



Gastric Cancer Associated Risk Factors and Prevalence in Pakistan

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ABSTRACT

Gastric cancer (GC) is the most lethal disease of all cancer types. In the last three decades, it has become the most common reason for death among all cancer types. Gastric cancer is at the fourth number in all over the world and annually 8,000,000 deaths are reported. Female gastric cancer has been increased in the last 5 years. Unexpected diversity has been noted in GC spreaders in the whole world. Eastern Europe, China, and South America are the major regions of Gastric cancer prevalence. Its main sources are correlated with 2 agents, dietary intake and *Helicobacter pylori* infection. Although in south Asia occurrence of *H. Pylori* is high but less prevalence risk. The sole methods to minimize the prevalence of gastric cancer include elimination of Pylori, standard hygienic condition, proper diet, and improved living standards. One of the most common and complicated factors of gastric cancer is infection with Pylori. The main intention of this article is to elaborate the concerned review of GC and up-to-date information about its occurrence moreover its risk aspects in Pakistan.

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1. INTRODUCTION

Gastric cancer (GC) prevalence is associated with the living style of society and its incidences are high in the low socioeconomic groups. Tumor in the epithelium of the lower esophagus, which is associated with a high incidence of stomach and heart injury, is one of the common causes. *Helicobacter pylori* infection, much use of alcohol, no refrigeration, cigarette smoking, very little use of fruits and vegetables, and fatal anemia are the main risk factors associated with gastric cancer. As stated by a Scandinavian study gastrointestinal hemorrhage, weight loss and epigastric pain were major signs of GC. The prevalence of Gastric cancer is lowering but death rates are still very high (Chong et al., 2014). Gastroesophageal junction tumors are mostly associated with dysphagia. In America and Europe, diagnosis of GC is occurring at the last stages when metastasis takes place. Discomfort in the upper abdomen, anorexia as well as weight loss is common sign and symptoms of gastric cancer. Large tumor mass in the antrum region will result in obstruction in the outlet of the stomach. Anemia results due to severe bleeding as well as loss of blood in the stool. Dysphagia may also observe in those patients who have esophagus gastric junction cancer. However, in this paper, our main consideration is to find the effects of *Helicobacter Pylori* (*H. Pylori*) infection that ultimately cause Gastric cancer in the human population.

2. METHODS

Samples were collected from different hospitals of Shaukat Khanum Memorial Cancer Hospital and Research Centre (Lahore, Pakistan) and Bahawalpur Institute of Nuclear Medicine and Oncology (BINO) (Bahawalpur, Pakistan). Along with these samples; their histopathological reports were collected also. From these patients, consent was also obtained along with tissue samples. After collecting, tissue samples were kept in RNA later solution and stored at -80°C until further use. Sample collection was done with Ethical approval from ethical review boards of the Islamia University of Bahawalpur and collaborating hospital. Those patients who were diagnosed with distinctive stages and types of gastric cancer were included in this study, which does not depend on age, sexual orientation, and ethnicity. About 10-15 µm sections were made and each section was placed in respective labeled Eppendorf tube. Trizolchloroform method was used for the extraction of RNA. Initially, all the patients and control tissue samples were permitted to thaw that was stored at -20°C. 20-µm paraffin block was cut and placed in 1.5 mL of Eppendorf tubes and PCR is done. The tubes were incubated overnight at 55°C. The tubes were removed from overnight incubation. RNA integrity was later ascertained on 1% agarose gel in made Tris Acetate EDTA (TAE) buffer. A Nano-drop spectrophotometer was used for the quantification of extracted RNA.

3. RESULTS AND DISCUSSION

H. Pylori is the first bacterial cancer-causing agent for stomach cancer in 1994. There is a strong relation between gastric pathologies and *H. Pylori*. The most common pathologies of the stomach are type B antral enteritis, stomach ulceration, and lymphoma of mucosa-associated lymphoid tissue (Karami et al., 2013). Gastric neoplasia development is mostly caused by *H. Pylori*, it does this by causing inflammation in the gastric mucosa that leads to changes in histopathology as a result GC develops. Ahmad et al described that in Pakistan patients having *H. Pylori* infection are more prevalent to gastric cancer (Ahmad et al., 2009). Ejaz et al narrated that the high incidence of cancer is due to pesticides in the rustic regions of Pakistan (Ejaz et al., 2004). Khan et al conducted a report, which explains the most usual reason for GC in Pakistan is the increased prevalence of *H. Pylori* (Khan et al., 2013). Zeb et al

concluded some main causes of cancer are less use of antioxidants, no proper rest, too much work, and ignorance (Zeb *et al.*, 2006). Bhurgri *et al* stated that in Pakistan after *H. Pylori* causes cigarette smoking and less utilization of vegetables are significant risk factors of GC (Bhurgri *et al.*, 2004). *H. Pylori* infection risk factors consist of polluted water supply, unhygienic food, and high rate of population (Zhong *et al.*, 2012).

The ratio of GC patients increases due to use of cigarettes. The prevalence of GC is more in people consuming pickled vegetables, processed meat, smoked fish, and starch. It is demonstrated that nitrosamine does not only causes cancer in animals but also humans. People having hereditary nonpolyposis colorectal cancer (HNPCC) syndrome are more prevalent than gastric cancer. Another cause of GC is an alteration in the sequence of E-Cadherin. Poor prediction in patients with gastric cancer during surgical resection leads to expression of AMFR, which is another risk factor of GC. People who drink unboiled water are at high risk of *H. Pylori*. *H. Pylori* infection relates to the quality of water. To our best knowledge until now, high chances of GC are associated with smoking. It has been proved that 60% increased the chances of GC in men and 20% in women smokers than nonsmokers. There are variations in gastric cancer incidence from person to person, as some people smokeless cigarettes and some consume a large number of cigarettes (more than 20 cigarettes each day). Alcohol consumption is one of the initiating factors of GC (Jedrychowski *et al.*, 1986). Many reports have been reported about the relationship between alcohol use and gastric carcinoma (Lagergren *et al.*, 2000). GC is inversely related to socioeconomic factors, as there is less risk of GC when there is high socioeconomic status (Nagel *et al.*, 2007). EBV is 9% of all GC cases reported in Asia, Europe, and America. Male patients are more prevalent to have EBV than females. EBV-linked GC is different from *H. Pylori*-based GC (Malakar *et al.*, 2014). Professions like an angler, cooks, dry cleaners, minors, nurses, and machine operators are associated with a high risk of GC as there is exposure of Nitro oxides, dust, and radiations (Cocco *et al.*, 1994). Campos *et al* studied in Colombia the Epstein bar virus linked with GC (Campos *et al.*, 2006).

GC has world geographical variations. It remains the major death cause of Americans in the 20th century. The high prevalence areas, which are infected with GC, are eastern Asia countries including China and Japan. Death rates are maximum in Japan (Maxwell *et al.*, 1999). Death rate about 6.8/1,000,000 was in Japan because of cancer (Aoki, 2006). Eastern Europe, central and south America are also included in high-risk areas. South Asia, north and east Africa, North America, New Zealand, and Australia are included in low-risk areas (Stock & Otto, 2005). Gastric cancer at a high rate was reported in Iran (Alireza *et al.*, 2003). In Iran, the ratio is 19.7 to 1, 00,000 people in Semnan province (Babaei *et al.*, 2005). About 1,000,000 people are diagnosed each year with stomach cancer (Khoshbaten *et al.*, 2014; Unal *et al.*, 2014; Basiri *et al.*, 2014; Karim *et al.*, 2014; Yang *et al.*, 2014). In China, the ratio is also high (Lu *et al.*, 2014). A decrease in GC has been observed over the last few decades (Stock & Otto, 2005). *H. Pylori* infection is decreasing due to improvement in living conditions as a result GC is decreasing (Atrkar *et al.*, 2013).

GC commonly affects males (Byrne *et al.*, 2002). GC in Pakistan mostly affects young males. In all these cases 33% of tumors were removed by surgery and other patients (66.7%) were handled by analgesic treatment. The overall death rate due to improper care was 13.13% (Afridi & Bano, 2011). Some studies showed that the prevalence of GC in Central and South Asia varies. In Karachi ratio of GC was 6 out 100,000 in men and 3.6 out of 100,000 in women respectively. Prevalence of GC was 11.2 out of 100,000 in Iran that is at a much risk region as compared to Karachi (Marjani *et al.*, 2007). A gastric cancer study was held in Peshawar, Pakistan. Out of all GC cases reported in the province. 60% of patients are from the northern

region and the southern part has 33%. The ratio of 6% belongs to the western area while the eastern side was 4% in ratio. Due to environmental conditions, the most common type was adenocarcinoma. No evidence of gastric lymphoma was seen (Ullah et al., 2003). Prevalence in males with age above 40 years is at more risk of GC in Karachi. Males have two times more prevalence of GC as compared to females in Karachi. 6541 total deaths per year were reported due to GC in Pakistan. The chance of GC due to *H. Pylori* infection is higher in Pakistan and as a result, the number of patients is increasing day by day because of improper care, diagnosis, and treatment on the public side. It was diagnosed in all the patients at a late stage with lymph nodes involved in the thick gastric wall (Ahmad et al., 2007).

4. CONCLUSION

People of Pakistan are facing the GC as one of the major health issues. The risk factor associated with GC is *H. Pylori*. Factors, which are contributing to the increase of GC ratio, are processed food intake, tobacco use, and physical inactivity as well. Death rates are increasing day by day due to its late prognosis. Timely diagnosis and public health education awareness programs are required to lessen the prevalence of GC. Modern tools in the case of diagnosis could be very helpful. Aggressive screening could also be suggested. All possible risk factors should be identified. Measures about improving lifestyle change and improving hygiene should also be taken to decrease the prevalence of GC in

5. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. Authors confirmed that the paper was free of plagiarism.

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