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Association of dietary practices and lifestyle modifications in gastroesophageal reflux disease

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Abstract

Gastroesophageal reflux disease (GERD) is a disorder of lower esophageal sphincter which is increasing rapidly around the world. It is the backflow of gastric contents towards the oral cavity. Its growing prevalence can create many health complications like esophagitis, esophageal stricture, narrowing of the esophagus, inability to swallow, esophageal carcinoma and any more. If this is not treated at the right time it may lead to mortality and morbidity. GERD is usually accompanied by heartburn sensation or feeling of regurgitation or even both. This can create discomfort with poor quality of life, sleep and work. The onset of GERD has no gender or age specification it can be at any age, but at an early age of childhood, it can be a threat to prevalence in adulthood. Many factors can cause GERD, like smoking especially right after the meals, high intake of fatty foods, increased levels of spices, and consuming larger intake of micronutrient intake. Some sedentary lifestyle practices like laying down right after the meal can also contribute to the factors that can cause GERD

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Introduction

Gastroesophageal reflux GERis a natural, anatomical process to the esophagus through gastric contents, caused one hour per day after the meal is called Gastroesophageal Reflux GER (Ranjitkar et.al. 2012). Gastroesophageal reflux (GER) can be present in both patients as well as healthy individuals. When GER starts to show symptoms or complications it is stated to as GER disease (GERD)(Loots *et al.*, 2013).GERD is associated with problematic signs and barriers due to regurgitation of stomach content which is further divided into esophageal and extraesophageal disorder. Representative, non-representative and extra-esophageal symptoms can be caused by this disease(R Badillo and Francis, 2014).Different Complexities of GERD can be seen such as esophageal stricture, reflux esophagitis, esophageal adenocarcinoma, and Barrett's esophagus (MacFarlane, 2018). Persistent GER can be a reason for long term swelling and damage to the esophageal line. Barrett's esophagus that is persistent reflux which follows to a modification of metaplastic within the inside layer of esophagus and is also known originator for adenocarcinoma of esophagus (Pandeya et.al., 2012). The real cause of increasing GERD is not clear exactly, it may because of growing prevalence of obesity, change in dietary patterns and last but on the least, H. pylori infection (Urbanska et.al., 2018).GERD is essentially accompanied by heartburn and regurgitation and sometimes chest pain and dysphagia are the symptoms of GERD but it may reflect other symptoms too (Subramanian and Triadafilopoulos). Due to this condition there is a low capacity of work, poor quality of life and sleep (Urbanska et.al., 2018). Extra-esophageal manifestations such as cough, dental erosion, laryngitis, non-cardiac chest (epigastric) pain, and asthma are also complementary, but they are not only limited for GERD(MacFarlane, 2018). Chronic cough is one of the most common etiological factors among GERD patients (Kahrilas et.al., 2014).There is not a proper basic method for measuring the cough as a result of reflux, though analysts have tried various procedures to associate constant cough due to reflux (Sidwa et.al., 2017). For the development of GERD no gender or ethnic considerations are seen. Whereas there are many aspects in our daily lifestyle like alcohol consumption, larger or higher intakes of dietary fat, BMI variations, and last but not the least smoking that can contribute for onset of GERD.(Singh *et al.*, 2013)Excessive intake of micronutrients can cause raised levels of adiposity, insulin resistance which can eventually cause severe GERD.(Mion & Dargent, 2014)The disturbance in the action of insulin in the regulation of glucose is insulin resistance (Budiyani et.al., 2017), Link of GERD with dietary carbohydrates and insulin resistance was seen significant. Nonetheless, high-fat/low-starch diet assisted patients concerning lowering GERD signs and indicators and regularity of prescription usage. Particularly, a case list of five adults was noted, who had GERD signs within 2 weeks of eating a low-starch/high-fat (Atkins) diet (Mion and Dargent, 2014).

Gastroesophageal Reflux Disease in Children and Infants

GERD can originate in well term newborns as well as youngsters. (Sherrow *et al.*, 2014)Two forms of esophageal diseases that are most common in children a) gastroesophageal reflux disease andb) Eosinophilic esophagitis.(Mehta *et al.*, 2018)Although the scientific cause of childhood GERD is not clear (González et.al., 2014).Past studies presented that GERD in childhood can be a greater threat for future prevalence of GERD in adulthood (Choi, Ha, and Jeong, 2016).Although the pathophysiology and symptoms of GERD in children and adults are alike especially in older children but children may represent some distinct and wide range of gastro-esophageal and extra-esophageal symptoms and potential complications (Rybak et.al., 2017). Frequency of GER in premature toddlers differs from 22% to 85% based on the method applied for analysis. Gastroesophageal reflux indicators are everyday problems for low-birth-mass newborns (<1500 g)(Sherrow *et al.*, 2014). Change of nursing periods and frequency can be a beneficial assistant to alleviate GER in dysphasic children (Jadcherla *et al.*, 2012).GERD in infants does not require any kind of

treatment and most regurgitations resolved by 12 months of age (Baird et.al, 2015).According to a study, 50% of infants aged from birth to 3 months had at least one episode of regurgitation. Investigations illustrated that complains of regurgitations were lessened up to 67% at the age of 4 months, further decreased at 6 to 7 months i.e. 21% and further 5% reduced at 10 to 12 months (Papachrisanthou and Davis, 2015).Treatment is by changing the body positions, such as changes in body positioning when awake, lowering of feeding volumes, thickening agents, widely hydrolyzed or amino acid formulas and in breastfed infants eliminating cow's milk and egg from mother diet. In children and adolescents lifestyle changes to treat reflux including sleeping position, avoiding smoking, alcohol and late evening meal are needed. Infants who are of low quality and children who are low to moderate quality evidence; Histamine H2 receptors was seen affected (Baird et.al., 2015). The most important therapy in both GERD and GER which is emphasized is a lifestyle change. Surgical therapy is reserved for children who are at risk for life-threatening complications of GERD. USDA has discussed and control its underlined when using promoters of gastric emptying and mortality (Lightdale et.at., 2013).

Prevalence

Many studies have revealed that the prevalence of GERD has been increased during recent era (Alsulobi *et al*., 2017).A total of 25% of the general population is known to feel heartburn relatively once per month (Kines and Krupczak, 2016).This condition has become common worldwide, where its prevalence in North America and Europe has reached 8.8% to 30% (Sloan and Katz, 2019).In Western countries GERD is a major gastrointestinal problem which is in between 10-20% of weekly cases. Whereas in Asia, between 2005 and 2010 its prevalence is recorded as 5.2-8.5%. Countries like Iran and eastern Asia have reached a prevalence of 6.3-18.3%. While South Central Asia is on the top list for GERD symptoms in their population (R Badillo and Francis).In Pakistan a prevalence study concluded that Gastroesophageal reflux disease is in range of 22.2-24.0% (Butt and Hashemy, 2014).

The ambulatory reflux audit method

Ambulatory reflux audit is a method that allows measuring directly acid exposure of esophagus, regularity in episodes of reflux and relationship amongst episodes of reflux and symptoms. Patients having frequent signs even with medical therapy, and specifically who do not have data from endoscopy of GERD uses this audit so that the analysis is confirmed. The patients who are on treatment can be used to manage reflux with common sign and to make aware about analysis before going through anti-reflux surgery may also be suggested in endoscopy adverse cases (Badillo and Francis, 2014).Proton pump inhibitors (PPIs)—inhibitor of gastric acid formation are among the top 10 most frequently recommended medications in the world for treating gastroesophageal reflux and peptic ulcers. They are extensively recommended and accessible over the counter for a range of gastrointestinal (GI) conditions from heartburn to gastritis, generally with little or no testing (Kines and Krupczak, 2016).The technique of mechanical sphincter augmentation (MSA) was seen to be promising for the patient with GERD. The patients (N=150) were evaluated, Out of those, 66 patients experienced device implantation. All patients were diagnosed with GERD by pH testing. With anti-secretory medications, all patients were improved clinically, but on medical intolerance, there was incomplete symptom control. The duration of hospital stay was lessened to 0.7 days. An average follow up 5.8 months (range 1 to 18.6 months), 92 % of patients were gratified or neural with GERD condition and 83 % of patients were free from proton pump inhibitor (Smith et.al., 2014), It was seen that the use of proton pump inhibitor (PPI) along with modified caloric restricted diet and aerobic exercises was more useful in curing symptoms of GERD as compared to the use of PPI with a standard diet. With caloric restricted diet body mass index was reduced from 30.3 ± 4.1 to 25.7± 3.1 ($P < 0.05$), and mean weight was lessened from 82.1 ± 16.9 kg to 69.9 ± 14.4 kg ($P < 0.05$) which helped in lifting the effect of

PPI, relieving symptoms and lessened use of chronic medications(de Bortoli *et al*., 2016).

Factors associated withGER/GERD

Over the past ten years, a vigorous positive relationship between GERD and obesity is seen.BMI and esophageal acid exposure are linked with Complexities of GERD. Now some new researches show that belly fat is the real offender rather than overall obesity (Mion and Dargent, 2014).Physical exercise, cognitive behavior therapy, and Calorie restriction strategies were seen to be therapeutic for GERD. Regular exercise enhances the efficiency of diet (Fock and Khoo, 2013). A most important reason was considered smoking(Slomski, 2014).After the treatment for 1 year,141 GERD patients who terminated smoking had an improvement in their GERD symptoms of 43.9%(Kohata *et al*., 2016). Gastroesophageal reflux disease factors can be further modified by non-citrus fruit, income, race, and energy intakes(Silvera *et al*., 2014). Moreover it was seen that late-night meals elevated period with supine acid contact compared with head-of-the-bed elevation and early meals (5.2% point change), reduced period with supine acid contact compared to a flat position (from 21% to 15%) (Ness-Jensen et.al., 2016). Elevated levels of GERD, when treated with great price of acid dropping prescriptions can cause a socio-economic burden related to disease (Badillo and Francis, 2014). It is generally observed that several foods as well as tobacco and alcohol influence the force of LES (lower esophageal sphincter)(Eherer, 2014).Dietary habits are the main factor in causing GERD such as late-night eating practices, snack preference over proper meals, fussy and uneven eating, an inclination towards liquefied foods, and last but not the least a shorter time duration between dinner and bedtime (Choi, Ha, and Jeong, 2016).GERD can be lowered by modifying dietary habits, like increasing fiber and lowering fat intake (Eherer, 2014). It is a question still to beanswered if feeding solid food is shielding towards gastroesophageal reflux. It is also still not clear if definite feeding times cause a greater risk of reflux in gastro esophagus(Meyer *et al*., 2019).Intervention was done on patients suffering from GERD which included nutrition education for 1.5 hours and achieving the diet as possible for two weeks. These patients were compared with people who were not educated, and it was concluded that educating patients by nurses can significantly increase the quality of life for a patient suffering from gastroesophageal reflux disease (Chamanzari *et al*., 2014).

Dietary practices

To reduce the complications and reducing the risk factors diet is a primary step to be taken (Seremet et.al., 2015).For pathogenesis and management of GERD with diet still needs to be cleared (Sethi and Richter, 2017). An association was found between the severities of GERD symptoms with a certain diet. Symptoms were reported more often after the ingestion of fatty, spicy, sour, and sweet foods. Whereas consumption of frequent peppermint tea is also involved in some cases, but it still needs some more studies. It is recommended for GERD patients to eat small frequent meals instead to one big meal (Jarosz and Taraszewska, 2014).Particularly in females, high amount of milk and potato raise reflux in esophagitis(Nam *et al*., 2017).To find the association of GERD with specific dietary components 268 reflux esophagitis patients were evaluated by a food frequency questionnaire. By analyses of multiple logistics, it was seen that high consumption of meat, oils, salts, and calcium increases the risk for RE (reflux esophagitis). Whereas carbohydrates, calories from protein, vitamin C, grains, potatoes, fruits, and eggs indicated negative dose-response. Above all, while a high intake of protein, carbohydrates, vitamin C, and grains reduces the risk for RE(Wu *et al*., 2013).

Meal timing, meal patterns, and fluid intake

4763 adults were assessed about their dietary practices with the help of a questionnaire and Latin Class Analysis (LCA). This assessment included checking of their meal patterns, fluid intake which was taken with their meals, the rate at which meal is taken, and meal to sleep intervals. Identification of different classes such as regular and irregular meal patterns, moderate to slow and moderate to fast class

of related rate, moderate and much intra meal drinking class of fluid injection, short and long meal to sleep interval. After adjustment irregular meal patterns had higher odds of GERD. It was seen that GERD is associated with long meals and intervals of sleep inversely, whereas GERD was not pointedly associated with eating rate and intra meal fluid. However GERD and dietary patterns have certain associations (Esmaillzadeh *et al.*, 2013). In a randomized control trial, it was seen that late evening meal increase time with supine acid exposure compound as compared with early meals (5.2 % pint change) and head of bed elevation decrease time with supine acid exposure compared with flat position (from 21 % to 15 %). GERD patients should be educated to avoid late evening meal and head to bed raise is effected late-night GERD. It is suggested that there should be a difference of at least four hours between dinner and bedtime, as consistent data is exposed that short meal to sleep intervals elevates the episodes of reflux (Surdea-Blaga et.al., 2019).

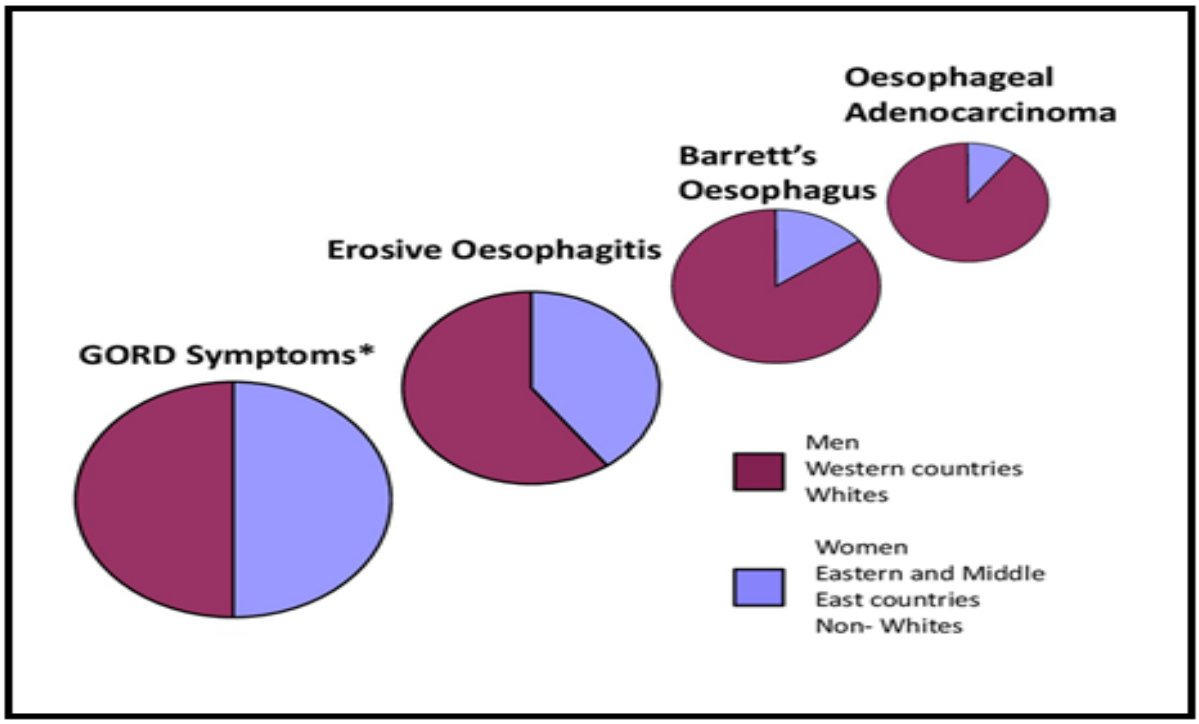

Fig. 1.

Selection of diet

Dietary patterns were interrogated which was divided into mainly Mediterranean versus non-Mediterranean (frequent consumption of traditional dishes, fresh fruit, vegetable, olive oil, fish and frequent consumption of red meat, fried food, sweets, and junk food respectively). As a result, it was concluded that Non-Mediterranean diet was positively related to GERD (Mone *et al.*, 2016). On another hand investigation was done on the effect of dietary fiber intake on symptoms of esophageal function in non-erosive GastroesophagealReflux disease (GERD) (NERD) patients. With the help of a questionnaire, food frequency questionnaire, 24-hour esophageal examination, esophageal manometers, patients of NERD who have low fiber intake (< 20 g/d) were given supplemented with psyllium 5.0 g TID. As a result of supplementation, the patients experiencing heartburn were reduced and the GERD-Q score was also reduced after the treatment. Fiber enriched diet was significant to lower the esophageal sphincter resting pressure, heartburn frequency, and lower cases of Gastroesophageal Reflux per week (Morozov et.al., 2018). Moreover it was reported that high caloric intake and high levels of fat intake are strongly correlated with chronic cough due to GERD. Regardless of diet, weight loss was seen to be associated with the reduction in cough symptoms (J.

E. Smith et.al., 2013).Findings suggested that, low carbohydrate diet shields against Gastroesophageal Reflux disease (Jaroszand Taraszewska, 2014).

Conclusion

Gastroesophageal reflux disease is a serious digestive disorder that is due to the malfunctioning of the lower esophageal sphincter.It can cause many health problems and complications if not diagnosed and treated at the right time. To decrease mortality and morbidity rate, GERD involves both dietary and lifestyle modifications side by side for its treatment. Carelessness in any of these two can aggravate the condition and worsen the symptoms of GERD.

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