

Occupational Health Problems and Co-morbidities among Food Handlers in Kozhikode District, Kerala, India: A Cross-sectional Study

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ABSTRACT

Introduction: Over the past five years, India's food service market has grown at 10.3%, with many people consuming food from outside. Food handlers can passively transmit infections to consumers, and occupational health problems contribute to this transmission. Therefore, it is essential to identify the morbidity and occupational health problems among food handlers.

Aim: To assess the prevalence of morbidity and occupational health problems among food handlers in the Kozhikode district, kerala.

Materials and Methods: The present cross-sectional study was conducted among food handlers in Kozhikode district, Kerala, India, during January to December 2024. A multistage sampling was done and data were collected from 1132 participants by expert team through direct interviews using a pretested semi structured questionnaire. Questionnaire consisted of demographic parameters like age, gender, education and native place, occupational parameters, general examination and laboratory tests. Descriptive and inferential statics were analysed using Statistical Package for Social Sciences (SPSS) Ver.25. Chi-square test was used to find the association between qualitative variable and p-value <0.05 was considered as statistically significant.

Results: The study participants were predominantly male 998 (88.2%), with mean age of 39.92±13.39 years. In acute morbidity, 22 (1.9%) had a fever. Other morbidities such as diarrhoea, vomiting and boils were less than 1%. Out of the total tested 35 (7.51%) were positive for S.Typhi O, 10 (0.88%) were positive for S.Typhi H and 4 (0.35%) were positive for S.Paratyphi AH but only few had acute morbidities. During examination, one-fourth of the participants were found to be hypertensive according to Joint National Committee-8 criteria. The prevalence of occupational health problems was 125 (11.04%), with paronychia being most common 59 (5.21%). Cooking was significantly associated with cut injuries (OR=3.64, p<0.001). No participants were dewormed in the last six months.

Conclusion: The prevalence of morbidities and occupational health problems among food handlers was low, but the public health implications are significant. Occupational health issues, particularly paronychia and contact dermatitis were common among participants involved in washing and cut injuries were prevalent among participants engaged in cooking. To prevent food-borne disease transmission, regular health screening, awareness classes, and the promotion of hand washing and safe food handling practices should be implemented. Additionally, exempting ill workers from duty can enhance public health.

Keywords: Occupational morbidity, Paronychia, Unorganised sector, Widal test

INTRODUCTION

In the last five years, the food service market in India has grown at a rate of 10.3%, driven by the increasing number of restaurants and small food outlets [1]. The rise of online food delivery application like Swiggy, Zomato and UberEats has further encouraged the habit of ordering food. This suggests that a large proportion of the population from urban and rural areas consumes food from local eateries, hotels and other food establishments [1]. Food handlers in these establishments were involved in various activities like preparing, cooking, packing, storing, displaying, serving food, and cleaning utensils. So, any infections among them, such as surface infection, infections due to enteric organisms or due to poor personal hygiene can spread to consumers at any point in food chain [2-4]. Additionally, they also face various physical, chemical, biological and mechanical injuries at work, further increasing the risk of transferring infection [5]. Hence, their health plays a crucial role in public health for preventing Foodborne Diseases (FBDs) [6].

According to the World Health Organisation (WHO), more than 150 million people fall ill annually in South East Asian region due to FBDs [7]. In India, data from the Integrated Disease Surveillance Programme (IDSP) from 2011 to 2015 revealed that food borne

outbreaks accounted nearly half of all reported outbreaks [8]. Kerala, in particular, has witnessed a notable increase in food poisoning incidents, with reported cases rising from 2,673 in 2022 to 5262 in 2023. Kozhikode district's contribution to these cases doubled from 5.3% in 2022 to 10.1% in 2023. Beyond official reports, numerous deaths related to food poisoning have been reported in Kerala in recent years [9-13]. In this regard, to prevent infections due to food borne disease transmission, the Food Safety Standard Authority of India (FSSAI) mandates the health cards for all employees working in Indian food industry [14].

Despite the significant role of occupational health in the transmission of infection, there is scarcity of data of prevalence of morbidities and occupational health problems among food handlers in Kerala. In this context, The present study was planned with an aim to identify the prevalence of occupational health problems and co-morbidities among food handlers in Kozhikode district. The primary objective was to assess the prevalence of occupational health problems and co-morbidities among food handlers in the Kozhikode district, Kerala. And the secondary objective of this study was to find out the association between occupational health problems and other demographic factors.

MATERIALS AND METHODS

The present cross-sectional study was conducted in KMCT Medical College located in Kozhikode district, Kerala, India. This study was carried out among food handlers in various food establishments in Kozhikode district Kerala state from January 2024 to June 2024. Ethical clearance for the study was obtained from the Institutional Ethical Committee. (IEC No: IECKMCT/66B/2024). Written informed consent was obtained from all participants before their enrolment in the study.

Sample size calculation: Sample size was calculated using the formula $\{(1.96)^2 pq/d^2\} \times \text{design effect}$. Where, p is pooled prevalence of outcome from previous study, q is (1-p) and d is absolute error. Based on previously available literature [15], the prevalence of occupational injuries like cut wound and burns were 23.3% and 14.3%, respectively were identified. The average of these two prevalence (p) was 18.75%. The q was 81.25%. The absolute precision (d) was taken as 3%. The design effect = $\{1+(m-1) \times \text{ICC}\}$. Where, 'm' is average cluster size (25), ICC is intra cluster correlation coefficient, taken as 0.01 (Due to limited studies, a common value of 0.01 was used as ICC) [16]. Design effect is 1.24. Substituting all these values in $\{(1.96)^2 pq/d^2\} \times \text{design effect}$. The authors got minimum samples of 781. With 10% non-response rate, minimum required samples were 860.

The participants were selected via a multi-stage sampling method. Kozhikode district, divided into 12 blocks [17], out of which three blocks were randomly selected. All food establishments in these blocks were listed from the records of Kerala Hotel and Restaurant Association (KHRA), Kozhikode Unit. From these, 75 food establishments (3blocks X 25 food establishments = 75) were selected using the lottery method.

Inclusion and Exclusion criteria: All food handlers present at the time of study were included in the study. Food handlers who denied to participate in the study were excluded.

Study Procedure

Data collection was carried out using a pretested, semi structured questionnaire [Annexure-I] prepared by expert epidemiologists from Department of Community Medicine. It comprised three sections. First section gathered sociodemographic information, native place, duration and category of occupation, present and past morbidity details, history of vaccination, hospitalisation and detailed the history of jaundice, typhoid fever, acute diarrhoeal disease, dysentery, nail infection, skin infection and injury etc., Second section recorded blood pressure, general and physical examination findings. Third session documented laboratory test include Widal test. Data collection was done by an expert team, including an Epidemiologist, Clinical Doctors, Phlebotomists, Staff Nurses and Clerical staff. Prior to this, a half day training session on introduction of data collection tool, interview techniques and physical examination was conducted at the department.

The investigators in association with KHRA organised health screening camps in respective area and informing them in advance. The camp featured four stations: Registration, history taking, general and physical examination and blood collection. Primary data was obtained through direct interviews. Blood pressure was measured using a sphygmomanometer (AccuSure AS Series) on the non-dominant arm and participants were classified according to Joint National Committee-8 (JNC-8) criteria [18]. Following this, clinical examination were conducted, and with symptoms suggestive of any infectious diseases specifically noted.

Blood samples (5 mL) were collected from all study participants under aseptic precaution by an experienced Phlebotomist and subsequently transferred to plain tubes. From each sample, 500 microliters of serum were extracted, and Widal test was performed using the tube method by an experienced microbiologist. All the

laboratory tests were done at a National Accreditation Board for Testing and Calibration Laboratories (NABL) accredited laboratory in Kozhikode district.

Participants were provided with an information sheet and consent form in their local language. For illiterate participants, a witness who was not part of the research team was present during the consent process, and thumb impression of these participants was obtained. The identity of the participants was kept anonymous throughout the study. Participants with any morbidity were given either treatment advises or referred, as necessary.

Operational definitions:

Food handlers: Any person who is involved in any food related activities like cooking, cutting, food serving, washing and cleaning [14].

Job categorisation: All food handlers were classified into three category- cooking, food servings, and washing.

Interstate migrants: It defined as the participants with Indian citizenship and native place anywhere outside Kerala state [19].

STATISTICAL ANALYSIS

Collected data were entered in Microsoft excel. Descriptive and inferential statistics were analysed using IBM Statistical Package of Social Science version 25 Inc., Chicago, United States of America. Quantitative variables were expressed as mean and standard deviation. Qualitative variables were expressed as percentage and frequency. Chi-square test was used for finding the association between qualitative variables. Odds Ratio (OR) with 95% Confidence Intervals (CI) was calculated to measure the strength of association. A significance level of p-value<0.05 was deemed statistically significant.

RESULTS

Data was collected from a total of 1153 food handlers. Due to lysis of blood samples, researcher analysed 1132 (98.2%) data. The age of the study participants was 39.92 ± 13.39 years (mean $\pm$ SD), with ranging from 18 to 79 years. Out of the total participants, 998 (88.2%) were male. Most participants were from Kerala 882 (77.9%) and 250 (22.1%) were inter-state migrants. About literacy, 1124 (99.3%) participants were literate and majority 777 (68.6%) were studied up to 10th standard [Table/Fig-1]. Regarding the occupation, the mean duration of working was 6.84 ± 8.06 years (mean $\pm$ SD). In category wise significant proportion were involved in cooking 613 (54.1%), followed by food serving 340 (30.0%), washing 114 (10.1%), and other tasks 65 (5.7%) [Table/Fig-1]. Concerning the past history of reported diseases, 143 (12.6%) had a history of jaundice and 28 (2.5%) had history of typhoid fever at some point in their life. Regarding the present morbidities (within the past 7 days), 22 (1.9%) had history of fever. Other present morbidities such as diarrhoea (2; 0.2%), vomiting (1; 0.1%) and boils (1; 0.1%) were reported in less than 1% of cases. About non-communicable diseases among food handlers, 30 (2.7%) had diabetes mellitus followed by 26 (2.3%) had hypertension. However, upon examination, one-fourth of the participants were found to be hypertensive according to JNC-8 criteria [Table/Fig-1] [18].

According to Widal test result, 85 (7.51%) participants were positive for S.Typhi O; among them, three had fever and one had diarrhoea in the last seven days. For S. Typhi H, 10 (0.88%) tested positive, with only one reported diarrhoea in the last seven days. For S. Paratyphi AH, 4 (0.35%) were positive, but none had a history of morbidity in the last seven days [Table/Fig-2].

Based on occupational health problems, the total prevalence of reported health problems was 125 (11.04%). Among these, 61 (5.4%) had nail problems, including 59 (5.2%) with paronychia and 2 (0.18%) with onychomycosis. Prevalence of paronychia was

Parameters		Male (998) Frequency (Percentage)	Female (134) Frequency (Percentage)	Total Frequency (Percentage)
Years of schooling	Illiterate	8 (0.8%)	0 (0%)	8 (0.7 %)
	No schooling	6 (0.6%)	0 (0%)	6 (0.5 %)
	10 years	671 (67.2%)	106 (79.1%)	777(68.6 %)
	12 years	226 (22.7%)	14 (10.4%)	240 (21.2 %)
	15 years	85 (8.5%)	13 (9.7%)	98 (8.7 %)
	17 years	2 (0.2%)	1 (0.7%)	3 (0.3 %)
Native place	Kerala	749 (75.1%)	133 (99.2%)	882 (77.9%)
	Interstate migrants	249 (24.9%)	1 (0.8%)	250 (22.1 %)
Work experience	≤5 years	630 (63.1%)	70 (52.2%)	700 (61.8%)
	>5 years	368 (36.9%)	64 (47.8%)	432 (38.1 %)
Category of work (*)	Cooking	511 (51.2%)	102 (76.1%)	613 (54.1%)
	Food serving	311 (31.2%)	29 (21.6%)	340 (30.0%)
	Washing	88 (8.8%)	26 (19.4%)	114 (10.1%)
	Others†	63 (6.3%)	2 (1.5%)	65 (5.7%)
	Receptionist	25 (2.5%)	0 (0%)	25 (2.5%)
History of vaccination	Tetanus Toxoid (TT)Vaccine	310 (31.1%)	44 (32.8%)	354 (31.2 %)
	Typhoid Vaccine	62 (6.2%)	9 (6.7%)	71 (6.3 %)
	Hepatitis A Vaccine	39 (3.9%)	5 (3.7%)	44 (3.9 %)
Past history diseases	Jaundice	131 (13.1%)	12 (9.0%)	143 (12.6 %)
	Typhoid	25 (2.5%)	3 (2.2%)	28 (2.5 %)
Present morbidities	Fever	21 (2.1%)	1 (0.7%)	22 (1.9 %)
	Vomiting	1 (0.1%)	0 (0%)	1 (0.1%)
	Diarrhoea	2 (0.2%)	0 (0%)	2 (0.2 %)
	Boils	1 (0.1%)	0 (0%)	1 (0.1 %)
	Stye	0 (0%)	1 (0.1%)	1 (0.1%)
	Nail condition*	54 (5.4%)	7 (5.2%)	61 (5.4%)
	Skin condition*	56 (5.6%)	8 (6.0%)	64 (5.6%)
Non communicable diseases	Type 2 Diabetes Mellitus	26 (2.6%)	4 (2.9%)	30 (2.7%)
	Hypertension	20 (2.0%)	6 (4.5%)	26 (2.3 %)
	Coronary heart disease	7 (0.7%)	0 (0%)	7 (0.6%)
	COPD	3 (0.3%)	0 (0%)	3 (0.3 %)
	Visual problems	12 (1.2%)	22 (16.4%)	34 (3%)

[Table/Fig-1]: Sociodemographic factors and work profile of study participants (n=1132).

†Others includes receptionist, purchasing and food delivery; *includes paronychia and onychomycosis;

♦Includes Contact dermatitis, burns and cut injuries; (*): Female participants were involved in multiple activities; hence, the total does not tally to 134.

Microorganisms	Result	Frequency	Percentage
S. Typhi O*	Reactive	85	7.51%
S. Typhi H†	Reactive	10	0.88%
S. Paratyphi AH*	Reactive	4	0.35%
S. Paratyphi BH	Non-reactive	1132	100%

[Table/Fig-2]: Distribution of Widal test result (Qualitative test).

*3 had history of fever and 1 had history of diarrhoea

†One had history of fever

♦No one had history of present morbidities

notably high 9 (7.9%) among participants those who involved in washing. Additionally, 64 (5.6%) had various skin problems, including contact dermatitis (32; 2.8%), cut injuries (26; 2.3%) and burn (6; 0.53%). The prevalence of contact dermatitis was higher 64 (5.26%) among those involved in washing and cut injuries were more common among participants involved in cooking 21 (3.43%) [Table/Fig-1,3]. This study also detailed the association between specific job roles and health outcomes. There was no significant association between washing and paronychia or contact dermatitis. Cooking was significantly associated with cut injuries (OR=3.64, $p<0.001$) [Table/Fig-4]. About the vaccination status of the participants, 354 (31.2%) had received Tetanus Toxoid (TT), 71 (6.3%) with typhoid vaccine, and 44 (3.9%) with Hepatitis A vaccine ever in life. No participants were give history of deworming in the last one year [Table/Fig-1].

Location	Type	Frequency	Percentage
Nails	Paronychia	59	5.21%
	Onychomycosis	2	0.18%
Skin	Contact dermatitis	32	2.83%
	Cut injuries	26	2.29%
	Burn	6	0.53%
Total		125	11.04%

[Table/Fig-3]: Distribution of occupational health problems among the study participants (n=1132).

Skin problems affecting the fingers, palms, hands, face, and other bodysites, and also collected detailed descriptions of these conditions were included. Based on the information, They were categorised into burns, cut injuries, and contact dermatitis. Nail conditions were included under paronychia (5.21%) and onychomycosis (0.18%). A boil was reported by one participant (0.1%). In part 2 of the questionnaire, none of the participants were diagnosed with icterus, lymphadenopathy, oedema, throat infections, eye discharge, ear discharge, or visible deformities at the time of the study. A minor percentage reported gum problems (0.1%) and stye (0.1%). Around 34 participants (3%) had visual problems and 0.5% had head lice. All ulcers were preceded by cut injuries, so we have included them under the category of cut injuries in the results section.

Exposure variables	Outcome variables		Odds Ratio (OR) (95% Confidence Interval)	p-value
	Yes	No		
Washing	Paronychia*		1.67 (0.79-3.47)	0.17
	Yes	9 (7.89%)*		
	No	50 (4.91%)		
	Contact dermatitis		2.11 (0.85-5.26)	0.10
	Yes	6 (5.26%)		
	No	26 (2.55 %)		
	Cut injury		0.73 (0.17-3.17)	0.40
	Yes	2 (1.75%)		
	No	24 (2.36%)		
Cooking	Paronychia*		1.07 (0.63-1.82)	0.77
	Yes	33 (5.38 %)*		
	No	26 (5.01 %)		
	Contact dermatitis		1.63 (0.78-3.4)	0.19
	Yes	21 (3.43 %)		
	No	11 (2.12 %)		
	Cut injury		3.64 (1.36-9.74)	< 0.001
	Yes	21 (3.43%)		
	No	5 (0.96%)		
	Burn		4.25 (0.49-36.58)	0.18
	Yes	5 (0.82%)		
	No	1 (0.19%)		
Food serving	Paronychia*		0.86 (0.47-1.54)	0.61
	Yes	16 (4.71 %)*		
	No	43 (5.43%)		
	Contact dermatitis		1.22 (0.58-2.57)	0.58
	Yes	11 (3.23%)		
	No	21 (2.65%)		
	Cut injury		0.41 (0.14-1.21)	0.10
	Yes	4 (1.18%)		
	No	22 (2.78%)		

[Table/Fig-4]: Association between category of occupation and occupational morbidity (n=1132).

*one paronychia is associated with receptionist, not included in this [Table/Fig-3].

#Many of the study participants were involved in multiple category of work.

DISCUSSION

The present cross-sectional study on morbidity and occupational health problems among food handlers working in Kozhikode district of Kerala, India. This study included 1132 subjects. Similar to other studies [20,21] most of the study participants were middle aged (39.92±13.39 years). It mainly because they typically seek stable employment to support themselves and their families or due to other occupations youngsters were not came to this kind of occupation. But in contrast to this result majority of food handlers in outside the states and countries belonged to young age group [15,22-25]. In gender wise distribution, similar to other studies, [6,15,21,26] the majority of the participants in this study were male. Possibly indicating that, more women are engaged in other kind of occupations. Concerning the education of the study participants, the mean year of schooling was 9.1±3.4 years, which aligns with findings from other studies [23,24]. These data reflect the typical workforce in the hospitality sector, where lower educational levels are common. Many food handling jobs do not require advanced education but rather rely on skill that can be learned on the job. Regarding the interstate migrants, similar to other study [24] nearly one-fourth of them involved in food industry. This highlights the seriousness of poverty, limited access to quality education, job insecurity and political instability in their native regions. On the basis of work experience, similar to other studies [24,26] majority had five years or less of experience. This suggests a relatively transient workforce, which may influence their exposure to occupational

hazards due to varying levels of job familiarity and safety practices. Regarding the past history of diseases, 12.6% of participants had jaundice and 2.5% had typhoid fever at some point in their lives. These diseases often represent only the tip of the iceberg of underlying health issues. Additionally, there is a possibility of recall bias. Therefore, it is important to diagnosis antigen- antibody titre of these diseases to frame future vaccination policy.

With respect to acute morbidity profile, comparing with other studies from India [24,25], The present study study indicates the low prevalence of symptoms such as fever (1.9%), vomiting (0.1%), and diarrhoea (0.2%). This could suggest that acute illnesses are either uncommon or underreported among food handler. It may also due to the healthy worker effect, where only healthy workers attend the camp. Additionally, fear of losing their jobs participants may not reveal any acute illness to the researchers.

This study also investigated the Widal test. The results indicated that a small percentage of food handlers had reactive results for *S. Typhi* O, *S. Typhi* H and *S. Paratyphi* AH. Among these, only a minor percentage of participants exhibited acute morbidities. It is important to advice food establishment owners to exempt these workers from their occupation to reduce the spread of infection to others.

In this study, the most common reported chronic morbidities were diabetes mellitus and hypertension followed by that was coronary artery diseases, which were lower than those reported among

food handlers inside and outside Kerala [26,27]. The occurrence of non-communicable diseases among these participants may be due to irregular eating habits, work related stress, job insecurity or behaviour factors.

Even though, only few had reported hypertension, in this study the investigators examined and identified one fourth of the participants had high blood pressure according to JNC 8 criteria [18]. It indicating the irregular health check-up among the participants and necessity for regular non communicable disease screening among these participants.

The reported prevalence of occupational health problems in this study was 11.04%. This was lower than the prevalence observed among other workers in an unorganised sector doing unskilled works in the same geographical area, such as municipal solid waste management workers (47%) [28] and construction workers (17.2%) [29]. As well as lower than figures reported in other countries and states [6,15,21,23,26]. This lower prevalence is likely due to upgraded kitchen equipment, improved ergonomics, and awareness campaigns.

Among the reported nail related occupational health problems, paronychia was a more prevalent (5.2%), particularly among those involved in washing (7.9%). This condition may result from frequent hand washing, working without gloves, exposure to chemical like soap and sanitation, injuries to the nail bed or cuticles while cutting or peeling, allergic reactions to certain foods or chemicals and poor nail hygiene. Most prevalent occupational dermatoses among food handlers in neighbouring country is also paronychia [30,31]. This may be aggravated by underlying diseases like diabetes mellitus.

Regarding the reported skin related occupational health problems, contact dermatitis (2.8%) and cut injuries (2.3%) were more prevalent among the study participants. Similar to other studies [26,32], cut injuries were more prevalent among participants involved in cooking and contact dermatitis among participants involved in washing.

Most occupational injuries occurred among participants engaged in washing (14.9%), indicating ongoing issues related to hand hygiene and physical safety. These conditions are particularly concerning in the food industry, where hand hygiene is crucial in preventing food contamination.

The association between the type of work and specific morbidities revealed significant findings. Those who involved in cooking had a notably higher risk of cut injuries (OR= 3.68, $p<0.001$). This is likely due to handling sharp objects and exposure to hot surfaces and substances [32]. Additionally, workers from outside the state had higher odds of occupational injuries (OR=1.68; $p<0.01$) and specifically high odds of contact dermatitis (OR=2.84; $p<0.01$) and cut injuries (OR=3.12; $p<0.01$). It mainly due to limited skills, insufficient safety measures, inadequate use of Personal Protective Equipment (PPE), long working hours, lack of awareness and training.

Regarding vaccination status, a minor percentage had received TT, typhoid and hepatitis A vaccines, which was lower than in other states [26,33,34]. The low coverage of vaccination may be attributed to several factors, such as misinformation about vaccines, cost, irregular working hours and lack of awareness. Hepatitis A virus infection is one of the food borne disease and natural infection with the Hepatitis A virus provides life-long immunity. However, the anti-Hepatitis A antibody titre of the study participants are not known, which is important for framing a vaccination policy. In contrary to other study, none of the participants in this study were taken deworming tablets in last one years [34].

These findings from a significant proportion of food handlers working in the unorganized sectors in northern Kerala, highlight the importance of pre placement examinations and regular health screenings including Non Communicable Disease (NCD) screening to prevent the morbidities and occupational health hazards among the participants. To address these issues, all food establishment

owners, in collaboration with KHRA, conduct awareness class on health and safety in the local languages of the participants. They also provide PPE to prevent cross contamination and ensure self-protection. Additionally deworming prophylaxis is implemented at every food establishment level. Owners are responsible for ensuring that food handlers do not work when they are ill. These findings will assist stake holders and policymakers in conducting studies on the antigen antibody titre of the Hepatitis A virus and in developing immunization policies for this high- risk population.

Limitation(s)

This is a cross-sectional study, so the researcher can identify only the diseases present at the time of the study. Additionally, data from the food handlers who were sick at the time of camp could not be obtained. Therefore, future research should focus on longitudinal studies to identify the trend and prevalence of morbidities and occupational health problems among food handlers.

CONCLUSION(S)

The results of this study suggest that prevalence of morbidities and occupational health problems among food handlers were low, but the consequences for public health are substantial. Prevalence of occupational health problems were high among those involved in washing. Most commonly paronychia and contact dermatitis. Prevalence of cut injuries was high among those involved in cooking and was significantly associated. These highlight the need for better workplace safety, hygiene practices and PPE. Also, vaccination was much lower and none underwent deworming in last six months. The transmission of any food borne diseases from food handlers to consumers can be prevented by targeted interventions such as regular health screening, health and self-care awareness class and deworming prophylaxis. Apart from this regular practice of hand washing techniques, safe food handling practices and exempt from duty during illness could be beneficial for public health. The strength of this study was that it was conducted by medical staffs with adequate experience. A multistage sampling method was employed and the researcher included large number of participants working in different categories of food handling jobs across different food establishment in whole district. Thus, the data may be extrapolate to food handlers throughout Kerala state.

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[ANNEXURE-I]: QUESTIONNAIRE

Occupational Health Problems and Co-morbidities among food handlers in Kozhikode district, Kerala- A Cross-sectional study.

Part 1

1. Name:
2. Aadhar card no:
3. Blood group:
4. Education:
5. Contact number:
6. Native place:
7. Workplace:
8. Occupation:
Cooking ☐ Food serving ☐ Dish washing ☐
Receptionist ☐ Purchasing ☐ Food delivery ☐
9. How long have you been working in the present firm:
10. Workplace contact no:
11. Vaccination history if any: TT ☐ Typhoid ☐ Hepatitis A ☐
12. Do you have any of the following illness since last 7 days?
Fever /diarrhea/ vomiting/Boils
13. Have you ever had history of following?
Jaundice ☐ Typhoid ☐

14. Have you ever had skin problems affecting		
	Y/n	Describe
Fingers		
Palms		
Hand		
Face		
Other body sites		
Nails		
15. Have you ever suffered from the following?		
Boils		
Stye		
Paronychia		
Discharge from eyes		
Discharge from ears		
Gums		
Recurrent infections		

16. Have you ever sought any medical advice for any of the above problems? Yes/No
if yes specify the problem and time:
17. Whether you have any history of Non-Communicable Disease? Yes/no
18. If yes, what are they? DM/HTN/dyslipidemia/cancer/MI/CAD/COPD/CKD/other (specify)

Part 2- Physical examination: (to be completed by a registered medical practitioner).

	Impression		Impression
Icterus		Eye discharge/	
Lymphadenopathy		Stye	
Oedema		Ear discharge	
Ulcer (Site/size/discharge)		Throat	
Nail condition		Visible deformity	
Visual defect		Hair condition	

Part 3: laboratory investigation

1. Widal test result:
 - a. S. Typhi O:
 - b. S. Typhi H:
 - c. S. Para typhi AH:
 - d. S. Para typhi BH: