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Escherichia coli diarrhoea among the adults – prospective research

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Abstract

Introduction: *Eschrichia coli* is common diarrhea causing agent. This study aimed to identify the bacterial pathogens responsible for diarrhea and abdominal pain in adults. Foodborne illnesses remain a significant public health concern, with Escherichia coli.

Methods: The study, conducted from January to May 2021 at GSL Medical College, included adults with diarrhea and abdominal pain. Stool samples were collected, processed, and cultured on selective media to identify bacterial pathogens. Statistical analysis was performed to assess pathogen prevalence and its association with symptoms, using descriptive statistics for findings interpretation.

Results: Among 100 adults with diarrhea and abdominal pain, 52% were male, and the majority (40%) were aged 31–45 years. Abdominal pain (80%) and diarrhea (75%) were the most common symptoms. *Escherichia coli* was the leading isolate (30%), followed by Salmonella spp. (25%) and *Staphylococcus aureus* (20%).

Conclusion: In conclusion, this study highlights Escherichia coli as the primary bacterial cause of diarrhea among adults, followed by Salmonella spp. and *Staphylococcus aureus*. These findings underscore the importance of targeted food safety measures and public health interventions to address foodborne pathogens and prevent related illnesses in communities.

Key words: Escherichia coli, Diarrhea, Foodborne pathogens, Abdominal pain, Bacterial isolation

Introduction

Escherichia coli (E. coli) is a major cause of diarrheal illness globally, particularly among adults in both developing and developed nations. [1] Various strains of E. coli, such as Enterotoxigenic E.coli (ETEC) and Enteropathogenic E. coli (EPEC), are known to cause significant morbidity through gastrointestinal infections that manifest as diarrhea, abdominal pain, and dehydration. These pathogens can lead to severe public health challenges due to their high transmissibility through contaminated food and waterctive studies on E. coli diarrheal infections help understand the epidemiological factors, transmission routes, and risk profiles that contribute to the burden of the disease among adults. [2, 3] Such studies are crucial for identifying regional variations in pathogenic strains and resistance patterns, which are important for guiding effective treatment and preventive strategies.

Research highlight that antibiotic-resistant E. coli strains pose additional challenges in managing diarrheal illnesses, with implications for prolonged symptoms and more severe health outcomes. [1, 4] These insights the need for regular monitoring and stringent hygiene measures, especially in regions with higher incidence rates. [2] The present study, therefore, aims to assess the prevalence and

characteristics of E. coli-related diarrhea among adults, focusing on the epidemiological patterns and clinical presentations of infection.

Methods:

It was prospective research conducted in the department of Microbiology, GSL Medical College. Study was conducted from January to March 2021. Study protocol was approved by the Institutional ethics committee. An informed written consent was taken from the study members.

Individuals of both gender, aged >18 years with diarrhoea and pain abdomen were included in the research. Non cooperative individuals and those in unconscious state were not considered in the research.

Stool samples were collected from the study members. Each sample was collected in sterile containers and transported to the laboratory for analysis within two hours of collection to maintain viability. Upon arrival at the laboratory, each stool sample was subjected to a macroscopic examination for consistency, color, and presence of blood or mucus. A portion of each sample (approximately 1 g) was then mixed with 9 mL of sterile saline solution to create a 1:10 dilution. This mixture was vortexed to ensure homogenization.

Specimen was cultured in different media and after incubation, the growth was identified by gram stain and battery of biochemical tests asp per Chandra TJ et al. [6] report. The diluted stool samples were inoculated onto selective media specific for various foodborne pathogens. Different culture media namely, Xylose Lysine Deoxycholate (XLD) agar, MacConkey agar, Cetrimide agar were used. Plates were incubated at 35-37^{0}C for 24-48 hours under appropriate atmospheric conditions.

The prevalence of each bacterial species was recorded, and statistical analysis was performed to evaluate the association between the identified pathogens and clinical symptoms. Descriptive statistics were utilized to summarize the findings, and results were interpreted in the context of existing literature on foodborne illnesses.

Results:

The study included 100 adults presenting with diarrhea and abdominal pain, with a slight male predominance (52%). Age distribution revealed that most participants (40%) were between 31–45 years old. Among the clinical symptoms, abdominal pain was the most common, affecting 80% of individuals, followed closely by diarrhea (75%). E. coli emerged as the most prevalent bacterial isolate, detected in 30% of stool samples, followed by Salmonella spp. (25%), *Staphylococcus aureus* (20%), Shigella spp. (15%), and *Pseudomonas aeruginosa* (10%).

Discussion:

The observed demographic and symptom trends in this study align with existing literature on gastrointestinal infections. Studies show that foodborne pathogens, particularly in adults, lead to symptoms such as abdominal pain and diarrhea, which were prominent in this cohort. [5] The higher incidence of these symptoms in males and the concentration in the 31–45 age group may reflect lifestyle and dietary habits, as well as occupational exposure, which have been linked to increased risk of foodborne illnesses. [6] The predominance of abdominal pain (80%) as a primary symptom, followed closely by diarrhea (75%), is consistent with other findings where these are the most common clinical presentations of bacterial gastrointestinal infections. [7]

Abdominal pain and diarrhea often co-occur as primary symptoms in cases of E. coli infections and other bacterial gastroenteritis. [8] The pain may stem from the inflammatory response to bacterial toxins, which can cause mucosal irritation and disrupt normal bowel movements. Such findings emphasize the importance of addressing symptom patterns in diagnosing foodborne infections and improving treatment protocols. [9] Early identification and targeted management strategies are crucial in minimizing disease progression and transmission within affected communities.

The predominance of E. coli in this study, found in 30% of stool samples, is consistent with its established role as a leading cause of bacterial

gastroenteritis worldwide. E. coli is a common pathogen in foodborne outbreaks due to its ability to contaminate a wide range of food sources and its resilience in the environment. [10] Studies from 2019 have highlighted its virulence factors, including the production of Shiga toxins in specific strains, which can lead to severe gastrointestinal symptoms. [11]

Following E. coli, Salmonella spp. was identified in 25% of samples. Salmonella is another major cause of foodborne illness globally, often linked to the consumption of contaminated poultry, eggs, and produce. Its ability to evade immune responses through intracellular survival mechanisms contributes to its high incidence in gastrointestinal infections. [12] *Staphylococcus aureus*, detected in 20% of samples, is notable for producing enterotoxins that lead to rapid-onset symptoms such as vomiting and abdominal cramps. [13]

The presence of Shigella spp. (15%) and *Pseudomonas aeruginosa* (10%) further underscores the diverse bacterial etiology of gastroenteritis. Shigella, commonly associated with dysentery, spreads easily through contaminated food and water, while *Pseudomonas aeruginosa* infections often occur in immunocompromised individuals. [14] This pathogen distribution highlights the need for targeted food safety measures.

This study highlights the prevalence of E. coli as the primary bacterial isolate in cases of diarrhea and abdominal pain, followed by Salmonella spp., *Staphylococcus aureus*, Shigella spp., and *Pseudomonas aeruginosa*. Each pathogen showed distinct clinical impacts, with E. coli and Salmonella frequently associated with abdominal pain and diarrhea, while Shigella was linked to vomiting and fever. These findings emphasize the need for ongoing surveillance, improved hygiene practices, and food safety interventions to control the spread of these pathogens. Such measures are crucial in reducing the incidence of foodborne illnesses and protecting public health.

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