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Promoting health in the digital age: towards a model of professional practices 4.0

Promoción de la salud en la era digital: hacia un modelo de prácticas profesionales 4.0

A promoção da saúde na era digital: rumo a um modelo de práticas profissionais 4.0

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Abstract

Health promotion seeks to overcome the biological and curative approach, but faces limitations in the face of current demands. The advancement of digital health, the appreciation of collaborative practices, and the need for greater community engagement require new approaches. This article proposes the "Health Promotion 4.0" model, which integrates technological and social innovations to enhance professional performance and the autonomy of individuals. This is a theoretical-reflective essay, based on a historical analysis of the concept of health and a review of recent literature on digital health, interprofessional education, and community engagement. The model is structured on three pillars: Digital Fluency, with the strategic use of technologies such as telehealth and artificial intelligence; Interprofessional Co-creation, which strengthens collaboration between teams and users; and Enhanced Social Engagement, which mobilizes communities through digital platforms. It concludes that the adoption of this paradigm is essential to promote equity, quality of life, and more integrated and sustainable health care.

Descriptors: Health Promotion; Digital Health; Professional Practices; Innovation in Health; Interprofessional Collaboration.

Resumén

La promoción de la salud busca superar el enfoque biológico y curativo, pero enfrenta limitaciones ante las demandas actuales. El avance de la salud digital, la valoración de las prácticas colaborativas y la necesidad de una mayor participación comunitaria requieren nuevos enfoques. Este artículo propone el modelo "Promoción de la Salud 4.0", que integra innovaciones tecnológicas y sociales para mejorar el desempeño profesional y la autonomía de las personas. Se trata de un ensayo teórico-reflexivo basado en un análisis histórico del concepto de salud y una revisión de la literatura reciente sobre salud digital, educación interprofesional y participación comunitaria. El modelo se estructura en tres pilares: Fluidez Digital, con el uso estratégico de tecnologías como la telesalud y la inteligencia artificial; Cocreación Interprofesional, que fortalece la colaboración entre equipos y usuarios; y Mayor Participación Social, que moviliza a las comunidades a través de plataformas digitales. Se concluye que la adopción de este paradigma es esencial para promover la equidad, la calidad de vida y una atención sanitaria más integrada y sostenible.

Descriptores: Promoción de la Salud; Salud Digital; Prácticas Profesionales; Innovación en Salud; Colaboración Interprofesional.

Resumo

A promoção da saúde busca superar o enfoque biológico e curativista, mas enfrenta limitações frente às demandas atuais. O avanço da saúde digital, a valorização de práticas colaborativas e a necessidade de maior engajamento comunitário exigem novas abordagens. Este artigo propõe o modelo “Promoção da Saúde 4.0”, que integra inovações tecnológicas e sociais para potencializar a atuação profissional e a autonomia dos sujeitos. Trata-se de um ensaio teórico-reflexivo, fundamentado na análise histórica do conceito de saúde e em revisão da literatura recente sobre saúde digital, educação interprofissional e engajamento comunitário. O modelo estrutura-se em três pilares: Fluência Digital, com o uso estratégico de tecnologias como telessaúde e inteligência artificial; Cocriação Interprofissional, que fortalece a colaboração entre equipes e usuários; e Engajamento Social Ampliado, que mobiliza comunidades por meio de plataformas digitais. Conclui-se que a adoção desse paradigma é essencial para promover equidade, qualidade de vida e um cuidado em saúde mais integrado e sustentável.

Descritores: Promoção da Saúde; Saúde Digital; Práticas Profissionais; Inovação em Saúde; Colaboração Interprofissional.

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Introduction

Health, as an essential resource for social development and a fundamental dimension of quality of life, has been the subject of constant reinterpretation. The health promotion movement, marked by the Ottawa Charter in 1986, sought to break with the curative logic, proposing a broader vision that involves social determinants, healthy public policies, and community empowerment. In Brazil, the creation of the Unified Health System (SUS) and the Family Health Strategy (ESF) represented an effort to incorporate this perspective into primary care[1-3].

However, as pointed out in the study that forms the basis of this work, the persistence of hegemonic models results in the continued predominance of curative and individualistic practices, even in a system oriented towards promotion[4]. The challenge of overcoming actions focused on a biological approach and moving towards a positive conception of health remains relevant. These limitations reveal the need to strengthen intersectoral approaches, social participation, and health education as essential components of truly comprehensive care.

Since the publication of the historical analysis in 2016, the healthcare landscape has been drastically transformed by the acceleration of digital transformation. The COVID-19 pandemic has driven the adoption of digital technologies on an unprecedented scale, highlighting both their potential and existing inequities[5]. Given this new reality, the theoretical framework for health promotion needs not only to be revisited but also reinvented. Digitalization has exposed weaknesses in communication, information, and care processes, demanding new strategies to expand access, ensure safety, and promote equity. In this context, the need arises to reflect on the role of digital technologies as tools for health promotion, going beyond the mere computerization of services. Resources such as artificial intelligence, wearables, self-care applications, telemonitoring platforms, and decision support systems expand the capacity for continuous monitoring, personalization of interventions, and user engagement in care. However, if they are not incorporated from an ethical, participatory perspective oriented towards social determinants, they can reinforce inequalities and deepen digital exclusion[6].

Health Promotion 4.0, therefore, involves not only the use of innovative technologies, but also the creation of collaborative ecosystems that integrate users, health professionals, managers, researchers, and developers. This model requires that professional practice be rethought, incorporating digital skills, critical thinking, and the ability to mediate care processes in hybrid environments - both physical and digital. At the same time, it reinforces the protagonism of the population as an active agent in the production of their own health, valuing local knowledge, life experiences, and community practices[7].

This article advances the discussion by proposing an innovative model: Health Promotion 4.0. Inspired by the concept of Industry 4.0, which describes the fourth industrial revolution marked by the fusion of digital, physical, and biological technologies[8], this model articulates technological innovations with the fundamental principles of health promotion. The objective is to analyze the limitations of current paradigms and outline a new model of professional practices capable of responding more effectively, equitably, and participatively to contemporary health challenges.

Methodology

This study is structured as a theoretical-reflective essay, based on the methodology of reflective review and the historical conceptual basis on care models presented in the article "Concepts and movements in health promotion in search of the reorientation of practices"[4]. To support the formulation of the innovative proposal, a new search and content analysis was carried out in the scientific literature published after 2016, encompassing the Medline/PubMed, LILACS, and SciELO databases. Descriptors such as "Health Promotion," "Digital Health," "Interprofessional Practices," "Innovation in Health," and "Community Engagement" were used to capture contemporary productions that addressed the current challenges in the field.

The process of categorization and content analysis followed the classic structure proposed by Bardin[7], adapted for the purpose of developing a renewed conceptual model. In the pre-analysis phase, the collected material was organized and compared with historical assumptions, allowing the identification of gaps, tensions, and potential breaking points with the biomedical paradigm. Subsequently, the material exploration phase comprised the systematic coding and thematic categorization of recent studies, from which three central axes of innovation emerged: the incorporation of digital technologies, the redesign of interprofessional practices, and the strengthening of social engagement strategies.

In the final stage, corresponding to the treatment and interpretation of the results, an integrative synthesis of the findings and the articulation between the three identified axes were carried out. This process allowed us to outline the structuring pillars of the "Health Promotion 4.0" model, formulating inferences about how the integration between digital technologies, collaborative practices, and social participation can reorient work processes in health and contribute to overcoming the persistent limitations of the curative and individualistic model.

Results

The analysis of the literature, starting from the diagnosis that health practices are still predominantly anchored in a negative concept of health - understood as the absence of disease - and in curative and fragmented models[1], highlighted the persistence of a paradigm that limits the reach of health promotion and prevention actions. This scenario reveals fertile ground for innovation, while also indicating the urgency of rethinking the theoretical and practical frameworks that guide health work in Brazil and worldwide. From this analytical movement, the "Health Promotion 4.0" model is consolidated, conceived as a response to contemporary challenges at the interface between technology, care, and social participation. This proposal emerges as an alternative to the exhaustion of

traditional models, recognizing that transforming professional practices requires more than the incorporation of new tools: it demands a structural change in the way we understand, produce, and manage health. Thus, Health Promotion 4.0 proposes an epistemological and operational shift, based on the integration of emerging technologies, the redefinition of interprofessional work, and the strengthening of community protagonism, in line with the principles of equity, participation, and comprehensiveness.

Chart 1. Comparison between traditional models and the 4.0 model of health promotion. Rio de Janeiro, RJ, Brazil, 2016-2024

Aspect	Traditional Model (Curative)	Health Promotion 4.0
Main focus	Illness and absence of complications	Health, quality of life, and equity
Protagonism	Healthcare professional	User/community as co-creators
Organization of care	Service-focused and fragmented	Collaborative, continuous, and digital network
Technology	Instrumental and restricted	Strategic, integrated, and equitable
Social participation	Passive, consultative	Active, digital, and real-time

The transition to this model, therefore, presupposes the consolidation of new operational bases that articulate technological, professional, and social dimensions within a single care framework[6]. It is recognized that innovation in the field of health is not limited to technical advancement but also involves the capacity of systems and workers to incorporate more collaborative, welcoming, and socially determinant-oriented approaches. In this context, three pillars are outlined that support the conceptual architecture of Health Promotion 4.0, functioning as structuring axes of transformation: the strategic use of digital technologies, the reconfiguration of interprofessional practices, and the expansion of social engagement strategies.

These pillars, although distinct, are deeply interdependent. Together, they enable the construction of a more responsive, equitable care model connected to the complex demands of contemporary life. Their articulation guides the formulation of practices that go beyond the biomedical approach, favoring more participatory and integrated work processes capable of promoting autonomy and co-responsibility among users, professionals, and communities.

Pillar 1. Digital fluency

Digital fluency goes beyond the instrumental use of technology and proposes its strategic and critical integration into care processes. It involves understanding technology not only as a support tool, but as a mediator capable of transforming practices, languages, and relationships in healthcare, contributing to overcoming the biological and disease-centered approach that still prevails in many services. Technologies such as telehealth, artificial intelligence, self-care apps, big data analytics, and gamification have the potential to broaden the scope of health promotion, allowing for more personalized, continuous, and participatory interventions[8,9].

This approach directly addresses one of the central pillars of health promotion: the "development of personal skills"[2], by creating new avenues for empowerment, autonomy, and user agency, digital fluency, through interactive technologies, allows individuals to access qualified information, monitor their health in real time, and actively participate in decisions about their care. Furthermore, digital fluency strengthens health literacy, an essential element for expanding people's ability to make informed decisions and cope with the increasing complexity of the healthcare system.

However, the adoption of these technologies must occur in an ethical and equitable manner. It is crucial to recognize that, if not accompanied by inclusive policies, infrastructure investments, and digital literacy initiatives, such tools can exacerbate existing inequalities[5]. Vulnerable groups, such as rural populations, the elderly, and communities on the outskirts of cities or with low levels of education, are at risk of becoming even more marginalized, which reinforces the need for digital inclusion strategies as a structuring component of Health Promotion 4.0.

Pillar 2. Interprofessional co-creation

Interprofessional co-creation proposes a paradigmatic shift in relation to the hegemonic medical model, historically marked by the centralization of knowledge and decision-making power in the hands of a few professionals[10]. The purpose of this pillar is to establish collaborative processes that value dialogue between different areas of knowledge - nursing, medicine, nutrition, psychology, physical education, social work, integrative therapies, among others - expanding the capacity of teams to respond comprehensively and contextually to the demands of users.

In this model, the user ceases to be a passive recipient and begins to act as an active agent in the formulation, implementation, and evaluation of health actions. This practice aligns with the principles of social participation foreseen in the Brazilian Unified Health System (SUS) and the guidelines of the Family Health Strategy, which advocate for the shared construction of actions with communities. By legitimizing popular knowledge and recognizing the territory as a living space for health production, interprofessional co-creation promotes greater harmony between professional practices and the real needs of the population[3,11].

This approach also critically confronts the fragmentation of care by replacing isolated actions with collaborative intersectoral networks. The joint construction of interventions allows for integration between sectors such as education, social assistance, culture, sports, and

technology, broadening the reach of actions and strengthening the capacity of teams to act on the social determinants of health. Thus, co-creation is consolidated as a fundamental axis to support innovative, effective, and socially committed practices.

Pillar 3. Enhanced social engagement

Expanded social engagement recognizes that, in the digital age, virtual platforms become new and powerful spaces for social mobilization, meaning-making, and the construction of collective agendas. Social networks, community forums, collaborative platforms, and virtual learning environments function as arenas where advocacy strategies are strengthened[9], Advocacy for rights and the development of healthy public policies. This movement embodies two structuring axes of the Ottawa Charter: "strengthening community action" and "creating healthy public policies"[2].

In this context, health promotion takes on new dimensions of scale and impact. Communities can organize themselves more quickly, horizontally, and in a more widespread manner, expanding their capacity to demand actions that address social determinants, in line with the expanded concept of health enshrined in the 1988 Constitution[3]. Furthermore, the digital environment fosters the creation of solidarity and learning networks, allowing local experiences to connect and inspire transformations in different regions and contexts.

However, the expansion of these digital spaces requires caution. The spread of fake news, the political and commercial use of personal data, informational polarization, and the manipulation of narratives represent real risks, capable of compromising the quality of public debate and weakening social mobilization. Therefore, expanded social engagement must be anchored in principles of ethics, transparency, digital literacy, and informational sovereignty, ensuring that collective participation is strengthened and not captured by private or anti-democratic interests[12].

Discussion

The proposed "Health Promotion 4.0" model directly and proactively addresses the structural challenges described by Bezerra and Sorpreso[4], which is especially true regarding the historical difficulty of reorienting healthcare practices that are still strongly anchored in the biomedical paradigm. The persistence of curative and fragmented actions is not merely a remnant of an outdated theoretical model, but an expression of socio-political and organizational conditions that shaped the healthcare system in a pre-digital era, marked by the centrality of the medical professional, vertical communication, and limited engagement with the social determinants of health[13]. Therefore, thinking about Health Promotion 4.0 implies not only updating instruments, but also transforming rationalities, power relations, and ways of producing care.

Analyzing the results presented, it becomes evident that digital fluency emerges as one of the most promising axes for transforming healthcare practice. Technologies such as telehealth, artificial intelligence, monitoring applications, and gamification significantly expand the capacity for continuous monitoring, personalization of interventions, and democratization of access to services. At the same time, they introduce new possibilities for empowerment and health education, favoring the development of user autonomy. However, such advances bring with them important challenges. The risk of a "technocratization" of care, in which technology comes to occupy the center of decisions, obscuring the human, social, and community dimensions of the health-disease process, demands a critical approach. Excessive dependence on digital solutions can reinforce inequalities, render vulnerable populations invisible, and reduce the clinical encounter to an interaction mediated by algorithms[5,8,9].

Interprofessional co-creation, in turn, represents a paradigmatic shift. By breaking with the traditional vertical logic of the biomedical model, it proposes a redistribution of decision-making power and values plural forms of knowledge, including the knowledge of users and communities. This approach aligns with experiences of co-management and expanded clinical practice, demonstrated in the literature as strategies capable of increasing adherence, strengthening bonds, and producing greater problem-solving capacity[10-14]. However, its implementation does not occur without tensions. Institutional barriers, disputes over professional identity, consolidated hierarchies, and cultural resistance still limit the effectiveness of this proposal, requiring training processes and organizational arrangements that favor genuine collaboration among the different actors.

Regarding broader social engagement, it is observed that the digital environment has consolidated itself as a strategic territory for communication, political mobilization, and the defense of rights. Virtual platforms allow for increased social participation, enhance advocacy campaigns, disseminate self-care practices, and strengthen solidarity networks. However, this same space is traversed by risks: the circulation of misinformation, algorithmic manipulation, digital exclusion, and the political use of data can compromise the reliability of interactions and weaken collective action. Thus, social engagement increases the demand for critical strategies of digital mediation, health literacy, and regulatory mechanisms that preserve the autonomy and integrity of the communities involved[9,12,15,16].

This set of analyses highlights that Health Promotion 4.0 cannot be understood as mere technological modernization, but as a profound reconfiguration of the epistemological, ethical, and operational foundations of healthcare work. The proposed pillars, digital fluency, interprofessional co-creation, and expanded social engagement, are interdependent and only acquire transformative power when articulated with each other. The contemporary challenge lies in integrating technological innovation with social justice, democratic participation, and collaborative practices, so that the digital revolution does not reproduce historical inequalities but effectively contributes to building a more equitable, inclusive healthcare system oriented towards promoting life in its entirety.

Conclusion

The understanding that health concepts and care models are products of their historical contexts highlights the need for continuous updating of health practices. In the contemporary scenario, marked by digital convergence, the intensification of information flows, and socio-technical transformations, it becomes imperative to break with traditional disease-centered models and adopt new frameworks oriented towards comprehensiveness and health promotion. It is in this context that the "Health Promotion 4.0" model presents itself as a powerful alternative for reorganizing work processes in health.

Overcoming the historical dichotomy between curative and preventive practices demands more than operational adjustments: it requires an epistemological and organizational reconfiguration of care, recognizing health as a collective production, situated within social determinants and mediated by qualified human interactions. The articulation between digital fluency, interprofessional co-creation, and expanded social engagement offers a way to strengthen the autonomy of individuals, democratize access to information, and promote more collaborative, dialogical practices centered on the real needs of communities. The success of Health Promotion 4.0 will depend, above all, on the capacity of governments, training institutions, health services, and social actors to transform technological potential into a tool for emancipation, and not for deepening inequalities. This implies continuous investments in digital education, infrastructure, participatory governance, and intersectoral integration. More than incorporating technologies, it is about reorienting the meaning of care, valuing equity, citizenship, and co-responsibility as structuring pillars.

Thus, the proposed model reaffirms that health innovation is not achieved solely through the adoption of technological devices, but through the construction of new socio-technical arrangements capable of strengthening bonds, expanding individual and collective capacities, and promoting environments that favor healthier choices. Health Promotion 4.0, therefore, presents itself not only as a response to contemporary challenges but as a strategic path to consolidate a more just, participatory, and humanized future within the scope of the Brazilian Unified Health System (SUS) and global health.

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