Republic of Yemen

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وزارة التعليم العالي والبحث العلمي

جـــامـــعـة الـــرازي

الـدراســات الـعليـا

Prevalence of Typhoid Fever and Associated Factors among Restaurants' Food Handlers in Sana'a City, Yemen

A thesis submitted to the department of Community Health and Nutrition, Faculty of Medical Sciences, Al-Razi University, as partial fulfillment for master degree in "Epidemiology"

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إنتشار حمى التيفوئيد والعوامل المرتبطة بها بين متداولي الغذاء في مطاعم مدينة صنعاء، اليمن

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أستاذ مشارك في طب المجتمع

جامعة صنعاء

2021

DECLARATION

I hereby declare that this submission is my work for getting a master's degree in Epidemiology. And all that, to the best of my knowledge, contains material that is not previously published, nor material that has been accepted for taking any of other degrees in any other University, except where due information has been made in the text.

Mohammed Saleh Saleh Abdullah

(Researcher)

CERTIFICATE

This is to certify that this thesis entitled "**Prevalence of Typhoid Fever and Associated Factors among Restaurants' Food Handlers in Sana'a City, Yemen**" which submitted to the department of Community Health and Nutrition, Faculty of Medical Sciences, Al-Razi University, for awarding a master degree in Epidemiology.

It is a record of the original and bona fide thesis work carried out by **Mohammed Saleh Saleh Abdullah** under my guidance. Such material as has been obtained from other sources has been duly acknowledged in the research.

This thesis embodies the work of the candidate himself and no part of it has been submitted for any other degrees.

Supervisor:

Dr. Abdullah Abdul-Aziz Muharram

Associate Professor of Community Medicine,

Faculty of Medicine and Health Sciences,

Sana'a University

DEDICATION

I dedicated this work to my mother, the spirit of my father, and to my lovely wife.

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1	%	Percent
2	(φ)	Phi statistical test
3	°C	Celsius degrees
4	µg	Microgram or Microgramme
5	aOR	Adjusted odds ratio
6	BC	Before the century
7	CD4	A cluster of differentiation 4
8	CDC	Centers for Disease Control and Prevention in the US
9	CFR	Case fatality rate
10	CI	Confidence interval
11	Cm	Centimeter
12	DNA	Deoxyribonucleic acid
13	Dr	Doctor
14	ECDC	European Centre for Disease Prevention and Control
15	EF	Enteric Fever
16	eg.	(exempli gratia) meaning "for example."
17	etc.	(et cetera) to indicate further similar items are included
18	F	is feces (in Selenite F Broth)
19	FSA	Food Standards Agency
20	G	Gram
21	GN	Gram-Negative
22	H_2S	Hydrogen Sulphide
23	HIV	Human Immunodeficiency Virus
24	HTAR	Hospital Tengku Ampuan Rahimah
25	IDL	Immuno Develop Lab
26	IgG	Immunoglobulin G

27	IgM	Immunoglobulin M
28	IM	Intramuscular
29	IV	Intravenous
30	KAP	Knowledge, Attitude, and Practice
31	kD	Kilo Dalton
32	Kg	Kilogram
33	Km^2	Square kilometers
34	LDC	Lysine decarboxylase
35	LPS	Lipopolysaccharide
36	MC	Mayo clinic
37	Mg	Milligram
38	Ml	Milliliter
39	MMR	Measles, Mumps, and Rubella
40	N	(Number) the total population sample
41	n.	(Number) part of the total population sample
42	NC	Negative Control
43	No.	Number
44	NTS	Non-Typhoidal Salmonella
45	P	Percentage
46	PC	Positive Control
47	PCR	Polymerase Chain Reaction
48	pH	Power of Hydrogen
49	S	Salmonella
50	SD	Standard Deviation
51	Spp.	Species
52	SPSS	Statistical Package for the Social Sciences
53	ST	Salmonella Typhi
54	T-cell	Thymus cell

55	TF	Typhoid Fever
56	TMP/ SMX	Trimethoprim/ Sulfamethoxazole
57	Ty21a	Live attenuated Oral Typhoid Vaccine
58	UK	United Kingdom
59	UN	United Nation
60	US	United States
61	USA	United States of America
62	USTH	University of Sciences and Technology Hospital
63	WASH	Water and Sanitation Hygiene
64	WHO	World Health Organization
65	XLD	Xylose Lysine Deoxycholate
66	χ^2	Chi-square
67	YSMQ	Yemeni Authority for Standardization, Metrology, and Quality Control
68	Z	Standard normal deviation

ABSTRACT

Background of the study:

Typhoid Fever remains a crucial public health issue around the globe, especially in developing countries. The high carrier rate of Salmonella Typhoid in food handlers working in restaurants and other food establishments may contribute to the constant high Typhoid Fever prevalence rate in developing countries.

The objective of the study:

The current study aimed at determining the prevalence of Typhoid Fever and associated factors among restaurants food handlers in Sana'a City, Yemen.

Research methodology:

A cross-sectional study was carried out, using questionnaires, observational checklists, and blood and stool samples which were collected randomly from 123 of the restaurants' food handlers from 25th of August 2020 to 25th of December, 2020.

Results:

The isolate prevalence and Widal seroprevalence of Typhoid Fever (Salmonella Typhi) among restaurants food handlers in Sana'a City were (0.8%), and (13%) respectively. Poorly adherence to medical examination was (99.2%), (71.5%) knew nothing about Typhoid Fever, (99.2%) had poor knowledge about Typhoid Fever transmission, (54.5%) of them had none treated sources of drinking water, (55.3%) of the toilets were not clean, (83.7%) of restaurants' washing basins with no soap or detergent, of the floor tiles (68.3%) were dirty and cracked. Furthermore, (43.9%) with inadequate personal hygiene, only (35.8%) with good behaviors,

(25.2%) had personal or family history of TF, (17.1%) had symptoms of TF, (23.6%) had poor kitchen status, (35.8%) with poor WASH and restaurants condition. Mainly, the Salmonella Typhoid isolate-prevalence associated factors were geographical distributional zones, with a *p*-value of (0.022). Additionally, the Salmonella Typhoid Widal seroprevalence associated factors were Typhoid knowledge, family history, trash collection beside the restaurant, and the dirty and cracked restaurants floor tiles, with *p*-values of (0.009), (0.028), (0.025), and (0.024) respectively.

Conclusion and recommendations:

Typhoid Fever is prevalent among food handlers and it was statistically significantly associated with Sana'a City geographical zones, knowledge regarding Typhoid, family history, trash collection beside the restaurant, and dirty cracked floor tiles. Further researches on a wider range, obligatory admission conditions, educational courses, periodical medical checkups, and continuous evaluation of the health requirements implementation in restaurants are recommended.