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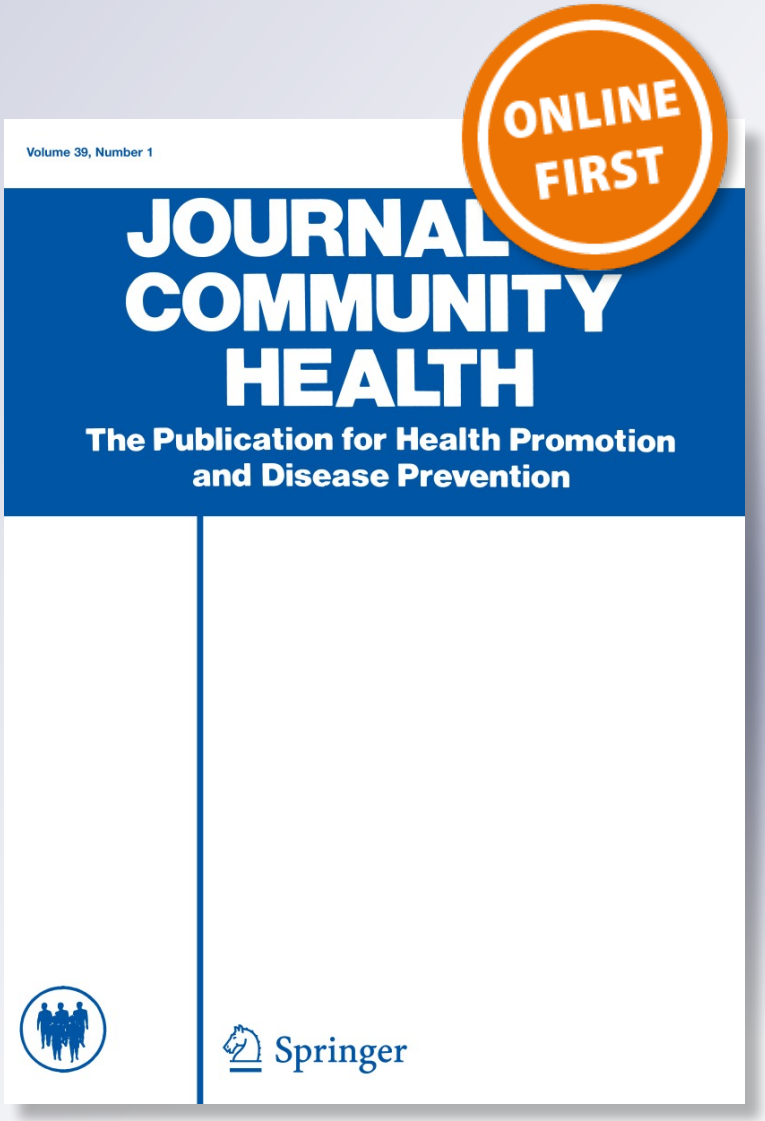


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ORIGINAL PAPER

# Prevalence of Gastrointestinal Disease and Its Associated Risk Factors in Sikkim and Darjeeling Districts

**Varsha Rani Gajamer · Hare Krishna Tiwari**



**Abstract** The gastrointestinal disease accounts for a large number of deaths in several parts of the world. Gastrointestinal infection has been an emerging problem in Sikkim and Darjeeling District and also in other parts of our country. To study the prevalence and to explore the risk factors associated with gastrointestinal diseases in Sikkim and Darjeeling District. The present study is the population based descriptive type cross sectional study. The study design was based on random selection among 100 individuals from different areas of Sikkim and Darjeeling district of West Bengal. Questionnaire based anonymous feedback system was followed to collect the data. The data were analyzed using statistical tool and the relative risk was calculated. Total 65 (65 %) cases of gastrointestinal disease were found in 100 individuals out of which 24 were males and 41 were females. Cases of diarrhea, gastroenteritis, dysentery, food poisoning, amoebiosis and enterocolitis was 34, 18, 3, 3, 1 and 0 % respectively. The statistical analysis reveals that a gastrointestinal disease is more prevalent in females as compared to males and in the age group between 15 and 25 years. The various associated risk factors for gastrointestinal disease which was observed during the study were frequency of diet, diet type, consumption of spicy food, fermented food, smoking, consumption of alcohol, consumption of fruits available in market and an inappropriate sanitary condition.

**Keywords** Prevalence · Gastrointestinal disease · Sikkim · Darjeeling · Risk factors

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## Background

Darjeeling is a town in the Indian state of West Bengal is nestled among the rolling mountains with the glistening Himalayas towering over the blue sky. Darjeeling district is famous for its beautiful hill stations often referred to as the Queen of the Hills and Darjeeling tea. Darjeeling is the district headquarters. Kalimpong, Kurseong and Siliguri, three other major towns in the district, are the sub divisional headquarters of the district [1]. It has an area of 3,149 square km and altitude of 6,710 feet [2].

Darjeeling was originally a part of Sikkim [3]. Sikkim is a small, remote, mountainous state, bound by the Tibetan Plateau in the north, the Chumbi Valley of Tibet and the Kingdom of Bhutan in the east, the Republic of Nepal in the west and Darjeeling district in the south [4]. As per the 2011 census, its population is 607,688 with more than 20 % defined as tribal, and the population density is 86 persons per sq. km. Nepali, Bhutia and Lepcha are the three main ethnic groups of this society with many minor ethnic groups such as Rai's [4]. Its geographical location has a very significant socio-cultural influence on its population.

Most of the population of Sikkim has non-vegetarian diet whereas only 11.7 % were reported as vegetarian [5]. Traditional fermented foods are an important component of the diet of the people of Sikkim [6]. About 13 % fermented foods constitute the daily meal of the ethnic people of Sikkim and Darjeeling hills [6]. The per capita consumption of ethnic fermented foods and beverages in Sikkim is 163.8 g/day, comprising 12.6 % of total food intake [6]. The addition of microorganisms in the diet, as in fermented foods, could change the gastrointestinal microbiota. Microorganisms are critical to the function of the gastrointestinal tract to help in digestion of foods. However, the presence of pathogenic bacteria and viruses in the

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Gastrointestinal tract can cause the symptoms of gastroenteritis including abdominal cramps, nausea and vomiting, diarrhea, loss of appetite, weakness, fever or chills and dehydration [7].

A disease in any section of the gastrointestinal tract from esophagus to rectum is known as a gastrointestinal disease. Gastrointestinal tract infections can be caused by viruses, bacteria, protozoa, helminthes and rarely fungi [8]. Gastrointestinal infection has been an emerging problem in the whole world which ranges from inconvenience to life-threatening disease. Until two decades ago inflammatory bowel disease was rare in Asia [9] but recent population-based and referral centre cohorts have shown a rising incidence and prevalence of inflammatory bowel disease in [10]. It has been stated that the diarrheal disease is the leading killer of adults and children in India [11]. In general, most of the Sikkim's population has been suffering from bowel pains, stomach ache and other symptoms of gastro-tract infections. The lifestyle factors such as drinking habits, sedentary working style, dietary pattern, food type may contribution to the diseased condition [9].

Therefore, the present work envisages the study of gastrointestinal disease among male and females and different age group and to assess the various risk factors associated with gastrointestinal disease in Sikkim and Darjeeling District.

## Methods

### Institutional Approval for the Study

The approval of the Committee for Advance Studies and Research, Sikkim University was obtained prior to beginning of the study.

Consent from participants: Informed consent was obtained from participants prior to start the study.

### Place of Study

The present study was conducted in the Department of Microbiology, Sikkim University, Sikkim. The field survey was conducted on Eastern part of Sikkim and at different districts of Darjeeling at random locations including different places like Gangtok, Darjeeling and Siliguri including its plain areas under Siliguri sub division.

The present study was conducted from January 2013 to July 2013.

*Study design and participants* The type of study conducted was population based, descriptive type cross sectional study based on Questionnaire-based anonymous feedback system. The field survey used the observations method and the rapport building method to gain the information. The study was conducted on a randomly selected, equally distributed population by direct interview using questionnaire. A questionnaire based feedback model was used for data collection (Appendix). A comprehensive English questionnaire was developed covering applicable aspects including demographics (gender, age), socio-economic (e.g. profession, income), dietary habits (e.g. vegetarian/non-vegetarian, fermented/non-fermented foods), physical activity, life-style behavior (e.g. addictions like smoking and alcohol consumption) and medical history (e.g. diseases, medications). The total population ($n = 100$) was interrogated (but the valid entries were only considered according to the risk factors) based on the questionnaire in Nepali, Hindi and English language and the information was filled in English language.

### Sampling

Stratified random sampling method was employed to collect samples. Random locations in Sikkim, in and around Gangtok, including villages, panchayats, markets, hospitals were selected for sampling. Adequate care was taken to incorporate all strata of society with all individuals more than 15 years old. A total of 100 individuals (respondents) were interviewed for the study. Respondents were explained the purpose of study (for sincere response), our affiliations (for credentials of study) and anonymous nature of questionnaire (for reliable answers).

As the questionnaire was in English, symptoms were described in Nepali/Hindi for those subjects who did not understand scientific or English terms. Symptoms were explained to respondents to identify the exact disease/ailment and then after confirmation were marked on questionnaire.

### Statistical Analysis

The questionnaire was checked for errors and data was entered into MS excel and converted into Microsoft Excel format (.xls) and statistically analyzed using Graph pad prism V5.01.exe software (San Diego, USA).

### Relative Risk Calculation

Relative Risk analyses were carried out using online software "MEDCALC" (Version 12.2.1-© 1993–2012, MedCalc Software, Broekstraat 52, 9030 Mariakerke, Belgium). Relative risk $= [a/(a + b)]/[c/(c + d)]$.

#### *Criteria for Significance of Relative Risks*

$RR \approx 1$ means the association between exposure and disease unlikely to exist; $RR > 1$ means the increased risk

**Table 1** Relative risk calculation

| | |
|---|---|
| Exposed group | |
| Number with positive outcome: | a= |
| Number with negative outcome: | b= |
| Control group | |
| Number with positive outcome: | c= |
| Number with negative outcome: | d= |

of disease among those that have been exposed. RR $< 1$ means the decreased risk of disease among those that have been exposed (Table 1).

## Results

Percentage of respondents with gastrointestinal disease from Sikkim and Darjeeling with respect to total no. of respondents was 57.5 and 70 % respectively. Different types of gastrointestinal disease were included in the study namely diarrhea, dysentery, amebiosis, peptic ulcer, enterocolitis, food poisoning and gastroenteritis. The prevalence rate of diarrheal disease was 34 %, whereas the respondents for enterocolitis were nil. Moreover, the respondents for gastroenteritis, dysentery, food poisoning, amoebiosis and peptic ulcer were 18, 3, 3 and 1 % respectively. Percentage of respondents with gastrointestinal disease with respect to total no. of respondents in male and female was found to be 50 and 78.8 % respectively. The age group composition of respondents were 15–30 years (42 %), 31–45 years (29 %), 46–60 years (17 %), 61–75 years (4 %), 76–90 years (7 %) and more than 90 (1 %).

It was found that females were more prone to gastrointestinal diseases as compared to males. It was observed that the 24 males out of 48 male respondents i.e. 50 % and 41 females out of 52 respondents 78.8 % complained of a gastrointestinal disease.

It was found that gastrointestinal disease was more prevalent in the age group 15–30 years. Moreover, the prevalence of gastrointestinal disease decreases as the age group decreases. It was observed that maximum prevalent rate of 29 % gastrointestinal disease was observed in case of group 15–25 years and no gastrointestinal disease were observed in the age group above 90 years (Table 2). Various known and unknown risk factors were observed during the study (Table 3). One of the unknown risk factors observed which may aid to gastrointestinal disease was frequency of diet. It was observed that the respondents having a frequency of diet less than thrice a day is more susceptible to gastrointestinal disease. All the respondents having a frequency of diet twice a day complained the symptom of gastrointestinal disease having a relative risk factor of 1.37. On the contrary, only 62 % respondent having a frequency of diet trice a day showed the symptom of gastrointestinal disease.

When the two parameters vegetarian and non-vegetarian diets were investigated it was observed that diet do play a significant role in gastrointestinal disease, as non vegetarian diet contributes 60 % in a gastrointestinal disease and relative risk is 1.483.

Another risk factor included in the present study was consumption of spicy food. It was observed that out of the total respondents only 37 % of the individual preferred spicy food. Interestingly, it was found that out of the total spicy food consumers 72.9 % of the respondents complained of the gastrointestinal disease and the relative risk were 1.2098.

In Sikkim, non-vegetarian diet and consumption of ethnic/traditional fermented food is very popular [8] as compared to Darjeeling. Similarly, the prevalence of gastrointestinal tract infections were not higher among the respondents who consume fermented food regularly as the relative risk factors for non-vegetarian diet and fermented food was reported as 0.9849 and respectively.

In the present study it was found that 59.2 % of the fruit consumers' complained of gastrointestinal disease and the

**Table 2** Prevalence of gastrointestinal disease among the different age groups

| Characteristics | Age groups | | | | | |
|---|---|---|---|---|---|---|
| | 15–25 | 26–35 | 36–45 | 46–55 | 56–65 | >65 |
| Total respondents with gastrointestinal diseases | 29 | 19 | 11 | 3 | 3 | 0 |
| Percentage of respondents with gastrointestinal diseases with respect to total number of respondents with gastrointestinal diseases | 44.61 | 29.23 | 16.92 | 4.61 | 4.61 | 0 |

**Table 3** Prevalence of gastrointestinal disease with respect to frequency of diet, diet type, consumption of spicy food, consumption of fermented food, smoking, alcohol consumption and inappropriate sanitary condition

| Prevalence of gastrointestinal disease | Status | Male | Female | Total | (%) | Statistics | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | RR | 95 % Cl | Z-test | *P* value |
| Frequency of diet | Twice | 3 | 0 | 3 | 3 | 1.3720 | 0.9203–2.0454 | 1.552 | 0.1206 |
| | Gastrointestinal disease | 3 | 0 | 3 | 3 | | | | |
| | Thrice | 45 | 52 | 97 | 97 | | | | |
| | Gastrointestinal disease | 21 | 41 | 62 | 62 | | | | |
| Diet type | Vegetarian | 3 | 8 | 11 | 11 | 1.4831 | 0.7641–2.8790 | 1.165 | 0.24441 |
| | Gastrointestinal disease | 0 | 5 | 5 | 5 | | | | |
| | Non-vegetarian | 45 | 44 | 89 | 89 | | | | |
| | Gastrointestinal disease | 24 | 36 | 60 | 60 | | | | |
| Consumption of spicy food | Yes | 12 | 25 | 37 | 37 | 1.2098 | 0.9141–1.012 | 1.332 | 0.1829 |
| | Gastrointestinal disease | 27 | 0 | 27 | 27 | | | | |
| | No | 6 | 4 | 10 | 10 | | | | |
| | Gastrointestinal disease | 27 | 0 | 27 | 27 | | | | |
| Fermented food | Yes | 27 | 28 | 55 | 55 | 1.3977 | 1.0211–1.9132 | 2.091 | 0.0366 |
| | Gastrointestinal disease | 16 | 25 | 41 | 41 | | | | |
| | No | 21 | 24 | 45 | 45 | | | | |
| | Gastrointestinal disease | 8 | 16 | 24 | 24 | | | | |
| Smoking | Yes | 11 | 0 | 11 | 11 | 1.0130 | 0.7060–1.4535 | 1.0130 | 0.99442 |
| | Gastrointestinal disease | 7 | 0 | 7 | 7 | | | | |
| | Yes | 11 | 0 | 11 | 11 | | | | |
| | No. Gastrointestinal disease | 4 | 0 | 4 | 4 | | | | |
| Alcohol consumption | Yes | 19 | 9 | 28 | 28 | 1.013 | 00.7539–1.3720 | 1.0170 | 0.9121 |
| | Gastrointestinal disease | 10 | 6 | 16 | 16 | | | | |
| | No | 9 | 3 | 12 | 12 | | | | |
| | Gastrointestinal disease | 10 | 6 | 16 | 16 | | | | |
| Inappropriate sanitary condition | Yes | 11 | 5 | 16 | 16 | 1.4063 | 1.1546–1.7127 | 3.389 | 0.0007 |
| | Yes. Gastrointestinal disease | 5 | 4 | 9 | 9 | | | | |
| | Yes | 11 | 5 | 16 | 16 | | | | |
| | No. Gastrointestinal disease | 6 | 1 | 7 | 7 | | | | |

relative risk for the consumption of fruits was 1.1591. Therefore, the consumption of inorganically grown fruits can be considered as one of the risk factor of gastrointestinal diseases.

Smoking was also observed one of the risk factor for gastrointestinal disease. As 63.6 % of the smoker's complained of gastrointestinal disease on the other hand only 36.3 % of the smokers did not complain of any symptom of gastrointestinal disease. The relative risk of Smoking as a risk factor for gastrointestinal disease was 1.0130.

In the present study conducted, it was found that 57.2 % of the respondent consuming alcohol complained of gastrointestinal disease with a relative risk of 1.0130. The prevalence of gastrointestinal disease with respect to poor sanitary condition was observed it was found that 56.2 % of the respondents with poor sanitary complained of gastrointestinal disease condition with a relative risk of 1.4.

## Discussion

The infectious diseases most prevalent in Sikkim are tuberculosis, gastroenteritis, cholera, infectious colitis, conjunctivitis and influenza [12]. In the study conducted by Kaushal et al. [8] it was found that out of his total respondents 24 % of respondents were found with at least one gastrointestinal infection in the past 1 year, which indicate that gastrointestinal infections are common in Sikkim with almost one out of four people reported gastrointestinal infections. In the present study in which both the study area Sikkim and Darjeeling were taken into

account, it was found that 57.5 and 70 % of respondents complain of gastrointestinal disease in Sikkim and Darjeeling respectively showing the prevalence of gastrointestinal disease more in Darjeeling. Since the population of Darjeeling is higher as compared to the population of Sikkim therefore slightly higher numbers of respondents were included in the study. It was observed that among the different types of gastrointestinal diseases the maximum respondents of the study area complained of diarrheal disease. The prevalence rate of diarrheal disease was 34 %, whereas the respondents for enterocolitis were nil. Moreover, the respondents for gastroenteritis, dysentery, food poisoning, amoebiosis and peptic ulcer were 18, 3, 3 and 1 % respectively.

When the prevalence of gastrointestinal diseases with respect to gender and age group was checked, it was found that females were more prone to gastrointestinal diseases as compared to males. It was observed that the 24 males out of 48 male respondents i.e. 50 % and 41 females out of 52 respondents 78.8 % complained of any one of the gastrointestinal disease. Similar to the present study, [11] found that irritable bowel syndrome was significantly more common in girls and was associated with more school absenteeism and physician consult [13]. It has been observed that the Functional GI Disorders (FGIDs) are more frequently found in females, and FGID patients exhibit more psychiatric diagnosis and psychosocial disturbances [14]. The prevalence of gastrointestinal disease with respect to different age group was observed it was found that gastrointestinal disease was more prevalent in the age group 15–30 years. Moreover, the prevalence of gastrointestinal disease decreases as the age group increases. It was observed that maximum prevalent rate of 29 % gastrointestinal disease was observed in case of group 15–25 years and no gastrointestinal disease were observed in the age group above 90 years. Gastrointestinal disorders persist into adulthood among significant numbers of children and adolescents, these disorders also contribute to more school absenteeism and higher rates of medical consultation and hospital use [15, 16]. Conclusive findings indicated that the majority of GI symptoms in these age groups are because of functional disorders [16, 17].

There are various known risk factors associated with GI disease. Various known and unknown risk factors were observed during the study. One of the unknown risk factors observed which may aid to gastrointestinal disease was frequency of diet. It was observed that the respondents having a frequency of diet less than thrice a day is more susceptible to gastrointestinal disease. All the respondents having a frequency of diet twice a day complain the symptom of G.I. disease having a relative risk factor of 1.37. On the contrary, only 62 % respondent having a frequency of diet thrice a day showed the symptom of gastrointestinal disease.

Food habits and diet type usually play a very important role in the health of an individual. In the study conducted in Sikkim by Kaushal et al. [8] it was found that 74 % of the respondents preferred non-vegetarian diets compared to 26 % preferring vegetarian diet and consumption of non-vegetarian diet did not pose as a risk factor for gastrointestinal tract infections as the relative risk factors for non-vegetarian diet. In contrast, when the two parameters vegetarian and non-vegetarian diet were investigated it was observed that diet do play a significant role in G.I. disease, as non vegetarian diet contributes 60 % in a G.I. disease and relative risk is l.483.

In a recent systematic review consisting of 2,609 Inflammatory bowel disease patients, a high dietary intake of fats, fatty acids, sugars and meat increased the risk for developing Crohn's disease (CD) and ulcerative colitis (UC), while increased intake of fiber, fruit and vegetables decreased the risk for development of CD and UC [18]. Another risk factor included in the present study was consumption of spicy food. It was observed that out of the total respondents only 37 % of the individuals consumed spicy food. Interestingly, it was found that out of the total spicy food consumers 72.9 % of the respondents complained of the G.I. disease and the relative risk were 1.2098. Throughout Asia, Chili is commonly used as a spicy ingredient. The active component of chili capsaicin can mediate a painful, burning sensation in the human gut via the transient receptor potential vanilloid-1 (TRPV1). Recently it has been reported that, the TRPV1 expressing sensory fibers have increased the functional gastrointestinal disorder and visceral hypersensitivity in the gastrointestinal tract of patients. Moreover, it has also been observed that the acute exposure to capsaicin or chili can aggravate abdominal pain and burning in dyspepsia and Irritable bowel Syndrome patients. On the other hand, the recent study shows that the chronic ingestion of natural capsaicin agonist or chili has been shown to decrease dyspeptic and gastro esophageal reflux disease symptoms [19].

In Sikkim, non-vegetarian diet and consumption of ethnic/traditional fermented food is very popular [8] as compared to Darjeeling. Similarly, the prevalence of gastrointestinal tract infections were not higher among the respondents who consume fermented food regularly as the relative risk factors for non-vegetarian diet and fermented food was reported as 0.9849 and respectively.

During an interview with the respondents we found out all the respondents consume fruits available in the market. Most of the fruits which are sold in a market are grown inorganically. Moreover, in the present study it was found that 59.2 % of the fruit consumers' complained of Gastrointestinal disease and the relative risk for the consumption of fruits was 1.1591. Most fruit sellers use Calcium carbide for ripening the fruits. Calcium carbide is extremely hazardous to the human body as it contains traces of arsenic and phosphorus. The early symptoms of arsenic or phosphorus poisoning include vomiting, diarrhea with or without blood, burning sensation of the chest and abdomen [20]. It has been reported that eating artificially ripened mangoes causes stomach upset because the alkaline substance is an irritant that erodes the mucosal tissue in the stomach and disrupts intestinal function. Chronic exposure to the chemical could lead to peptic ulcer [21]. Therefore, the consumption of inorganically grown fruits can be considered as one of the risk factor of gastrointestinal diseases.

Amongst all risk factors smoking represents one of the most consistently observed environmental influences on IBD. Studies in west have shown that smoking is a risk factor for the development of Crohn's disease but is protective for the development of Ulcerative colitis [22, 23]. When the association of G.I. disease smoking was observed it was found that smoking is one of the risk factor for gastrointestinal disease. As 63.6 % of the smoker's complained of G.I. disease on the other hand only 36.3 % of the smokers did not complain of any symptom of G.I. disease. The relative risk of Smoking as a risk factor for G.I. disease was 1.0130.

Alcohol consumption is the world's third risk factor for diseases; in middle income countries, it is the greatest risk factor [24]. Alcohol can interfere with the activity of many enzymes that are essential for intestinal functioning. One of these enzymes is lactase, which breaks down the milk sugar lactose; lactase deficiency results in lactose intolerance. It also interferes with some of the enzymes involved in transporting nutrients from the intestine into the bloodstream and inhibits important enzymes that participate in the metabolism of drugs and other foreign organic substances in the gut [25]. Alcohol-induced digestive disorders and mucosal damage in the GI tract can cause loss of appetite and a multitude of abdominal complained, such as nausea, vomiting, feelings of fullness, flatulence, and abdominal pain [26].

In the present study it was found that 57.2 % of the respondent consuming alcohol complained of G.I. disease with a relative risk of 1.0130. Whereas, Kaushal et al. and Rosenstock et al. [8, 27] found the relative risk to be 1.4258 and 2.4 respectively. The prevalence of G.I. disease with respect to poor sanitary condition was observed it was found that 56.2 % of the respondents with poor sanitary complained of gastrointestinal disease condition with a relative risk of 1.4.

## Conclusion

The present study is preliminary in nature and conducted with stratified random sampling, it provides the basic data about the prevalence of gastrointestinal diseases and various risk factors associated with it in Sikkim and Darjeeling District.

As right from the food habits, quality of food, sanitation, lack of information can be attributed to the problem, it requires a comprehensive strategy to deal with it. The concerned authorities hence require framing a comprehensive strategy to nip the root of the problem. Payers, clinicians, policy makers, and others interested in resource utilization may use these statistics to better understand evolving disease trends and the best way to meet the challenge of these diseases. It is expected that the medical services of the state will be highly benefited by the findings of the study.

The various associated risk factors of gastrointestinal disease will help the medicinal practitioner to provide suitable medical treatment to the people.

Moreover, the study can be valuable for them in designing the effective remedial measures to decrease the risk factors of gastrointestinal diseases, and enlighten the common mass with the pros and cones of their present life style and need to bring necessary changes in it to improve the quality of life of people.

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## Appendix: Questionnaire Based Feedback Form for the Study of Human Gastrointestinal Pathogens from Sikkim & North Bengal

**Household no.:** **Head of the family:**

***Demographics***

**Name:**

1.**Gender** - Male / Female

2. **Age (yrs.)-**(15-30) / (31-45) / (46-60) / (61-75) / (76-90) / (> 90) _____yrs old.

3.**Population type -** Rural /Urban

**Name of place & Dist.**_____

4.**Sikkim / North Bengal**

***General Information***

Height _____ ft Weight _____ kg

B.M.I –normal/ underweight /over weight

**Educational qualification**

Iliterate/Matriculated /no matriculated

**Profession**
Government employee /Private sector employee
Farmer /Small self-owned business /others

**Community –**
**SCs / STs / OBCs/ General**_____

***Dietary habits***

Frequency of diet intake(per day) - twice /Thrice

5.**Major dietary composition**
Vegetarian / Non-vegetarian /vegan

**If non-vegetarians frequency of meat consumption**
Daily /weekly /fortnight/month

**Meat preferred -** Chicken / Mutton / fish / buff/ beef/pork

**6.Diet Type (mostly taken )** - Cooked / Un-cooked / Boiled / Steamed / Canned / Cafeteria style /raw/ fibrous

Consumption of spicy food/chili- yes / no

**Food consumed within last 24hrs** _____
_____

_____

7.Food source – own farm / market / both

8. Consumption of fermented food-yes or no, if yes then tick gundruk /kinema / daihi / churpi / dry meats/karyong)

8. Consumption of fruits
Yes/ no (source-_____

**Water source**
Government provided /Natural spring/river /Not known

**Water consumed** Raw /Boiled /Filtered /Purified

Health supplements like (Horlicks) / milk or beverage like tea taken with the last 24 hrs
Yes/ no_____

***History of Infection/diseases***

**General**

Heart diseases / Arthritis / Depression /Malaria

**Oral**

Oral ulcers / Plaque / Bleeding gums

**Liver**- Cirrhosis / Hepatitis

**Chronic disease-**Diabetes/high blood pressure / cancer

**G.I DISEASES**

**Ever pain abdomen?**
Yes/No/Seldom/ Never

**Complaint of any gastrointestinal tract infections like**
(Diarrhea/ Dysentery/ Amoebiosis/ Peptic ulcer/ Enterocolitis/ Food poisoning/ Gastroenterits)

- Diarrhea with vomiting
- Diarrhea with fever
- Diarrhea with blood
- Only diarrhea
- Abdominal pain and vomiting after consumption of any food

**Remedy used**
Allopathic medicine (Antibiotic taken/ not taken)/ Homeopathic medicine/Traditional and Ayurvedic medicine.
**Preventive measures taken**

**De worming-** done/not done

***Social/Lifestyle behavior***

**Smoking**
Yes-Filtered cigarettes / Yes-Non-filtered cigarettes
/No /Quit

**Alcohol consumption**
Yes / No

**Frequency of alcohol consumption**
Daily /Weekly /Occasionally

**Preferred alcoholic beverage**
(Wine / Brandy / Beer / Rum / Whisky / Vodka Gin /Home brew )

***Living conditions***

11.**House type**
Hut /Cottage /Concrete

12.**Appropriate sanitary/ventilation conditions**
Yes / No

13.**Cooking infrastructure**
**Hygienic / un hygienic**

14.**Domesticated animals**
Dogs / Cat / Birds / Cows / Swine / Goat

**Shelter of animals.**

**Any Specific Observation:**

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