

Transform Suffering by Cultivating Resilience: Embedding SDGs into Intergenerational Digital Health Platform for Navigating the Post-Pandemic Landscape [†]

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Abstract: The world is being upended by the COVID-19 pandemic which has posed considerable challenges—deaths, fears, unemployment, social distancing, isolation, and lockdowns. Behind the apparent negative impact of an economic downturn, the pandemic has also caused soaring levels of stress and mental health crises, especially in the elderly. Although existing digital health products, services, and platforms are making use of innovative technologies, these alone cannot ensure success, and the scaling up of application of innovative technology for social good requires overcoming numerous bottlenecks. Therefore, it is imperative to identify the integrated needs of stakeholders within the healthcare system and synthesize a holistic approach for sustainable development.

Keywords: Universal Health Coverage (UHC) paradigm; integrated primary care; gerontechnology; age-friendly city; Sustainable Development Goals



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1. Introduction

1.1. Global Challenges, Trends, and Awareness after the Outbreak

The world is facing an unprecedented challenging situation with the COVID-19 pandemic, leading to the global trend of implementing social health practices such as “social distancing”. To reduce the transmission of virus, in addition to quarantine and isolation procedures applied to those who have been exposed to or infected with COVID-19, a social distancing policy has also been enforced amongst the general population to reduce the chance of transmission. This may often bring more damage to high-risk groups like the elderly (above the age of 60 years) whose risk of infection is greater as they have a higher rate of morbidity of noncommunicable diseases (NCDs) and more frequent need of hospitalization, intensive care unit admission, and death [1,2]. The elderly population, therefore, is not only experiencing the anxious sense of social isolation and loneliness but also facing the potentially serious mental and physical health consequences. The impact might also be disproportionately amplified in those with pre-existing mental illness, who were often already suffering from loneliness and social isolation prior to the enforcement of public health distancing measures during the pandemic.

An imperative agenda that governmental institutions need to highlight is the aging of the world's population at an unprecedented pace, and these aging populations were posing serious challenges on the health and long-term care systems around the world even before the COVID-19 outbreak. Sustainable and easily accessible elderly care services are in high demand. According to projections from the United Nations, the number of people aged 60 or above will rise from 901 million in 2015 to 2100 million in 2050, increasing from 12% to 22% of the total world population [2–4]. In this population, NCDs are the leading causes of death and disability, and the regional and the global NCD deaths are projected to increase by 15% between 2010 and 2020 to 44 million deaths, with the highest numbers predicted

in the Western Pacific (12.3 million deaths) and the Southeast Asia (10.4 million deaths) regions. Of particular concern is the high level of premature mortality from NCDs [4,5]. At the same time, the significance of future population aging and the increasing prominence of the risk of NCDs are now well recognized by different countries and the corresponding administrations. The statistics also demonstrate how healthcare systems and services, as well as the support of Universal Health Coverage (UHC), must adapt as the global health care burden is shifting toward noncommunicable diseases. Research has also shown that both loneliness and social isolation are associated with an increased risk of NCDs such as heart disease, stroke, cancer, diabetes, and chronic respiratory diseases, especially during the post-pandemic era [1].

1.2. Population Aging in China and Response to Elderly Primary Care Amid COVID-19

Over the past two decades, population aging due to a lower fertility rate and longer life expectancy became more and more pronounced in China. The China National Committee on Aging (CNCA) reported that the number of Chinese citizens aged 60 or above reached 241 million at the end of 2017, representing 17.3% of the country's total population. People aged 65 years or older are expected to make up around 30% of China's population in the next 30 years, and the demographic transition from 1950 to 2050 illustrates that the Chinese population is aging dramatically [6,7]. However, according to the global AgeWatch index, China ranks only 90th in psychological wellbeing and 85th in social connections [7–9], which are quite low compared with other countries with similar overall rankings, illustrating the deficits in mental health wellbeing experienced by the elderly in China. Since the pandemic, the recognition of mental health issues such as loneliness along with depressive symptoms has worsened over time in preference to the public health benefits of social distancing. On the other hand, a systematic review concluded that loneliness and social isolation are significantly associated with mental health issues [10–15]. The mechanism of adverse health impacts from loneliness stem from the physiological stress response, while, for social isolation, mental health issues can be caused by behavioral changes such as adopting an unhealthy lifestyle amid social distancing policy, increased alcohol consumption and smoking to alleviate the loneliness, physical inactivity caused by the shutting down of public facilities, poor dietary choices caused by limited market supply, and worsened adherence to medical prescription [16–20]. The reduction in social networking activities also exacerbates these conditions. Recognizing and developing a better understanding of the appropriate mechanisms helps in designing feasible and impactful interventions for improving social connections for the elderly. Concerning these rising challenges associated with the aging population, the CNCA recently released guidelines [21–24] to raise the awareness among Chinese citizens. An elderly-friendly community movement has emerged, aiming to meet the potential social needs caused by aging, such as the need for more high-quality elderly care centers and more resources deployment for gerontechnology initiatives.

1.3. Changes for Preventing the Detrimental Effect of Loneliness and Social Isolation under COVID-19

Preparing for an aging population is essential to the achievement of an integrated SDG 2030 agenda, with the aging problem spanning across the goals of good health, gender equality, reduced inequalities, and sustainable cities. In addition, the global impact of the COVID-19 pandemic has tremendously affected all sectors of society. The widespread lockdowns and preventive measures have isolated individuals, affected the world economy, and limited access to physical and mental healthcare. To tackle these unprecedented challenges, usage of health information technology has recently become an effective strategy, and a growing population from all walks of life is increasingly harnessing digital health tools to increase their awareness of post-pandemic health and wellbeing. However, the elderly population which has been worst affected by both the pandemic and the social distancing measures has seen the least benefits from these digital solutions [25]. The

age-related digital divide reveals the longstanding inequality in access and skills to make use of these new technologies. Nonetheless, digital health can play a critical role in holistically managing elderly primary care and providing preventive measures during the COVID-19 pandemic. Therefore, the elderly's perception of digital health usage plays a significant role in shaping confidence and subsequent behaviors regarding the elderly's intention to use and, thus, the building up of the cornerstone for healthy aging and equity. In recognition of the relevance between advocacy of information literacy among the elderly and the achievement of Sustainable Development Goals, an increasing number of research institutions, government bodies, and industry players are beginning to engage in research and advocacy for gerontechnology, as well as the promotion of digital literacy related to sustainable goals, national and regional development agendas, and institutional advancement. Digital innovations for the development and enhancement of elderly primary care have become an ongoing research focus to redesign and extend the strategic support to healthcare policies and systems globally.

2. Methods

2.1. Elderly Mental Health Digital Platform Framework Design Embedding the SDG3 Goals

The right to health across one's life course has gained increasing awareness with the promotion of the UN's Sustainable Development Goals (SDG), which aim to ensure healthy lives and promote wellbeing for all ages. SDG3 provides a critical opportunity for the world to realize the elderly's right to health. It is not only essential to address the exclusion and vulnerability of elderly in the implementation of the new agenda, but it is also equally important to identify the transformative, inclusive, and sustainable development outcomes on the benefit of elderly's mental health. In view of the challenges and opportunities arising from the aging population in China, a needs assessment study must be benchmarked with WHO's age-friendly model through both quantitative and qualitative research methods. It is significant to align the regional elderly health service standard of China with the global standard and goal.

Prior to designing the digital platform framework (Figure 1) for elderly mental health wellbeing embedding SDG3, several consultations with stakeholders of aging-related projects were conducted from January to June 2021 to obtain a better view of the situation and significance of aging in China, as well as the feasibility of reaching out to the aging community for conducting scientific research.

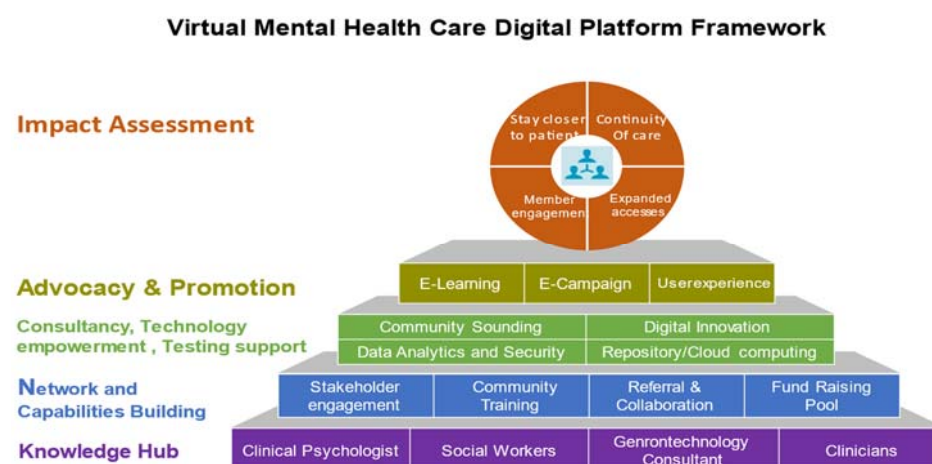


Figure 1. Elderly mental health digital platform framework based on consultation and baseline needs assessment.

2.2. Study Design

Six focus groups were formed, and a total time of 1.5 to 2 h was allocated for each group to participate in interviews with light refreshments offered. Efforts were made

to recruit 8–10 interviewees for each group with similar numbers of males and females. The focus groups were formed on a voluntary basis, and the participating elderly were separated according to two age groups (60–69 and >70 years old). According to the results of the quantitative survey, participants were divided into three socioeconomic statuses (low SES, middle SES, and high SES) on the basis of three dimensions: income, education, and pension types of individual participants. Elderly with a total score from the three dimensions ranging from 0–5 were categorized into the low SES group, while those with a score ranging from 6–10 were categorized into the middle SES group and those with a score ranging from 11–15 were categorized into high SES group (Table 1).

Table 1. Focus group interview constitution: 2 × 3 matrix.

Group	Age	Socio-Economic Status
1	60–69	Low
2	60–69	Middle
3	60–69	High
4	70 and over	Low
5	70 and over	Middle
6	70 and over	High

The procedures and discussion topics for the focus groups were designed with reference to the WHO APC Project Methodology Vancouver Protocol (WHO, 2007). The interviewer led the group participants through the discussion on respective domains of SDG3 and invited them to identify the advantages, stigmas, barriers, challenges, and opportunities to transform the adversity of aging under the effect of pandemic by cultivating resilience to mental health wellbeing, identifying ways to embed SDG3 goals into an intergenerational digital health platform for navigating the post-pandemic landscape, and sharing suggestions for improvement.

Working with the SDG3 framework and agenda on the global aging initiative, the intergenerational digital health platform includes three main functions: (1) screening to detect the level of mental health risk for easy triage, (2) early intervention with appropriate therapy with customized service delivery, and (3) social connection between segmented groups for behavioral changes. These functions are primary intended to address the elderly’s baseline needs related to the following:

- Health (accessible and affordable healthcare services and opportunities without the constraint of time, place, and resources to stay active);
- Participation (accessible digital tools, information services, social connections, volunteer help, and the need to be valued and respected);
- Utilization of information technology (recent and ongoing innovations in digital health technologies are achieving great potential and gaining a user base to bring about a transformative impact on mental health diagnosis, preventing, monitoring, and invention).

Grounded in the needs assessment and qualitative feedback from our research, it was identified that the utilization of existing digital health products, services, and platforms that feature innovative technologies are not enough to ensure success on their own. The scaling up of digital technology usage for elderly mental wellbeing requires overcoming multiple challenges. To satisfy the baseline needs summarized above, the engagement of every stakeholder within the healthcare system to transform the traditional disease-oriented and technology-oriented therapies into a people-oriented ecosystem is vital to synthesize a holistic and sustainable approach to establish the paradigm and achieve the goals within the SDG framework. The intergenerational digital health platform was developed to facilitate this transformation, to gain further information on the demand from the society for those innovative practices, and to identify social resources surrounding the mental health enhancement activities. Development of the intergenerational digital health platform went through three stages, as exhibited in Figure 2: stage 1, baseline needs

assessment by on-site visit; stage 2, platform development, demonstration, and collection of elderly's comments and feedback; stage 3, refinement and enhancement of the platform and promotion to the wider aging community.



Figure 2. Three-stage intergenerational digital health platform development.

3. Results

The development and implementation of the intergenerational digital health platform can help strengthen the SDG goals at the regional and global level. Leveraging the power of innovative technology, particularly the implementation of AI and other disruptive technologies, has become essential not only in healthcare companies but also in recent academic research and public deployment of healthcare services. Our research identified the following key factors for future initiatives and more in-depth studies:

- a. Overcoming barriers of elderly people's equal right to health: a basket of indicators should be considered holistically before jumping to policy implementation, since the elderly population is subjected to numerous physical, psychosocial, and environmental concerns with their mental health situation.
- b. Maintaining social connections with the use of technology-based platform: many of the elderly are neither familiar nor receptive toward new technologies, and the modern style of mobile interaction may not effectively serve their emotional needs without coaching and advocating. The platform developed embedding SDG3 concepts should help older family members and their caregivers with the needed information literacy to overcome such technology barriers.
- c. Managing emotions and psychiatric symptoms with minimum stigma: loneliness is often associated with negative cognitions, especially under the pandemic and without deployment of sufficient resources to primary care. In addition, anxiety and depression brought by the social distancing policies during the pandemic may have aggravated social withdrawal issues and exacerbated the feeling of loneliness and isolation.
- d. Special care should be taken for elderly people with mental health issues and their family caregivers: In response to the COVID-19 pandemic, the world and the way in which people think and live have changed significantly. In addition to the elderly, caregivers within the family might also be facing high levels of stress and experiencing the feeling of isolation and loneliness. More detailed information on the unique aspects of the effects of the pandemic on elderly mental health should also be considered and highlighted by government agencies, social service organizations, and healthcare providers.

4. Discussion and Conclusions

This study was conducted with the aim of enabling the creation of precision public health services for the public good with the following three objectives: (1) to better deliver and monitor health equity for the elderly via the implementation and scale-up of the intergenerational digital health platform. Our study identified ways to incorporate health-related SDG goals into policy design and accountability measurement in regional mental health services; (2) to ensure that everyone, especially the elderly population, has

equal opportunity to receive integrated care under the Universal Health Coverage (UHC) paradigm. Our study offered decision support indicators valuable for policymakers to exercise judgements on whether their strategies can make a difference; (3) to leverage data science and innovative technology in community care services, enable risk stratification in counseling support, and deliver primary care knowledge to vulnerable groups. Our study explored innovative and sustainable schemes to motivate young people to connect with the elderly by co-creating a primary care data hub for enhanced deployment of digital therapeutics.

Unlike other discipline-specific studies which focused on biomarkers for developing improved diagnosis and therapies, this study made use of community data gathering and analytics to build up the interdisciplinary framework for digital therapeutics, including data from the four dimensions of clinic, home, remote, and community care. This research adopted a mixed data approach for baseline needs assessment and evidence-based knowledge discovery using surveys, focus group interviews, and field trips. Meanwhile, the qualitative data collection took place in the form of structured group interviews through the lens of three digital health start-ups which were working on and delivering intergenerational connection platforms.

With reference to the SDGs, the primary aim of this research was to carry out a needs assessment on elderly mental healthcare and to propose an intergenerational digital health platform design embedding SDG goals. The platform aims to identify service gaps and prioritize needs in elderly care service delivery, in order to cultivate resilience at the regional and global level, as well as promote and strengthen collaboration between stakeholders. In broader sense, the current study strives to prevent the impact of population aging on the long-term sustainable growth by demonstrating a way for the government, community, families, individuals, and industry sectors to join hands and devote efforts to tackling these global challenges.

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