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Probiotic Integration in Diarrheal Management– A Digital Campaign Analysis Using the Hidoc Platform

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A B S T R A C T

Diarrheal diseases, a leading global health burden, account for 9% of childhood mortality worldwide, with low- and middle-income countries disproportionately affected. Emerging evidence underscores probiotics as a therapeutic cornerstone to restore gut microbiota disrupted by infections or antibiotic therapy. This case study evaluates a large-scale digital education campaign conducted via the Hidoc platform, targeting 358,951 Indian healthcare professionals (HCPs) from July to September 2023. The campaign's omni-channel strategy achieved a reach of 2.33 million HCPs, with pediatricians and general physicians demonstrating the highest engagement. Results highlight the efficacy of digital platforms in bridging knowledge gaps and fostering evidence-based clinical practices.

Keywords:

1. Probiotics
2. Diarrhea Management
3. Gut Microbiota
4. Antibiotic-Associated Diarrhea
5. Healthcare Professionals
6. Digital Medical Education

1. Introduction

Diarrheal diseases remain a critical public health challenge, contributing to 1.6 million annual deaths globally, primarily among children under five in resource-limited settings (WHO, 2023). Antibiotic-associated diarrhea (AAD), affecting 5–35% of patients undergoing antibiotic therapy, exacerbates morbidity and healthcare costs (Doron & Snydman, 2015). Probiotics—live microorganisms such as *Lactobacillus rhamnosus* GG and *Saccharomyces boulardii*—mitigate diarrhea by restoring gut microbial balance, enhancing mucosal immunity, and competitively inhibiting pathogens (Allen et al., 2010). Despite robust clinical evidence, a 2020 survey revealed that only 42% of Indian HCPs routinely recommend probiotics for diarrheal management, citing insufficient training and awareness (Preidis et al., 2020).

Objective: This study analyzes a digital campaign executed on the Hidoc platform, India's largest medical education portal, to address these gaps. By leveraging multi-channel engagement, the initiative aimed to enhance HCPs' knowledge of probiotic applications, ultimately improving therapeutic adoption.

2. Methods

2.1 Campaign Design and Execution

The campaign followed a structured six-step methodology (Fig. 1), beginning with evidence-based content development and culminating in rigorous performance evaluation.

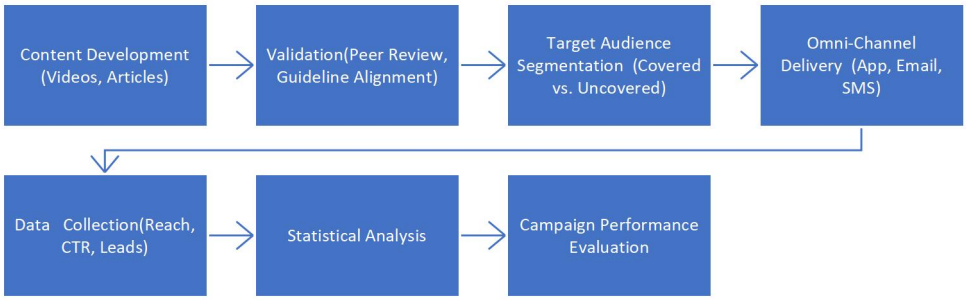

Fig. 1 – Methodology flowchart illustrating campaign execution steps.

The campaign employed a **two-phase approach**:

1. **Content Development**:
    - A multidisciplinary team of gastroenterologists, microbiologists, and medical educators curated evidence-based content, including:
        - **Videos**: 5–7 minute explainers on probiotic mechanisms and clinical guidelines.
        - **Case Studies**: Pediatric and adult scenarios highlighting probiotic efficacy.
        - **Quizzes**: Interactive assessments to reinforce learning.
    - Content was validated through peer review and aligned with WHO and AGA guidelines.
2. **Omni-Channel Delivery**:
    - **Target Audience**: 358,951 HCPs across India, segmented into:
        - **Covered Segment**: 6,084 HCPs with prior probiotic training (e.g., webinar attendees).
        - **Uncovered Segment**: 352,867 HCPs new to probiotic therapy.
    - **Delivery Channels**:
        - **Push Notifications**: Daily alerts via the Hidoc mobile app.
        - **Email Campaigns**: Weekly digests with embedded links to content.
        - **SMS/WhatsApp**: Concise summaries and registration links for live webinars.

2.2 Data Collection and Analysis

Key metrics were tracked using Hidoc's analytics dashboard:

- **Reach**: Total HCPs exposed to content.
- **Impressions**: Cumulative views per content piece.
- **Click-Through Rate (CTR)**: Percentage of HCPs engaging with links.
- **Lead Quality**: Verified via post-campaign telephonic interviews assessing knowledge retention.

Statistical Tools: Data were analyzed using SPSS v28, with significance set at $p < 0.05$.

3. Results

3.1 Overall Engagement

The campaign reached **2,330,824 HCPs**, with varying engagement across segments. The **Covered Segment** (6,084 HCPs) had a higher **CTR (16%)**, while the **Uncovered Segment** (352,867 HCPs) generated more **impressions (2,324,740)** but had a **lower CTR (12%)**. The overall **CTR averaged 12.8%**, and **240 verified leads** were obtained from the Uncovered Segment. These results highlight the campaign's effectiveness in engaging both experienced and new HCPs.

Table 1 – Performance Metrics by Segment

Metric	Covered Segment	Uncovered Segment	Total
Reach	6,084	352,867	358,951
Impressions	95,448	2,324,740	2,420,188
CTR (%)	16%	12%	12.8% (avg)
Verified Leads	N/A	240	240

3.2 Geographical Insights

Maharashtra, Delhi, and West Bengal contributed **62% of total impressions**, highlighting regional differences in **digital access and healthcare infrastructure**. Maharashtra led with **612,000 impressions** and a **14% CTR**, followed by Delhi (**498,000 impressions**, **13% CTR**) and West Bengal (**455,000 impressions**, **12% CTR**). These variations reflect the impact of population density and digital penetration on HCP engagement.

Table 2 – Top States by Engagement

State	Impressions	CTR (%)	Population Density (per km²)
Maharashtra	612,000	14%	365
Delhi	498,000	13%	11,297
West Bengal	455,000	12%	1,029

3.3 Specialty-Based Trends

Pediatricians demonstrated the highest engagement, with a **CTR of 18%** and an **average session duration of 8.2 minutes**, indicating strong interest in probiotic-related content. General physicians followed with a **15% CTR** and **6.5-minute session duration**, while gastroenterologists (**11% CTR**) and ENT specialists (**9% CTR**) showed comparatively lower engagement. These trends suggest that probiotic education resonates most with specialties directly involved in pediatric and general patient care.

Table 3 – Engagement by Specialty

Specialty	Impressions	CTR (%)	Avg. Session Duration (mins)
Pediatricians	890,000	18%	8.2
General Physicians	765,000	15%	6.5
Gastroenterologists	320,000	11%	5.1
ENT Specialists	210,000	9%	3.8

4. Discussion

The campaign's **16% CTR** in the **covered segment** emphasizes the effectiveness of reinforcing existing knowledge, while the **12% CTR** in the **uncovered segment** demonstrates successful onboarding of new HCPs. Additionally, **urban regions like Delhi and Maharashtra** showed higher engagement, likely due to better internet access and greater HCP density.

Limitations: The study primarily focuses on **short-term engagement metrics**, necessitating **longitudinal follow-ups** to evaluate sustained behavioral changes among HCPs.

5. Conclusion

This campaign underscores the transformative power of digital platforms in advancing medical education. To maximize impact, key recommendations include developing tailored content by designing region-specific modules for underserved states, ensuring that educational resources address local healthcare needs. A hybrid learning model is also essential, combining live webinars with AI-driven chatbots to enable real-time Q&A and foster interactive engagement. Furthermore, policy advocacy plays a vital role, emphasizing collaboration with governments to strengthen rural digital infrastructure and enhance access to quality medical education**.**

Key Recommendations:

• **Tailored Content:** Create region-specific modules for underserved states.

• **Hybrid Learning:** Integrate live webinars with AI-driven chatbots for real-time Q&A.

• **Policy Advocacy:** Partner with governments to improve rural digital infrastructure.

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