Review

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# Urgent appeal for expanded initiatives in gastric motility disorders across low and middle-income countries: illustrating the example of gastroparesis

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## Abstract

This paper provides a comprehensive exploration of the current state of gastroparesis management in low and middle-income countries (LMICs), emphasising recent innovations, persistent challenges, and future prospects. Gastroparesis, a condition characterised by delayed stomach emptying, presents debilitating symptoms and is notably linked to neuropathic disorders, including diabetes mellitus. Despite an apparent higher prevalence in LMICs compared to the global average, epidemiological data remains scarce. The paper highlights pioneering research in Pakistan, Brazil, and China, showcasing a transformative shift toward comprehensive studies that delve into nuanced aspects of gastroparesis epidemiology, gender-specific patterns, and innovative therapeutic approaches such as acupuncture. However, challenges impeding clinical management and research in LMICs are identified, encompassing the absence of extensive epidemiological studies, lack of treatment guidelines, and the scarcity of specialised training programs for healthcare professionals. These challenges are intertwined with broader issues such as limited healthcare infrastructure, resource disparities, and healthcare workforce shortages. The paper proposes a multifaceted approach for addressing these challenges, involving international collaboration, capacity building, and the integration of gastroparesis management into primary healthcare services. Strategies to combat brain drain, such as collaborative agreements akin to the UK-South Africa Memorandum of Understanding, are advocated.

**Keywords:** gastroenterology, gastroparesis, health policy, low and middle-income countries, motility

## Introduction

Gastroparesis, a debilitating condition characterised by delayed stomach emptying without mechanical obstruction, manifests through distressing symptoms such as nausea, vomiting, abdominal pain, early satiety, fullness, and bloating. Its aetiology is often linked to neuropathic disorders, notably diabetes mellitus; however, it can also manifest idiopathically or be triggered by factors like post-vagotomy and scleroderma[1]. Despite a notable

## HIGHLIGHTS

- Low and middle-income countries (LMICs) face a hidden burden of gastroparesis. Despite limited data, existing research suggests a higher prevalence of gastroparesis in low and middle-income countries compared to the global average. This highlights a critical under-recognised issue.
- Pioneering research in countries like Pakistan, Brazil, and China showcases advancements in understanding gastroparesis epidemiology, gender disparities, and alternative therapies like acupuncture.
- The lack of extensive epidemiological data, treatment guidelines, and specialized training programs for healthcare professionals impede effective clinical management and research in LMICs. Broader issues like limited healthcare infrastructure and workforce shortages further compound these challenges.
- We propose international collaboration, capacity building, and integration of gastroparesis management into primary healthcare as key strategies to address these challenges. Innovative solutions like the UK-South Africa Memorandum of Understanding to combat brain drain are also recommended.
- There's also a need to emphasise the pressing need for expanded initiatives to improve research, diagnosis, and treatment of gastroparesis in LMICs, alleviating the suffering of millions and promoting healthcare equity.

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lack of epidemiological data on gastroparesis prevalence in low and middle-income countries (LMICs), consensus from reputable sources such as United European Gastroenterology (UEG) and the European Society for Neurogastroenterology and Motility (ESNM) suggests a higher prevalence in these regions. Estimates indicate a prevalence ranging between 1.1 and 1.7% in countries like Russia, Brazil, China, and South Africa, surpassing the global average of 0.9%. Furthermore, this consensus highlights a higher prevalence of gastroparesis in women and, among ethnic classifications, a greater occurrence among Caucasians[2]. Current literature substantiates a link between chronic gastroparesis and heightened long-term mortality, obesity, smoking, presence of abdominal pain, and gastro-oesophageal reflux being associated with a less favourable prognosis[3]. Despite the potential greater burden of gastroparesis in LMICs, there remains a paucity of research exploring context-specific treatment and public health interventions. This short communication aims to highlight the current landscape of gastroparesis management in such settings, whilst serving as a call to action for a greater magnitude of research and analysis to be conducted to this end.

## Insights into gastroparesis management in LMICs

The landscape of gastroparesis management in LMICs is undergoing a transformative phase, marked by a notable shift in focus towards comprehensive research and epidemiological studies. Despite a prevailing dearth of wide-scale epidemiological investigations into the prevalence of gastroparesis in LMICs, encouraging signs of change are emerging. Pioneering studies, exemplified by Asif and colleagues' research in Pakistan, are leading efforts to evaluate the presence of gastroparesis among diabetic patients, shedding light on the specific challenges faced in this population. Furthermore, these studies delve into nuanced aspects of gastroparesis epidemiology, such as gender-specific patterns, providing a more refined understanding of the condition within diverse patient groups in LMICs[4]. Similarly, research in Brazil has attempted to investigate the demographic, clinical, and aetiological characteristics of individuals with gastroparesis, as well as the associations between these factors and the degree of impairment in gastric emptying[5].

A plethora of studies, particularly originating from China, has been at the forefront of exploring an amalgamation of evidence-based and traditional medications and therapies to improve gastroparesis symptoms. Groundbreaking research studies investigating the efficacy of acupuncture as a potential aid in gastroparesis management have been performed in China. For instance, a multicenter, randomised, controlled trial conducted by Zhang *et al.*[6] with 200 patients demonstrated that acupuncture yielded high clinical efficacy rates (86.73%) in alleviating gastroparesis-like symptoms such as anorexia, belching, nausea, vomiting, epigastric pain, early satiety, and bloating in diabetic patients. Other studies, such as those by Zheng *et al.*[7], further underscored the positive outcomes of acupuncture in improving symptoms and gastric emptying, indicating a promising avenue for gastroparesis management. These studies collectively signify a shift towards more holistic and innovative approaches in the treatment landscape, showcasing the potential of integrative therapies to enhance outcomes for individuals with gastroparesis.

Recent research from LMICs has also endeavoured to investigate the impact of gastroparesis on various physiological systems. For instance, in Brazil, studies have specifically examined the cardiovascular autonomic status in diabetic individuals with gastroparesis, revealing suboptimal outcomes in these patients[8]. Moreover, noteworthy endoscopic advancements, including gastric per-oral endoscopic pyloromyotomies, have been successfully performed in Mexico, highlighting ongoing progress and continued innovation in endoscopic procedures for treating such debilitating disorders[9].

## Challenges impeding clinical management and further research in LMICs

Despite notable advancements in understanding and managing gastric motility disorders such as gastroparesis, there remains a considerable gap in addressing the challenges faced by LMICs. One critical aspect is the absence of extensive epidemiological studies to accurately evaluate the prevalence of gastric motility disorders, including gastroparesis, in these regions. Epidemiological studies on gastroparesis have thus far been predominantly confined to high-income nations[10]. The lack of comprehensive data hampers the development of targeted healthcare strategies, making it challenging to allocate resources effectively and implement evidence-based interventions. The dire need for epidemiological research underscores the urgency to prioritise gastroparesis within the broader spectrum of gastroenterological disorders in LMICs.

In addition to the scarcity of epidemiological data, many LMICs struggle with the establishment of formal treatment guidelines for gastroparesis. Despite notable strides in investigating complementary therapies, the absence of standardised protocols further complicates patient care. The lack of guidelines not only hinders the consistency of treatment but also contributes to disparities in healthcare delivery across different regions. This lack of standardisation reflects broader challenges in healthcare infrastructure and resource availability in LMICs, where the focus on basic healthcare needs often overshadows specialised conditions like gastroparesis[11]. Moreover, the crucial shortage of healthcare workers exacerbates the challenge of implementing comprehensive research initiatives in LMICs, particularly those nations situated in Sub-Saharan Africa[12]. Gastroparesis, as part of the spectrum of gastroenterological disorders, receives inadequate attention due to limited expertise and resources. Research efforts are often focused on more prevalent diseases, and the scarcity of trained professionals in gastroenterology further diminishes the capacity for in-depth studies. The emphasis on basic healthcare needs in LMICs also diverts attention and resources away from specialised conditions like gastroparesis[11].

Effectively managing complex conditions like gastroparesis requires specialisation and extensive training; for instance, certain residency programs in the USA and Canada that offer motility fellowships specifically designed for gastroenterologists[13]. However, such specialised training poses a formidable challenge in LMICs. Unlike high-income nations, where these programs are more readily available, LMICs face significant obstacles in establishing such postgraduate training programs, and data on the existence and effectiveness of such programs in these regions are notably scarce[11,12]. The difficulties in establishing specialised training programs in LMICs are intricately linked to broader challenges. A fundamental constraint is the persistent issue of insufficient funding, as highlighted by the WHO's estimates. Beyond funding, the challenges extend to student and teacher

attrition rates, with students struggling to secure adequate funding for tuition fees, even with government subsidies. Poor quality secondary education further compounds the difficulties faced by aspiring healthcare professionals. In addition, the migration of skilled gastroenterologists to higher income settings, allured by higher wages and better quality of life, compounded poor career opportunities to specialise in gastrointestinal-motility, exacerbates this crisis[11,12].

## Future prospects

In addressing the multifaceted challenges associated with the management of gastroparesis in LMICs, a comprehensive and strategic approach is imperative. To initiate and advance research in this domain, collaborative efforts must be orchestrated among global health organisations, governments, and research institutions. Establishing dedicated funding mechanisms that prioritise extensive epidemiological studies on gastroparesis in LMICs is crucial for generating insightful data and understanding the prevalence and patterns of this condition within diverse populations[11,12].

Simultaneously, there is an urgent need to bolster the expertise of healthcare professionals in LMICs, particularly gastroenterologists. This can be achieved through the development and implementation of postgraduate training programs tailored to the unique challenges presented in these regions. Drawing inspiration from successful models such as motility fellowships available in high-income countries, these programs should not only enhance clinical skills but also foster research capabilities, promoting a holistic approach to gastroenterological disorders. International collaboration becomes paramount in this endeavour, wherein partnerships facilitate knowledge exchange and skill development. By providing opportunities for healthcare professionals in LMICs to engage in training sessions and gain exposure to innovative practices, these partnerships contribute to capacity building and the creation of a well-equipped healthcare workforce[11,12].

Crafting standardised treatment guidelines is a crucial next step, requiring collaboration between international medical associations, gastroenterology experts, and local healthcare professionals. These guidelines must be flexible enough to adapt to the diverse healthcare settings in LMICs, ensuring consistency in patient care and treatment outcomes. Integration of gastroparesis management into primary healthcare services represents a paradigm shift, necessitating heightened awareness among policymakers and healthcare providers. Emphasising the importance of addressing gastroenterological disorders within the broader healthcare spectrum can lead to more accessible and comprehensive patient care[11–13].

Addressing the challenge of brain drain, or the migration of skilled healthcare professionals, requires a multifaceted approach. Improving working conditions, offering competitive salaries, and creating opportunities for career advancement are essential components of a strategy aimed at retaining healthcare specialists in LMICs. Collaborative initiatives, modelled after successful bilateral agreements, can further incentivize professionals to contribute their expertise locally. Public health campaigns emerge as a pivotal tool in raising awareness about gastroparesis and other gastrointestinal-motility disorders. These campaigns, directed at the general population, healthcare professionals, and policymakers, play a crucial role in educating stakeholders about the impact of these conditions, stressing the need for early diagnosis and effective management[13–15].

## Conclusion

In conclusion, the landscape of gastroparesis management in LMICs is evolving, marked by promising strides in research, treatment innovations, and increased awareness. However, significant challenges persist, including the lack of comprehensive epidemiological data, the absence of standardised treatment guidelines, and the scarcity of specialised training programs for healthcare professionals. To address these challenges, a multifaceted approach is essential, involving international collaboration, capacity building, and the integration of gastroparesis management into primary healthcare services. By implementing these strategies, there is potential not only to advance the understanding and treatment of gastroparesis in LMICs but also to mitigate the brain drain of specialists and foster self-sufficiency in critical healthcare domains.

## Ethical approval

Not applicable.

## Consent

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## Author contribution

The study was conceptualised and supervised by H.R.B. Material preparation, data collection, and analysis were performed by H.R.B., P.D., M.D.M.M. and S.K. The first draft of the manuscript was written by all authors. All authors read and approved the final manuscript.

## Conflicts of interest disclosure

The authors report there are no competing interests to declare.

## Research registration unique identifying number (UIN)

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## Data availability statement

Data availability is not applicable to this article as no new data were created or analysed in this study.

## Provenance and peer review

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All authors have read and approved the final version of the manuscript, and Hareesha Rishab Bharadwaj had full access to all of the data in this study and takes complete responsibility for the integrity of the data and the accuracy of the data analysis. Hareesha Rishab Bharadwaj affirms that this manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study planned have been explained.—Mentioned both here and in the manuscript.



## References

[1] Oshima T, Siah KTH, Kim YS, *et al*. Knowledge, Attitude, and Practice Survey of Gastroparesis in Asia by Asian Neurogastroenterology and Motility Association. J Neurogastroenterol Motil 2021;27:46–54.
[2] Huang I, Schol J, Khatun R, *et al*. Worldwide prevalence and burden of gastroparesis-like symptoms as defined by the United European Gastroenterology (UEG) and European Society for Neurogastroenterology and Motility (ESNM) consensus on gastroparesis. United European Gastroenterol J 2022;10:888–97.
[3] Pasricha PJ, Yates KP, Nguyen L, *et al*. Outcomes and factors associated with reduced symptoms in patients with gastroparesis. Gastroenterology 2015;149:1762–74.
[4] Asif MS, Khan MS, Nabeel M, *et al*. Frequency of gastroparesis symptoms in patients with type-2 diabetes mellitus at a tertiary care hospital in Pakistan. Cureus 2023;15:e44236.
[5] Borges CMR, Secaf M, Troncon Le de A. Clinical features and severity of gastric emptying delay in Brazilian patients with gastroparesis. Arq Gastroenterol 2013;50:270–6.
[6] Zhang BM, Huang WY, Xu SW, *et al*. Clinical observations on acupuncture treatment for diabetic gastroparesis syndrome. Shanghai J Acupunct Moxibustion 2009;12:696–7.
[7] Zheng L, Wang X. Clinical observation on acupoint selection in diabetic gastroparesis treatment. Tradit Chin Med J 2004;6:24–6.
[8] Araujo LMB, Freeman R, Broadbridge C. Cardiovascular autonomic tests in diabetic patients with gastroparesis. Arq Neuropsiquiatr 1997;55:227–30.
[9] Hernández-Mondragón OV, Solórzano-Pineda OM, Blancas-Valencia JM, *et al*. Piloromiotomía endoscópica por vía oral para el tratamiento de gastroparesia refractaria: reporte del primer caso en México. Revista Gastroenterol México 2018;83:459–61.
[10] Syed AR, Wolfe MM, Calles-Escandon J. Epidemiology and diagnosis of gastroparesis in the United States. J Clin Gastroenterol 2020;54:50–4.
[11] Mandeville KL, Krabshuis J, Ladep NG, *et al*. Gastroenterology in developing countries: Issues and advances. World J Gastroenterol 2009;15:2839; [cited 2020 Jan 12].
[12] Li M, Gao N, Wang S, *et al*. A global bibliometric and visualized analysis of the status and trends of gastroparesis research. Eur J Med Res 2023;28:28.(1).
[13] Lazarescu A, Andrews CN, Liu LWC, *et al*. Meeting the motility educational requirements of the gastroenterology trainee in the 21st century. J Canadian Assoc Gastroenterol 2019;2:20–32.
[14] Guilbert JJ. The World Health report 2006 1: Working together for health 2. Educ Health Change Learn Pract 2006;19:385–7.
[15] Robinson M, Clark P. Forging solutions to health worker migration. Lancet 2008;371:691–3.