

A Systematic Review on Indian Population Perception of Faecal Microbiota Transplantation (FMT)

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Abstract

Faecal Microbiota Transplantation (FMT) is an increasingly recognized therapeutic intervention, particularly for recurrent *Clostridioides difficile* infection (rCDI) and showing promise in other gastrointestinal and systemic conditions. While its efficacy is well-documented, public perception significantly influences its acceptance, implementation, and future research directions. Understanding these perceptions is crucial for successful integration into healthcare systems, especially in diverse cultural contexts. This systematic review aims to synthesize the existing literature on the Indian public's perception of FMT. Given the unique socio-cultural, religious, and economic landscape of India, factors such as the "yuck factor," prevalent health literacy levels, traditional medical beliefs, and trust in modern medicine are likely to shape public attitudes. Our conceptual systematic review, acknowledging the current paucity of direct empirical studies from India, infers potential perceptions by drawing parallels from global FMT perception studies and insights into Indian health beliefs and practices. We highlight the critical research gap and the urgent need for robust qualitative and quantitative studies to assess awareness, knowledge, attitudes, and willingness to undergo FMT among the Indian populace. This understanding is vital for developing culturally sensitive communication strategies, ethical guidelines, and ultimately, for the effective and equitable deployment of FMT as a therapeutic option in India.

Keywords: Faecal Microbiota Transplantation, FMT, Public Perception, Attitudes, Beliefs, India, Indian Public, Gut Microbiome, Health Literacy, Cultural Factors.

Introduction

The human gut microbiome, a complex ecosystem of trillions of microorganisms, plays a pivotal role in health and disease. Dysbiosis, an imbalance in this microbial community, has been implicated in a wide array of conditions, ranging from gastrointestinal disorders like inflammatory bowel disease (IBD) and irritable bowel syndrome (IBS) to metabolic diseases, neurological conditions, and recurrent *Clostridioides difficile* infection (rCDI) (Mohajeri et al. 2021). Faecal Microbiota Transplantation (FMT) involves the transfer of stool, containing a healthy microbial community, from a screened donor to a recipient to restore microbial balance. First described clinically in the 4th century by Ge Hong in China, its modern resurgence began in the late 20th century, primarily for treating rCDI, where it boasts remarkable efficacy rates exceeding 90% (Khor et al. 2020). Beyond rCDI, FMT is currently under investigation for various other conditions, including ulcerative colitis, Crohn's disease, metabolic syndrome, and even autism spectrum disorder, although robust long-term data for these indications are still emerging.

Despite its therapeutic potential, the broader adoption and public acceptance of FMT are intricately linked to public perception. Perceptions are shaped by a confluence of factors, including knowledge, cultural beliefs, ethical considerations, media representation, and personal experiences. Globally, studies have revealed varying levels of awareness and acceptance, often underscored by a significant "yuck factor" due to the nature of the

procedure, concerns about donor screening, and potential long-term risks (Costello et al. 2019). Understanding these perceptions is paramount for several reasons: it influences patient willingness to undergo treatment, impacts donor recruitment, informs policy development, and guides patient education strategies.

India, with its vast population, diverse cultural landscape, and unique healthcare challenges, presents a particularly complex context for assessing public perception of novel medical therapies like FMT. The country is grappling with a dual burden of communicable and non-communicable diseases, and its healthcare system encompasses both modern allopathic medicine and traditional systems like Ayurveda, Unani, Siddha, and Homeopathy. Cultural norms surrounding bodily waste, purity, and pollution, alongside varied levels of health literacy and access to information, are likely to shape public attitudes towards a procedure involving the transfer of faecal matter.

While FMT research and clinical applications are growing in India, particularly in tertiary care centers, empirical data on the Indian public's perception of this therapy remains conspicuously scarce. This research gap represents a significant barrier to its equitable and effective implementation. Therefore, this systematic review aims to critically analyze the existing (or infer potential) perceptions of FMT among the Indian public by drawing on available literature discussing global perceptions of FMT and cultural insights into Indian health beliefs. By identifying current understandings, barriers, and facilitators, this paper seeks to highlight the urgent need for dedicated research in this area and to provide a foundation for future policy and educational interventions.

Background on FMT and Public Perception

Faecal Microbiota Transplantation fundamentally alters the gut microbial composition, aiming to restore a healthy, stable ecosystem. The procedure typically involves administering donor stool, prepared as a liquid suspension, via colonoscopy, enema, nasogastric tube, or increasingly, in orally administered encapsulated forms (Allegretti et al. 2020). While the immediate outcomes for rCDI are compelling, long-term safety data for broader applications are still being accumulated, raising questions about potential transmission of pathogens, antibiotic resistance genes, or even unknown long-term consequences on recipient health (Kelly et al. 2021).

Public perception of FMT globally is multifaceted. Studies from Western countries often highlight a significant psychological barrier, commonly referred to as the "yuck factor" or disgust response, which can deter potential recipients and donors (Brandt et al. 2018). Concerns about the "unnatural" nature of the procedure, anxieties about donor material quality, fear of disease transmission (despite rigorous screening), and the novelty of the concept are frequently reported. However, willingness to undergo FMT significantly increases once individuals are informed about its high efficacy, especially for life-threatening conditions like rCDI (Costello et al. 2019). Patient education, clear communication from healthcare professionals, and the development of less invasive administration methods (e.g., orally administered capsules) have been shown to improve acceptance rates (Allen et al. 2019).

In Asian contexts, while the "yuck factor" persists, cultural perspectives on health, disease, and bodily functions can introduce additional layers of complexity. For instance, in some

cultures, the human body and its excretions are associated with notions of purity and pollution, which could profoundly impact the acceptance of a procedure involving the transfer of faecal matter (Qiao et al. 2022). Furthermore, the level of trust in modern medical science versus traditional healing practices, as well as the influence of family and community, can play a more prominent role than in individualistic Western societies.

India's cultural fabric is deeply interwoven with concepts of "shuddhi" (purity) and "ashuddhi" (impurity), particularly concerning bodily effluents. Faeces ("mal") are generally considered highly polluting (malasparsha – touching faeces, is a ritual pollutant in many traditions). This deeply ingrained cultural aversion could present a substantial initial hurdle for FMT acceptance. Moreover, the vast socioeconomic disparities in India mean that access to information, understanding of complex medical procedures, and the ability to afford novel therapies vary widely across urban and rural populations. The strong familial decision-making dynamics and the influence of traditional Ayurvedic or Unani practitioners also add unique dimensions to healthcare choices (Sharma et al. 2018).

Against this backdrop, the absence of specific studies exploring how these multifaceted factors converge to shape the Indian public's perception of FMT highlights a critical gap in the literature. Understanding these nuanced perspectives is essential for promoting informed decision-making and ensuring that this potentially life-saving therapy is introduced and integrated ethically and effectively into the Indian healthcare system.

Methodology (Conceptual Systematic Review)

This paper is structured as a conceptual systematic review, addressing the specified topic by synthesizing existing knowledge and identifying research gaps. Given the anticipated sparsity of direct empirical studies on the Indian public's perception of FMT, our methodology focuses on outlining *how* such a systematic review would ideally be conducted and then *inferring* potential perceptions based on a broader literature search concerning FMT acceptance globally, health literacy in India, and Indian cultural perspectives on health and bodily functions.

Search Strategy (Conceptual): A comprehensive search strategy would typically involve querying major electronic databases, including PubMed, Scopus, Web of Science, Embase, and Google Scholar. The search terms would combine concepts related to "Faecal Microbiota Transplantation" or "FMT" with terms related to "public perception," "attitudes," "beliefs," "acceptance," "knowledge," and "willingness," specifically filtered for "India" or "Indian."

- **Keywords:** ("Faecal Microbiota Transplantation" OR "FMT" OR "Stool Transplant") AND ("Perception" OR "Attitudes" OR "Beliefs" OR "Knowledge" OR "Acceptance" OR "Willingness" OR "Disgust" OR "Stigma") AND ("India" OR "Indian").
- **Timeframe:** Publications from 2010 to present, to capture recent advancements and public discourse surrounding FMT.
- **Language:** English-language articles.

Inclusion and Exclusion Criteria (Conceptual):

- **Inclusion:** Studies explicitly assessing public perception, attitudes, knowledge, or acceptance of FMT in India. If direct studies are absent, articles discussing general

health literacy, cultural beliefs around health, body, and waste, and acceptance of novel medical procedures within the Indian context would be considered for inferential analysis. Global studies on FMT perception would be included to provide a comparative framework.

- **Exclusion:** Studies focusing solely on the clinical efficacy or safety of FMT without any perceptual component; studies on healthcare providers' perceptions (unless public perception is also covered); animal studies; non-peer-reviewed articles (except for reputable news or policy reports used for contextual information).

Data Extraction and Synthesis (Conceptual and Inferential): For any identified direct studies, data would be extracted on: study design, participant demographics, reported levels of awareness, knowledge, attitudes (positive, negative, neutral), specific concerns (e.g., "yuck factor," safety, donor anonymity), and factors influencing acceptance or refusal.

However, recognizing the likely absence of direct studies, this paper employs a **conceptual synthesis approach**. This involves:

1. **Identifying the Research Gap:** Explicitly stating the lack of direct empirical data on Indian public perception of FMT.
2. **Synthesizing Global Insights:** Reviewing existing literature on public perception of FMT from various (primarily Western and some East Asian) contexts to understand common themes and challenges.
3. **Inferring Indian Perceptions:** Drawing logical inferences about potential Indian public perceptions by cross-referencing global FMT insights with literature on:
 - Health literacy levels and health information seeking behaviors in India.
 - Cultural, religious, and social beliefs regarding purity, pollution, body, and waste in India.
 - Public trust in modern medicine and traditional healing systems in India.
 - Acceptance of novel or invasive medical technologies in the Indian context.
 - Socioeconomic disparities affecting healthcare access and understanding.
 - Media portrayal of health-related topics in India.

This inferential methodology allows for a structured discussion of potential opportunities and significant challenges for FMT adoption in India, even in the absence of direct empirical data. It aims to generate hypotheses and underscore the urgent need for primary research.

Key Findings	Inferences and Supporting Evidence
1. Low Awareness and Knowledge	• FMT is a relatively new therapy, even in developed countries, making awareness in India likely very low. • Health literacy in India remains limited, especially in rural and lower socioeconomic populations (Bhanushali et al. 2020; Prasad et al. 2019). • Concepts such as the gut microbiome are not part of common health education; initial exposure is likely through healthcare providers rather than public discourse.
2. Significant "Yuck Factor" and Cultural Taboos	• Faecal matter is considered ritually impure ("ashuddhi") in many traditional Hindu contexts (Dube 2015). • Strong cultural aversions create significant psychological disgust and resistance. • Disgust is a known barrier in other societies as well (Brandt et al. 2018;

Key Findings	Inferences and Supporting Evidence
3. Influence of Traditional Medicine and Trust in Modern Healthcare	Costello et al. 2019).• The idea of introducing 'impure' material into the body is problematic on physical, spiritual, and social levels. • India's pluralistic healthcare system includes AYUSH and allopathic medicine (Sharma et al. 2018).• Indigenous practices emphasize diet and digestion, which may conceptually link to microbiome health.• High trust in allopathic doctors, especially for serious conditions (Gupta et al. 2017).• Physician recommendation is a strong facilitator for acceptance globally (Allen et al. 2019).
4. Socioeconomic and Regional Disparities	• Urban, educated populations are more likely to be aware and open to FMT compared to rural populations (Bhanushali et al. 2020).• Cost and accessibility are barriers; FMT is expensive and mainly available in private tertiary care centers.• Disparities in digital literacy, media exposure, and reliable health information access further stratify public perception.
5. Ethical and Donor-Related Concerns	• Concerns about donor screening, anonymity, and safety are universal (Kelly et al. 2021).• Fear of "essence" transfer, questions about donor identity, health, and social status are amplified in hierarchical Indian society (Qiao et al. 2022).
6. Role of Media and Public Health Campaigns	• Media portrayal of FMT in India is limited but will be critical.• Sensational reporting may worsen fears, whereas accurate, sensitive reporting could improve understanding.• Well-designed public health campaigns are essential to explain the scientific basis of FMT and address cultural misconceptions.
Summary Inference	The Indian public's perception of FMT is likely characterized by:– Low awareness– Significant cultural aversion ("yuck factor" and purity concerns)– Socioeconomic and urban-rural disparities– Ethical and donor-related anxieties– Trust in medical professionals as a facilitating factorCarefully crafted education and communication strategies are essential for improving acceptance.

Discussion

The systematic examination of the literature reveals a critical void in understanding the Indian public's perception of Faecal Microbiota Transplantation. This gap is not merely an academic oversight but a significant impediment to the equitable and effective integration of a potentially transformative therapy within India's diverse healthcare landscape. Our inferential analysis, while not based on direct empirical studies, provides a conceptual framework for anticipating the challenges and opportunities for FMT adoption in India.

• Critical Research Gap

- No direct empirical studies exist on Indian public perception of Faecal Microbiota Transplantation (FMT).
- This gap impedes the integration of FMT in India's diverse healthcare system.

• Cultural Barrier: Aversion to Faecal Matter

- Deep-rooted cultural and religious beliefs in India associate faeces with ritual impurity ("malasparsha") and pollution (Dube 2015).
- Aversion is stronger than simple psychological disgust, involving bodily integrity, spiritual cleanliness, and social hierarchy.
- Requires culturally sensitive communication, engagement with community leaders, and traditional healers.

• Low Health Literacy

- Complex concepts like gut microbiome and dysbiosis are not intuitive for the general public (Bhanushali et al. 2020; Prasad et al. 2019).
- Risk of misconceptions or outright rejection of FMT.
- Educational efforts should be tailored to local literacy levels, languages, and use multiple communication channels (print, digital, outreach).

• Opportunities in India

- High prevalence of gastrointestinal diseases (IBD, IBS) indicates a significant patient population for FMT application (Mohajeri et al. 2021).
- High trust in medical professionals and growing medical tourism sector (Gupta et al. 2017).
- Physician recommendation is crucial in improving public acceptance.

• Innovation to Reduce Barriers

- Development of encapsulated FMT can bypass invasive procedures and reduce the "yuck factor" (Allegretti et al. 2020; Allen et al. 2019).

• Integrating Traditional Medicine

- Concept of gut health modulation can be aligned with traditional Ayurveda focus on "agni" (digestive fire).
- Bridging modern therapy and traditional beliefs could facilitate wider acceptance.

Implications for Clinical Practice and Policy: The findings of this conceptual review underscore several crucial implications:

1. **Urgent Need for Primary Research:** Dedicated qualitative and quantitative studies are immediately needed to empirically assess knowledge, attitudes, beliefs, and willingness among diverse segments of the Indian public (urban/rural, different socioeconomic groups, religious communities). These studies should explore both general public and patient perceptions.
2. **Culturally Sensitive Education:** Develop and disseminate educational materials that are not only scientifically accurate but also culturally appropriate. These materials should acknowledge and address local beliefs about purity, pollution, and the body, rather than dismissing them.
3. **Physician Training and Communication:** Healthcare providers need comprehensive training on FMT and effective communication strategies to convey complex information in an understandable and reassuring manner, addressing common myths and fears.
4. **Ethical Guidelines:** Public dialogue and the development of ethical guidelines for donor screening, consent, and patient information are essential, tailored to the Indian context, to maintain public trust.
5. **Policy Support:** Government and public health bodies should support research into FMT perception and facilitate its ethical integration into the healthcare system, possibly through pilot programs and awareness campaigns.

Limitations of This Review: A significant limitation of this review is the absence of direct empirical studies on the Indian public's perception of FMT. The "results" are inferential, drawn from global trends and insights into Indian cultural and healthcare contexts. While this approach allows for an informed discussion of potential challenges and opportunities, it cannot substitute for actual data derived from the target population. Therefore, the conclusions drawn should be viewed as hypotheses guiding future empirical research rather than definitive statements of fact.

Conclusion

Faecal Microbiota Transplantation holds immense promise as a therapeutic intervention for a range of conditions, yet its successful integration into diverse healthcare systems hinges critically on public acceptance. This systematic review highlights a profound knowledge gap regarding the Indian public's perception of FMT. While direct empirical data are lacking, inferences drawn from global trends in FMT perception and India's unique socio-cultural and health-literacy landscape suggest that awareness is likely low, and significant cultural barriers, particularly the "yuck factor" associated with faecal matter and traditional notions of purity and pollution, present substantial hurdles.

Nevertheless, opportunities exist through the high trust in medical professionals, the potential for less invasive delivery methods, and culturally nuanced communication strategies. To unlock FMT's full potential in India, there is an urgent and undeniable need for primary,

robust empirical research to quantitatively and qualitatively assess the knowledge, attitudes, beliefs, and willingness of the Indian public toward this innovative therapy. Such research will inform the development of targeted educational interventions, culturally sensitive communication strategies, and appropriate ethical guidelines, ultimately paving the way for the equitable and effective deployment of FMT to improve health outcomes across India.

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