highlighting the urgent need for school-

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based mental health interventions in rural areas[9]. A systematic review found that while research on schizophrenia and substance use disorders within China's digital mental health field is relatively more common, the methodological rigor of these studies often falls short compared to those conducted in Western countries[10].

The implementation of a digital mental health clinic in secondary schools demonstrated the potential of providing mental health services through digital platforms, particularly outside of traditional working hours[11]. A survey revealed that although individuals with severe mental health issues in China have high rates of digital technology ownership, they frequently lack the necessary knowledge to effectively utilize these technologies for health-related purposes[12]. Mental health professionals in China generally expressed positive attitudes toward the adoption of digital mental health services, though they acknowledged a significant knowledge gap in their ability to deliver these services effectively[13].

Moreover, the Step-by-Step program, a World Health Organization transdiagnostic digital mental health intervention aimed at reducing depressive and anxiety symptoms among young adults in China, is being evaluated for its effectiveness and implementation in a university community[14]. Research examining the relationship between parents' mental health literacy and that of their adolescents identified the mediating role of the parent-child relationship and the moderating influence of school mental health services[15]. Another study demonstrated significant improvements in students' health literacy, including health beliefs, healthy lifestyles, and basic health skills, through interactive interventions, thereby fostering the formation of healthy behaviors[16].

In conclusion, the positive impact of digital affinity and health literacy on the mental health of stratified populations in China is evident. Future research should prioritize enhancing the awareness and application of digital health technologies among mental health professionals and fostering stronger collaborations between families and schools in mental health education.

4. Discussion

This review underscores the pivotal role of digital affinity and health literacy in enhancing mental health outcomes, particularly within the stratified Chinese population. The included studies demonstrate that digital interventions delivered through various platforms can significantly improve mental health knowledge, mitigate mental health issues, and foster healthy behaviors. The heightened relevance of these interventions was particularly evident during the COVID-19 pandemic, where digital health solutions were essential for providing remote mental health support and services.

In comparison to existing international literature, this review contributes unique insights by contextualizing the effectiveness of digital health interventions within China's specific cultural and social frameworks[17]. While global literature widely acknowledges the positive impacts of digital health technologies on mental health, this review delves deeper into their application among diverse Chinese demographic groups, such as university students, schoolchildren, and rural left-behind children. Moreover, it explores the critical role of these interventions in managing public health crises within this population. The review further highlights the significance of family and educational settings as conduits for mental health literacy, an aspect that is less emphasized in Western contexts but is crucial in the Chinese setting, where collectivist values and the importance of education are deeply ingrained[18].

A significant challenge that emerges from this review is the impact of China's stringent internet control system on the dissemination of mental health information and the efficacy of digital tools. The "Great Firewall," as it is colloquially known, is a sophisticated and pervasive internet censorship mechanism that not only filters out content deemed politically sensitive but also restricts

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access to a broad array of websites and online platforms, including those that host mental health resources. This regulatory framework poses a formidable barrier to the widespread dissemination of mental health information, as many valuable resources and platforms that are freely accessible in other parts of the world are either heavily censored or entirely blocked in China[19].

The implications of such extensive internet regulation are profound. Firstly, the limitation on accessing international mental health resources necessitates the development of domestic alternatives. However, these alternatives must not only be developed but also rigorously adapted to meet the specific cultural and regulatory context of China. This requirement introduces an additional layer of complexity in designing and implementing effective digital mental health interventions. For instance, platforms like YouTube, which are often used in Western contexts to disseminate mental health education through videos and online communities, are inaccessible in China. Consequently, local platforms such as WeChat and Weibo must fill this void, but they operate under strict government oversight, limiting the scope and content of the information that can be shared[20].

Furthermore, the regulation of online content under China's internet policies can lead to the self-censorship of mental health providers and content creators, who may avoid discussing certain topics that could be perceived as sensitive or controversial. This self- censorship could result in the omission of critical discussions around mental health issues, thus diluting the potential impact of digital interventions. Additionally, the fear of repercussions might deter individuals from seeking help online or participating in digital mental health platforms, particularly for issues related to depression, anxiety, or other mental health conditions that are still stigmatized in many parts of Chinese society[21].

Moreover, the effectiveness of digital tools is also compromised by the variability in internet speed and access across different regions of China, particularly between urban and rural areas. While urban residents might have relatively unrestricted access to high- speed internet, those in rural areas often face significant challenges, including slow connections and limited access to necessary digital infrastructure. This digital divide further exacerbates existing inequalities in mental health care access, making it more difficult to deliver effective digital interventions to those who might need them the most[22].

In light of these challenges, it is imperative that future research and intervention strategies account for the unique digital landscape of China. Culturally tailored digital interventions must be developed in a way that not only respects the regulatory environment but also leverages local platforms effectively. Additionally, there is a need for advocacy and policy efforts to ensure that the digital tools designed to improve mental health literacy are accessible, effective, and culturally resonant, despite the constraints imposed by internet censorship.

Ultimately, while digital health interventions hold significant promise for improving mental health outcomes in China, their success is contingent upon navigating the complex interplay of cultural norms, regulatory frameworks, and technological infrastructure. Addressing these challenges head-on will be critical in realizing the full potential of digital tools in enhancing mental health literacy and care across China's diverse population.

5. Conclusion

The findings of this scoping review reveal the intricate and multifaceted relationship between digital affinity, health literacy, and mental health self-management within China's stratified population. While digital health interventions have shown significant promise, especially in the context of the COVID-19 pandemic, their efficacy is deeply intertwined with the socio-cultural and regulatory environment unique to China. The role of digital affinity and health literacy in this

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context cannot be overstated, as these factors critically influence the accessibility, acceptability, and effectiveness of mental health interventions across various demographic segments.

Moving forward, it is essential to acknowledge that the landscape of digital health in China is not static; it is shaped by ongoing developments in technology, shifts in policy, and evolving cultural norms. The strict regulatory environment, while presenting challenges, also offers opportunities for the development of innovative, culturally tailored digital health strategies that align with local norms and governmental policies. Such strategies must prioritize inclusivity, ensuring that mental health interventions are accessible not only to urban populations with high digital literacy but also to rural and underserved communities.

In light of these complexities, future research must transcend the traditional boundaries of health technology studies to incorporate a more holistic view that includes regulatory impact assessments, cultural competency evaluations, and longitudinal studies that track the long-term effects of digital interventions. A key area for future inquiry should focus on the development and implementation of digital mental health interventions that are adaptable to China's diverse population, with particular attention to how these interventions can be scaled sustainably across different regions. Furthermore, there is a pressing need for full-scale reviews and empirical studies that rigorously evaluate the efficacy of digital mental health interventions within the Chinese context. Such research should not only assess short-term outcomes but also consider the sustainability and long-term impacts of these interventions on mental health literacy and self-management. Understanding the nuanced ways in which digital affinity and health literacy interact with socio-cultural factors will be crucial for developing interventions that are not only effective but also culturally resonant.

In conclusion, the future of digital mental health in China hinges on the ability to navigate and integrate these diverse factors into a cohesive strategy that promotes mental well-being across all segments of the population. As the digital health landscape continues to evolve, it will be imperative for researchers, practitioners, and policymakers to collaborate closely, ensuring that the interventions developed are not only innovative but also equitable, inclusive, and sustainable. This comprehensive approach will be vital in driving forward the field of digital mental health, ultimately contributing to the broader goal of improving mental health outcomes for all individuals, regardless of their socio-economic status or geographical location.

Table 1: Characteristics of included studies

Author(s)	Year	Study Population	Intervention Type	Key Findings	Implications for Mental Health Literacy and Digital Affinity
Li TM, et al.	2013	Young people	Web-based social network game	Enhanced mental health literacy	Highlights the potential of gamification in mental health education
Ning L, et al.	2024	University students	Latent profile analysis	Identified digital health literacy profiles; linked to mental health outcomes	Underscores the importance of tailoring digital health interventions
Sun T, et al.	2021	Rural left-behind children	Comparative study	Lower mental health literacy among left- behind children	Suggests targeted interventions for vulnerable groups
Zhang X, et al.	2021	General, including SMI patients	Systematic review	Varies in digital intervention effectiveness	Calls for rigorous research and culturally
Xu Y, et al.					
Zhang					

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Table 1: (continued).

X, et al.					adapted interventions
Zhang X, et al.	2023	Secondary school students	Digital mental health clinic	Effective in crisis prevention and intervention	Supports the expansion of school-based digital mental health services
Sit HF, et al.	2023	People with severe mental health problems	Survey study	High technology use but low digital health literacy	
Wang X, et al.	2022	Mental health professionals	Nationwide survey	Positive attitudes but lack of knowledge on digital mental health	Indicates the need for training and education in digital health
Huang LL, et al.	2022	Chinese young adults	RCT of Step-by-Step intervention	Protocol for evaluating a WHO digital intervention	Points to the necessity of training programs for professionals
	2024	Adolescents and their parents	Study on intergenerational transmission	Highlights the role of parent-child relationship and school services	Anticipates benefits of scalable, evidence-based digital mental health solutions
	2024	Fourth-grade students	Interactive intervention study	Significant improvement in health literacy	Emphasizes family and school involvement in mental health literacy Demonstrates the effectiveness of interactive learning approaches

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