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The Role of Digital Marketing in Promotion of Preventive Healthcare in Uttar Pradesh, India

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ABSTRACT

Background: Preventive healthcare is critical in reducing disease burden and improving long-term health outcomes, yet in India, especially in populous states like Uttar Pradesh, traditional communication channels often fail to ensure wide reach and engagement.

Aim: This study explores the role of digital marketing strategies in promoting preventive healthcare practices in Uttar Pradesh, assessing their reach, effectiveness, and barriers to implementation.

Methods: A mixed-method approach was used, drawing on secondary datasets from national health portals, telemedicine records, and survey reports, complemented by interviews with healthcare administrators, digital marketing experts, and frontline providers. Analytics from social media campaigns and search engine optimization (SEO) metrics were reviewed to evaluate user engagement.

Results: Social media, SEO, and telemedicine applications such as e-Sanjeevani significantly expanded preventive healthcare outreach. By 2025, over 330.7 million tele-consultations were conducted nationally. However, barriers including digital illiteracy, infrastructure gaps, and privacy concerns persisted.

Conclusion: Digital marketing tools hold transformative potential for preventive healthcare in Uttar Pradesh, but equitable outcomes require addressing digital access, literacy, and trust challenges.

, ***Keywords:*** *Preventive Healthcare; Digital Marketing; Uttar Pradesh; Health Awareness; Telemedicine; Health-Tech.*

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1. INTRODUCTION

Preventive healthcare focuses on reducing the burden of diseases through early detection, education, and lifestyle interventions, thereby improving health outcomes and minimizing long-term healthcare costs. In India, particularly in densely populated states like Uttar Pradesh, where both communicable and non-communicable diseases persist, promoting preventive healthcare has become a public health priority. Traditional health communication methods, though valuable, often fall short in reach, speed, and engagement especially in remote or underserved areas.

The emergence of digital marketing has transformed how health information is circulated, enabling interactive, targeted, and scalable outreach. Through platforms such as social media, mobile health apps, search engine optimization (SEO), and telemedicine services, healthcare providers can connect with users in real time and foster behaviour change at the population level. Notably, government led initiatives like the Ayushman Bharat Digital Mission (ABDM), the e-Sanjeevani tele-consultation platform, and the ABHA digital health ID system have embedded digital tools into India's healthcare delivery ecosystem [1, 2].

Recent estimates suggest that India's preventive healthcare market is projected to reach USD 197 billion by 2025, growing at a CAGR of 22%, with digital platforms playing a pivotal role in this expansion [3]. Moreover, the use of platforms like e-Sanjeevani has enabled over 330.7 million tele-consultations by Dec 2024, reflecting the increasing reliance on digital health services [4]. As Uttar Pradesh continues to improve key health indicators such as maternal mortality and institutional delivery rates, the integration of digital marketing into public health initiatives offers a promising pathway to enhance awareness, accessibility, and preventive health behaviours.

2. METHODOLOGY

Study design

This research adopted a mixed-method approach to comprehensively examine the influence of digital marketing on promoting preventive healthcare in Uttar Pradesh.

Analytics Review

The reach and engagement of preventive health messages, analytics from social media campaigns and search engine optimization (SEO) performance metrics were systematically reviewed.

Quantitative Data Collection

The quantitative component drew upon secondary datasets sourced from credible government repositories such as the National Health Portal, Press Information Bureau, and the National Family Health Survey (NFHS-5), supplemented by tele-consultation records from the e-Sanjeevani platform and relevant digital health performance reports.

3. RESULTS

Digital Marketing Channels in Preventive Healthcare

Social media platform

Digital marketing serves as a basis in the dissemination of preventive healthcare information in India, particularly in populous and health-challenged regions like Uttar Pradesh. Social media platforms such as WhatsApp, Facebook, and Instagram have played a pivotal role in sharing health tips, promoting vaccination drives, and amplifying government health initiatives through influencer campaigns. As of 2024, over 60% of Indian internet users reportedly follow health-related content online, reflecting the wide reach and influence of these platforms [5].

Search Engine Optimization (SEO)

Search Engine Optimization (SEO) is a vital digital marketing channel in preventive healthcare, enabling providers to connect with patients actively seeking medical information online. With 89% of businesses relying on organic search, SEO boosts visibility by improving rankings on search engine results pages (SERPs), where over 68% of clicks go to the top five listings. Healthcare SEO enhances local targeting, builds brand authority, and offers a cost-effective, long-term strategy to attract qualified leads [6].

As patients increasingly turn to search engines for medical information, SEO ensures that reliable, evidence-based resources are easily discoverable. Advanced techniques like BERT-based NLP models and graph analytics, as demonstrated by Sarafrazi et al. (2023)[7], optimize content and prevent keyword cannibalization, thereby improving search rankings and user engagement. These strategies empower healthcare providers to effectively reach at-risk populations with timely preventive information, ultimately supporting early intervention and better health outcomes Clinics and health start-ups that have implemented SEO strategies observed a 30–40% surge in patient inquiries and appointments within six months, largely due to improved visibility of preventive content in search rankings [5].

Telemedicine services and mobile health applications

Platforms like e-Sanjeevani and MaNTrA have significantly bridged accessibility gaps in rural districts. These tools facilitate real-time virtual consultations and maternal health monitoring, offering cost-effective alternatives to traditional care. The Government of India's push for digital integration through initiatives like the Ayushman Bharat Digital Mission further enhances the adoption of such platforms [4].

Together, these digital marketing channels have transformed health communication into a dynamic, interactive, and accessible process, fostering a preventive healthcare culture among diverse populations. This study investigated the role of

digital marketing in advancing preventive healthcare in Uttar Pradesh, assessing its reach, effectiveness, and implementation challenges across diverse demographics.

Digital Health Initiatives

e-Sanjeevani Telemedicine

UP conducts around 45,000 tele-consultations daily, with over 438,000 consultations logged connecting rural patients to doctors effectively.

Digital Doctor Clinic Project

With INR 350 crore initial investment, UP pilots clinics in districts like Lucknow and Bulandshahr. These feature lab services, USG, and tele-consultation, aiming to bridge rural health gaps [8].

ABHA (Ayushman Bharat Health Account)

Over 680 million ABHA IDs have been issued nationally, facilitating electronic health records accessible in UP too [9].

Jiyyo e-Mitra Virtual PHCs

These use tablets to link rural health workers with urban doctors via video, boosting primary care delivery in hard-to-reach villages [10].

102 Ambulance Helpline

A fleet of 2,272 ambulances handles an average of 25,000 trips daily in UP, benefiting over 90 lakh women and newborns [11].

Telemedicine and E-Health

Telemedicine has been adopted to facilitate medical consultations for patients in rural and hard-to-reach regions. Additionally, e-health solutions such as digital health records and online scheduling platforms have been deployed to enhance the efficiency of healthcare services [12].

Illustrative Data and Trends

Growth of India's Digital Health Market (2024–2030)

India's digital health market is projected to grow from $14.3 billion in 2024 to $52.4 billion by 2030, reflecting a Compound Annual Growth Rate (CAGR) of 24.4% (Figure 1). This nearly 3.6-fold increase over six years highlights the robust potential of technology-driven health services, especially in preventive care. The rise is attributed to increased smartphone penetration, health-tech start-up activity, and government initiatives like ABDM (Ayushman Bharat Digital Mission) [13].

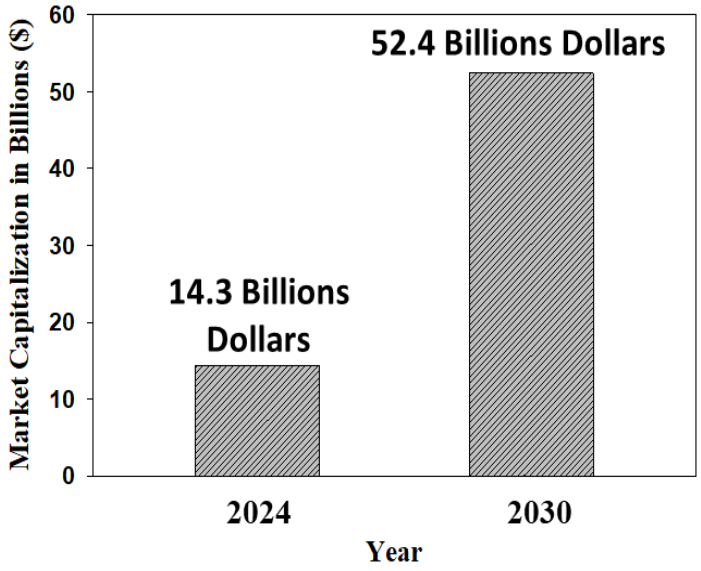

Figure 1: Digital Health Market capitalization projection from 2024 to 2030, with expecting CAGR of 24.4%

IT Spending in Healthcare

India's public health expenditure (Centre + states) reached approximately 1.84% of GDP in FY 2024 25, up from 1.35% in 2013 14, yet still below the National Health Policy 2017 goal of 2.5% by 2025 [14]. Combined Centre state health spending (including clean water/sanitation) reached approx. 2.13% of GDP in FY 2023 24 suggesting that if current trends continue, the 2.5% target may be reached or narrowly missed by 2025. A report from November 2023 noted that the Indian healthcare sector spent ₹22,465 crore (~USD 2.7 billion) on technology, with annual growth doubling over the last few years [15]. Major hospital chains like Apollo Hospitals are expanding digital and AI tools, though the exact share of IT budget dedicated to AI is still modest (3.5%) but growing (Figure 2).

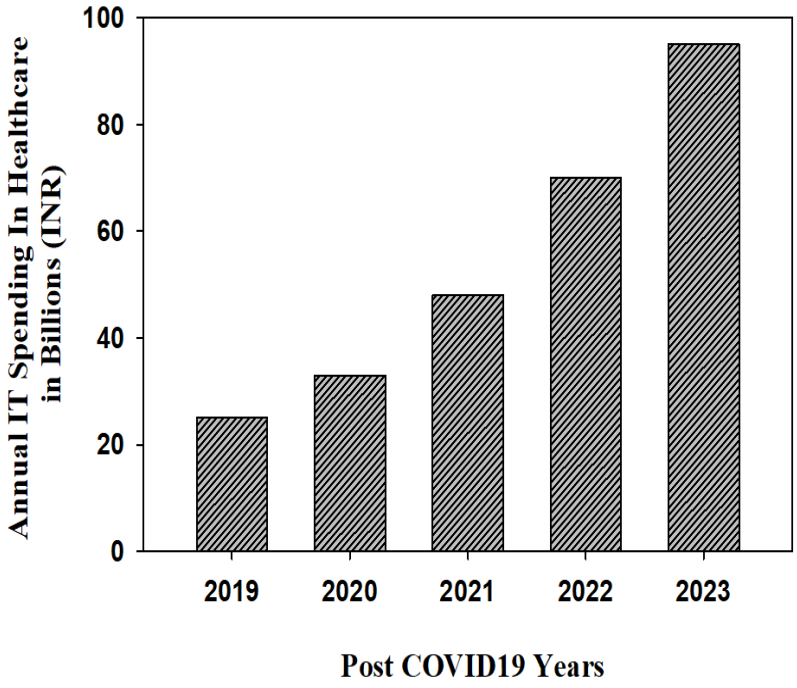

Figure 2: Shows India's annual public health expenditure (Central+ states) from financial year 2019-2023

Post-pandemic, healthcare IT spending grew by 19.9% year-over-year, indicating a sustained push toward digitization. "Annual IT Spending in Healthcare (India)" shows a clear upward trend in India's healthcare IT expenditure from 2019 to 2023, measured in ₹ billion. The COVID-19 pandemic significantly accelerated the adoption of digital health tools, reflected in the 40–45% annual growth from 2020 onward.

It has been reported nearly 4x increase in spending during the period 2019–2023. The Spending rose from around ₹25 billion in 2019 to nearly ₹95 billion in 2023, a cumulative increase of approx. 280% over five years [16].

Tele-consultation Growth via e-Sanjeevani

The e-Sanjeevani – National Telemedicine Service has emerged as one of the most extensive telemedicine initiatives worldwide, particularly in the domain of primary healthcare delivery. As of 31 December 2024, the service had facilitated virtual consultations for more than 330.7 million patients across 131,147 (Figure 3).

Telec-consultations via e-Sanjeevani grew 22.5× from 12 million in 2021 to 270 million in 2024, indicating rapid adoption. The year 2023 alone saw 192 million new consultations, accounting for over 70% of the total uptake a sign of increasing trust and scale of digital health services. The pandemic acted as a catalyst, as the platform was launched in response to the COVID-19 pandemic in 2020 and quickly scaled to become one of the world's largest telemedicine initiatives. This growing numbers likely reflect better rural outreach, integration with state health systems, and increased public awareness [4].

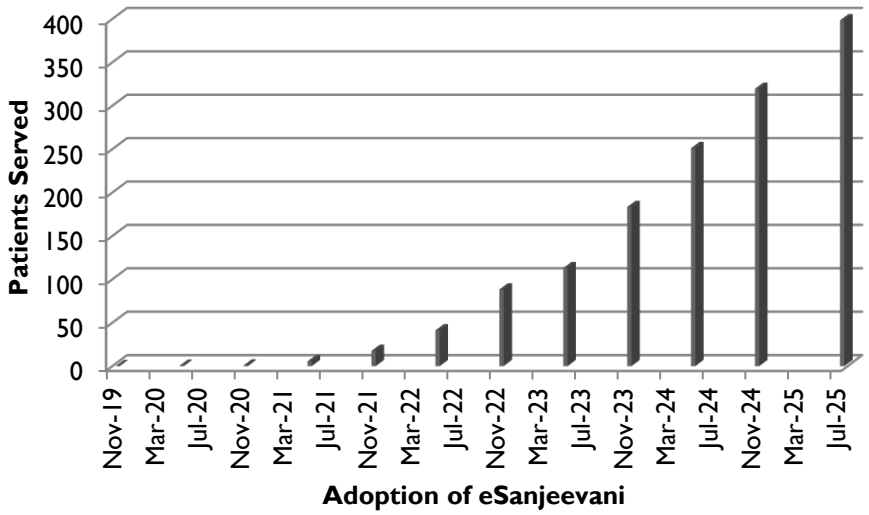

Figure 3: Tele-consultations growth via e-Sanjeevani 2019-2025

ABHA Health ID Integration

As of November 2024, 689.7 million Ayushman Bharat Health Account (ABHA) IDs had been generated, and 453.8 million health records were digitally linked. This means approximately 65.8% of IDs had corresponding digital health records, showing encouraging progress in creating a unified digital health repository to support preventive interventions [1, 20] (Figure 4).

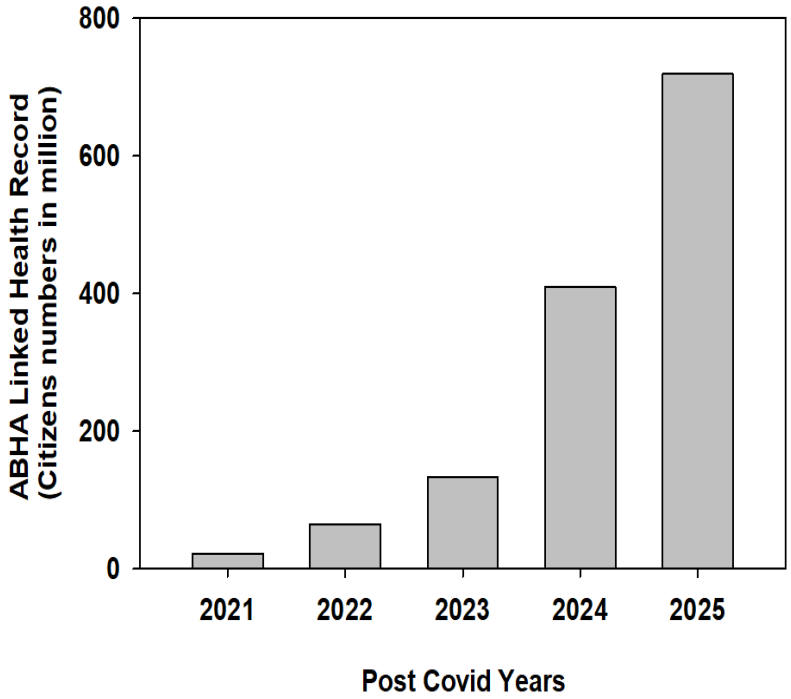

Figure 4: ABHA Health Id integration data from year 2021 to 2025

Global Health-Tech Funding (India's Position)

Between 2014 and 2024, India attracted USD 7.92 billion in digital health investments, with USD 2.6 billion secured in 2021 alone, representing over 32.8% of the total funding in a single year. India ranks 4th and positioning itself as the top Health-Tech investment destination among developing countries (Figure 5). This spike aligns with the post-pandemic surge in demand for digital-first healthcare services and investor confidence in the sector's growth trajectory. With China (2nd) and India (4th) both in the top five, Asia is clearly emerging as a strong base for Health-Tech innovation and investment. Whereas, the United States leads by a wide margin, attracting over 91 billion USD, which is nearly 3.7× more than China and over 11× more than India. The U.K., Germany, Israel, Canada, and France follow with moderate funding levels, reflecting strong innovation ecosystems but comparatively smaller markets or investment volumes. India surpasses traditionally strong digital economies like Germany, Israel, and Canada in total Health-Tech investment. This reflects: A booming digital health start-up ecosystem, a vast and diverse population driving demand and supportive policies like the Ayushman Bharat Digital Mission (ABDM) [17].

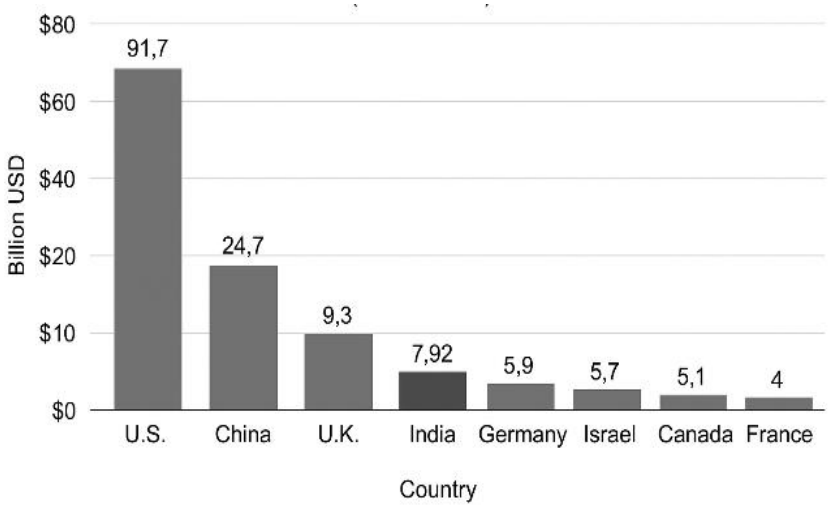

Figure 5: Global Health-Tech Funding (India's Position) 2014-2024

Challenges in Implementation & Opportunities

Despite the success stories, UP continues to grapple with problems such as digital divide, over 55% of rural UP lacks stable internet, limiting outreach, Low digital literacy, especially among elderly and low-income groups, language barriers hinder content consumption in non-Hindi-speaking communities and privacy concerns around digital health records, although addressed partially by DPDPA 2023 (Digital Personal Data Protection Act) [18].

Localized content creation in regional languages must be prioritized. Digital health promotion needs collaborative planning with local governments, NGOs, and tech start-ups. Integration of influencer marketing, especially using health workers and community leaders on WhatsApp and Facebook, shows promise in behaviour change communication.

Opportunities for Scaling

Expansion of tele-health kiosks in village panchayats can democratize digital consultations. Incorporating AI-powered tools for predictive health alerts via mobile apps may revolutionize early detection. Strengthening public-private partnerships can amplify reach and technology adoption in underserved communities [19].

4. DISCUSSION

This study demonstrates the growing influence of digital marketing in transforming preventive healthcare delivery in Uttar Pradesh (UP). With a population exceeding 240 million and significant rural dispersion, UP faces persistent public health challenges, particularly in maternal-child health and chronic disease management. In this context, digital platforms offer a promising solution to bridge healthcare awareness and access gaps.

The rise of telemedicine, particularly through the government-backed e-Sanjeevani platform, illustrates the rapid digital transformation. From just 12 million consultations in 2021, the platform scaled up to over 330.7 million by 31 Dec 2024, making it one of the largest virtual healthcare networks globally [4]. This reflects both infrastructure readiness and increasing public acceptance of digital care, catalyzed by the COVID-19 pandemic.

Social media has become a potent medium for health promotion. Platforms like WhatsApp and Facebook have facilitated health messaging, vaccination awareness, and support behaviour change communication through culturally adapted messaging and community influencer engagement. With over 60% of Indian internet users following health-related content, social media has outpaced traditional IEC (Information, Education, Communication) tools in engagement and outreach [5]. In UP, integration with frontline workers such as ASHAs and ANMs using digital tools has further localized messaging and improved trust. Search Engine Optimization (SEO) also plays a crucial role. As more people turn to Google for medical advice, well-optimized digital content from credible providers helps guide users toward preventive services. Clinics using healthcare SEO saw a 30–40% increase in appointments within six months, underlining the effectiveness of such tools [6]. Moreover, integrating NLP and graph analytics into content strategies—as shown by Sarafrazi et al. (2023)[7] enhances targeting and reduces misinformation exposure.

Uttar Pradesh's adoption of digital health initiatives including ABHA IDs, telemedicine kiosks, and virtual PHCs demonstrates government commitment. However, there are significant barriers to scale. Over 55% of rural UP lacks reliable internet, hampering access to digital services [18]. Digital illiteracy especially among the elderly and underprivileged—limits effective utilization. Furthermore, language diversity in UP creates accessibility challenges, as much of the content remains in Hindi or English. Additionally, data privacy concerns continue to affect user trust. The Digital Personal Data Protection Act (DPDPA) 2023 offers a regulatory framework, but public awareness of consent, rights, and data protection is still limited.

To further enhance the impact of health initiatives, several strategic actions can be implemented. First, developing localized content and interfaces is crucial, incorporating multilingual, culturally relevant health materials with visual aids, audio messaging, and community storytelling tailored for non-literate users. Second, strengthening digital infrastructure by expanding 4G/5G and Wi-Fi access in underserved areas, particularly through public health centers and village panchayats, will improve connectivity and access. Third, leveraging influencer health campaigns by training community leaders, ASHAs, and youth groups as digital influencers can effectively promote health messages on platforms like WhatsApp, YouTube Shorts, and Instagram Reels. Fourth, integrating predictive AI tools to deliver mobile alerts for early detection, such as reminders for child immunizations or antenatal care visits, can enhance adherence to preventive care. Finally, fostering public-private partnerships with start-ups and telecom companies will drive innovation in content development, last-mile delivery, and mobile health solutions, creating a robust ecosystem for health promotion.

5. CONCLUSION

Digital marketing has emerged as a transformative force in promoting preventive healthcare in Uttar Pradesh. Platforms like social media, SEO, telemedicine apps, and centralized health databases are redefining how public health messages are delivered and acted upon. However, to ensure equitable impact, systemic barriers like internet access, data literacy, and public trust in digital systems must be addressed. The findings advocate for a coordinated, inclusive digital health strategy that aligns with India's broader healthcare goals.

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Abbreviations & Acronyms

ABDM – Ayushman Bharat Digital Mission

ABHA – Ayushman Bharat Health Account

NFHS-5 – National Family Health Survey – Round 5

DPDPA – Digital Personal Data Protection Act (2023)

UP – Uttar Pradesh

MoHFW – Ministry of Health and Family Welfare (Govt. of India)

NGO – Non-Governmental Organization

PIB – Press Information Bureau (India)

CASI – Center for the Advanced Study of India (University of Pennsylvania)

PHC – Primary Health Centre

Virtual PHC – Virtual Primary Health Centre

IEC – Information, Education, and Communication

ASHAs – Accredited Social Health Activists

ANMs – Auxiliary Nurse Midwives

SEO – Search Engine Optimization

NLP – Natural Language Processing

AI – Artificial Intelligence

SERP(s) – Search Engine Results Page(s)

USG – Ultrasonography

GDP – Gross Domestic Product

CAGR – Compound Annual Growth Rate

IT – Information Technology

Declaration on competing interests

The authors declare no competing interest

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