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ORIGINAL ARTICLE

Public Awareness and Preventive Practices Regarding Gastrointestinal Non-Communicable Diseases (NCDs) in Rural Pakistan: A Community-Based Study

MUHAMMAD TAUSEEF JAVED[1], SHEEMA KHAN[2], GHULAM SHABIR SHAIKH[3], BILAL MASOOD[4], ABDUL WADOOD SHAH[5], GHULAM HUSSAIN BALOCH[6]

[1]*Head, Department of Community Medicine, Gujranwala Medical College & Gujranwala Medical College Teaching Hospital (GMCTH), Gujranwala, Pakistan.*
[2]*Assistant Professor, Gastroenterology Unit, Medical Teaching Institution (MTI) / Khyber Teaching Hospital (KTH) / Khyber Medical College (KMC), Peshawar, Pakistan.*
[3]*Chief Medical Officer, Sir C.J. Institute of Psychiatry and Behavioral Sciences, Hyderabad, Liaquat University of Medical & Health Sciences (LUMHS), Pakistan.*
[4]*Assistant Professor, Department of Community Medicine, Bolan Medical College, Quetta, Pakistan.*
[5]*Assistant Professor, Department of Community Medicine, Isra University, Hyderabad, Pakistan.*
[6]*Assistant Professor, Department of Community Medicine, Isra University, Hyderabad, Pakistan.*
Correspondence to: Sheema Khan, Email: sheemakhan459@gmail.com

ABSTRACT

Background: Gastrointestinal non-communicable diseases (GI-NCDs) such as chronic liver disease, gastrointestinal cancers, and inflammatory bowel diseases are an emerging public health concern in Pakistan, particularly in rural areas where awareness and preventive practices are poorly documented.

Objective: To assess public awareness and preventive practices regarding GI-NCDs among rural populations in the catchment areas of Gujranwala Medical College Teaching Hospital (GMCTH), Gujranwala, and Khyber Teaching Hospital (KTH), Peshawar.

Methods: This community-based cross-sectional study was conducted from January 2022 to January 2023 on 200 adult participants (100 from each district) selected through multistage sampling. Data were collected using a structured, pre-tested questionnaire covering socio-demographics, knowledge, risk factor awareness, and preventive practices. Analysis was performed using SPSS version 26.0, with associations tested using the Chi-square method at a significance level of $p<0.05$.

Results: The mean age of participants was 39.6 ± 12.8 years, with 54.5% females and 65.5% having no formal or only primary education. Correct identification of GI-NCD examples was reported by 34.5% of respondents, and awareness of key symptoms varied from 15.0% (rectal bleeding) to 61.0% (abdominal pain). Preventive practices were suboptimal; 72.0% treated drinking water, 41.0% practiced regular hand washing with soap, 20.5% consumed adequate fruits/vegetables, and only 4.5% had ever undergone GI cancer screening. Education level was significantly associated with awareness scores ($p<0.001$).

Conclusion: Public awareness and preventive practices regarding GI-NCDs in rural Pakistan are inadequate. Integrating targeted education, preventive interventions, and accessible screening into rural health programs is essential to reduce the future burden of these diseases.

Keywords: Gastrointestinal non-communicable diseases, Public awareness, Preventive practices, Rural health, Pakistan.

INTRODUCTION

Non-communicable diseases (NCDs) have emerged as the leading cause of morbidity and mortality worldwide, accounting for nearly 74% of all deaths according to the World Health Organization (WHO)[1]. Traditionally associated with cardiovascular diseases, cancers, chronic respiratory diseases, and diabetes, the spectrum of NCDs also includes a substantial but often under-recognized category gastrointestinal non-communicable diseases (GI-NCDs). These encompass a variety of chronic and progressive disorders such as chronic liver disease (including cirrhosis and non-alcoholic fatty liver disease), gastrointestinal cancers (colorectal, gastric, pancreatic, and hepatocellular carcinoma), inflammatory bowel diseases (Crohn's disease and ulcerative colitis), irritable bowel syndrome, and functional dyspepsia. Although infectious gastrointestinal illnesses have historically dominated public health agendas in developing nations like Pakistan, the growing burden of GI-NCDs is a silent yet significant threat that demands urgent attention[2,3].

In Pakistan, several socio-demographic and environmental factors converge to create a fertile ground for the rise of GI-NCDs. The prevalence of hepatitis B and C virus infections largely due to unsafe medical practices and inadequate infection control has resulted in a high incidence of chronic liver disease and hepatocellular carcinoma. Dietary habits rich in saturated fats, refined carbohydrates, excessive salt, and low fiber intake contribute to obesity, gastroesophageal reflux disease, and colorectal cancer risk[4]. The pervasive use of smokeless tobacco products such as *gutkha* and *paan* increases the risk of oral, esophageal, and gastric malignancies. Furthermore, prolonged exposure to unsafe drinking water, poor sanitation, and suboptimal hygiene can aggravate chronic gastrointestinal inflammation, especially in vulnerable rural populations where access to healthcare is limited and preventive health education is minimal[5].

The rural areas of Pakistan represent a unique epidemiological landscape for GI-NCDs. Over 60% of the population resides in rural settings, where health infrastructure is sparse, healthcare professionals are in short supply, and advanced diagnostic facilities are concentrated in urban centers[6]. In these areas, awareness of GI-NCDs is often remarkably low, with many individuals unable to distinguish between acute infectious diarrheal diseases and chronic gastrointestinal disorders. Preventive practices, such as regular screening for hepatitis, colon cancer, or dietary modifications, are seldom followed, partly due to economic constraints, cultural beliefs, and misconceptions regarding disease causation. Traditional healers, home remedies, and late-stage medical consultations remain the norm, resulting in delayed diagnoses and poor prognoses[7].

While Pakistan's National Action Framework for Non-Communicable Disease and Mental Health (2021–2030) outlines strategies for addressing NCDs, the specific focus on gastrointestinal conditions remains inadequate. Most national and provincial awareness campaigns continue to prioritize communicable diseases, maternal and child health, and general nutrition, leaving GI-NCDs underrepresented in health promotion programs. Moreover, community health initiatives such as the Lady Health Worker (LHW) program though successful in maternal and child health interventions have not yet integrated structured modules on GI-NCD prevention, early detection, and lifestyle modification. This gap perpetuates low disease literacy and limits the community's ability to adopt preventive measures[8,9].

Globally, research has shown that public awareness and preventive practices are pivotal in mitigating the burden of NCDs, particularly in low- and middle-income countries (LMICs). Studies

in similar rural contexts indicate that empowering communities with accurate health knowledge, coupled with culturally appropriate interventions, can significantly reduce disease incidence and improve early detection rates. However, in Pakistan, empirical data specifically examining the awareness, perceptions, and preventive behaviors related to GI-NCDs in rural communities is scarce[10].

This study, therefore, seeks to fill this critical knowledge gap by assessing the level of public awareness, understanding of risk factors, and adherence to preventive practices regarding GI-NCDs among rural populations in Pakistan. The findings will provide evidence for policymakers, healthcare providers, and public health planners to design targeted interventions, integrate GI-NCD education into existing community health programs, and ultimately contribute to reducing the morbidity and mortality associated with these largely preventable conditions[11].

MATERIALS AND METHODS

This community-based cross-sectional descriptive study was conducted collaboratively by the Department of Community Medicine, Gujranwala Medical College & Gujranwala Medical College Teaching Hospital (GMCTH), Gujranwala, and the Gastroenterology Unit, Khyber Teaching Hospital (KTH) / Khyber Medical College (KMC), Peshawar. The study aimed to assess the level of public awareness and preventive practices regarding gastrointestinal non-communicable diseases (GI-NCDs) among rural populations in selected areas of Punjab and Khyber Pakhtunkhwa provinces of Pakistan. The research was carried out over a period of twelve months, from January 2022 to January 2023.

The study population comprised adult residents aged 18 years and above, living in rural union councils within the catchment areas of both GMCTH Gujranwala and KTH Peshawar. Only permanent residents who had been living in the selected areas for at least one year were included, irrespective of gender, literacy level, or socio-economic status. Individuals with severe psychiatric illness, cognitive impairment, or those unwilling to participate were excluded. A sample size of 200 participants was calculated using the WHO sample size formula, assuming a 50% prevalence of adequate awareness regarding GI-NCDs, a 95% confidence interval, and a 7% margin of error. A multistage sampling technique was used for participant selection. Initially, two rural union councils were randomly chosen from each district's administrative lists. Within each selected union council, households were chosen using systematic random sampling by selecting every fifth household as listed by Lady Health Workers. From each household, one eligible adult respondent was selected randomly using the Kish grid method to ensure balanced gender representation.

Data were collected using a structured, pre-tested questionnaire designed after reviewing WHO NCD surveillance tools and relevant literature. The questionnaire comprised four main sections: socio-demographic details, knowledge and awareness about GI-NCDs, preventive practices, and attitudes with health-seeking behavior. It was first developed in English, then translated into Urdu and Pashto, and back-translated to ensure accuracy. A pilot test was carried out on 20 individuals, who were later excluded from the final analysis, to evaluate clarity and reliability, resulting in a Cronbach's alpha of 0.82. Trained field teams consisting of medical students, community health workers, and Lady Health Workers, supervised by faculty from both institutions, conducted face-to-face interviews at participants' homes in a private setting. The purpose of the study was explained in detail, and written informed consent was obtained before participation. For illiterate participants, verbal consent with thumb impressions was taken in the presence of a witness.

Ethical approval for the study was obtained from the Institutional Review Board of Gujranwala Medical College and the Ethics Committee of Khyber Medical College, Peshawar. Confidentiality and anonymity of all participants were maintained, and they were informed of their right to withdraw from the study at any time without consequence. Participants who were found to have symptoms suggestive of gastrointestinal disease were referred to the nearest primary health center or to the Gastroenterology Unit at KTH for further evaluation and management. Data entry was carried out in Microsoft Excel, and statistical analysis was performed using SPSS version 26.0. Descriptive statistics such as means, standard deviations, frequencies, and percentages were used to summarize socio-demographic characteristics, awareness levels, and preventive practices. The Chi-square test was applied to determine associations between awareness and independent socio-demographic variables, with a p-value of less than 0.05 considered statistically significant.

RESULTS

A total of 200 participants from rural communities of Gujranwala and Peshawar districts were interviewed, with an equal distribution from each district (n=100 per site). The mean age of respondents was 39.6 ± 12.8 years, with the youngest being 18 years and the oldest 72 years. Slightly more than half of the respondents were females (54.5%), while males constituted 45.5% of the study population. The majority of participants were married (82.0%), and almost two-thirds (65.5%) had no formal education or had attended only primary school. Occupationally, a large proportion were housewives (42.0%), followed by agricultural workers (27.0%), daily wage laborers (15.5%), and small business/shop owners (8.0%), while the remainder were students or unemployed. The average monthly household income was PKR 23,800 ± 6,500, indicating a predominantly low-income population (Table 1).

The level of knowledge regarding gastrointestinal non-communicable diseases was generally low across the study population. Only 34.5% of respondents correctly identified examples of GI-NCDs such as chronic liver disease, gastrointestinal cancers, and inflammatory bowel disease. Recognition of key symptoms was also limited; abdominal pain was identified by 61.0% of participants, chronic diarrhea by 42.5%, unexplained weight loss by 28.5%, and rectal bleeding by only 15.0%. Awareness of major risk factors varied considerably, with the highest awareness for contaminated drinking water (57.0%) and hepatitis B/C infection (54.0%), followed by unhealthy diet (43.5%) and tobacco use (31.0%). However, awareness regarding the role of physical inactivity (19.5%), obesity (22.0%), and family history of GI cancers (11.0%) was very poor (Table 2).

Preventive practices were found to be suboptimal. Although 72.0% of respondents reported using some form of water treatment before drinking (mainly boiling or filtration), only 41.0% consistently washed hands with soap before meals and after defecation. Dietary habits revealed high consumption of fried and spicy foods in 68.0% of participants, with low daily fruit and vegetable intake (less than three servings/day) in 79.5% of the sample. Tobacco use in any form (smoking or chewing) was reported by 29.0% of respondents, more common among males ($p<0.01$). Vaccination coverage for hepatitis B was self-reported by 38.5% of participants, but documentation was available for only 26.0%. Screening for gastrointestinal cancers was almost non-existent, with only 4.5% having ever undergone any form of endoscopic or fecal occult blood testing (Table 3).

When awareness scores were compared across socio-demographic variables, higher education was significantly associated with better knowledge scores ($p<0.001$). Participants with secondary education or higher correctly identified an average of 6.2 ± 1.8 knowledge items compared to 3.1 ± 1.5 among those with no formal education. Gender differences were also evident; males demonstrated slightly higher awareness of hepatitis risk and screening importance, whereas females showed better knowledge of dietary and hygiene-related preventive measures. District-wise comparison showed that participants from rural Gujranwala had marginally higher overall awareness scores than those from rural Peshawar (mean scores 4.8 ± 2.0 vs. 4.3 ± 1.9), though the difference was not statistically significant ($p=0.08$).

Overall, the results indicate that despite some level of awareness about certain GI-NCD risk factors particularly contaminated water and hepatitis infection there remain substantial knowledge gaps, poor adoption of preventive behaviors, and extremely low rates of screening in the rural communities studied. The findings highlight the urgent need for targeted educational and community-based health promotion interventions addressing both modifiable lifestyle factors and the importance of early detection measures.

Table 1: Socio-demographic characteristics of study participants (n=200)

Variable	Category	Frequency (n)	Percentage (%)
Age (years)	18–30	54	27.0
	31–45	82	41.0
	46–60	46	23.0
	>60	18	9.0
Gender	Male	91	45.5
	Female	109	54.5
Marital status	Married	164	82.0
	Unmarried	36	18.0
Education level	No formal education	74	37.0
	Primary	57	28.5
	Secondary	41	20.5
	Higher secondary & above	28	14.0
Occupation	Housewife	84	42.0
	Agriculture	54	27.0
	Laborer	31	15.5
	Business/shop	16	8.0
	Student/unemployed	15	7.5
Monthly household income (PKR)	<20,000	83	41.5
	20,000–30,000	94	47.0
	>30,000	23	11.5

Table 2: Knowledge and awareness regarding GI-NCDs among participants (n=200)

Parameter	Correct Knowledge (n, %)	Incorrect/No Knowledge (n, %)
Examples of GI-NCDs	69 (34.5)	131 (65.5)
Symptoms: Abdominal pain	122 (61.0)	78 (39.0)
Symptoms: Chronic diarrhea	85 (42.5)	115 (57.5)
Symptoms: Unexplained weight loss	57 (28.5)	143 (71.5)
Symptoms: Rectal bleeding	30 (15.0)	170 (85.0)
Risk factor: Contaminated water	114 (57.0)	86 (43.0)
Risk factor: Hepatitis B/C	108 (54.0)	92 (46.0)
Risk factor: Unhealthy diet	87 (43.5)	113 (56.5)
Risk factor: Tobacco use	62 (31.0)	138 (69.0)
Risk factor: Physical inactivity	39 (19.5)	161 (80.5)
Risk factor: Obesity	44 (22.0)	156 (78.0)
Risk factor: Family history of GI cancers	22 (11.0)	178 (89.0)

Table 3: Preventive practices regarding GI-NCDs among participants (n=200)

Preventive Practice	Yes (n, %)	No (n, %)
Water treatment before drinking	144 (72.0)	56 (28.0)
Regular hand washing with soap	82 (41.0)	118 (59.0)
Low-fat diet adherence	64 (32.0)	136 (68.0)
Daily fruit/vegetable intake ≥3 servings	41 (20.5)	159 (79.5)
No tobacco use	142 (71.0)	58 (29.0)
Received hepatitis B vaccination (self-reported)	77 (38.5)	123 (61.5)
Documented hepatitis B vaccination	52 (26.0)	148 (74.0)
Ever screened for GI cancer	9 (4.5)	191 (95.5)

DISCUSSION

This study provides important evidence on the current state of public awareness and preventive practices regarding gastrointestinal non-communicable diseases (GI-NCDs) in rural Pakistan, focusing on populations within the catchment areas of Gujranwala Medical College Teaching Hospital (GMCTH), Gujranwala, and Khyber Teaching Hospital (KTH), Peshawar. The results reveal a concerning gap in both knowledge and preventive behaviors, reflecting broader trends in low- and middle-income countries (LMICs) where the epidemiological transition toward non-communicable diseases has outpaced the development of appropriate public health education and preventive infrastructure[11,12]. The low proportion of participants correctly identifying GI-NCDs and their early warning signs, particularly unexplained weight loss and rectal bleeding, suggests a risk of delayed diagnosis and late-stage presentation, which has been documented as a major determinant of poor prognosis in gastrointestinal cancers and chronic liver disease in similar rural contexts in South Asia. Education emerged as a consistent determinant of awareness, with participants possessing secondary or higher education achieving significantly better knowledge scores. This finding aligns with studies from rural India, Nepal, and Bangladesh, where literacy has been shown to enhance disease recognition, improve health-seeking behavior, and increase adherence to preventive measures. The relatively higher awareness of hepatitis B and C as risk factors likely reflects the success of targeted campaigns and vaccination drives in certain districts, yet the persistence of low vaccination documentation rates points to gaps in program coverage, record-keeping, and follow-up[13,14].

Preventive behaviors observed in the study were inadequate across multiple domains. Although the majority reported treating drinking water, a significant proportion still consumed water without any form of purification, maintaining a pathway for chronic gastrointestinal infections that can contribute to malignancy and liver disease over time. Hand hygiene was practiced regularly by less than half of the respondents, reflecting behavioral gaps similar to those reported in rural Sindh and Khyber Pakhtunkhwa, where sanitation interventions have shown limited uptake without sustained community engagement[15,16]. Dietary habits were another area of concern, with high consumption of fried and spicy foods, low fruit and vegetable intake, and little adherence to low-fat diets. This pattern is consistent with previous national nutrition surveys that highlight limited affordability and accessibility of healthier food options in rural markets. Tobacco use, reported by nearly one-third of participants, is a well-established risk factor for esophageal and gastric cancers, yet smokeless tobacco—more culturally acceptable in rural Pakistan has not been adequately addressed in public health messaging compared to cigarette smoking[17,18].

Perhaps the most alarming finding was the negligible rate of gastrointestinal cancer screening, with only 4.5% of respondents ever undergoing any screening procedure such as endoscopy or fecal occult blood testing. This reflects systemic barriers, including absence of organized screening programs, limited diagnostic facilities in rural health centers, high out-of-pocket costs, and low perceived need for screening in asymptomatic individuals[19]. Comparable studies from rural Iran and Sri Lanka have demonstrated that community-based screening programs, when integrated with primary healthcare services, significantly increase participation and lead to earlier detection. The absence of a statistically significant difference in awareness and practices between Gujranwala and Peshawar districts indicates that these deficits are widespread and not specific to a single geographic region or provincial health system, suggesting that interventions need to be nationwide in scope[20].

The findings underscore the need for comprehensive, culturally tailored strategies to improve GI-NCD awareness and preventive behaviors in rural Pakistan. Integrating GI-NCD education into existing community health platforms such as the Lady Health Worker (LHW) program, developing targeted campaigns focusing on dietary modification and tobacco cessation, and expanding access to affordable screening services could address the identified gaps[21,22]. Collaboration between government health departments, non-governmental organizations, and academic institutions will be critical in designing and implementing

these interventions. Furthermore, any preventive strategy must address structural determinants, including poverty, education, and health infrastructure, to create an enabling environment for sustained behavioral change. Without such multi-level action, the burden of GI-NCDs in rural Pakistan is likely to increase, leading to higher morbidity, mortality, and healthcare costs[23,24,25].

CONCLUSION

This study demonstrates that awareness and preventive practices regarding gastrointestinal non-communicable diseases in rural Pakistan are markedly insufficient, with significant gaps in knowledge of symptoms, risk factors, and the importance of screening. While some awareness exists for hepatitis-related risks and water safety, preventive behaviors remain inconsistent and screening uptake is almost negligible. Education level emerged as a strong predictor of awareness, underscoring the need for targeted, community-based health education initiatives. Strengthening preventive health services, integrating GI-NCD awareness into existing rural health programs, expanding vaccination coverage, and improving access to affordable screening are essential to reduce the future burden of these diseases in rural populations.

DECLARATIONS

Availability of Data and Materials: The datasets generated and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing Interests: The authors declare that they have no competing interests.

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Authors' Contributions: MTJ and SK conceptualized and designed the study. GSS and BM supervised data collection and field coordination. AWS performed data analysis and interpretation. GHB drafted the manuscript. All authors contributed to critical revisions, read, and approved the final manuscript.

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