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Literature Review of Chronic Diarrhea in Egypt

Mohamed Ayman Hamad *, Boshra El-sayed Talha Hussein, Lobna Abo Ali, Asem Elfert, Sabry Abousaif
Tropical Medicine and Infectious Diseases Department, Faculty of Medicine, Tanta University, Tanta, Egypt.
*** Corresponding author:** Mohamed Ayman Hamad,**Email:** mohamed169832_pg@med.tanta.edu.eg, **Phone:** +201501538304

ABSTRACT

Background: Chronic diarrhea, defined as persistent loose stool lasting at least four weeks, affects a significant portion of the global adult population, with prevalence varying according to region, underlying health conditions, and healthcare access. It has a multifactorial aetiology including infections, inflammatory diseases, malabsorption syndromes, and functional bowel disorders, which pose substantial challenges in both diagnosis and management. The condition can result in malnutrition, dehydration, electrolyte imbalances, weight loss, and long-term complications if untreated. Early diagnosis and systematic clinical evaluation are therefore essential.

Objective: This review aimed to analyse the epidemiological characteristics, diverse etiological factors (such as inflammatory bowel disease, irritable bowel syndrome, and malabsorptive disorders), and the underlying pathophysiological mechanisms. Also, to evaluate diagnostic protocols, imaging, and endoscopic evaluations alongside current therapeutic approaches, emphasizing evidence-based strategies to improve patient outcomes.

Methods: A literature review was conducted in PubMed, Scopus, and Web of Science. We searched for chronic diarrhea in Egypt, epidemiology, inflammatory bowel disease, irritable bowel syndrome and malabsorption to identify relevant studies published between 2000 and 2024. Articles were selected based on their clinical focus, language (English and Arabic), and relevance to diagnostic and therapeutic challenges. Strict inclusion and exclusion criteria were applied to ensure that the analysis focused on studies pertinent to the multifactorial aetiologies and management of chronic diarrhea.

Conclusion: The review confirmed that chronic diarrhea in Egypt is a multifactorial disorder with aetiologies ranging from infectious and inflammatory to malabsorptive conditions.

Keywords: Chronic diarrhea, Egypt, Epidemiology, IBD, IBS malabsorption, Diagnostic approaches, Therapeutic strategies, Gastrointestinal disorders, Tropical medicine.

INTRODUCTION

Chronic diarrhea is defined by persistent loose stool lasting at least for four weeks and affects approximately 5-10% of the global adult population. Prevalence varies with region, health conditions, and healthcare access. Its diverse aetiologies include infections, inflammatory diseases, malabsorption syndromes, and functional bowel disorders, which complicate diagnosis and treatment. The condition leads to malnutrition, dehydration, electrolyte imbalances, weight loss, and anaemia in many inflammatory cases. Early diagnosis is crucial because untreated chronic diarrhea can result in long-term complications [1].

Due to the wide range of potential causes, a systematic diagnostic approach is essential. Medical history, physical examination, laboratory tests, imaging, and endoscopic evaluation guide clinicians in identifying the underlying aetiology. Treatment varies by cause; infectious cases require antimicrobial therapy, while immune-related conditions respond to anti-inflammatory or immunosuppressive agents. Dietary modifications also play a key role in symptom management. This strategy aimed to reduce complications, improve patient outcomes, and address the multifactorial challenges posed by chronic diarrhea in affected populations [2].

DEFINITIONS

Diarrhea is defined based on stool frequency, consistency, volume, or weight. Loose stools are the hallmark feature, though water-holding capacity makes clinical quantification difficult. According to the British

Society of Gastroenterology, chronic diarrhea is defined as a persistent alteration from the norm with stool consistency between type 5 and 7 on the Bristol stool chart and increased frequency for over four weeks. The World Health Organization defines chronic diarrhea as three abnormally loose stools in 24 hours for four weeks [3]. Bristol stool chart is a valuable tool used to describe the consistency of the stool and categorizes stool form into seven distinct types. This chart, developed at the University of Bristol by Lewis and Heaton, which distinguishes between constipation (types 1 and 2), normal stool (types 3 and 4), and diarrhea (types 5, 6, and 7). Diarrhea is further classified by duration into acute (less than two weeks), persistent (two to four weeks), and chronic (more than four weeks) as defined [4].

EPIDEMIOLOGY

Chronic diarrhoea is a common gastrointestinal disorder with a prevalence of 3–5% in the adult population worldwide, increasing to 8–10% among older adults. Prevalence may be similar between younger and middle-aged groups, then rises in those over 65. Contributing factors include increased medication use and chronic diseases such as diabetes, thyroid dysfunction, and inflammatory bowel disease [5]. The exact prevalence of chronic diarrhea in Egypt is not well documented. A prospective study conducted in Alexandria Main University Hospital concluded that the

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most common etiology was IBD (68%) followed by irritable bowel syndrome (IBS) (14.4%) then cancer colon (7.2%) [6]. A cross sectional study reported that 27.5% of medical students had IBS, 16% of them had constipation predominant IBS, 20% had diarrhea-predominant irritable bowel syndrome (IBS-D), and 64% had mixed type [7]. Another study conducted on medical students in Ain Shams University Hospitals found that IBS frequency was 31.7% and 26.6% of them were diarrhea predominant, while 73.4% were constipation predominant [8].

Regarding IBD, an Egyptian study among patients undergoing colonoscopy at Zagazig University Hospitals found that IBD prevalence was 11.2% [9]. Another single-center study recruited 44 patients with chronic watery non-bloody diarrhea from Bolak Eldakror Hospital and found that 50% of patients had microscopic colitis (MC) [10]. A systematic review was conducted on the prevalence of celiac disease (CeD) in Arab countries stated that, the highest prevalence among the general population (3.2%) was reported in Saudi Arabia, and the lowest (0.1%) was reported in Tunisia, with a prevalence of 0.53% in Egypt [5].

PATHOPHYSIOLOGY OF CHRONIC DIARRHEA

Introduction: The development of chronic diarrhea is complex and involves changes in normal intestinal motility, net water and electrolytes absorption and secretion, mucosal barrier structure and function, and luminal contents composition. There is no universal classification of its pathophysiological mechanisms, as chronic diarrhea may be osmotic, secretory, malabsorptive, inflammatory, functional, or secondary to dysmotility. Most diarrheal diseases do not fit into a single category, often involving mixed mechanisms with inflammatory mediators and hormonally or **neurally** mediated cellular channels, contributing to severity [11].

Types of chronic diarrhea: Secretory diarrhea arises from dysregulation of intestinal fluid homeostasis, characterized by excessive fluid secretion. It is caused by multiple etiological factors including bacterial and viral pathogens, inflammatory processes, pharmacological side effects, and genetic mutations affecting ion and solute transporters along with cyclic nucleotide and calcium signalling. Activation of Cl^- channels on the apical surface leads to efflux of Cl^- ions and significantly increased luminal secretion, while reduced Na^+ absorption thereby further contributes to a high-volume diarrheal state persisting at night [12].

Osmotic diarrhea is characterized by a high osmotic gap between stool water concentration and its measured osmolality. This gap results from inadequately absorbed substances such as lactose in lactase deficiency, drawing fluid into the intestinal lumen. The gap, calculated as 290 minus twice the sum of stool Na^+ and K^+, differentiates diarrhea types. Normal values range from 50 to 100 mOsm/kg. Values above 100 indicate osmotic diarrhea, which improves with fasting due to a reduced presence of sugars and minerals [13].

Inflammatory diarrhea results from complex inflammatory processes that disrupt intestinal homeostasis, downregulating ion transporter function and altering interactions between the immune system and microbiota. Pathogen invasion triggers immune responses, recruiting neutrophils and macrophages, while cytokines such as IL-1 and TNF-α increase intestinal permeability, leading to fluid loss. Epithelial damage compromises barrier integrity, and gut microbiota dysbiosis, which worsens inflammation. Reduced villous surface impairs absorption, while increased Cl^- secretion further exacerbates diarrhea. Neural and hormonal changes accelerate motility, reducing transit time and fluid absorption and aggravating symptoms [14].

Chronic fatty diarrhea, also called steatorrhea, results from defective fat digestion by pancreatic enzymes or bile acids, or from the inability of the proximal small intestine to absorb sufficient fat. The ingested fat forms greasy, pale, and malodorous stool. CeD, an autoimmune disorder triggered by gluten, causes villous atrophy in the duodenum and reduces the surface area for nutrient absorption. Similarly, SIBO destroys the mucosal lining and impairs nutrient absorption, leading to the excretion of undigested fat as described above [15].

Chronic pancreatitis lead to long-term inflammation and tissue destruction of the pancreas, resulting in exocrine pancreatic insufficiency with reduced lipase production essential for fat digestion. Ileal resection and short bowel syndrome reduce bile acid production or reabsorption, limiting fat emulsification and absorption. Bile acid diarrhea, as well as primary biliary cholangitis and primary sclerosing cholangitis, impair bile flow. Post-cholecystectomy syndrome, following gallbladder removal, causes excessive bile entry into the colon and self-limiting diarrhea in many cases indeed [16].

Functional diarrhea involves a complex interplay between dietary factors, gut microbiota, and abnormal gut motility. Diet may influence IBS through alterations in microbiota composition, intestinal permeability, and proinflammatory responses. These changes contribute to visceral hypersensitivity and disrupted brain-gut communication. Sensitization of enteric nervous system neurons, potentially exacerbated by dysbiosis and inflammatory mediators, further intensifies symptoms. This process, observed in patients with a history of gastroenteritis, underscores the role of dietary influences and microbial imbalance in the development of functional diarrhea [17].

Drug-induced diarrhea results from various pharmacodynamic and pathophysiological mechanisms. Hundreds of drugs are identified as causing diarrhea either as a side effect or due to their

mechanism of action. These drugs mimic the processes seen in both fatty and functional diarrhea. Their effects on the gastrointestinal tract highlight the diverse origins of diarrhea. Recognition of drug-induced cases is essential, as they occur alongside conditions such as CeD, SIBO, pancreatitis, and IBS, revealing overlapping symptoms and contributing factors in gastrointestinal disorders [18].

Table 1: Drugs associated with diarrhea [19].

Mechanism	Drug
Osmotic	Citrates, phosphates, sulfates, magnesium-containing antacids and laxatives, sugar alcohols (e.g., mannitol, sorbitol, xylitol)
Secretory	Anti-arrhythmics (e.g., quinine), Antibiotics (e.g. Amoxicillin/clavulanate), Anti-neoplastics, Biguanides, Calcitonin, Cardiac glycosides (e.g., digitalis), Nonsteroidal anti-inflammatory drugs (NSAIDs), Colchicine, Prostaglandins (e.g. misoprostol).
Motility	Macrolides (e.g., erythromycin), metoclopramide, stimulant laxatives (e.g., bisacodyl, senna).
Malabsorption	Acarbose, aminoglycosides, orlistat, and thyroid supplements.

❖ DIAGNOSIS OF CHRONIC DIARRHEA

History taking and red flags: A comprehensive medical history is critical in evaluating patients with chronic diarrhea. History taking includes symptom duration, severity, stool characteristics, associated gastrointestinal symptoms, red flag features, past medical and surgical history, family and travel history, and special habits. Diarrhea is defined by loose stools, increased frequency and incontinence, or urgency. Chronic diarrhea is defined as the passage of ≥ 3 loose or liquid stool per day, with stool consistency characterized as watery, mushy, formed, or hard, or according to the Bristol chart [20].

Watery stools may indicate osmotic or secretory processes, while the presence of blood suggests conditions such as haemorrhoids, diverticulosis, inflammatory bowel disease, or cancer. Large volume pale stools indicative of steatorrhea, and floating stools possibly due to increased methane or gas content. The physician should establish whether diarrhea is continuous or intermittent, its relation to meals and whether it occurs at night or during fasting periods [21].

Diarrhea must be strictly differentiated from conditions such as pseudo-diarrhea, faecal urgency, and faecal incontinence. Pseudo-diarrhea is characterized by increased stool frequency with normal consistency and weight, often observed with irritable bowel syndrome, hyperthyroidism, or anorectal conditions. Faecal urgency refers to the sudden need to empty the bowels, potentially arising from anxiety, inflammatory bowel disease, infections, or medications. Faecal incontinence involves uncontrolled passage of faeces due to impaired external anal sphincter control, with various structural, neurological, or congenital causes [22].

ASSOCIATED GASTROINTESTINAL SYMPTOMS

Associated gastrointestinal symptoms play an important role in chronic diarrhea evaluation. Abdominal pain, described as cramping or dull ache, often correlates with bowel movements, as seen in irritable bowel syndrome. Abdominal bloating is reported as a sensation of fullness, pressure, or gassiness. Red flag symptoms, including tenesmus, blood in stool, nocturnal diarrhea, significant weight loss, and fever, must be carefully assessed, particularly in older adults or those with risk factors for malignancy or serious organic disease [23].

Past medical history and additional background information are essential in chronic diarrhea assessment. This includes co-morbidities such as immunodeficiency, diabetes, thyroid dysfunction, and neurological diseases, as well as surgical history noting gastrointestinal surgeries that may affect absorption. Family history of ulcerative colitis, celiac disease, or colorectal cancer is an alarm feature. Travel history, smoking, and alcohol use, along with dietary factors such as caffeine, dairy products, and certain food additives, must be carefully explored to identify potential contributing factors [24].

PHYSICAL EXAMINATION

The physical exam of chronic diarrhea may show no abnormalities yet offers vital clues about underlying conditions and severity when combined with other investigations. Findings can include orthostatic hypotension, tachycardia, and fever, indicating dehydration, anaemia, or infection. Additional signs such as jaundice, pallor, muscle wasting, dermatological manifestations, hyperpigmentation, flushing, heart murmurs, thyroid changes, lymphadenopathy, and nutrient deficiency symptoms consistently help identify complications and direct further diagnostic evaluation in clinical practice [25].

ABDOMINAL AND RECTAL EXAMINATIONS

Abdominal examination findings in chronic diarrhea include tenderness and distention, which may indicate inflammatory or infectious conditions, while ascites is observed in severe protein-losing enteropathy or malignancy. A palpable mass may result from

pancreatic pseudocysts, pancreatic enlargement, or colorectal cancer. Guarding and rigidity signal inflammation or complications such as perforation, warranting urgent surgical consultation, and an abdominal bruit suggests chronic mesenteric ischemia requiring vascular imaging. Rectal examination assesses for perianal disease, mucosal alterations, anal continence, and structural abnormalities [26].

LABORATORY INVESTIGATIONS

Initial laboratory workup for chronic diarrhea includes CBC, CRP, faecal calprotectin, anti-tTG-IgA, total IgA, and a basic metabolic panel, all guided by the patient's history and physical exam. Stool tests for chronic diarrhea help diagnose inflammatory and infective causes. Microscopic examination (including ova and parasite studies) and stool cultures identify infections, while stool electrolytes distinguish osmotic from secretory diarrhea using the osmotic gap and faecal PH [1].

ENDOSCOPIC AND HISTOPATHOLOGICAL ASSESSMENT

Esophagogastroduodenoscopy (EGD) examines the oesophagus, stomach, and duodenum, with duodenal biopsies essential for diagnosing conditions such as CeD, Whipple's disease, and other small bowel disorders. Ileocolonoscopy inspects the entire colon and terminal ileum with multiple biopsies, serving as the gold standard for diagnosing IBD, MC, and CRC. Flexible sigmoidoscopy, limited to the distal colon, may suffice for MC, proctosigmoiditis, or limited CRC screening. Video capsule endoscopy and enteroscopy further evaluate small bowel pathology and allow therapeutic interventions [27].

RADIOLOGIC STUDIES TO ASSESS CHRONIC DIARRHEA

Imaging studies help define anatomic abnormalities and complications in chronic diarrhea by delineating strictures, fistulae, diverticula, and inflammatory extents in IBD or chronic pancreatitis, and by detecting hormone-secreting tumours. CT and CT enterography identify bowel wall thickening, abscesses, fistulas, neoplasms, and ischemic colitis with high sensitivity and specificity. MRI and MR enterography offer improved differentiation between inflammatory and fibrotic strictures, while evaluating motility. Bowel ultrasonography and endoscopic ultrasound provide non-invasive, high-resolution imaging for intestinal and pancreatic evaluation [28].

FURTHER INVESTIGATIONS IN CHRONIC DIARRHEA

Bile acid diarrhea is confirmed using either 75SeHCAT testing or serum bile acid precursor 7α-hydroxy-4-cholesten-3-one testing. With 75SeHCAT, retention percentages at seven days classify severity: 10–15% for mild loss, 5–10% for moderate, and 0–5% as severely abnormal. Bile acid sequestrants are recommended when values fall below 15%. Serum bile acid precursor testing, with a negative predictive value of 95% and positive predictive value of 74%, indicates bile acid diarrhea with levels above 47.1 ng/ml, although diurnal and post-prandial variations and liver disease may yield false positives [29].

Direct pancreatic function tests are not widely available, while indirect tests like serum trypsin, faecal chymotrypsin, and faecal elastase assays have limited sensitivity. As a result, imaging and empirical pancreatic enzyme replacement therapy may be used to assess pancreatic insufficiency in patients with steatorrhea. Small bowel aspirate cultures, though most sensitive for SIBO, lack standardization, and hydrogen breathe tests for glucose and lactose show poor sensitivity and specificity. Therefore, an empirical trial of antibiotics is advised. Other evaluations include anorectal manometry, endoanal ultrasound, and hormone-secreting tumour testing only after excluding other causes [30].

❖ TREATMENT OF CHRONIC DIARRHEA

Treatment of chronic diarrhea poses a significant clinical challenge requiring a multifaceted approach that encompasses specific therapy for identified aetiologies, empirical treatment in select scenarios, and symptomatic management when a definitive diagnosis remains unclear. Following a comprehensive evaluation, targeted therapeutic intervention may be medical using 5-ASA, corticosteroids, immunosuppressants, biologics, antibiotics, antiparasitics, and somatostatin analogues or surgical when complications such as strictures and fistulae, or neoplasms necessitate intervention. This approach optimizes patient outcomes and addresses the condition's consequences [25].

MEDICAL TREATMENT

Medical treatments for chronic diarrhea vary depending on the underlying cause. IBD management includes 5-ASA, which inhibits inflammatory mediators to reduce colonic inflammation, and corticosteroids, which induce remission but are unsuitable for long-term use due to side effects [31]. Biologic therapies, such as TNF-α inhibitors (infliximab, adalimumab), integrin inhibitors (vedolizumab), interleukin inhibitors (ustekinumab), and Janus kinase inhibitors (tofacitinib), are effective in maintaining remission [32]. In IBS-D and functional diarrhea (FDr) psychological therapies, rifaximin, bile acid sequestrants, and antispasmodics may be used [33].

Antibiotics and antiparasitics are employed when infections are present, somatostatin analogues (octreotide & lanreotide) can alleviate symptoms in neuroendocrine tumors by reducing serotonin levels, for drug-induced diarrhea, discontinuation or modification of the medication is advised. Symptomatic treatment

options, including loperamide, anticholinergic agents, and intraluminal adsorbents help reduce stool frequency and improve consistency but do not address the root cause, making definitive diagnosis a priority when possible [33].

SURGICAL MANAGEMENT

Surgical management is a critical intervention when medical therapy is insufficient, particularly in cases of IBD or other gastrointestinal conditions. Procedures include colectomy for refractory IBD, proctocolectomy with ileal pouch-anal anastomosis for ulcerative colitis or familial syndromes, and resection with anastomosis for Crohn's disease or early CRC. Strictureplasty, fistulectomy, and bowel reconstruction surgeries are also employed, while small bowel transplantation is considered for extensive bowel disease and short bowel syndrome. Surgical intervention aims to alleviate symptoms, prevent complications, and improve quality of life [35].

DIETARY MANAGEMENT

Dietary modifications play a key role in managing chronic diarrhea. A low-FODMAP diet reduces poorly absorbed fermentable carbohydrates and is beneficial for IBS-D. A gluten-free diet is necessary for individuals with celiac disease to prevent symptoms and intestinal damage. Lactose restriction helps patients with lactose intolerance avoid diarrhea and bloating. Adjusting fiber intake is important—soluble fiber (e.g., psyllium) can improve stool consistency, while insoluble fiber may worsen symptoms. Maintaining proper hydration and electrolyte balance is essential, especially in cases with significant fluid loss. A bland diet, consisting of easily digestible foods like bananas, rice, and toast, may help minimize gastrointestinal irritation during acute phases. Personalized nutrition counseling ensures dietary modifications are both effective and nutritionally adequate [34].

MANIPULATING THE GUT MICROBIOME - PROBIOTICS AND PREBIOTICS

Manipulating the gut microbiome involves the use of probiotics to support digestive health in chronic diarrhea. Probiotics, including Lactobacillus, Bifidobacterium, and Saccharomyces boulardii, help resist pathogenic colonization, supply enzymes, reduce ammonia levels, and modulate the immune system. Prebiotics such as fructo-oligosaccharide, inulin, and lactulose promote beneficial bacteria growth, enhance mineral absorption, and support short-chain fatty acid production. These interventions aim to improve gut barrier function, regulate bowel movements, and reduce inflammation, thereby alleviating diarrhea symptoms and promoting overall gastrointestinal well-being.

CONCLUSION

The review confirmed that chronic diarrhea in Egypt is a multifactorial disorder with aetiologies ranging from infectious and inflammatory to malabsorptive conditions. Despite advances in diagnostic tests and treatment strategies, gaps in epidemiological data and limited access to advanced diagnostics continue to hinder optimal management. Future research should concentrate on nationwide studies, improved diagnostic protocols, and the development of tailored therapeutic strategies to reduce morbidity and improve quality of life.

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