International Journal of Allied Medical Sciences and Clinical Research (IJAMSCR)

ISSN:2347-6567

IJAMSCR |Volume 11 | Issue 3 | July - Sept - 2023
www.ijamscr.com

Research article *Medical research*

An Epidemiological Investigation of food Poisoning Outbreak in District Sonipat, Haryana.

Dr. Sonam[1], Dr. Gaurav Chhillar[2], Dr. Jasmine Chhillar[2], Dr. Usha Kataria[3], Dr. Dinesh Chhillar[4*]

[1] *Epidemiologist, Department of IDSP, Civil Surgeon Office, Sonipat, Haryana, India.*
[2] *Interns, NCR Medical Collage and Hospital, Meerut, Utter Pradesh, India.*
[3] *Professor and head, Department of Dermatology, BPS Govt. Med. College for Women, Khanpur Kalan, Sonipat, Haryana, India.*
[4] *District Surveillance officer, Sonipat, Haryana, India.*

[*] **Corresponding author: Dinesh Chhillar**
Published on: September 24, 2023

ABSTRACT

Background: On 22nd March, 2023, 27 cases of food poisoning were reported in urban area of Sonipat district. On investigation, it was observed that these cases were mainly among religious fasting population and kept on increasing to 199 on 23rd March, 2023. Involvement of adjacent areas was also noticed. A rapid fall was seen on next day. Thus an epidemiological investigation was carried out to confirm the existence of this food poisoning outbreak which was suspected to be occurred due to consumption of preparations of Buckwheat.

Aims and Objectives: To compare the age wise distribution, gender distribution and attack rate calculation among the cases of food poisoning in district Sonipat, Haryana.

Materials and method: The number of cases was described by time, place and person. Frequency tables were formulated and an epidemic curve was also shown for time series analysis. For person distribution age and gender analysis was done and a table was formulated for the same. An incidence map was drawn to describe the place analysis. Total 4 legends were described on the basis of attack rates.

Results*:* Out of 239 cases; 116 (49%) were males and 123 (51%) were females. Attack rates for females was 1.84/10,000 population and for males was 1.48/10,000 population. Maximum of the cases (56 cases) were reported in age group of 30-39 years followed by age group 50-59 years (39 cases). Block wise attack rates/10,000 population were calculated. Urban block of Sonipat was found most prevalent with an attack rate of 7.50/10,000 population respectively. The calculated attack rates for Rai and Kharkhoda block were 0.86 and 0.07 followed by Gannaur block with an attack rate of 0.05/10,000 population. No cases were reported from rest three blocks (Kathura, Mundlana, and Gohana) of district Sonipat.

Conclusion: Population of age group 30-39 years were found more affected due to food poisoning outbreak. Use of stale buckwheat is not recommended for consumption. Other fresh seasonal food may be substituted as per tradition.

Keywords: Food poisoning; Outbreak; Buckwheat; Epidemiological investigation.

INTRODUCTION

A wide variety of pathogens can cause disease in humans through the consumption of contaminated food. Contamination of food can occur at any point from farm to table, as a result of improper hygiene, handling, storage or preparation, and the broad range of food products that can be contaminated adds to the complexity.[1] There are two species of cultivated buckwheat, common buckwheat (Fagopyrum esculentum) and Tartary buckwheat (Fagopyrum tartaricum). Buckwheat is used in different types of food such as noodles, bread, pancakes, porridge and kasha, pre-boiled and dried whole buckwheat grain. Buckwheat allergy is an IgE-mediated allergy, sometimes causing severe allergic

reactions.[2] Fagopyrism, a toxic photosensitization in animals such as sheep and cattle fed on buckwheat and exposed to sunlight. Its clinical symptoms of itching erythema, constipation, and digestive disturbances of mild to serious degree have long been described in the literature. Hypersensitive symptoms included asthmatic attacks, urticaria eruption, gastrointestinal disorders, nasal symptoms, and conjunctiva congestion. Routes of exposure included both mouth and airway. The antigenicity of buckwheat is extremely strong, and that hyposensitivity treatment with buckwheat extracts should not be given because of the risk of severe and dangerous reactions.[3] The first description of a hypersensitivity reaction to buckwheat was published in 1909 by Smith H.L. The described case was about patients who suffered from dyspnoea, acute rhinitis, urticaria and mucosal angioedema after the ingestion of buckwheat flour.[4]

A food borne disease outbreak is defined as two or more illnesses caused by the same germ (e.g., a toxin, virus or bacteria) which are linked to eating the same food. Food borne disease outbreaks can have significant, long-term economic and health impacts. It is important to report any potential food borne disease outbreak to your local health department as soon as possible.[5] Public health officials investigate outbreaks to try to identify the common food or ingredient as quickly as possible to remove the contaminated product from sale and restore consumer's health and trust in the safety of the food supply.[6] The investigation identifies a food-handling error in a small kitchen that occurs shortly before consumption.[7] WGS has been widely used as a diagnostic tool to improve the level of resolution in investigating outbreaks.[8]

Sonipat district is one of the 22 districts of Haryana state in North India. Sonipat town is the district headquarters. It is a part of National Capital Region also. It is bordered by Delhi, Panipat, Rohtak, Jind, Jhajjar and Baghpat. The total area of Sonipat district is 2,260 sq km. In 2011, Sonipat had population of 1,450,001 of which male and female were 781,299 and 668,702 respectively. District Sonipat comprises of 4 sub-divisions namely Gannaur, Sonipat, Kharkhoda and Gohana and eight blocks (Gannaur, Sonipat, Rai, Kharkhoda, Gohana, Kathura, Murthal and Mundlana). On March 22, 2023, 27 cases of food poisoning got admitted in different government and private health facilities in district Sonipat. The presenting symptoms were pain abdomen, nausea with vomiting, diarrhoea, giddiness and tremors. Some of the cases were also complaining of mild fever and vertigo. These cases of food poisoning were reported majorly among the fasting population in urban area of Sonipat district. These cases kept on increasing and reached to 199 on March 23, 2023. Involvement of adjacent areas was also noticed. A rapid fall was seen on next day (24th March). 5 cases on 25th March, 0 cases on 26th March, 2-2 cases on 27th and 28th March, 2023 were noticed. After this no cases were reported. Consumption of Buckwheat flour preparation was common in this outbreak.

Aims and Objectives

The study was done to compare the age wise distribution, gender distribution and attack rate calculation among the cases of food poisoning in district Sonipat, Haryana.

Specific Objectives

1. The study was done to compare the age wise distribution, gender distribution and attack rate calculation among the cases of food poisoning in district Sonipat, Haryana.
2. To find out the major source of food poisoning during the outbreak.

MATERIALS AND METHODS

An epidemiological investigation was carried out by IDSP department, Sonipat to investigate this food poisoning outbreak. A detailed history was taken about the consumption of food items from all the cases. Consumption of Buckwheat was common among all the cases. During the further investigation, a wholesaler shop was suspected as the source of contamination. This shop was situated at old industrial area, Sonipat. Buckwheat flour was ceased. A list of all the shopkeepers was formulated who had purchased the buckwheat flour from this shop. All were sensitized and flour purchased from wholesaler was destroyed from all these shops.

Patients with symptoms of pain abdomen, nausea, vomiting/diarrhoea, giddiness with tremors and vertigo were taken as suspected cases of food poisoning. A line list of such cases reporting to all the healthcare facilities was made.

Inclusion Criteria

Patients with symptoms of pain abdomen, nausea, vomiting/diarrhoea, giddiness with tremors and vertigo were taken as suspected cases of food poisoning were confirmed clinically during the specific study period and audited by rapid response team, health department, Sonipat were included in the study.

Exclusion Criteria

Any other admitted cases of poisoning other than food poisoning, such as suicide or accidents, were excluded from the study.

Data Collection Technique

Data abstraction forms included demographic data, associated co-morbidities and cause of poisoning. Data was then reviewed and double-checked independently by District Surveillance officer, Sonipat. Reports which could not be retrieved were excluded from the analysis.

Statistical Analysis

Categorical data are presented as frequency and proportions and continuous data as mean, median, and standard deviation as appropriate. Microsoft Excel and SPSS Statistics (IBM) were used for analysis. Data obtained was analyzed in terms of objectives and results were recorded accordingly.

RESULTS

A line list of patients with symptoms of pain abdomen, nausea, vomiting/diarrhoea, giddiness with tremors and vertigo reported to all the healthcare facilities was made. Total numbers of 239 cases were reported. Out of these 239 cases; 116 (49%) were males and 123 (51%) were females. Attack rates for females was 1.84/10,000 population and for

males was 1.48/10,000 population. Maximum of the cases (56 cases) were reported in age group of 30-39 years followed by age group 50-59 years (39 cases). Block wise attack rates/10,000 population were calculated. Urban block of Sonipat was found most prevalent with an attack rate of 7.50/10,000 population respectively. The calculated attack rates for Rai and Kharkhoda block were 0.86 and 0.07 followed by Gannaur block with an attack rate of 0.05/10,000 population. No cases were reported from rest three blocks (Kathura, Mundlana, and Gohana) of district Sonipat. The number of cases was described by time, place and person. Attack rates were also calculated per 10,000 populations in respective areas. Frequency tables were formulated by describing reported cases in respect to days. [Table 3] An epidemic curve was also drawn for time series analysis. An incidence map was drawn to describe the place analysis. Total 4 legends were described on the basis of attack rates. For person distribution age and gender analysis was done and a table was formulated for the same.[table 2]

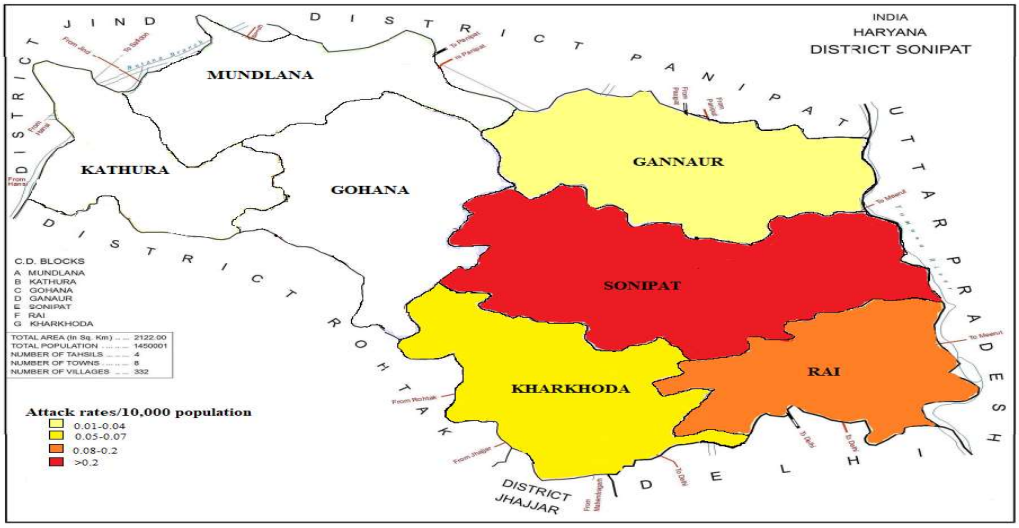


Fig 1: An incidence map on the basis of attack-rates in different blocks of district Sonipat

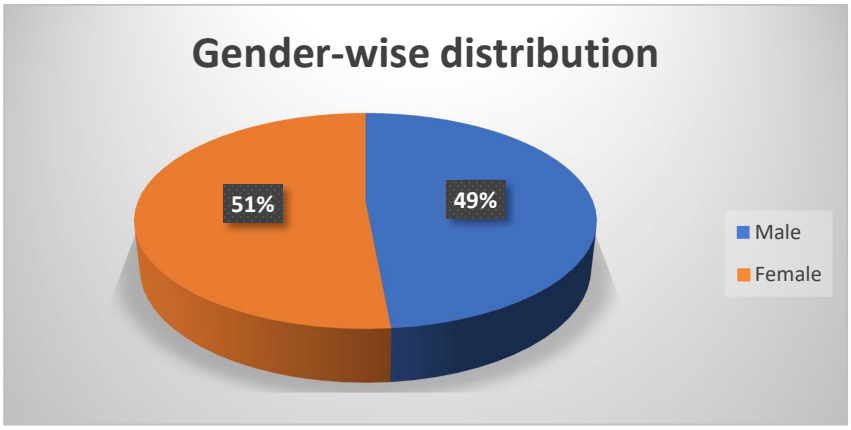


Fig 2: Gender-wise distribution of food poisoning cases

Table 1: Block-wise distribution of cases and calculated attack rates/10,000 population

District	Block	Cases	Population	Attack rates/10,000 population
SONIPAT	Urban	217	289333	7.50
SONIPAT	Rai	17	198707	0.86
SONIPAT	Gannaur	1	190028	0.05
SONIPAT	Kharkhoda	1	137807	0.07
JHAJJAR		2	9,58,405	0.02
ROHTAK		1	10,61,204	0.01

Table 2: Age and gender wise distribution of cases and calculated attack rates

Age-wise distribution of food poisoning cases and attack rates				
Sr. No.	**Age group (years)**	**Cases**	**Population**	**Attack rates/10,000 population**
1	0-9 yrs	9	278255	0.32
2	10-19 yrs	35	305950	1.14
3	20-29 yrs	37	274630	1.35
4	30-39 yrs	56	209235	2.68
5	40-49 yrs	36	157325	2.29
6	50-59 yrs	39	98310	3.97
7	60-69 yrs	18	77285	2.33
8	70-79 yrs	7	32770	2.14
9	80-89 yrs	2	12325	1.62
10	90-99 yrs	0	3190	0.00
11	>100 yrs	0	725	0.00
Gender-wise distribution of food poisoning cases and attack rates				
Sr. no.	**Gender**	**Cases**	**Population**	**Attack rates/10,000 population**
1	Males	116	7,81,299	1.48
2	Females	123	6,68,702	1.84
	Total	**239**	**14,50,001**	**1.65**

Table 3: Frequency distribution of cases with respect to time

Date of admission	No. of reported cases
22-03-2023	27
23-03-2023	199
24-03-2023	4
25-03-2023	5
26-03-2023	0
27-03-2023	2
28-03-2023	2
29-03-2023	0
30-03-2023	0
Total no. of cases	**239**

DISCUSSION

Food poisoning has been defined as an acute gastroenteritis caused by ingestion of food or drink contaminated with either living bacteria or their toxins or inorganic chemical substances and poisons derived from plants and animals. Buckwheat is generally consumed as main ingredient in preparation of food in Navratri Fasts. A shop situated at old Industrial Area, Sonipat was source of contamination/ infection during surveillance. The Flour Mill at this shop was used to make Buckwheat flour. Later on packaging of this flour was also done in this shop. These packets were purchased by local shop keepers. On being a suspicious source of transmission; samples of Buckwheat flour were ceased with the help of FDA department. These samples were sent for testing. One sample from this shop was found unsafe food to consume. Buckwheat flour is used only in Navratri days and not used in routine throughout the year, so fresh buckwheat grains and flour may not available throughout the year.

An epidemiological investigation was carried out by IDSP department, Sonipat to investigate this food poisoning outbreak. A detailed history was taken about the consumption of food items from all the cases. Consumption of Buckwheat was common among all the cases. During the further investigation, a wholesaler shop was suspected as the source of contamination. This shop was situated at old industrial area, Sonipat. Buckwheat flour was ceased. A list of all the shopkeepers was formulated who had purchased the buckwheat flour from this shop. All were sensitized and flour purchased from wholesaler was destroyed from all these shops.

CONCLUSION

Consumption of contaminated buckwheat flour was found responsible for the food poisoning outbreak. Females and population of age group 30-39 years were found most affected. That might be due to maximum population involved in fasting from this group. Second most affected age group was 50-59 years. Incidence in this group might also be higher because of underlying medical problems and lower immune response. Other fresh seasonal foods may be substituted as per relaxation allowed in religion.

REFERENCES

1. Friesema IH. Slegers-Fitz-James IA, wit B, Franz E. Surveill Characteristics Food-Borne Outbreaks Neth. Eurosurveillance. 2022 Jan 20;27(3):2100071.
2. Norbäck D, Wieslander G. A review on epidemiological and clinical studies on buckwheat allergy. Plants (Basel). 2021 Mar 23;10(3):607. doi: 10.3390/plants10030607, PMID 33806876.
3. Wieslander G. Review on buckwheat allergy. Allergy. 1996 Oct;51(10):661-5. doi: 10.1111/j.1398-9995.1996.tb04445.x, PMID 8904992.
4. Heffler E, Pizzimenti S, Badiu I, Guida G, Rolla G. Buckwheat allergy: an emerging clinical problem in Europe. J Allergy Ther. 2014;5(02):1000168.
5. World Health Organization. Foodborne disease outbreaks: guidelines for investigation and control. World Health Organization; 2008.
6. Hu K, Renly S, Edlund S, Davis M, Kaufman J. A modeling framework to accelerate food-borne outbreak investigations. Food Control. 2016 Jan 1;59:53-8. doi: 10.1016/j.foodcont.2015.05.017.
7. Altekruse SF, Cohen ML, Swerdlow DL. Emerging foodborne diseases. Emerg Infect Dis. 1997 Jul;3(3):285-93. doi: 10.3201/eid0303.970304, PMID 9284372.
8. Yong W, Guo B, Shi X, Cheng T, Chen M, Jiang X et al. An investigation of an acute gastroenteritis outbreak: Cronobacter sakazakii, a potential cause of food-borne illness. Front Microbiol. 2018 Oct 26;9:2549. doi: 10.3389/fmicb.2018.02549, PMID 30416493.