Postprint: A Demand Study on Integrated Medical-Preventive Diabetes Services in Primary Care in the Digital Health Context

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Abstract

Background As the population aging process accelerates and the disease spectrum among residents changes, the prevalence of chronic diseases represented by diabetes continues to rise annually, necessitating the establishment of a broad-coverage, high-efficiency integrated medical-preventive model at the primary care level. Existing research has primarily focused on the demand for health management services and factors influencing service adoption, with scarce identification and analysis of the demand for integrated chronic disease medical-preventive services under digital technology. Objective To explore residents' demand for diabetes integrated medical-preventive services under the digital health context, as well as the impact of different service contents on service recipients' acceptance and satisfaction, thereby providing a theoretical basis for improving whole-process, all-round integrated medical-preventive services for the public. Methods Based on relevant research and practical work, 20 survey items for diabetes integrated medical-preventive service demand were established. From January to June 2023, diabetic patients and at-risk populations in Fujian, Guangdong, and Yunnan provinces were surveyed using convenience sampling, obtaining data from 410 respondents. According to five demographic characteristics—gender, age, education level, residence type, and medical insurance type—attribute classification analysis was conducted using the Kano model analysis method to examine the relationship between service demands of different attributes and resident satisfaction, and thereby propose supply strategies for diabetes integrated medical-preventive services. Results Residents with different demographic characteristics demonstrated both commonalities and individual differences in their demand for diabetes integrated medical-preventive services, with significant differences in service demand among populations of different age groups and education levels. The integrated medical-preventive service demands of diabetes prevention and treatment groups fo-

cused on screening-prevention and diagnosis-treatment stages, yet convenient services provided through the internet and social media were not related to user satisfaction. Conclusion The personalization level of diabetes integrated medical-preventive services at the primary care level should be enhanced, fully satisfying the must-be attribute demands of service populations such as "preliminary screening for diabetes and complications," improving expected attribute services such as "establishing whole-cycle personal electronic health records," and enhancing the delivery of attractive attribute demands such as "risk prediction" and "remote health monitoring."

Full Text

Preamble

Demand Analysis of Diabetes Primary Healthcare and Prevention Integration Services in the Context of Digital Health

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Abstract

Background With the acceleration of population aging and changes in disease patterns, the prevalence of chronic diseases such as diabetes is increasing annually. There is an urgent need to establish a primary healthcare and prevention integration model with broad coverage and high efficiency. Existing research has primarily focused on demand for health management services and factors influencing service adoption, with few studies identifying and analyzing demand for chronic disease healthcare and prevention integration services under digital technology.

Objective To explore residents' demand for diabetes healthcare and prevention integration services in the context of digital health, and to examine how different service contents affect service recipients' acceptance and satisfaction, thereby providing a theoretical basis for improving comprehensive, whole-process healthcare and prevention integration services for the public.

Methods Based on relevant research and practical work, we established 20 survey items on demand for diabetes healthcare and prevention integration services. From January to June 2023, we surveyed diabetes patients and at-risk

populations in Fujian, Guangdong, and Yunnan provinces using convenience sampling, obtaining data from 410 respondents. According to five demographic characteristics—gender, age, education level, residence type, and medical insurance type—we conducted attribute classification analysis using the Kano model to investigate the relationship between service demands of different attributes and residents' satisfaction, and subsequently proposed supply strategies for diabetes healthcare and prevention integration services.

Results Residents with different demographic characteristics showed both commonalities and individual differences in demand for diabetes healthcare and prevention integration services, with particularly notable differences across age groups and education levels. The healthcare and prevention integration service demands of diabetes prevention and treatment groups focused on screening, prevention, and treatment stages. However, convenient services provided through the internet and social media were unrelated to user satisfaction.

Conclusion We should enhance the personalization of primary diabetes healthcare and prevention integration services, fully satisfy essential attribute needs such as "initial screening for diabetes and complications," improve expected attribute services such as "establishment of full-cycle personal electronic health records," and enhance attractive attribute services such as "risk prediction" and "remote health monitoring."

Keywords Diabetes mellitus; Primary healthcare and prevention integration; Digital health; Service demand; Kano model

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Introduction

As population aging accelerates and residents' disease patterns change, the prevalence of chronic diseases represented by diabetes is rising annually. The separation of medical treatment and public health systems, along with a focus on treatment over prevention, has made it difficult for the current healthcare service system to effectively meet people's health needs [1-2]. Integrating disease treatment and prevention to establish a broad-coverage, high-efficiency healthcare and prevention integration model that emphasizes early diagnosis, treatment, and rehabilitation can improve the efficiency of healthcare resource utilization and minimize health problems [3]. However, healthcare and prevention integration practices remain in the exploratory stage, with issues such as residents' vague understanding of family doctor services (signing without actual use) [4] and low acceptance of internet-based nursing services [5]. Relying solely

on government administrative promotion cannot resolve the contradiction between rapid growth in service supply and low utilization rates. It is essential to improve service capabilities while simultaneously increasing service acceptance among policy implementation targets [4].

Over the past two decades, the number of diabetes patients in China has grown explosively, making diabetes prevention and treatment a breakthrough point for healthcare and prevention integration practices in many regions. Scholars both domestically and internationally have discussed diabetes healthcare and prevention integration, focusing primarily on collaborative service needs surveys [6-8], factors influencing health management service adoption [9], and healthcare and prevention integration service models [10]. Existing research has laid a foundation for improving service acceptance, but less attention has been paid to service changes brought by digital technology applications in diabetes healthcare and prevention integration. PORTZ et al. [11] proposed that providing patient portals for chronic disease patients to access appointment scheduling, electronic health records, assisted self-health management, and online contact for non-urgent issues can improve healthcare service delivery and quality. Age, income, education level, medical insurance type, and residence all affect the use of digital primary healthcare services [12-13]. Although digital technology can significantly improve service refinement in the healthcare field [14], research has yet to reveal how different service contents affect service recipients' acceptance and satisfaction.

The Kano model can effectively identify differences in user demand attributes and is applicable to public health management research [15-17]. From a digital health perspective, this study systematically reviews residents' demand for diabetes healthcare and prevention integration services, uses the Kano model to explore demand attributes for diabetes healthcare and prevention integration service projects among populations with different demographic characteristics, analyzes the relationship between each attribute and user satisfaction, and proposes supply strategies for primary diabetes healthcare and prevention integration services.

Methods

Study Design and Sample

From January to June 2023, we surveyed diabetes patients and at-risk populations in Fujian, Guangdong, and Yunnan provinces using convenience sampling. Inclusion criteria were: (1) age 30 years or older; (2) having diabetes or a first-degree relative with type 2 diabetes; (3) understanding diabetes screening and treatment processes; (4) having experience visiting community hospitals or township health centers. Exclusion criteria were: (1) not using smartphones; (2) having mental illnesses such as dementia or cognitive impairment. All participants signed informed consent. This study followed biomedical ethics protocols and was approved by the Ethics Committee of the First Affiliated Hospital of

Fujian Medical University (Approval No.: 闽医大附一伦理医研 [2021] 327 号).

Based on the cross-sectional survey sample size estimation formula, we calculated the minimum sample size [18]. The sample size estimation formula was:

1-α P0 (1-P0) /d2

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