

A Cross Sectional Survey of Community Awareness about Typhoid and its Major Vector Cockroach in Southern Punjab, Pakistan

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Abstract: Cockroaches live in close proximity to human beings. Due to filthy breeding sites i.e. sewer systems they carry up to 40 pathogenic bacteria. Typhoid is a notorious disease known to be transmitted by cockroaches worldwide. Human thought, perception and behavior vary according to the traditions, vicinity and knowledge. This study was carried out to understand the awareness of community about typhoid and its vector and the way they manage them. For this purpose a questionnaire was developed and data regarding typhoid and its vector were collected from 500 people belonging to 5 localities i.e. Multan, Shujabad, Muzaffargarh, KotAddu and Dera Ghazi Khan of southern Punjab. Results revealed that 44.6% of peoples were affected by typhoid at least once in their life. For season of prevalence, 57.0% of persons said that typhoid problem is more during summer season as compared to other seasons. In southern Punjab 92.2% interviewed persons said that cockroaches create more problem in houses and 84.2% of persons said that annoyance of cockroaches occur in night time but data regarding about insect vector or responsible insect of typhoid only 20.2% person have information that cockroaches spread the typhoid. Present survey in Southern Punjab showed that cockroaches create most problems in food commodities and person need to control it properly and very little person identify the insect vector of typhoid. This survey highlights the Southern Punjab people practices in control of cockroaches.

Key words: Cockroaches • Typhoid • Southern Punjab • Educated People • Survey

INTRODUCTION

Cockroaches are tropical in origin so they live in humid parts of houses and other buildings i.e. bathrooms, kitchens, sewer systems etc., where warmth, moisture and food are adequate [1-3]. Their feeding mechanisms and filthy breeding habits make them the ideal agents for harboring and transmitting pathogenic bacteria [4] as well as viruses, fungi, protozoa and helminthes. Reports have proved that cockroaches are carrier of 40 different species of bacteria which are pathogenic to vertebrates [5-13].

Typhoid fever, known to be transmitted by cockroaches [10] is an infectious disease of global distribution [14]. Typhoid fever was reported to be endemic in Far East Asia, Middle East and Central and South America. It remains a serious problem in Zimbabwe

[15], Australia [16], Western French Guiana [17], Thailand [18], Ivory Coast, India [19, 20], Florida [21], Turkey [22], Spain [23] and Nigeria [24]. A number of reports regarding the epidemiology of this disease have been made [25-28]. It is a systemic infection caused by *Salmonella enterica* serotype *typhi*, remains an important worldwide cause of morbidity and mortality [29]. In 2000, it was estimated that over 2.16 million episodes of typhoid occurred worldwide, resulting in 216,000 deaths and that more than 90% of this morbidity and mortality occurred in Asia [30]. It is a prolonged febrile illness and continues to be a health problem in developing countries where there is poor sanitation, poor standard of personal hygiene and prevalence of contaminated food [31]. Although improved water quality and sanitation constitute ultimate solutions to this problem, vaccination in high-risk areas is a

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potential control strategy recommended by WHO for the short-to-intermediate term [32].

Human thought and behavior about natural world is greatly influenced by the traditions and knowledge possessed by the people of specific vicinity. The attitude towards animals depends on humans' knowledge, perception and nature of the relationship they have with a particular animal [33]. Educated people are in majority in Pakistan [34] and they try to tackle the problems in a wiser manner [35]. So this study was done to explore their knowledge about vector-borne diseases and how they manage these diseases. The survey was conducted in understanding why public health risks are increasing day by day in the presence of 56% educated persons in Pakistan? This survey would not only give information about prevalence of typhoid but also the status of its vector i.e. *Periplaneta americana* in residential areas and how people deal with this problem in developing countries like Pakistan.

MATERIAL AND METHODS

Questionnaire Development: A survey questionnaire was developed in Eco-toxicology laboratory Department of Entomology, Faculty of Agriculture Science and Technology, Bahauddin Zakariya University Multan, keeping in view the guidelines of Frary [36].

Area of Study: Present study was carried from February to April 2013 in major cities of Southern Punjab including Multan, Shujabad, Muzaffargarh, KotAddu and D.G Khan for typhoid fever survey. Punjab is the most educated province of Pakistan and it almost contains the fifty percent population of the country [37].

Data Collection: The questionnaire was designed to collect the information about three different aspects from 500 people regarding typhoid:

- Socio-demographic status of the interviewees including gender, age, locality, occupation, size of the house and age of the house.
- Hygienic conditions in houses and their vicinities and its correlation with Percent incidence of fever and occurrence of typhoid and its vector.
- How they manage the typhoid fever and its vector by various approaches and how they got the information about typhoid fever and its vector.

Data Management and Statistical Analysis: Data was

managed for question like gender as for male letter was designed "0" and for female "1". Scale was design for "0" to "4" for categories in each variable. The data were analyzed by simply computing the percentages of information provided by the community using SPSS software (Version 10.0 for windows, SPSS Inc., Chicago, USA). Multivariate logistic regression analyses were performed separately to determine the predictors of cockroaches and associated knowledge of typhoid and adoption of management practices used by them [38].

RESULTS

Survey of typhoid was done among five hundred people of Southern Punjab, Pakistan. Majority of interviewee were males i.e. 59.8% while females were 40.2%. As southern Punjab is densely populated, so educated people (92.2%) from southern Punjab were focused. Educated people (100%) from lesser developed areas i.e. Dera ghazi khan, Muzaffargarh and KotAddu were interviewed. Majority of respondents i.e. 53.6% of all surveyed areas were 19-30 years of age followed by 22.8% interviewee of 18 or less than 18 years in age. Comparison of respondents of different areas revealed that highest percentage of surveyed people i.e. 36% resident of Multan. Majority of persons in all interviewed areas were 66.8% students followed by government employed 6.8%, Business man 8.8%, Farmer 9% and other 6.6% were those people whose have different occupation i.e. Sales-man, Shop-keeper etc. Comparing the respondents of all the areas, highest percentage of students (100%) was from DG khan. Mostly persons (45.2%) of Southern Punjab had houses area ranging 1361.25-2722.5 square foot and 6.6% people's houses were greater than 5445 square foot. Among the surveyed areas highest number of people i.e. 63.4% with 1361.25-2722.5 square foot area were residents of KotAddu. Data on age of houses showed that most of houses (51.8%) were 5-20 years old. Comparing the respondents of different areas with each other it was found that 55.0% interviewee with 5-20 years old houses were belonging from Muzaffargarh. Data of all surveyed areas revealed that 88% respondents have well developed houses. About sanitary conditions of house, 50.2% interviewee claimed that they have fair sanitary conditions in their houses. Highest number of interviewee 61.0% with fair sanitary conditions were residents of Muzaffargarh. About the sanitary condition near vicinity of houses 49.6% respondents were of the view that they have fair sanitary conditions near their vicinity (Table 1).

Table I: Basic information of Persons in Southern Punjab, Pakistan

Sr. No	Variables	Category	MTN n (%)	DGK n (%)	MGR n (%)	KA n (%)	SBD n (%)	Total n (%)
1.	Gender	Male	93 (51.7)	34 (48.6)	109 (100)	9 (22.0)	54 (54.0)	299 (59.8)
		Female	87 (48.3)	36 (51.4)	0 (0)	32 (78.0)	46 (46.0)	201 (40.2)
2.	Education	Yes	179 (99.4)	70 (100)	109 (100)	41 (100)	62 (62.0)	461 (92.2)
		No	1 (0.6)	0 (0)	0 (0)	0 (0)	38 (38.0)	39 (7.8)
3.	Age	18 years	52 (28.9)	20 (28.6)	12 (11.0)	13 (31.7)	17 (17.0)	114(22.8)
		19-30years	120 (66.7)	34 (48.6)	34 (31.1)	23 (56.1)	57 (57.0)	268 (53.6)
		31-40years	1 (0.6)	15 (21.4)	34 (31.1)	5 (12.2)	6 (6.0)	61(12.2)
		< 40 years	7 (3.9)	1 (1.4)	29 (26.6)	0 (0)	20 (20.0)	57(11.4)
4.	Occupation	Govt. employ	34 (18.9)	0 (0)	0 (0)	0 (0)	10 (10.0)	44(8.8)
		Business man	22 (12.2)	0 (0)	0 (0)	0 (0)	22 (22.0)	44 (8.8)
		Farmer	17 (9.4)	0 (0)	0 (0)	0 (0)	28 (28.0)	45(9.0)
		Students	105 (58.3)	70 (100)	82 (75.2)	37 (90.2)	40 (40.0)	334 (66.8)
		Others	2 (1.1)	0 (0)	27 (24.8)	4 (9.7)	0 (0)	33(6.6)
5.	Area of House	5 marla	48 (26.7)	31 (44.3)	39 (35.8)	9 (22.0)	26 (26.0)	153 (30.6)
		5-10 marla	73 (40.6)	32 (45.7)	54 (49.5)	26 (63.4)	41 (41.0)	226 (45.2)
		10-20 marla	41 (22.8)	7 (10.0)	12 (11.0)	4 (9.8)	24 (24.0)	88 (17.6)
		Greater than 20 marla	18 (10)	0 (0)	4 (3.7)	2 (4.9)	9 (9.0)	33 (6.6)
6.	Age of House	5 years	48 (26.7)	15 (21.4)	17 (15.6)	6 (14.6)	24 (24.0)	110 (22.0)
		5-20 years	88 (48.9)	38 (54.3)	60 (55.0)	22 (53.7)	51 (51.0)	259 (51.8)
		Greater than 20 years	44 (24.4)	17 (24.3)	32 (29.4)	13 (31.7)	25 (25.0)	131 (26.2)
7.	House Construction	Kaccha	12 (6.7)	0 (0)	0 (0)	0 (0)	48 (48.0)	60 (12.0)
		Pakka	168 (92.3)	70 (100)	109 (100)	41 (100)	52 (52.0)	440 (88.0)
8.	Standing Water Nearby	Yes	74 (41.1)	29 (41.4)	47 (43.1)	20 (48.8)	45 (45.0)	215 (43.0)
		No	106 (58.9)	41 (58.6)	62 (56.6)	21 (51.2)	55 (55.0)	285 (57.0)
9.	Sanitary condition in House	Poor	22 (12.2)	0 (0)	13 (11.9)	11 (26.8)	12 (12.0)	58(11.6)
		Fair	80 (44.4)	40 (57.1)	57 (52.3)	25 (61.0)	49 (49.0)	251(50.2)
		Good	68 (37.8)	30 (42.9)	39 (35.8)	5 (12.2)	39 (39.0)	181(36.2)
10.	Sanitary condition near Vicinity	Excellent	10 (5.5)	0 (0)	0 (0)	0 (0)	0 (0)	10 (2.0)
		Poor	103 (57.2)	19 (27.1)	46 (42.2)	19 (46.3)	42 (42.0)	229(45.8)
		Fair	63 (35.0)	50 (71.4)	63 (57.8)	17 (41.5)	55 (55.0)	248(49.6)
		Good	12 (6.7)	1 (1.4)	0 (0)	5 (12.2)	3 (3.0)	21(4.2)
		Excellent	2 (1.1)	0 (0)	0 (0)	0 (0)	0 (0)	2(0.4)

MTN= Multan
 DGK= DG Khan
 MGR= Muzaffargarh
 KA= KotAddu
 SBD= Shujabad
 n= Frequency
 %=percentage

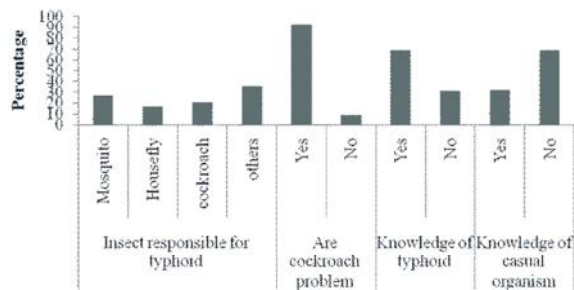


Fig. 1: Vector and causal organism information of typhoid

It was concluded that 69.2% persons were aware with the term typhoid among five hundred persons of Southern Punjab. To answer the question, “source of transmission

of typhoid?” 26.6% person gave opinion that mosquito responsible for the transmission of typhoid. There were severe problems of cockroaches in majority of areas i.e. 92.2% of the surveyed areas. In Southern Punjab 69.2% had information typhoid disease and 68.8% had no information about causal organism of typhoid (Fig. 1). Among surveyed people 75% said cockroaches were present in their home (Fig. 2). About peak time of infestation of cockroaches, 84.2% persons told that infestation of cockroaches occur in night time (Fig. 3). For the season of prevalence of cockroaches, 87.8% of persons told that the problem occurs in summer season in KotAddu (Fig.4). Persons of Southern Punjab stated that in summer season percent incidence of typhoid was more

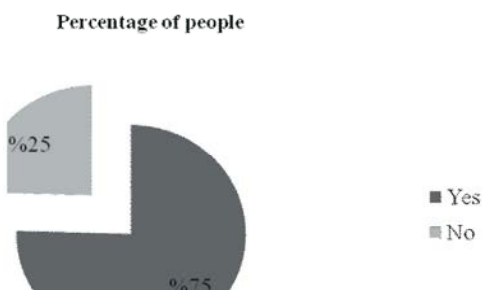


Fig. 2: Presence of cockroaches in your home

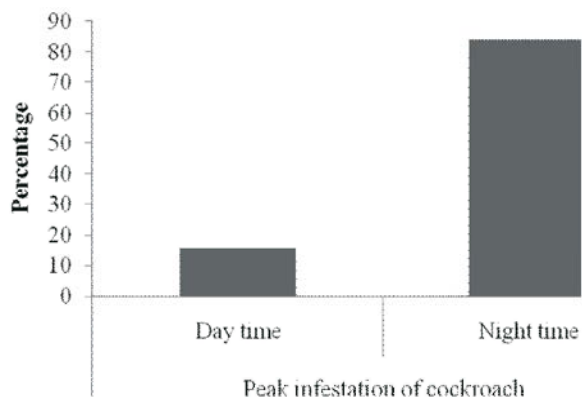


Fig. 3: Information about Peak time of infestation of cockroach in Southern Punjab Pakistan

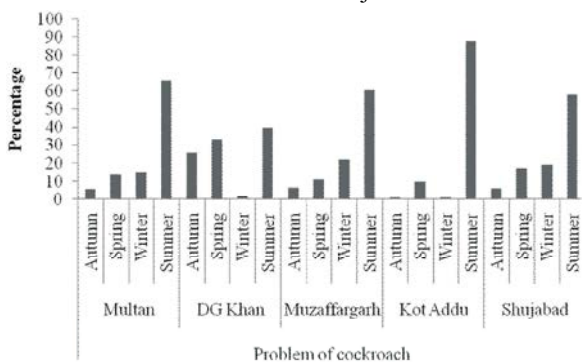


Fig. 4: Problem of cockroach in favorable season in five different cities of Southern Punjab, Pakistan

and highest percentage i.e. 65.9% was observed in KotAddu (Fig. 5). By typhoid fever affected persons in Shujabad was 63.0% (Fig. 6). About the family members who encountered by typhoid fever at least once in their life with highest in KotAddu where family members of 61.5% were affected by typhoid fever (Fig. 7). Survey results showed that 39.0% persons got information about typhoid from personal experience (Fig. 8). For management of typhoid, 68.0% persons got helped from doctors to control this disease (Fig. 9). To control cockroaches in houses, majority of respondents used chemicals. In Shujabad 90.3% person used chemical for control of cockroaches (Fig. 10).

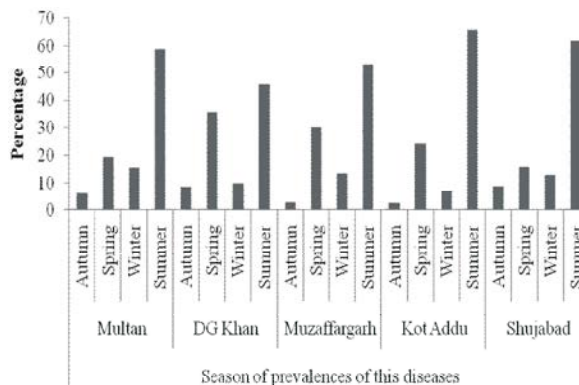


Fig. 5: Occurrence of typhoid in favorable season for cockroaches in five different cities of Punjab, Pakistan

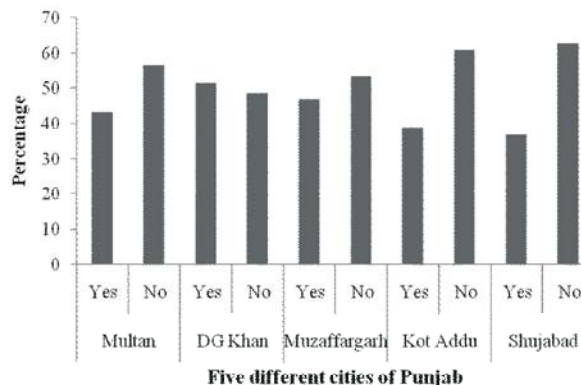


Fig. 6: Interviewed affected persons by typhoid

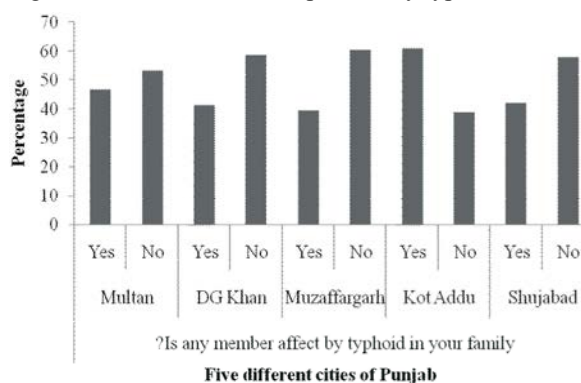


Fig. 7: Member in family affected by typhoid in five different cities of Southern Punjab, Pakistan

DISCUSSION

Education improves quality of life by inducing people behavior and produce significant variations in attitude, behavior and knowledge necessary to maintain or improve health [39, 40]. Focus was done on young educated people to collect the data because they are in majority in Pakistan [34] and also they try to manage every problem

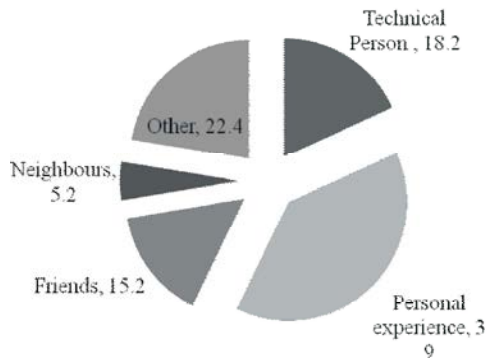


Fig. 8: Information gathering about typhoid from people
Percentage of people



Fig. 9: Information gathering for control of typhoid

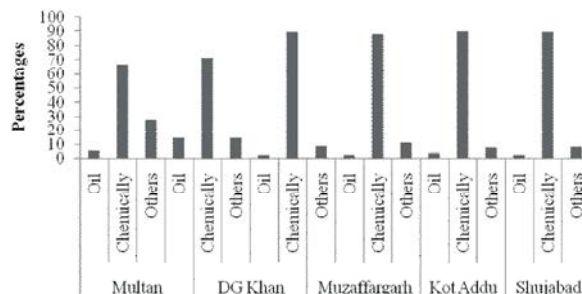


Fig. 10: Frequency of control method of cockroaches in five different cities of Punjab, Pakistan

in a wise manner [35]. As housing is one of the basic necessities of life so it has significant effects on human beings [41]. Areas having slum conditions i.e. deterioration, overcrowding, unsanitary conditions, or absence of basic and essential facilities like consumable water, drainage system and health services among others contained significant effects on socio-economic lifestyles and health conditions of its residents [42]. Area of the house describes why lesser number of houses have good sanitary conditions; larger the area of the house will result in more difficulty in maintaining hygienic conditions and also older houses have more cracks and crevices for insect multiplication [43]. Only excellent conditions in houses are not necessary as a number of vectors i.e. housefly, cockroaches, mosquitoes etc., are mobile and can be

managed in clean vicinity. They cause damage on food commodities [1-3]. Lesser number of areas has good sanitary conditions resulting in about majority of areas having severe cockroach infestation and a large fraction of people which have faced typhoid [44]. It is obvious from the data that most of people faced severe problems of cockroach so they are well familiar with its optimum season i.e. summer of optimum development [45]. Optimum season of development of vector can be positively correlated with the season of prevalence of disease. Only small percentage of people consulted technical persons for information about disease so smaller number of people knew about the casual organism and its vector. Chemical control of insect-pests is the most common method to control insect pests in Pakistan so more numbers of people use chemical control for control of insect pests even in household [46]. Despite of the fact that educated persons were focused for the study but data showed that only 68% people consulted a doctor when they were suffered from typhoid fever due to the fact that tradition has significant effect on behavior of people [33]. 81.4% people demanded for provision of knowledge about control of vector borne diseases like typhoid so there is urgent need of starting programme for training of people giving them orientation towards better disease management techniques.

Keeping in view the fact that educated persons are in majority in our areas, data were collected from random sampling of educated persons to explore their knowledge about typhoid, its vector and management strategies adapted by them to manage typhoid and its vector i.e. cockroach. We found that due to poor hygienic conditions in houses and their vicinities, majority of houses have problem of cockroaches and typhoid. Though we focused on educated people for our study we found that a large fraction of people don't consult doctor for management of important diseases so infectious diseases are increasing day by day in our areas. There is urgent need of starting training programmes to educate people about vector borne diseases in order to manage vector borne diseases by national efforts.

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