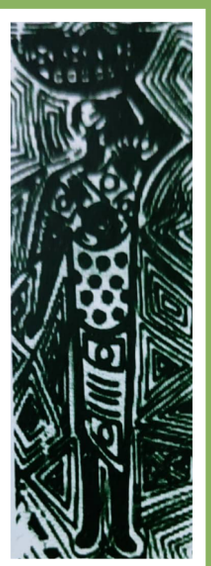
NIGERIAN JOURNAL OF PAEDIATRICS

https://www.njpaediatrics.com

PRINT: ISSN 0302-4660

ONLINE: ISSN 2814-2985

OFFICIAL JOURNAL OF THE PAEDIATRIC ASSOCIATION OF NIGERIA



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Nigerian Journal of Paediatrics 2025 (April-June); Volume 52(2): 88-100.
https://dx.doi.org/10.63270/njp.2025.v52.i2.2000012.

Gastro-Oesophageal Reflux Disease in sub-Saharan African Children

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Abstract

Gastroesophageal reflux (GER) is a physiologic, involuntary passage of gastric contents into the oesophagus and mostly occurs postprandial. Gastroesophageal reflux disease (GERD) occurs when the involuntary retrograde movement of gastric contents across the lower oesophageal sphincter (LES) into the oesophagus is associated with troublesome symptoms or complications. Gastroesophageal reflux disease (GERD) has been widely reported in developed countries. In a systematic literature review, the prevalence of GERD in children varies significantly, ranging from 23.1% to 40% in infants. The overall weekly prevalence of GERD symptoms in children under 10 years old was shown to be 3.2%, with rates ranging from 0.2% to 18.8% in children over the age of 10. The clinical presentation of GERD in children is mostly non-specific, but depends on the age of the child. It is therefore important to watch out for symptoms that are unusual and could be indicative of GERD. Children with prolonged, untreated GERD may present with varying complications which include failure to thrive, peptic oesophagitis, respiratory disease, dental erosions, and long-standing GERD in some children could lead to peptic strictures of the oesophagus, Barret's oesophagus, and a precursor of adenocarcinoma in adults. Little is known about GERD in children in sub-Saharan Africa. This article reviews GERD in children in sub-Saharan Africa and to outline the epidemiology, risk factors, clinical presentation in different age groups, and approach to diagnosis and treatment modalities. A search was conducted in PubMed, and African Journal online (AJOL) in June 2024.

Key words: Gastro-oesophageal Reflux, Endoscopy, pH Studies, Proton Pump Inhibitors.

Introduction

Gastroesophageal reflux (GER) is the involuntary passage of gastric contents into the oesophagus. It is a normal physiologic occurrence mostly observed in infants, and mostly occurs postprandial.[1] In the majority of individuals, there are no symptoms associated with GER, and it resolves overtime requiring no treatment.[1-3] Gastroesophageal reflux disease (GERD) occurs when the involuntary retrograde movement of gastric contents across the lower oesophageal sphincter (LES) into the oesophagus is associated with troublesome symptoms or complications. [1,4]

Gastroesophageal reflux disease (GERD) has been widely reported in developed countries. In a systematic review, the prevalence of GERD in children varies significantly, ranging from 23.1% to 40% in children under 18 months of age.[5] The clinical presentation of GERD in children varies depending on the age of the child, and is mostly non-specific. However, the commonest symptoms are regurgitation and vomiting. It is, therefore, important to watch out for symptoms that are unusual or for red flag signs that could be indicative of GERD. Children with prolonged untreated GERD may present with varying complications which include failure to thrive, peptic oesophagitis,

respiratory diseases, dental erosions, and long-standing GERD could lead to peptic strictures of the oesophagus, Barret's oesophagus, and a precursor of adenocarcinoma in adults could be seen in some children. Making a diagnosis could be challenging in sub-Saharan Africa due to lack of definitive diagnostic equipment. Therefore, a high index of suspicion is required to identify these symptoms, and to link them to GERD for a timely diagnosis to be made. The treatment of GERD in children is mainly supportive with lifestyle modifications to relief symptoms and prevent complications. Medical treatment with the use of acid suppressants is required in children who do not respond to lifestyle modifications. In some cases, where medical treatment is not efficient and complications are present, surgical management may be offered to the children.

Gastroesophageal reflux disease (GERD) has been widely reported in developed countries in children, however, little is known about GERD in sub-Saharan Africa. This article, therefore, aims to review the epidemiology, risk factors, clinical manifestation of GERD, diagnostic approach and treatment modalities of GERD in children in sub-Saharan Africa.

Methods

Publications relevant to the research theme were selected from the search of two medical databases, PUBMED and AJOL. Search terms included 'Reflux Disease', 'GER', 'GERD', 'Children', 'GERD and sub-Saharan Africa' with specific focus on epidemiology, clinical presentation, diagnosis, and treatment modalities. These key terms, with synonyms derived from MeSH headings, were used in the search. The search was limited to years between 1970 and 2023. The search on PUBMED for free full text returned 16 papers, while AJOL returned 45 papers. Publications relevant to this review's subject matter were selected based on the title and abstracts. PUBMED search engine had three publications and AJOL search engine, three publications which met inclusion into this review. Review articles, case reports, observational studies and systematic reviews were added to this review. Three articles from West Africa, two from South Africa and one from East Africa were added to this review. Additional searches were made on Goggle scholar, and in-text references of articles from the searches were reviewed for additional publications. Articles not published in English were excluded.

Epidemiology

Gastroesophageal reflux (GER) occurs in approximately 50% of infants less than three months of age and in 60% of infants aged three months and above.[6-8] In infancy, the male-to-female ratio for GER is 2:1.[8] Approximately 50% of infants experience vomiting during at least one feeding session in a 24 hour period by the age of two months and this increases to 60 – 70% at age three to four months and above. [6-9] About 5% of infants could still present with GER at 12 months of age.[8] The incidence of GER has been documented to be about 22% in neonates delivered preterm before 34 weeks of gestational age.[10] The prevalence of GERD in children aged less than 23 months, 2 years to 11 years, and adolescents 12 to 17 years is approximately 2.2% to 12.6%, 0.6% to 4.1%, and 0.8% to 7.6% respectively.[10] Globally, it is estimated that 20% of the world's population have symptoms of GERD and about 1% of children aged 14 years or less account for this number. [11,12] The global prevalence of GERD in children appears to be increasing, this may be due to better identification and understanding of the disease condition, or the growing conditions of other factors that contribute to GER.

African Perspective

The exact prevalence and incidence of GERD in African children is unknown as data on the incidence of GERD among paediatric age group in Africa are scarce. With the exposure to almost all similar risk factors, this could mean that GERD is also present in African children and careful history taking and clinical observations with the right expertise could lead to making this diagnosis. The prevalence of GERD in African-American children aged 2-17

years with obesity attending Paediatric Gastrointestinal (GI) clinic has been documented as 15%.[8] With the increasing trend of obesity leading to a double burden of malnutrition in sub-Saharan Africa, GERD could be on the increase coupled with changes in diet and sedentary lifestyle. In Nigeria, a nationwide questionnaire-based survey of 3520 adults showed that 7.6% of adults had GERD.[13] Prevalence data for children with GERD do not exist in Nigeria, however, there is a report of two cases involving a preterm infant who presented with failure to thrive and an adolescent with non-cardiac chest pain; both were managed for GERD with resolution of symptoms.[14]

Risk Factors for GERD

Numerous risk factors have been identified as possible predisposing to the development of GERD in children and adults globally. Gastroesophageal reflux (GER) is more frequent in formula fed infants compared to breastfed infants.[15] There is a causal relationship between cow's milk protein allergy and GER, and most infants present with vomiting and regurgitation.[15,16] Factors predisposing to increased prevalence of GERD include obesity, neurological impairment such as in children with cerebral palsy, motility disorders of the gastrointestinal tract (GIT), congenital diaphragmatic hernia, oesophageal atresia, congenital heart disease, chromosomal abnormality such as Down's Syndrome and chronic respiratory diseases as may be seen in children with bronchial asthma, cystic fibrosis, and bronchopulmonary dysplasia, and family/parent history of GERD.[17-24]

A South African study on dysphagia in neonates showed that untreated dysphagia in newborns could lead to GERD complicated with failure to thrive (FTT).[25] Obesity may lead to increased transient relaxation of the lower oesophageal sphincter (LES) and increased intra-gastric pressure predisposing to GERD.[23] In children with neurological impairment, factors contributing to GERD include, abnormal swallowing, dysmotility of the muscles, increased gag reflex, lying supine most of the time, and delayed gastric emptying. Side effects of medications such as diazepam may contribute to increased risk of GERD in children with cerebral palsy.[19] In children with oesophageal atresia, as a result of the dysmotility of the oesophagus and post-surgical repair, they may develop hiatus hernia and GERD.[22]

Other risk factors for GERD includes intake of highly acidic food, consumption of excessive fatty food, increased intake of caffeine, and overeating. In adolescents, alcohol consumption, and smoking of tobacco increases the risk of GERD. Lying down in a supine position shortly after eating, use of medications such as theophylline, diazepam, methylxanthines could also worsen reflux, possibly due to increased sphincteric tone.[26] Conditions leading to delayed gastric emptying such as gastroparesis, gastric outlet obstruction and pyloric stenosis increases intra-gastric pressure leading to increased risk of reflux and vomiting.[27] Motility disorders may lead to antral dysmotility and delayed gastric emptying with increased risk of GERD.[22] Gastroesophageal reflux (GER) has been mapped to 9q22-9q31 gene in infants, and monozygotic twins have been shown to have an increased incidence of GER compared to dizygotic twins, this possibly confirms the genetic involvement in GER.[28]

Physiology

Reflux is a normal physiologic occurrence and there are several mechanisms that protect against its occurrence. These mechanisms include the anti-reflux barrier, oesophageal clearance, and oesophageal mucosal resistance.[29] The anti-reflux barrier is composed of the lower oesophageal sphincter (LES), the angle of His, the crural diaphragm, and the phrenoesophageal ligament.[30] The LES consists of tonically contracted circular smooth muscles, composed of the intrinsic muscles of the distal oesophagus and the sling fibres of the

proximal LES.[30] The phrenoesophageal ligament holds the distal oesophagus to the crural diaphragm.[30] In adults, about 2cm of the LES is intra-abdominal.[30] The resting pressure of the LES is higher than the intra-abdominal pressure, thus preventing reflux of gastric contents into the distal oesophagus.[31] The angle of His is an acute angle between the great curvature of the stomach and oesophagus and acts as an anti-reflux barrier by functioning like a valve.[31] Oesophageal clearance limits the duration of contact between the luminal contents and oesophageal epithelium, the salivary and oesophageal secretions also neutralizes the acid that is produced.[32] Oesophageal mucosal resistance functions when acid contact time is prolonged, and this could be genetically determined.[32]

Pathophysiology

The reflux of gastric contents into the abdominal and lower thoracic oesophagus occurs as a normal event in most persons and this is mainly due to the transient relaxation of the LES. Figure 1 below shows reflux through the LES. Factors leading to increased intra-abdominal pressure relative to the LES resting pressure allows the reflux of gastric contents into the distal oesophagus.[31-33] Conditions that predispose to the disruption of the normal anatomical barriers include weak LES, presence of hiatus hernia, use of medications such as diazepam, lifting of weights among adolescents, the Valsalva manoeuvre, and the Trendelenburg position.[32] Patients with hiatus hernia, especially the sliding type, may have weakness of the phrenoesophageal ligament causing an upward displacement of the LES into the lower mediasternum.[29]

Factors determining the oesophageal manifestation of reflux includes the duration of oesophageal exposure, how caustic is the refluxate and the susceptibility of the oesophagus to damage.[29] The anti-reflux barrier is important in that, even low levels of tone within the lower oesophageal wall muscle may occlude the lumen of the junction against low pressure of gastric gas.[33] The normal LES pressure is 5 to 20 mmHg and is 4mmHg or more above the intra-gastric pressure.[33] Transient relaxation of the LES to the level of gastric pressure or a pressure of 0 to 2mmHg could lead to retrograde passage of gastric contents into the oesophagus.[33] The transient lower oesophageal sphincter relaxation (TLESRs) usually lasts less than 10 seconds.[33] A vago-vagal reflex composed of afferent mechanoreceptors in the proximal stomach, a brainstem pattern generator and efferent in the LES, regulates TLESRs.[33] Majority of GER episodes are due to TLESR which usually follows postprandial gastric distension.[33] GER has been observed to occur with normal LES pressure, if there is increased intra-abdominal pressure or delayed gastric emptying. [32, 33] In infants, the angle of His is less acute and becomes acute after one year of age.[32] This has been hypothesized as one of the reasons for increased regurgitation during infancy.[34]

Clinical manifestations

Clinical presentation of GERD varies depending on the age of the child; however, regurgitation is the most frequent symptoms among all age groups.[1,2]

In infants

The symptoms of GERD in infants may be atypical and include irritability, refusal to feed, sleep disturbances, chronic cough, wheezing, stridor, apnoea and failure to thrive (FTT). Failure to thrive could be due to insufficient calorie intake following refusal to feed, repeated vomiting and nutrient losses from vomiting. In the non-verbal infants, signs of oesophagitis may include crying and irritability.[35-37] These symptoms are also present in other common clinical conditions that can mimic GERD such as cow's milk protein allergy, pyloric obstruction and intestinal obstruction and these clinical conditions should be excluded.

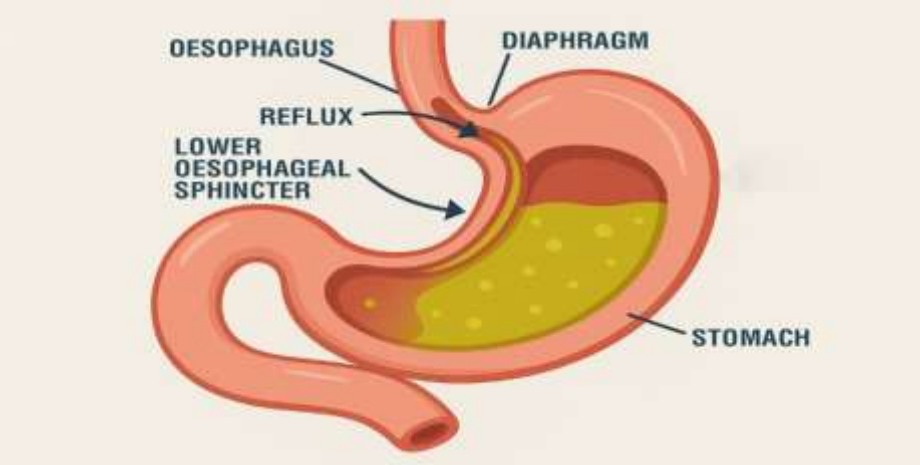

Figure 1: Gastroesophageal reflux disease in children [Adapted from: https://www.childrens.com/specialties-services/conditions/gastroesophageal-reflux-disease

In older children and adolescents

The symptoms of GERD in childhood and adolescents wax and wane. They may include chronic regurgitation, dysphagia, nausea, epigastric pain, and hoarseness of the voice. In patients diagnosed with erosive oesophagitis, cough and refusal to feed are more frequent symptoms.[38]

Atypical Clinical Presentation

Children with GERD may present with atypical symptoms.[9,14] These include chronic cough, sleep disturbances, hoarseness of the voice, dental erosion, difficulty swallowing, failure to thrive, non-cardiac chest pain, and halitosis.[14,38] Sandifer syndrome may occur in some patients where they present with arching of the back, torsion of the neck with chin lifting and is characterized by spasmodic torsional dystonia.[39] The arching position is believed to relief the discomfort caused by the acid reflux.[39] Apnoea and sleep disturbances have been reported to occur in neonates and children with GERD.[40] In GERD, laryngeal chemoreceptors are stimulated by acidic fluid leading to apnoea.[40]

Diagnosis of GERD

The diagnosis of GERD could be made following a thorough clinical history and physical examination.[9] Children with GER do not require any form of investigation. Investigations in children with GERD are indicated in the presence of complications including extra-oesophageal manifestations or when the diagnosis of GERD is questionable. The investigations requested for GERD include oesophageal pH monitoring, barium swallow contrast radiology, upper GI endoscopy with oesophageal biopsy, oesophageal manometry, combined multiple intraluminal impedance and pH monitoring and gastro-oesophageal scintigraphy.

Oesophageal pH monitoring: Oesophageal pH monitoring is sensitive and specific in detecting GER.[41,42] The pH probe is a microelectrode passed through the nose to the back of the throat to lie at 5cm above the LES and measures the acid reflux at the lower oesophagus.[42] The probe records acid reflux over a set time of 24 hours to mimic the patient's lifestyle.[42] A reflux episode is defined when the pH measured is less than 4.0.[42] It identifies the frequency of refluxes, duration of reflux and relation to intake.[42] It also confirms if episodic respiratory symptoms such as apnoea is caused by GERD and the efficacy of acid suppression.[42] pH monitoring is important for diagnosing GERD in children. Arana *et al*[42] according to a questionnaire-based study showed that 63% of the parents considered pH monitoring test to be well tolerated by their children and 28% perceived that pH monitoring induces changes in feeding. Oesophageal pH monitoring is available in South Africa, however, there are no

available publications on the diagnosis of GERD in children. In Nigeria and in most other countries in sub-Saharan Africa, oesophageal pH monitoring is not readily available.

Upper GI endoscopy with oesophageal biopsy: Upper GI endoscopy is not indicated in all children with GERD. However, it is useful in patients who are unresponsive to medical treatment and it allows for visualization of the oesophageal mucosa for the diagnosis of erosive oesophagitis caused possibly by *H pylori* infection or peptic oesophagitis. It is also useful for the evaluation of strictures, ulcers, and hiatal hernia.[44]

The North American Society for Pediatric Gastroenterology, Hepatology and Nutrition (NASPGHAN) and European Society for Paediatric Gastroenterology, Hepatology and Nutrition (ESPGHAN) guideline does not recommend the use of upper GI endoscopy to diagnose GERD in infants and children. However, endoscopy could be carried out if an underlying mucosal disease is suspected before the escalation of treatment and to obtain biopsies for histopathologic examination in children with complications of GERD.[1,2] Endoscopy could be used therapeutically to dilate reflux-induced strictures.[2] Histologic findings are very important in determining if there are signs of peptic oesophagitis.[45] Oesophageal biopsies are normal in about 20% of children with GERD and may also diagnose reflux oesophagitis in the absence of erosion while also eliminating allergic and infectious causes of oesophagitis.[1,2] Histologic signs of peptic oesophagitis include basal cell hyperplasia, extended papillae, and mucosal eosinophils.[1,2] The number of mucosal eosinophils may be important because finding >15 phf has been associated with eosinophilic oesophagitis (EoE) rather than with peptic oesophagitis.[1,2, 46] To increase the sensitivity of histology, it is advocated that multiple biopsies be taken in the middle and distal oesophagus.[45,47] Endoscopy could be useful to access for empirical failure of treatment in patients with GERD.[2] In Nigeria, paediatric endoscopy is expensive and not readily available.[48]

Oesophageal manometry

Oesophageal manometry measures intraluminal pressures and coordination of pressure activity of the muscles of the oesophagus.[42] Oesophageal manometry is becoming a more accessible tool for use in infants and children. It assesses oesophageal motility and LES function and is indicated for the evaluation of dysphagia and primary dysmotility disorder which could mimic GERD.[42] Oesophageal manometry is useful in accessing children who have failed standard treatment to exclude other diagnoses, preparation for anti-reflux surgery providing information about the site, length, and resting pressure of the LES.[42] Propagation pressure waves through the oesophagus are also recorded providing information on motility.[42] Oesophageal manometry measures movement of fluids, solids, and air in oesophagus, using a catheter with sequentially placed electrodes which measure changes in electrical impedance.[42] It identifies oesophageal clearance and acid exposure, oesophageal gastric motility, episodes of GER and its upper extent symptom association.[42] Oesophageal manometry is available in South Africa but there are no published studies on children investigated for GERD using manometry. In Nigeria, facilities for manometry are not readily available.

Abdominal ultrasonography

Mwango *et al.*[49] in East Africa, reported abnormal abdominal ultrasound scan (USS) findings in 16 (28%) of the 56 children studied for suspected upper gastrointestinal disease. The finding was in keeping with GER and these findings correlated with fluoroscopy findings in 14 out of the 16 children with GER. Structural findings suggestive of GER in abdominal USS could include a short intra-abdominal part of the oesophagus, a rounded gastroesophageal angle, and the presence of a beak at the gastroesophageal junction.[50] The North

American Society for Pediatric Gastroenterology, Hepatology and Nutrition (NASPGHAN) and European Society for Paediatric Gastroenterology, Hepatology and Nutrition (ESPGHAN) Guidelines of 2018 on GERD in children recommended that there is no evidence to suggest the use of ultrasound as a routine diagnostic tool for GERD in children. However, it could be useful for evaluating other conditions that could mimic GERD such as pyloric stenosis in the infant population.[2]

Abdominal ultrasound may also be useful in making diagnoses which may trigger symptoms of discomfort and vomiting such as hydronephrosis, uretero-pelvic obstruction, gallstones and ovarian torsion in adolescent females.[2] Ultrasound can also be used to detect hiatal hernia, length and position of the LES relative to the diaphragm and magnitude of the gastro-esophageal angle of His. Abdominal ultrasonography has also been proposed as a diagnostic test for gastric dysmotility, which could have implications from a reflux perspective.[2] In resource-poor countries where other key diagnostic tools are not readily available, abdominal USS may be useful to detect predisposing hiatus hernia of the oesophagus in symptomatic children.[50]

Combined Multiple Intraluminal Impedance

Combined multiple intraluminal impedance detects both acid and non-acid reflux episodes.[51] It is the most sensitive test to evaluate for GERD in children presenting with typical and atypical symptoms at the same time.[51] It is indicated when diagnosis of GERD is uncertain and surgery is considered with symptoms suggesting occult reflux, unexplained or difficult to control respiratory disease.[3] Oesophageal tracings are analysed for the typical changes caused by liquid, solid, air or mixed bolus and can differentiate between antegrade and retrograde flow.[51] The result is affected by the clinical condition of the child on the day of the study which must, as far as possible, correlate with normal state in terms of food intake and activity.[51]

Barium contrast swallow radiology

Barium swallow is available in many facilities in sub-Saharan Africa, however, it is not a first-line investigation for diagnosing GERD in children as it is not specific nor sensitive in making such diagnosis.[2] Barium swallow is useful for detecting anatomical abnormalities of the oesophagus and the anatomic abnormalities detected could include the H-type trachea-oesophageal fistula, oesophageal strictures and ring, hiatus hernia, pyloric and duodenal stenosis, duodenal web, and malrotation.[17] Hiatus hernia when present in a child may serve as a reservoir for acid and increase the risk of reflux oesophagitis. Therefore, barium contrast radiology is relevant for prognostication in children with GERD.[17]

Gastro-oesophageal scintigraphy

Gastro-oesophageal scintigraphy is used to visualise for post-prandial reflux, the degree and duration of GER.[51] It is also used to demonstrate the gastric emptying time.[51] It does not assess the severity of reflux. Gastro-oesophageal scintigraphy is a non-invasive test, requiring no sedation and uses continuous evaluation for up to one hour after a radio-labelled meal to scan the oesophagus and the stomach.[42] This test is highly sensitive and can detect small amounts of reflux. Milk labelled with technetium sulfur colloid is administered to the infant.[42] It is also important in the identification of children with foregut dysmotility, to monitor the effectiveness of treatment as it provides information on the amount and frequency of reflux. However, it has limited importance in the diagnosis of pulmonary aspiration.[51,52] A major error in performing scintigraphy is not performing a delayed scan over the pulmonary bed.[42] Delayed gastric emptying is especially common in children with cerebral palsy in whom vomiting may reflect an overall gut dysmotility rather than GERD.[42]

Therapeutic Options in GERD

The treatment of GERD includes non-pharmacotherapy, pharmacotherapy and surgical options. The non-pharmacotherapy options include conservative therapy and lifestyle modifications.

Conservative therapy

The choice of conservative therapy depends on the age of the patient. These include reassurance of parents in patients who do not have complications and require no further intervention. In infants aged less than 12 months with persistent symptomatic reflux with evidence of atopy, the use of hypoallergenic milk is advocated. The evidence of atopy may include positive family history and positive skin prick test.[53] Cow's milk protein allergy should be excluded in babies suspected to have GERD, the Cow's milk-related Symptom Score (CoMiSS) plays a vital role in distinguishing these two medical conditions. Cow's Milk-related Symptom Score is an easy-to-use, simple and fast tool designed to evaluate and monitor symptoms related to Cow's milk allergy (CMA) in infants less than one of age by health care professionals.[54] Elevation of the head of the bed, rather than the use of excess pillows to avoid abdominal flexion and compression that might worsen reflux may be useful in infants.[53,55]

Positioning measures are particularly important for infants who cannot control their positions unsupported. Seated position worsens reflux in infants and should be avoided in infants with GERD.[3] The NASPGHAN Guidelines recommend supine positioning during sleep.[1,2] Small, frequent feeds, the use of feed thickeners such as use of anti-regurgitation milk, has been shown to result in fewer regurgitation episodes, greater caloric density, and reduced crying time in infants.[1,2] Frequent, smaller volume of thickened feeds are recommended, especially for premature infants.[2] A 2017 meta-analysis of eight randomized controlled trials showed that thickened feeds were moderately effective in the reduction of the frequency of regurgitation in infants with GER in a study involving 637 infants.[10,56] The use of thickened formula is associated with increased weight gain and is superior to postural therapy in reducing episodes of regurgitation.[57] Overfeeding should be avoided, as this may aggravate reflux.

Lifestyle modifications

Lifestyle modifications may be important in the management of older children and adolescents with GERD. These modifications include proper eating habits, avoidance of tomato and citrus products, fruit juices, peppermint, chocolate, and caffeine-containing beverages.[58] Weight loss is advocated for those obese, avoidance of alcohol and tobacco when applicable and avoidance of excessive fatty foods as lipid which retards gastric emptying.[58] Smaller quantity and more frequent feeds are recommended.[55] Avoidance of late-night meals, prone or lying on the left side and elevation of the head of the bed may be helpful in controlling symptoms of GERD in adolescents and adults.[10,58]

Pharmacotherapy Options

Pharmacotherapy aims at reducing the acidity of the gastric contents. Agents used include gastric acid-buffering agents, mucosal surface barriers and gastric antisecretory agents and prokinetics.[9]

Antacids/Alginates

Antacids are useful in providing rapid but transient relief of symptoms through the mechanism of acid neutralization.[59] It reduces the exposure of the mucosa of the oesophagus to gastric acid during reflux. Long-term regular use is not recommended due to the risk of toxicity, and these include milk-alkali syndrome, hypophosphataemic rickets, or aluminium toxicity such as osteopenia, neurotoxicity, microcytic anaemia.[55, 59]

Surface Barrier Agents

Sucralfate binds to inflamed mucosa and forms a protective layer that resists further damage from gastric acid, therefore it acts as a physical

barrier to prevent further damage to the oesophageal mucosa.[59] The NASPGHAN/ESPGHAN Guidelines do not recommend the use of alginates for chronic treatment of GERD.[1,2] The use of sucralfate in the treatment of GERD is not recommended because of the short duration of action, limited efficacy, and potential for aluminium toxicity.[2]

Histamine-2 Receptor Antagonists (H2RAs)

These include cimetidine, famotidine, nizatidine and ranitidine. They function by suppressing gastric acid secretion by competitively inhibiting histamine at the parietal cell H2 receptor and have a rapid onset of action. They do not reduce the frequency of the gastroesophageal reflux and are less effective when compared to proton pump inhibitors.[60]

Proton Pump Inhibitors

Proton pump inhibitors (PPIs) selectively inhibit acid secretion through the mechanism of blocking the hydrogen–potassium–adenosine triphosphatase (H^+–K^+–ATPase) pumps that reside on the gastric parietal cell membrane.[60] They are useful in reducing the symptoms of dyspepsia, may prevent oesophageal injury following the effect of acid on the oesophagus and improve the healing of oesophagitis.[60] However, PPIs do not reduce the frequency of gastroesophageal reflux.[60] Available PPIs include omeprazole, rabeprazole, esomeprazole, pantoprazole, lanzoprazole, dexlansoprazole and vanoprazan. They are safe and well tolerated by children, however, there are reports of mild adverse events, manifesting as skin reactions and digestive symptoms.[61] Chronic use of PPIs may lead to increased risk of changes in osteoclast activity leading to possible fractures and in infants, the effect of prolonged hypochlorhydria in children could lead to increased risk of allergies.[61,62] PPIs may not be required in all patients with GERD and children with GER do not require PPIs.[60]

Surgical management

Life-threatening events are absolute indications for anti-reflux surgery, usually the laparoscopic fundoplication.[63] These life-threatening events include cardio-pulmonary failure, apnoea, and near miss sudden infant death syndrome attributed to GERD.[63] Children with failure to thrive, oesophagitis, oesophageal strictures, intractable emesis, or chronic problems such as neurological impairment with significant risk of GERD-related complications who do not respond to medical treatment may be considered for anti-reflux surgery.[63] Complications of surgical treatment include infection at the surgical site, haemorrhage, perforation of the gut, pneumothorax, breakdown of the wrap, hiatus hernia, oesophageal stricture, injury to the vagus nerve, heartburn, dumping syndrome, and intestinal obstruction.[63]

Conclusion

Gastroesophageal reflux disease (GERD) is a common gastro-intestinal disorder that affects all age groups and races. However, it appears to be less commonly reported among children in sub-Saharan African. Similar to children globally, the clinical manifestations of GERD in sub-Saharan African children vary depending on the age of the child, therefore necessitating a high index of clinical suspicion, especially in those presenting with atypical symptoms. Children presenting with atypical symptoms or extra-oesophageal manifestations may require an upper gastrointestinal endoscopy to detect oesophagitis and where available, pH studies may be considered. Despite the fact that typical GER resolves spontaneously, children diagnosed with GERD may require appropriate medical management.

Conflict of interests: The author declared no conflict of interest

Financial support: The author did not receive any financial supports for this research or manuscript.

Accepted for publication: 14th May 2025.

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