

Reducing the Risk of Gastric Cancer Through Proper Nutrition – A Meta-Analysis

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Abstract—Data Sources: Articles for this paper were sourced from Pub-Med and Google Scholar databases. Data Extraction: Human studies published in English from 2015 to 2021 were included. Two reviewers initially assessed abstracts of 958 papers and 192 papers were selected for future assessments. After a full review, 38 articles were selected. Results: Dietary salt is a high-risk factor for Gastric Cancer (GC) while red meat and a high-fat diet increase the risk. Alcohol intake is only a risk if consumed heavily. **Conclusion:** Dairy foods, vitamin C, smoked food, rich food, and Helicobacter pylori are included in the etiology of GC. So are fresh fruits, vegetables, and specific refined grains. Salt, fats, spicy foods, alcohol, red meat, and pepper increase the risk. Knowing cancer patients' nutrition problems would help intervention measures be taken to remedy the situation.

Keywords—epidemiology, classification, risk factors, helicobacter pylori, early gastric cancer (EGC), adenocarcinoma (ADC), quality of life (QoL)

1 Introduction

GC is a malignant tumor commonly linked to malnutrition and other nutritional deficiencies. More than one million new GC cases were identified in the year 2020. Nearly 800,000 people died from it making it the sixth most prevalent cancer globally. Effective diagnosis and treatment improve these patients' quality of life and survival. Adenocarcinoma (ADC), the most common type of cancer, accounts for up to 85 percent of all cases of GC. Other types of cancer that are not as common include lymphoma, digestive system tumors, and neuroendocrine tumors[1].GC's origins are still a mystery. It be categorized as cardiac (originating from the gastroesophageal junction) or non-cardiac (originating elsewhere) (distal). Nevertheless the incidence of this condition is predispose by several risk factors. Infection with h.pylori, one of the most significant factors. Factors related to an increased risk of developing pernicious anemia or Epstein-Barr virus infection include obesity, male gender, smoking

and drinking, poor socioeconomic position, and prior gastric surgery [2]. Cardiac GC has become more common in recent years because of a rise in gastroesophageal reflux disease. The use of salt and smoked or cured goods and the high consumption of processed meat in N-nitroso compounds have been link to GC.

Malnutrition is a severe problem with GC patients, it effect the digestion process, absorption process and cause blockage of the digestive system[2]. Malnutrition is common in GC patients, with some estimates putting it at as high as 60% of the time. However, this number fluctuates greatly depending on the tumor stage in patients. Like other cancer patients, these patients have a worse quality of life due to malnutrition, a greater risk of infection or other problems, a more extended hospital stay, and an increased financial burden[3]. Many causes that play a vital role in the development of malnutrition. Dysphagia and stomach pain are the common symptoms relates to GC patient (such as nausea and vomiting and intestinal obstruction). There have been enormous advancements in the diagnosis and treatment of EGC in the last decades. Irregular bowel syndrome (IBS): abdominal pain or discomfort, bleeding, hematemesis or melena, dizziness and lightheadedness, weight loss, nausea, vomiting, or bloating are the most prevalent signs and symptoms of IBS. GC patients who get timely diagnosis and start their treatment have a better prognosis. Enforcing early diagnosis and screening is critical to improving the survival and quality of life for people with EGC[4].

It is challenging to identify GC early since there is frequently a delay between the initiation of development and the manifestation of symptoms. In most cases, patients with early GC show signs indistinguishable from benign peptic ulcer disease and are later diagnosed with advanced stages of GC. Endoscopy has become essential in diagnosing GC [5]. Various scientific techniques, such as photofluorography, identify GC early because they lower the GC mortality rate with a practical approach Endoscopic guided surgery (EGS) has led to new optical technologies, such as narrow-band imaging, making it easier to see small body parts. Endoscopy is very effective in diagnosing GC. Simple, low-cost measures could be used to determine if a person has the disease and follow up with more precise testing to get timely diagnosis and start their treatment for better prognosis. This condition could be decreased by effective prevention measures[5].

1.1 Research contributions

This paper identifies critical risk factors associated with GC development. It covers how these risk factors affect dietary intake, dietary change, and nutritional status in GC patients' quality of life, and how the oral health status of GC patients can influence nutritional status and dietary change. It includes a systematic literature review of the effects of the dietary factors to timely diagnose the incidence of GC.

The aim of this paper is as follows:

- Examine the risk factors affecting GC patients.
- Examine the effects of oral health on dietary change.

Assess the impact of nutritional status on the quality of life of GC patients and, potentially, to provide solutions to improve their quality of life.

Outlines of paper. The remaining portion of the paper is structured as follows: Section 2 describes review research methods. Section 3 discusses the background of the study. It focuses on the epidemiology, risk factors, categorization, diagnosis, prevention, and GC treatment. Then, it describes the material and methods used to explain the methodological procedure. Section 4 reviews literature on quality of life. Section 5 identifies several critical risk factors associated with nutrition and their impact on patients' quality of life. It also contains a detailed discussion of the analysis findings of the risk factors. Section 6 discusses strengths, limitations, and future work. Section 7 concludes the paper.

2 Methodology

2.1 Search strategy

This article is a systematic literature review. We systematically searched the **Google Scholar** and **PubMed** databases for studies carried out in humans. We reviewed according to the preferred reporting items for systematic review and meta-analysis. We included only English Language articles. All articles published between 2015- 2021 included the following keywords: "**Gastric cancer, GC, gastric carcinomas, Stomach Neoplasms**", each of them combined with different risk factors, which show in (Table 2). All the papers having relevant materials were included. Retrieved articles were review by all authors and extracted by standardized methods and tools.

Inclusion is the intuitive component that is evaluated for further processing. At the same time, the exclusion is the component that rejected. Table 1 provides a more detailed description of the inclusion and exclusion factors and their explanations.

Table 1. Criteria (including & excluding) and related justification

Inclusion	Justification
Published papers in 2015 to 2021 in conference proceedings or journals.	Use the most recent findings only.
Papers present identifying risk factor associated with GC.	Dietary factor associated with GC to reduce the morality rate.
Exclusion	Justification
Papers, which are not in English languages.	English as an international language is standardized.
Secondary (review) and tertiary studies are the focus.	Concentrate on primary research.

Inclusion and exclusion criteria. Articles based on human beings. The following were the criteria for inclusion:

- Articles published in the English language.
- Studies that included adults ≥ 18 years of age.

- Articles published between the duration of 2015–2021.
- Articles having GC as the main keyword

The following were the exclusion criteria:

- Review papers, meta-analyses, surveys, case reports, comments, letters, presentations, or posters presented at conferences, or economic assessment.
- Studies including children <18 years of age.
- Studies where abstracts or full-text articles were not available.
- Articles that had redundant data, duplicate data.
- Studies that included animal experiments.
- Studies that included medical terms other than GC.
- Studies that were not available in the English language.

Table 2. Search strategy of the research

Search engines and databases	Search date	Search terms
PubMed and Google Scholar	Up to Dec 2021	Strategy: #1 AND #2 AND #3, #1 AND #2 AND #4 AND #5, #1 AND #2 AND #6, #1 AND #2 AND #7, #1 AND #2 AND #8 AND #9, #1 AND #2 AND #10 •#1 GC •#2 Risk factor •#3 Diet •#4 Lifestyle •#5 Environmental factors •#6 Family history •#7 Infections •#8 Treatments •#9 Medical conditions •#10 Demographic characteristics

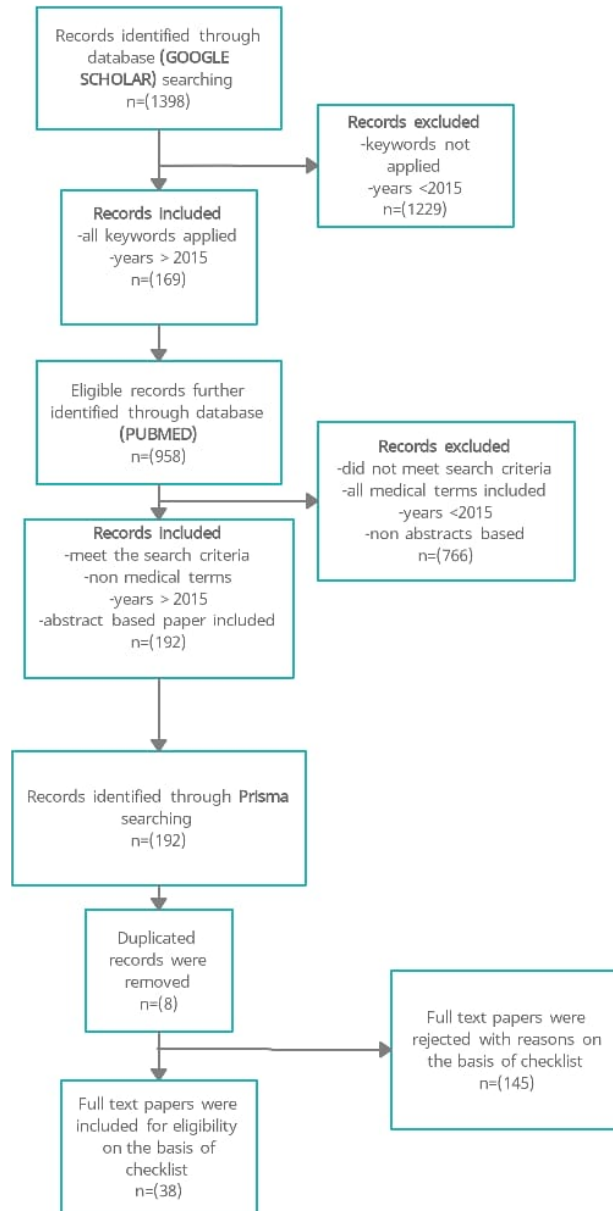


Fig. 1. Flowchart for article screening and selection

Study selection and data extraction. The quality of the articles assessed by evaluating eligible articles through the PRISMA checklist. One of our authors screened all titles and abstracts retrieved from the electronic searches on Google scholar and PubMed databases to identify potential eligible articles. Next, Full texts of the selected eligible articles were retrieved. The other author screened all full-text articles and

selected the articles based on the inclusion criteria set for the research. The non-eligible articles were excluded.

Results. Surveys, case reports, comments, letters, conference abstracts or posters, or economic evaluation and non-English language articles or articles with no full text available excluded. Two thousand three hundred and fifty-six (2,356) articles were identified after searching the databases using the keywords mentioned in the table (Search strategy table). After exclusion, the number decreased to (192) articles. Next, studies unrelated to the review topic of GC or studies reporting about other medical conditions (e.g., breast cancer, lung cancer, etc.) and the duplicate articles excluded. Ultimately, 38 articles were select for this systematic review. The PRISMA flow diagram explains the article selection process (Figure 1).

3 Background study of GC

3.1 Risk factors and prevention of GC

Anti-h.pylori GC develops from various causes in the human body, such as food or nutrition, lifestyle and environmental exposures, family history, medical disorders, infections, demographic traits, and genetic abnormalities. Although screening rates reduce h.pylori drugs, early diagnosis screenings are crucial preventative approaches. Although screening rates reduce h.pylori drugs early diagnosis, screenings are crucial preventative approaches. Diets high in fresh fruits and vegetables, low in salt, red and processed meats, and moderate alcohol reduce GC risk. Because of their capacity to neutralize free radicals, fresh fruits and vegetables strong in vitamin C and vitamin E cited as sources of antioxidants[6][7]. Vitamin-rich diets are more beneficial when there is a lack of foliage and selenium. Carotenoids, particularly vitamin B, is the most effective in reducing cancer risk. Carotenoids, tocopherols, and retinoids have been examined for their anticancer potential; however, their results have been inconclusive. Consequently, further investigation is required. Smoking has been linked to an increased risk of acquiring GC in the cardiac and non-cardiac subtypes. Smokers are 60% more likely than non-smoker to acquire GC, whereas female smokers are 20% more likely. Ex-smokers have a decreased chance of developing GC than those who smoke occasionally. People who smoke more than 20 cigarettes a day have a higher chance of developing GC. Excessive alcohol consumption might also worsen GC. According to the latest studies, status negatively affects GC rates, particularly heart and intestines. Moreover, another factor is exposure to dust, nitrogen oxides, N-nitroso compounds, and radiation, twenty occupations are at increased risk of getting GC[6][5]. Some modifiable factors have a positive impact when are altered[8][9]. Disparities in GC patients' ethnic and geographic backgrounds. One's dietary habits might have a substantial influence on one's chance of acquiring GC, which is why immigrants have a greater frequency than native-born citizens. Minimizing occurrences and better understanding prevention measures are essential since GC has limited treatment choices. Understanding the underlying causes of a disease is critical to the efficacy of preventive initiatives[10][11].

3.2 Dietary factors increasing the risk for GC

While there is a strong link between red and processed meat consumption and gastric carcinogenesis, some researchers have come with different results. People who eat a lot of red or processed meat are more likely to get noncardiac GC. The European Prospective Investigation Cancer (EPIC) found that meat consumption impacts some types of GC but not all of the sub-types of GC. High salt consumption, either directly or through consuming pickled and salted foods, raises the risk of GC, according to a report from the World Cancer Research Fund (WCRF)[12]. Also, newly released Korean data showed a 1.14 (95 percent CI 1.07–1.23) percent increase in GC incidence for every 40g/day increase in pickled vegetable intake[13].GC's relation with chicken and high-fat dairy products. GC is a public health concern in today's culture since it affects patients' lives. Cancer can spread to any region of the human body. GC is the third most common cancer in the world. Gastrointestinal malignancies, such as GC, have a higher risk of weight loss and disability. Nutrition has played a vital role in helping the healing of GC patients before, during, and after the treatment. GC patients were also often concerned about their diets. Also vital to metabolism and absorption, and hematopoiesis in the stomach. Some of the most frequent problems after gastric surgery are reflux and constipation [14]. H.pylori infection is the most common cause of GC. GC is more likely to have gastric ulcers (intestinal metaplasia) than an immune system disorder. Poor diet is not the only cause of every illness. The bacteria H. pylori cause 65% to 80% of GC cases. Only 2% of such patients are infected. On the other hand, genetic factors are to blame around 10% of the time. Among men, GC was two to one, according to the World Cancer Research Fund International[11][14].On the other hand, women had an incidence of one to zero. Rarely, scleroderma runs in few families. However, gene screening and treatment be beneficial to a people of those families that have a high-risk. Increasing public health awareness and a drop in GC incidence is because of proper food storage practices and the successful eradication of h.pylori infection[14].According to estimates from throughout the globe, at least 700,000 people die each year from this illness; 930,000 new cases are record each year. The GC has a complex etiology, with several variables influencing its development. Tobacco use, high salt consumption, environmental and genetic impacts on a diet, and an antioxidant-deficient diet have all link with an increased risk of GC.[15]. According to the World Health Organization, GC is the third most common cancer killer globally; and the fifth most often-diagnosed disease. It is twice as common in men as it is compared with women. Most GC patients are diagnosed at an advanced stage, which results in a meagre 5-year survival rate. A high 5-year overall survival rate for EGC can only be see in China, Japan, Korea, the United States, and Eastern Europe (73.3% and 73.3%, respectively) (96.6 percent). Because of recent research, EGC in the United States seems more beneficial to Asian patients than non-Asian patients (82.1 percent to 66.4 percent)[10].

3.3 Nutritional status

To give nutritional care for cancer patients, there are many options available, including eating, administering appetite-stimulating medications, and administering parenteral nourishment through infusion to patients. Providing nutritional help to patients, notably underweight patients, and those suffering from cachectic or a lack of appetite, is often tricky. Stimulating medications used in conjunction with an increase in appetite[16]. According to the author[16], malnutrition is responsible for the death of 20 percent of GC patients rather than the illness itself. In previous research, nutritional treatments substantially influence the quality of life and food consumption. A study conducted by author[5][17], examined the effects of nutritional support in GC patients and evaluated nutritional status in these patients. For patients, who are fighting against the disease might have benefit if recovers early, they also improving their quality of life, living a meaningful and long life. Several researchers[16][17], have stressed the need for early and repeated examinations of nutritional status in GC patients. A thorough process involves identifying people and communities at risk of malnutrition and developing, executing, and monitoring an intervention strategy. There were several advantages in diagnosing malnourished patients early on, such as preventing the future decrease in their nutritional status and ensuring or improving their overall quality of life.

3.4 Weight loss and quality of life

Malnutrition and weight loss have impacted the quality of life[18]. The author found that patients who did not lose weight had a better quality of life than patients who lost weight and had less appetite. (Both weight loss and less appetite were link to a lower quality of life. Patients who lose weight often experience typical symptoms such as tiredness, nausea, vomiting, and lack of appetite. There is a link between weight loss and quality of life (QoL) When stomach cancer patients' weight stabilized, the overall survival rate was much higher than before[19].

3.5 Nutrition decline

Losing weight loss in people with cancer has been difficult in the last decades. It is most common in people suffering from cancer of the head and neck, esophagus, stomach, and pancreas, but it can happen to anyone. Weight loss is common in people, and it can happen anywhere from 31% to 85% of the time, depending on the type of cancer. People with GC lost more than 5 percent of their weight, according to [20][21].

3.6 Quality of life

World Health Organization (2018) said that QoL is not merely a disease-free condition but a state of complete physical, mental, and social well-being. It is called Quality of Life, and it describes health in terms of things like how well a person can

cope, how much they can fun, and how much independence in their lives. It refers to a wide range of physical and psychological traits showing how well a person can mentally and physically involve their work. Quality of life is a vague term that means different things to different people. The term is still being debated today[21]. One way to think about this is to make a person important, meaningful, and happy in life. It is common to call QoL in its more general sense "health-related quality of life." Its function is to separate it from the needs of clinical medicine and tests. Quality of life (QoL) is essential when treatment is likely to cause distressing symptoms or problems with physical functioning at work, in the family and the community, in cognition, or with emotional adaption[22].

Health-related quality of life is a concept that includes both the physical and psychological effects of an illness and its treatment. The European Organization for Research and Treatment of Cancer (EORTC) gives a questionnaire module to measure the quality of life. They also made a cancer-specific, health-related QoL (HR-QoL) questionnaire that measures functional, global health status, and single- and multi-item symptoms. People who have cancer, their health is reflect in their measured quality of life, the role of eat in daily life plays a significant role. Nutrition care should be a part of overall cancer care because it can make a big difference in the quality of life. Patient's diagnosis with GC, aims to keep their (HR-QoL) as good as possible and keep the disease from getting worse. More than half of the people with incurable cancer who had 37 symptoms had fatigue, pain, lack of energy, weakness, and loss of appetite[23].

3.7 Nutrition care

In the hospital, proper nutrition is seen as a fundamental human right. High-quality health care needs a group to work together to attain this goal. Patients with GC suffer from various symptoms that limit their eating ability. To alleviate the symptoms, pharmaceutical treatments should be use on a case-by-case basis. Prescriptions for food guidance and medication have been showed to alleviate people's overall symptoms with advanced cancer. It integrates information from a nutrition evaluation into nutritional treatments and counselling[20].

3.8 Nutrition interventions

It is common for nutrition intervention to focus on resolving nutrition diagnoses rather than minimizing the symptoms or indicators associated with nutrition diagnoses. In an ideal world, clinical dietitians, nurses, and doctors work together to provide patients with dietary care. Patients with cancer have a wide range of symptoms. Suppose doctors do not make plans to improve nutrition early in the chronic phase of cancer patients. In that case, they could have a lower response to chemotherapy, a higher risk of chemotherapy, toxicity to the body, a higher risk of postoperative complications, and a weaker immune system[24]. Nutrition is a significant factor in the treatment of cancer. A broad treatment strategy included nutritional treatment as well. Because of this, the patient's health is impact by their eating habits, which in turn

impacts their ability to adhere to prescribed treatments and have a positive reaction to those treatments. Cancer patients are at significant risk of losing weight because of illness and treatment[25]. There is no universal diet for all cancer patients. However, health care practitioners determine the nutritional requirements of individual patients based on the features of the illness, treatment technique, and the patient's condition, fitness, and weight index. However, there are some basic guidelines to ensure that the body has adequate energy to fight off sickness and adverse effects from treatment. Typically, physicians advise patients to follow a diet rich in fruits, vegetables, fats, and oils, with a sugar intake. A gastric tube or intravenous feeding be necessary if oral intake is insufficient or if a patient suffers from extreme tiredness. Obesity is not only detrimental to one's health, but it also has an impact on one's ability to get treatment. Since depletion is an enormously essential component in the quality of life of cancer patients, contemporary cancer care treatment focuses on nutrition that recognizes all kinds of depletion[26].

4 Literature review

Initially published in 1954, Maslow's theory of the hierarchy of needs it was the first to describe how individuals driven to decide their daily lives. Maslow's five stages of human need are **physiological, safety, love and belonging, esteem, and self-actualization** (see Figure 1).



Fig. 2. Maslow's hierarchy of needs

To represent the Maslow hierarchy of requirements in a pyramid form, with physiological demands at the bottom of the pyramid. A person moves up to the next pyramid level after addressing their basic needs. At this point, they can concentrate on their safety requirements. Maslow advocated five degrees of human need: **physiological, safety, love and belonging, esteem, and self-actualization**. He also proposed five levels of the human need for other creatures (see Figure 2). A person focusing on numerous levels of requirements simultaneously, but only after one level is satisfied can, go to the next level of needs. Maslow's hierarchy of needs (Maslow, 1954) was a model of **psychological health based** on the premise that intrinsic human needs

should be satisfied [27][28]. The more demands a person fulfils, the more satisfied they are with their lives. Decades later, Maslow (1962) published his second historical book on the psychology of human being, which expanded on his prior theory and included new concepts. He formed a theory of quality of life. This quality-of-life theory is still considered conceptual by contemporary psychology specialists. He believes that quality of life is define by how an individual's needs are address. The greater the amount of need fulfilment accomplished by a person, the greater the perceived quality of life for that individual. A person's happiness with their general physical and psychological well-being, work, income, safety, and surroundings has been expressed in various[29].

4.1 Malnutrition during cancer trajectory

The role of diet in the development and progression of GC is significant. Increasing evidence suggests that nutrition and GC are link. The American Institute for Cancer Research and the World Cancer Research Fund[30] believe that a good diet, regular exercise, and average body weight prevent 30–40% of all malignancies. Some cancer types have a much more significant mortality rate than this. More than 90 percent of previous studies show that diet and cancer have used a "reductionist" approach, which focuses on one specific food or nutrient and how it affects tumor growth or regression. These investigations helping to gain a better understanding of how illness works in the more nuanced aspects. However, they do not contribute to a comprehensive picture of dietary prevention of cancer. They do not detail what to eat if they have been diagnosed with cancer and want to follow a diet to relief from recovery[31]. Those dietary components linked to an elevated GC risk, followed by those demonstrated to provide extra protection against the disease's occurrence in this review. We wrap things off with a look at some comprehensive studies that show how all of these individual variables combine to minimize the chance of GC[32]. The prognosis for cancer patients is becoming better because of new treatment options in the hospital. The cancer continuum covers diagnosis, treatment, recuperation, post-treatment life, and palliative care for certain patients. Patients' nutritional needs and problems in each of these stages are distinct. Treatments including surgery, radiation, and chemotherapy alter the body's digestion, absorption, and use of food in a significant way, as do the patient's typical eating habits[33]. Most cancer patients are malnourished during treatment, which affects the effectiveness of the treatment and necessitates a reduction in the treatment dosage or possibly a complete cessation of treatment. Nutrient deficiency, muscle mass and strength, immunological function, NIS reduction, and quality of life should be the primary aims of dietary support during active cancer treatment[34].

4.2 Effect of GC on nutritional status

Age is a well-known risk factor for cancer development, with half of all new malignancies occurring in those over 65 in industrialized nations. By the year 2050, this is predicted to be a global phenomenon. Many cancer patients lost weight because

their food consumption and the disease itself and its treatment possibilities significantly impact appetite and weight loss. It is challenging the body to get the proper nutrition if the patient has GC, blockages, and tumors. A severe type of anorexia called cachexia, happen to some cancer patients in the United States, Japan, and Europe. Anorexia, lethargy, muscular weakness, a low fat-free mass index, and a typical phenotypic are symptoms of a disease known as tumor necrosis factor-alpha in a person's body. *TNF-alpha* is a protein produced by the immune system to fight cancer (TNF-alpha). According to studies[35] an alarming percentage of cancer patients at risk of malnutrition are not getting enough nutritional care. The World Cancer Research Fund Cancer propose that people consume less red and processed meat and consume a diet rich in fruits and vegetables, legumes, and whole grains they have minimize ratio of cancer. Exposure to dairy products, whole grains, and dietary fiber reduce GC incidence, according to the 2018 World Cancer Research Fund Cancer Report. Non-starchy vegetables and fruit can also help reduce malignancies of the aero-digestive tract, such as mouth and throat cancer. In addition, malignancies of the mouth, pharynx, larynx, esophagus, and breast have been linked to alcohol use. A higher daily alcohol intake is link to an increased risk of GC. There is strong evidence in the study that physical exercise lower the chance of acquiring colorectal, GC and breast cancer and other types of cancer[3].

4.3 Consequences of impaired nutritional status

Impaired nutritional status has various adverse effects on both the person and the health care system. Frailty and sarcopenia have a complicated connection with food; a bad diet caused some serve symptoms. However, the underlying illness also affects a person's diet[23]. The consequences of a person's poor nutritional condition be examined in further detail below.

Malnutrition. Individuals who have had digestive difficulties and undergone gastrointestinal surgery are at high risk for malnutrition. A significant factor affecting their morbidity and recovery following gastrectomy surgery, including radical lymphadenectomy, identified as malnutrition. Early discovery of nutritional risk allows for early action, which will help avoid later difficulties. Lack of nourishment results in changing body composition (lower fat-free mass) and cell mass, resulting in decreased physical and mental performance and poorer clinical outcomes from illness [10]. Malnutrition is associated with an increased risk of disease and mortality, more extended hospital stays, a decreased tolerance to treatment, and a worse likelihood of surviving. Hypoalbuminemia, reduced organ function, and lowered immunity are common side effects of malnutrition. A critical prognostic factor in cancer patients is malnutrition. Malnutrition and its repercussions are responsible for 40% of all cancer deaths[36]. As a result, treating patients with GC requires the early diagnosis of malnutrition and efficient perioperative nutrition supplementation. Because of the treatment, the patient's nutritional state deteriorates significantly, as shown by weight loss and malnutrition signs. It is important to note that cancer is a long-term illness that spreads to other parts of the body and seriously harms its health and nutritional status. Older malnourished people are more susceptible to illness, have a worse quality of life, and are more likely to die. In addition, the rising expenditures of hospitalization

and drug usage might put further pressure on already overburdened global healthcare systems[37].

Obesity. Because malnutrition encompasses both deficiency and excess, obesity is included in the concept of malnutrition. Obesity people are more likely to suffer from vitamin deficiencies than their non-obesity counterparts are, even when they eat more calories than advised[38]. A reduced risk of developing osteoporosis is one of the few benefits obesity has for senior citizens. However, these are outweighed by the adverse health and well-being consequences, including decreased physical function, increased risk of chronic disease, and increased mental health and social issues.

4.4 Nutritional support and GC treatment

Patients and doctors must work together to implement all dietary treatments, especially those intended to prevent disease. Treatment intensity and duration are examples of public health hazards. Individual risk factors include concurrent illnesses, particular diets, and social support. Many newly diagnosed cancer patients had already slimmed down before they were diagnosed. Weight is usually restored once the tumor is eliminated, such as surgery to remove cancer[3]. Trauma from surgery, such as complete gastrectomy in many GC patients, leads to long-term health issues. These patients might be at risk for long-term malnutrition because of this. For both radiotherapy and chemotherapy, the duration of treatment is commonly extended. The likelihood of dietary issues associated with chemotherapy therapies and patient groups varies considerably[16].

4.5 Factors affecting diet and nutritional status

Appetite and satiety. However, although obesity is a rising public health problem, age-related changes have reduced appetite and satiety. Since senior citizens tend to consume less energy due to delayed stomach emptying (and sometimes feeling less hungry and more content after meals). It might lead to poor diet quality and diversity and lower energy intake[39].

Food safety and hygiene practices. The older population is more prone to food-borne illnesses and infections due to compromised immune systems, chronic disorders, and nutritional deficiencies such as Vitamin C, iron, and folic acid[40].

Health behaviors. According to a recent comprehensive study, harmful habits including smoking, inactivity, excessive alcohol use, and a poor diet generally congregate among the population. More than two-thirds of all new non-communicable disease (NCD) cases and the risk of complications among people with NCDs attribute to these modifiable risk factors: smoking, eating foods rich in saturated and fats, salt, and sugar, being inactive, and drinking excessively[41].

Medication. Multiple drugs and the administration of more medications than are clinically necessary recognize as a risk factor for malnutrition in older people, either directly via drug-nutrient interactions or indirectly through effects on appetite. There is an increased risk of malnutrition while taking some medicines, such as chemotherapy treatments. While prepatent, a medicine that delays vomiting, cause dysphagia, taste abnormalities, constipation, or diarrhea, can also impact nutritional status [42].

Psychological Factors. According to research, senior citizens are more likely to suffer from mild depression. Depression is expected to become the primary source of illness burden in high and middle-income nations by 2030. The ailment often misunderstood and under-treated. A wide range of factors causes depression in older persons. In addition, other factors such as chronic disease, social exclusion, or physical or mental incapacity play a role[43].

5 Discussion and finding

The purpose of this systematic review is to identify the risk factors that contribute to the development of GC and highlight potential preventative measures for GC patients. Diet, lifestyle, genetic predispositions, family history, medical disorders, infections, and demographic variables were all grouped into six primary groups, each with a total of **47 potential risk factors** for GC, according to the study's aims (6 factors) Table 3.

Table 3. Critical risk factor for GC

S.N O	THE RISK FACTORS	SUB-SECTIONS	DESCRIPTION OF THE PRODUCT	FACTORS WITH HIGH RISK/FACTORS WITH LOW RISK
1	Nutritional or dietary	Consumption of salt and diets high in salt Spicy cuisines Meat (the red smoked processed salty) foods containing milk Fermentation of salt-cured and smoked fish Tea is served hot. Leftover and mouldy bread and other stuff Consuming a low-vitamin C diet (vitamin C deficiency) Fresh fruits and vegetables are not being consumed in sufficient quantities. (Rich food) Refined grain	Preserved vegetables and other items. Fried Meals Unusual eating habits Foods high in starch and sugar Hot Meals Lack of access to drinking water N-nitroso Fatty and oily substances Frozen foods that have been steamed, boiled Foods that are high in fat Granular product that has been refined	Risk is an increase [82] [50] [83] [84][85]. Risk is an increase [86][87][88] [89]. Risk is an increase [90][91][92] [93] [94]. Risk is an increase [95][96][97] [98]. Risk is an increase [99] [100] [101]. Risk is an decrease[102] [103]. Risk is an decrease[104][105]. Risk is an increase[106][107] [108]. Risk is an increase[109][110] [111][112]. Risk is an increase [113][114][115]. Risk is an decrease [116][117] [118].
2	Factors such as lifestyle and the surrounding environment	Liquor Smoking Lack of physical exercise and inactivity Overeating and eating too quickly Exposure to work-related hazards An ionizing radiation source.	Opium anxiety Glass pipe Get daily surplus energy Cement Mineral dust Radiation-induced Chromatid VI	Risk is an increase[119][120][121][122]. Risk is an increase[123][124] [125][126]. Risk is an increase[127][128] [129]. Risk is an increase[130][131]. Risk is an increase[132][133]. Risk is an increase[134]. Risk is an increase[135].
3	Family history	The tumor's family history of GC	Family history of GC	Risk is an increase[136][137].

4	Injuries, illnesses, and other medical issues	Gastrectomy and stomach surgery have a long and illustrious history. A medical history of esophageal cancer (through the risk of pre-cancerous lesions) Blood type History of polyps and ulcers in the stomach of a person reproductive and gynecological factors	Atrophic gastritis lasts a long time. Metaplasia of the intestines Reflex	Risk is an increase[138][139]. Risk is an increase[140][141]. Risk is an decrease[142]. Risk is an increase[143]. Risk is an increase[143].
5	Infections	Helicobacter pylori	Bacteria that cause gastric ulcers are called Helicobacter pylori	Risk is an increase[138][139].
6	Demographic characteristics	Age Income and financial status Race	source of funds or income Sex Place home	Risk is an decrease[144]. Risk is an decrease[145]. Risk is an decrease[146].

5.1 Diet

One of the most critical variables in the occurrence of GC is a person's food and dietary habits. (According to the World Cancer Research Fund/American Institute for Cancer Research (WCRF/AICR), GC has been linked to high levels of salt consumption. The author[13], suggested that excessive salt intake contribute to GC prevalence. GC risk factors were identify in 2020 as being related to excessive intake of salt and salty foods/salt smoke[13]. Bad dietary habits also influence GC occurrences. A poor diet and a lack of nutrition have led to a higher risk of developing gastrointestinal cancer. Many studies have shown that eating fast, cooking with oil, eating hot or spicy food, eating high-glycemic-index foods. Irregular eating is link to a higher risk of having gallstones, which are hard to remove. Research shows that good eating behaviors, including chewing thoroughly and consuming food slowly, prevent GC. Stress and a pathetic-emotional state seem to be linked to inefficient and quick chewing and hurried eating, which negatively affects stomach and digestive system function[44].

According to the author[45], excessive salt consumption was associated with a 22% increase in GC incidence. Another risk factor for GC is a deficiency in fresh fruits and vegetables. GC is more likely to occur in those who consume less fresh fruit and vegetables. On the other hand, fruits and vegetables are link to a lower risk of GC. A case-control study in Shanghai, [46], correlated fruit eating with lower rates of GC among male smokers. Consuming more than 156 grams of fruits and vegetables per day was shown to have a protective effect. According to a meta-analysis of 22 cohort and case-control studies, consuming fresh veggies also lowers developing GC. On the other hand, the research found that vegetarians had a decreased chance of developing GC than meat-eaters. Consumption of excessive amounts of red meat[14].

5.2 Eating habit

Nutritional deficiency in patients with GC is a severe concern. Reduced digestion and absorption are possible complications of GC, as they might clog the digestive system. Furthermore, the stress associated with surgical trauma and poor eating habit exacerbate malnutrition. As a result, the prevalence of malnutrition among people with GC varies from 65% to 85%, making it the highest malnutrition rate among people with any tumour type. [46].

5.3 Vitamin C

The reduced risk of GC relates to vitamin C, suppressing the synthesis of N-nitroso compounds. Dietary vitamin C affects h.pylori infection and it cause GC by reducing the likelihood of precancerous lesions. Vitamin C and beta-carotene supplements worked well to treat h.pylori infections[47].Protective effects decreased after six years of follow-up and the removal of vitamin C and beta-carotene supplements. According to population-based case-control research in Sweden, patients with h.pylori infection benefit from a diet high in vitamin C and beta-carotene. According to a prospective European investigation, there was no correlation between h.pylori infection, plasma vitamin C levels, and the likelihood of developing GC[48].

5.4 High salt consumption

No conclusive findings have made on the link between salt consumption and an increased risk of GC. Despite the lack of conclusive evidence, many studies show a strong link between excessive salt intake and an elevated risk of GC. Based on observational research, there is a strong link between excessive salt consumption and GC (odd ratio=2.05, 95 percent CI, 1.60, 2.62; P 0.0001). A recent meta-analysis showed that salt consumption was directly connect to an increased GC risk, with the risk rising with salt intake. Another meta-analysis found a link between dietary salt consumption and stomach intestine metaplasia, although not statistically significant. Cross-sectional research conducted recently in Korea found a relationship between excessive salt consumption and an elevated incidence of atrophic gastritis with intestinal metaplasia. High salt diets and foods preserved by salting and pickling should be avoided to reduce GC's risk[49][50].

5.5 Poor food preparation

Smoked and preserved meals (such as cured and processed meats, pickled vegetables and sodium-rich traditional noodles or soup) enhanced the incidence of GC in the study participants. In addition, a high frequency of cooking oil use raises the risk of GC. Deep-oil-fried meals create human carcinogens at high frying oil temperatures. Because of excessive frying temperatures, cooking oil vapors are rich in human carcinogens and heterocyclic aromatic amines. Further evidence is that a high intake of

deep-fried food raises the risk of GC (relative risk=1.71, 95percent CI=0.67–4.34) in a prospective study[50].

5.6 Poor drinking water

According to research, drinking water sources seem to be an essential risk factor for EGC. Lack of sufficient restrictions contaminate well and river water; contamination sources include industrial waste, agricultural chemicals and fertilizers, and microorganisms. Consumption of well and river water tainted with bacteria, cyanotoxins, sulphates, nitrates, and other contaminants lead to intestinal cancer, connected to other health problems[51]. Drinking hot tea or coffee regularly enhances carcinogens' carcinogenic effects by causing intestinal epithelial damage and double the risk. It suggests that individuals should limit their use of hot liquids like tea and coffee to lessen their risk of developing GC[52].

5.7 Lack of food refrigeration

Several studies found that a lack of food refrigeration has link to an increased GC risk. The reason for this is that individuals who lack refrigeration rely on salt as a method of food preservation. Various biological factors explain refrigerator use and GC risk. Keep vitamins and other antioxidants at a greater level with long-term storage in the refrigerator. Traditional preservative techniques are reduced or eliminate. It protects the person from exposure to nitroso compounds or carcinogens. As a result of refrigeration usage, people are less likely to get GC[53]. Refrigerator use is associated with a lower risk of GC in some Asian countries (odd ratio=0.68; 95percentCI=0.50–0.93) and European countries (odd ratio=0.59; 95percent CI=0.38–0.93), according to a meta-analysis of evidence from 12 observations with 13 different reports of 14,361 individuals. In underdeveloped countries, refrigeration has long been a problem. Fresh food spoils quickly when not kept calm, resulting in much-wasted food. Food deterioration and health issues occur without refrigeration[54].

5.8 Red meat

According to research, GC has linked to a diet substantial in red meat and processed meats. Red meat consumption has risen dramatically in the last years. Amines, found in red meat, enhance the concentration of nitrous chemicals in the stomach. Solid carcinogens created by frying beef include polycyclic aromatic hydrocarbons. Significant N-nitrous chemicals and salt found in processed meats like sausages, salami, and hot dogs have a role in carcinogenesis GC[55]. Patients with h.pylori infection who consume red meat and processed meat have a 0.3 percent chance of developing non-cardiac GC. Meat contains a significant amount of heme iron, a necessary raw material for synthesizing carcinogens such as endogenous nitrosamines and free radicals. Seventy percent of heme iron intake was associated with a higher risk for GC, but only at the lowest levels of vitamin C. After ten years, if they are in the highest meat-consumption quarter. GC be prevent by limiting sausage eating to

once or twice a week. According to the study, a high intake of red meat is associated with an increased risk of developing GC[56]. Many theories have put up the effects of "heme" in red meat, lipids and proteins, and salt. According to past research, if a person consumes too much red and processed meat, his chance of developing GC increases. There was also a link between meat consumption and a slightly higher risk of developing type 2 diabetes. There was no correlation between red meat, smoked/grilled sausage and GC in other research[57].

5.9 Lifestyle and environmental factors

Lifestyle and environmental factors are related to a person's, group, or community's interests, attitudes, behavior features and behavioral orientations, and a person's or group or community's lifestyle. Smoking damages the stomach tissue permanently and irreversibly, increasing cancer risk. International Agency for Research on Cancer identifies this substance as a risk factor for GC. Tobacco use was estimated to be responsible for 22% of incidences of GC in the United Kingdom[58]. Obesity is a substantial risk factor for cancers. According to experts, cancer occurrences are rising due to sedentary lifestyles and obesity. In a meta-analysis, obese and overweight people were shown to have a 55% higher chance of developing GC. In the cardiac type, obesity and GC were shown to be linked. However, among Asians, this association was not seen, presumably because of the significant incidence of the non-cardiac form of GC compared to the cardiac type, which is more common. Obesity and atrophic gastritis have been demonstrated to have an inverse association, which explains why obesity and non-cardiac GC are not linked[59]. According to the reference, noncardiac is mainly impacted by *h.pylori* infection and less by variables such as Body Mass Index (BMI). However, the link between obesity and GC is less solid and meaningful. In contrast, few studies have examined the link between physical activity and GC. The relative risk of GC and physical activity has been linked in future research[60]. There was no link found between GC and cardiac types. GC is protected by spending an average time on physical activity. In addition, the research found that physical activity was linked to a lower risk of GC, which is a kind of cancer. Because of the differences in sample size and study design, this difference appears to result from the two studies[60].

Occupational and lower socioeconomic status. Socioeconomic status is negatively correlated with GC. According to research, GC is more prevalent in lower socioeconomic backgrounds. The risk of GC in the relatives of patients with GC was higher in those with a lower socioeconomic position. A person's nutrition, housing circumstances, and cleanliness all have a role in their socioeconomic standing[61]. Several occupations carry a higher risk of developing GC due to the significant exposures to dust, nitrogen oxides, N-nitroso compounds, and radiation, such as those listed above: mineworkers and rubber and coal miners; fishermen; machine operators; nurses; cooks; launderers; and dry cleaners. Aside from that, GC develops due to repeated, long-term exposure to asbestos. Recent research found an association between men's education and their chance of developing GC ($p=0.009$ for women vs $p=0.001$ for

males). Study participants who had completed at least 12 years of schooling had the lowest risk of GC[62].

Fish. Fisheries are a significant source of omega-3 fatty acids, anti-inflammatory and cancer-fighting properties. Fresh fish eating related to a lower risk of developing GC. According to the authors, there was no protective benefit of a high fish diet in a meta-analysis of 532 GC cases. Risk factors have been show to include salt and smoked salmon[63]. GC was showed to be inversely linked with fresh fish consumption in research. Risk is reduced by about 80% for individuals who consume more fish per week than those who never or sometimes consume fish. Fishery type and cooking method be to blame for conflicting findings on fish consumption's role in cancer prevention[64].

Pepper. Populations in Latin America and South India, where chili peppers are often consumed, have a higher risk of GC. However, it seems to have a shallow and negligible risk of cancer. We need further research and proof of this theory[65].

Tea. GC is reduced by drinking tea. Although the results are conflicting and ambiguous, tea and GC have been linked in specific research. This inconsistent data be the consequence of discrepancies in dose/frequency, temperature taking, limited case-control studies, and the influence of confounding variables such as non-strong and inaccurate h. pylori infection[66]. On the other hand, consuming hot tea has increased glycogen synthesis[67].

5.10 Family history

Studies have indicated that a family history of tumors and GC is a substantial risk factor; this information help better understand the molecular genetic pathways of cancer. In this context author[68], provided the first evidence of the influence of family and inheritance on GC incidence. According to their research, people with first-degree relatives with GC had a greater risk of developing GC. First-degree relatives with GC were shown to have an elevated chance of developing the disease. For example, the risk of GC with a family history was 2 to 10 times greater than in the general population. The author found that those with a family history of GC had a considerably increased chance of developing the disease[68].

5.11 Helicobacter pylori infections

An increasing number of studies point out the role of h.pylori infections (alone or in combination with other factors such as some genetic factors) as an emerging risk factor for GC. H.pylori, a gram-negative bacteria that infects more than half of the world's population, is one of the most frequent human stomach illnesses[69]. The prevalence of this infection is directly related to the age of the person infected. The vast majority of cases remain unnoticed. GC increases the rate of death if the infection continues to spread. As a result, it is a significant risk factor for GC. According to estimates, h. pylori infection was link to 32% of GC cases in the United Kingdom. The author[70],found h.pylori infection was considerably more significant in the case (patient) group than in the control (non-infected) group. The GC risk was shown to

decrease in people who had successfully treated *h.pylori* compared to those whose treatment was ineffective. The Human papillomavirus is also link to carcinogenesis. A meta-analysis found that the human papillomavirus (HPV) have a role in developing GC[71].

5.12 Non-helicobacter pylori-helicobacters

Gastritis, nodular gastritis, gastroduodenal ulcers, and MALT lymphoma are link to the zoonotic bacteria non-*Helicobacter pylori-helicobacters* (NHPH). *H. suis*, *h.felis*, *h.bizzozeronii*, *h.salomonis*, and *h.heilmannii* have all found in the human stomach]. As the most prevalent gastric NHPH species, *h.suis* colonizes the stomach of dyspeptic individuals[72]. When it comes to stomach MALT lymphomas, *h.heilmannii* have a more significant role than *h.pylori* in developing gastritis, ulcers, and ulcers of the duodenum in humans. Mucosal cytokines, critical in developing GC, are promoted by *h.felis* species.

5.13 Epstein-barr virus infection

Certain malignant tumors are link to the Epstein-Barr virus (EBV). This herpes virus enters into human body. Transplantation of infected organs is also a possible method of transmission. It has been suggested that EBV, a human herpesvirus, has a GC role. For the most part, EBV-positive tumors have found in the gastric fundus and body, accounting for around 9% of GC cases[73].

5.14 Medical conditions and treatments

In several studies by the author[1], medical illnesses and treatments have been link to an increased GC risk. These included blood type history of gastrectomy and Asian Pacific Journal of Cancer Prevention, surgeries, reflux, family history of gastric atrophy history of polyps and gastric ulcer. In patients with GC, A+ and A- were the most and the minor prevalent blood types, respectively. According to cohort research by the author, blood type A persons had a 20% higher risk of developing GC than blood type O people[74]. On the other hand, based on their study, author[74], found a link between blood type O and GC in those under 50 years. Gastrectomy and stomach surgery have been link to an increased risk of GC since gastric acid levels be reduce after surgery and become more sensitive to *h.pylori*. People who have stomach problems do not often take care of GC to grow in them. Before-cancerous gastric lesions were link to reflux, polyps in the stomach, gastric ulcer and family history of cancer based on a study by the author[23].GC has shown to be link to menopause and older age in cohort analysis of women with a history of the disease. According to the author[75], women who had a birth at a younger age were less likely to get GC. Participants in the study who had fewer than 30 years of fertility were more likely to get GC than those older than 30. Researchers identified a link between the age of menopause

and the number of years after menopause, and the usage of intrauterine devices. The author also showed a negative correlation between menarche and GC[74].

Gastric ulcer. Patients with h.pylori-positive gastric ulcers had greater GC incidence and relative risks than pylori-infected duodenal ulcer patient. Two hundred seventy-five duodenal ulcer patients were study in future Japanese research, but none got GC. GC was diagnosed in 3.4 percent of 297 patients with gastric ulcers[76]. The author[76],studied two hundred sixty-five stomach ulcers, and 37 of them were proven to be malignant (14 percent). The diameter of malignant ulcers (>1 cm) is more significant than that of benign ulcers (1 cm)[77].

Previous gastric surgery. Surgery to remove part of the stomach known as a "partial gastrectomy." Other stomach abnormalities be treated with this surgical surgery. For several years following partial gastrectomy, the chance of developing GC rose[78]. To put it in another way, those who have had gastric surgery for non-cancerous reasons are more likely to have GC. Bile reflux from the small intestine produce persistent inflammation in the gastric remnant. This be due to h.pylori infection, diminished acid production in the gastric residual or other causes.

5.15 Demographic characteristics

According to the author, older people were more likely to get GC (cardiac and non-cardiac). Furthermore, the biology of GC be affected by gender. According to the author[79], the male gender was relates to an increased risk of cardiac and non-cardiac malignancies. Moreover, the men are more prone to develop proximal GC than women. According to the author [80], the World Cancer Research Fund's prevalence of GC in males was 12.8 percent, while the rate for women was 5.7 percent[61].GC shown to be linked to lower yearly income, poorer food and fruit and veg expenditures, higher unemployment rates, and a more significant share of work in the agricultural and construction industries in Iran[62]. Furthermore, cancer incidence is inversely related to socioeconomic status. Even though socioeconomic status cannot be directly link to this malignancy, h.pylori and other, risk factors for GC, such as socioeconomic level, influence GC's occurrence.

5.16 Ionizing radiations

There are many variables, which can influence the GC. People exposed to ionizing radiation from nuclear bomb explosions in Japan after World War II were more likely to acquire GC[80]. Studies have revealed that persons who had radiation treatment for GC are more likely to develop the disease. Studies have indicated an increased incidence of GC in those who had radiation treatment for thyroid, Hodgkin, testicular, and cervical cancers, as well as peptic ulcers. Radiotherapy is associated with cancer development in a tiny percentage of patients. Cancer treatment always surpasses the chance of acquiring GC in the future[81].

6 Recommendations for practice

One of the most critical aspects of cancer treatment is nutrition. Accurate identification of the nutritional is critical when devising a nutritional intervention. For clinical dietitians give a high-quality nutrition advice and guidance to cancer patients, they must specialize in nutritional oncology. A low nutritional status influences treatment, method compliance, and drug response. The author[147], found a relationship between patient quality of life and dietetic education. Researchers found that patients who received information and nutritional counselling throughout chemotherapy were less likely to lose significant weight and had a higher overall quality of life[16][147].

The primary goals are preventing early mortality, reducing complications, and enhancing life expectancy. Treatment-related side effects were reduce when patients received nutritional instruction throughout their care. During active anticancer, nutritional aid should be include. According to several studies, patients receiving chemotherapy benefit from a better diet. Parenteral nutrition feeding has several drawbacks, including severe problems and a higher cost of treatment. Maintaining a well-balanced, reasonable, and scrumptious diet spread out across many, meals are integral to a healthy lifestyle. Doctors generally prescribe a heavy diet in fruits and vegetables but low in fat and sugar. However, in rare situations, augmenting a meal with protein and sugar be required to boost energy levels. Doctors turn to intravenous nourishment or gastric tubes if insufficient poor health. Because of their minimal drawbacks, oral nutritional supplements are more cost-effective and simpler to give than intravenous or enteral nourishment [148].

Emotional support for cancer patients is essential since this is a challenging period. Currently, doctors and medical personnel provide patients with motivational support, advice, explanations about their diagnoses, and recommendations for treatment, monitoring, and prognostication. Other studies have shown that the cancer stage is the most critical factor in determining a patient's quality of life. Patients with GC, in particular, be more adversely affect by poor nutrition and nutritional deficiency. Their dietary state influences the quality of life of GC survivors. According to the author[149], nutritional treatments should begin as soon as cancer has identified, and nutritional treatment is essential. A nutrition consultation should be perform at the time of diagnosis to have a positive attitude throughout treatment, contributing to a better quality of life for the patient. The results of this study be advantageous to physicians and nurses working at community health-care centers who treat patients with GC[150][151].

6.1 Recommendations for research

According to the American Society of Clinical Oncology, GC patients should speak with oncology-trained dietitians while they are unwell. Supportive and appropriate dietary methods are essential for medical personnel caring for cancer patients receiving chemotherapy. Despite this study's findings, more research done into the kinds of meals suited for GC patients to reduce the rate of weight loss in GC patients. When a patient is, diagnosed with a condition, doctors and nutritional professionals

must study the patient's diet plan to determine the best course of treatment to prevent weight loss. Nutritional treatment for patients with GC requires medical professionals to understand their roles and duties. In addition, healthcare professionals should educate patients about their condition and available treatment options. Because of this, they accept, understand, and prepare for the struggle.

Surgery, radiation, and chemotherapy are a few of the options available to those suffering from GC in hopes of curing them, extending their lives, and alleviating their symptoms. This treatment's short-term and long-term consequences have often led to a detrimental impact on health-related quality of life. Patients with GC are at a greater risk of developing mental comorbidities because of the intensity of this treatment. One of the study's **strengths** is a thorough evaluation of databases across a considerable period. However, it is also worth noting that this research does not include an animal or cellular investigation. A substantial portion of cancer research involves animal and cell research. The fundamentals of other research and associated theories are gleaned from these investigations. Consequently, these investigations' findings should be considered and published in light of their importance in future research.

6.2 Strength & limitations of this study

An essential aspect of this research is that it thoroughly assessed databases over a relatively long period. Therefore, certain limitations must be overlooked. Therefore, this research's findings should be considered and published in light of their significance for future work. Gastric cancer is the fourth most cause of cancer-related death globally. It continues to be a severe public health concern[152]. A dismal prognosis persists after extensive treatment, and most patients relapse within two years of completing their course of treatment. Health-related quality of life (HR-QOL) assessments are essential because they show how treatment affects patients' quality of life. It is particularly that when the prognosis is terrible, the situation with GC patients becomes bad[153]. The treatment process influences health-related quality of life (HR-QOL) and its effect on survival. Today's treatment options developed to extend patients. However, there is presently no comprehensive review of the research conducted[154]. A significant drawback of this research is the inability to obtain published or under consideration for publication before it was complete, which is a problem shared by all systematic review studies. It is also known as "publication bias" when researchers are denied access to studies with unfavorable, inconclusive, or statistically insignificant findings. As a result, these biases might be one of the study's weaknesses, making it unable to access all of the research. This summary minimizes these biases and examines them as thoroughly as feasible.

This systematic review has several limitations since the quality of the papers included in the review is highly reliant on the quality of the systematic review itself. The number of trials and patients in most cohorts was somewhat limited. The equipment used in each study was also unique, making it impossible to draw any meaningful comparisons between them. However, the systematic review's greatest strength was its thorough database scanning and identification of multiple influencing variables. Furthermore, studies have not been excluded because of the year they were

published. Our research was further hampered by using articles found in English-language publications. According to research completed in other languages, our study is incomplete. However, the familiarity in another language kept this issue from becoming a challenge.

6.3 Future development & challenges

In the development of GC, there are substantial research gaps in areas **such as nutrients**, as shown in articles included in this collection of this research. According to the finding of author[147],the systematic reviews, the diversity across research made it difficult to reach meaningful conclusions. By using data mining algorithms, physicians and patients can monitor the course of GC and take appropriate treatments to improve the patients' chances of survival and well-being, particularly if they are anticipated to be at high risk of developing EGC[147]. Next point is to search whether dietary interventions might improve cancer patients' quality of life (QoL) by conducting a comprehensive review of the existing research. Our review focused only on the correlation between nutritional status and quality of life in GC patients, not suggesting causality. However, despite these drawbacks, our comprehensive evaluation and analysis of the substantial body of research show a robust connection between nutritional status and quality of life in cancer patients[155]. Further, we have identified novel opportunities for **future direction** as an outcome of our review. Firstly, the best management practices for the timing of nutritional assessment and intervention in cancer patients have not yet been define. We must determine what those best management practices are to implement them. Malnutrition should be evaluate for any clinical signs that link the condition and quality of life (QoL)[156]. Using existing research as a guideline, we found substantial support for the idea that nutritional status is a significant predictor of quality of life in cancer patients. After reviewing the available literature, we found that nutritional status is a substantial predictor of QoL in cancer patients, consistent with the hypothesis. This research also supports a holistic approach to cancer treatment[157]. It also promotes a patient-centered approach to cancer treatment that considers all patient life elements.

7 Conclusion

GC remains a prevalent disease with an inferior prognosis.. H.pylori gastritis is the predominant risk factor for developing GC. Most can be gain from h.pylori eradication. Eradication could be either population-based or focusing on subjects at the highest risk. Endoscopic screening has the highest accuracy for the assessment of the gastric mucosa. However, it is on a population level only feasible in high-risk populations. Further interventions to lower GC incidence aim to promote a healthy lifestyle with adequate fiber, garlic and vitamin intake, modest alcohol use, and no smoking.

This comprehensive study concludes that nutrition and dietary variables have a significant role. This paper provides a thorough overview of more than 2,356 publications articles. In these research papers, we looked at studies that showed both positive

and negative impacts of GC and attempted to conduct an unbiased investigation of practical examples of GC. According to the analysis, a high glycemic index diet increased salt and fried food consumption, a diet heavy in animal products, and irregular eating patterns are all connected with an elevated risk of GC. Other risk factors for GC include smoking and excessive alcohol use. In light of the increased incidence of obesity and sedentary lifestyles, moderate physical activity would be beneficial. In addition to having a sedentary lifestyle, being overweight or obese was related to an elevated GC risk. We found that eating fruits and vegetables is connected with a lower incidence of GC. However, they were divided on whether all fruits and vegetables are equally efficient in lowering the risk of GC. Micronutrients such as selenium, iron, zinc, vitamin C and folate were investigated in depth by our research team. Dietary salt is a vital independent risk factor for GC. However, alcohol is most likely just a risk factor in the case of high alcohol intake. A high-fat diet increases the likelihood of developing GC.

However, fresh fruits and vegetables and certain micronutrients (selenium and vitamin C) are protective against the condition. EGC risk may be influenced by a slew of risk factors identified in this research. These include drinking hot water, consuming pickled foods, and being exposed to high levels of *H.pylori*. They serve as reminders of the need of preventing, detecting, and treating stomach cancer at an early stage. The findings of this study might greatly assist clinical researchers in choosing and implementing the best prediction models and assessing relevant influences. Decrease in GC-related mortality during the previous two decades. The earlier cancer is detected and treated, the better the prognosis and chances of survival. In protecting against GC, foods high in vitamins, minerals, and phytonutrients such as fruits and vegetables provide excellent protection. We urge everyone to eat more fruits and vegetables, get regular exercise, and abstain from smoking as part of our healthy lifestyle recommendations. This research aimed to evaluate the effect of dietary determinants on the quality of life (QoL) of GC patients. The nutritional condition of GC survivors impacts their overall quality of life. Furthermore, it has been shown that bodyweight status is significant in health-related quality of life. Patients should get nutritional counselling at the time of diagnosis to develop suitable therapies for their condition. Establish which prospective nutritional techniques to improve patients' assessments of their quality of life (QoL) in the future.

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