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Pakistan is facing many geographical and health challenge. Every winter, a large part of the Punjab province is engulfed in toxic smoke that reduces the visibility and causes a multitude of eye and lung issues leading to disruption in the lives of the residents and travellers to this area. While the term smog was coined for the smoke and fog due to coal burning, the smog faced by Punjab is from a variety of sources. This smog is mainly of photochemical origin which is produced when sunlight reacts with nitrogen oxides and volatile organic compounds in the atmosphere. Smog results from the interaction of these pollutants under humid conditions. Air Quality Index (AQI) and PM 2.5 are two ways to measure air quality of a particular area. Pakistan is among the top 10 countries with the highest PM 2.5 levels, which were also described as nations with highest recorded mortality rates. During winters, AQI of major cities of Punjab particularly Lahore is one of the highest in the world.

The health effects in humans due to smog such as respiratory issues are more pronounced in people with asthma and other lung diseases. Ozone which is one of the major components of smog, is a highly reactive compound that causes tissue damage in addition to sensitizing respiratory system to other irritants. Apart from respiratory issues, air pollution is also associated with increased cardiovascular diseases, neurodegenerative disorders, reduced life expectancy and the development of various types of cancers. The provincial capital Lahore suffers most due to the high level of soot, dust and industrial pollutants in the city.

While air pollution has not been solved in any region of the world yet, but there have been remarkable decreases in emissions and pollutant concentrations in many Western countries, where strong policies, regulations and regular monitoring systems were put into place. One remarkable is that of London where AQI improved significantly after implementation of policies and laws regarding environment. In Pakistan, the government organizations and other related departments have shown keen interest in solving the issue of smog but the mitigating measures against this menace of smog are usually taken on ad-hoc basis and lack consistency. There is dire need to formulate policies and bring transparency in the measures taken to combat this important issue of public health significance.

Contraceptive Use Among Post-Partum Women in an Urban Setting of Lahore

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Abstract

Postpartum is a transitional time for a woman and family. After few months of delivery, exclusive breast feeding reduces and women resume sexual activities that make them more prone to conceive. Adverse outcomes are more reported in pregnancies within the first year postpartum.

Objectives

- To find out the frequency of postpartum women using contraception.
- To identify the barriers in postpartum contraceptive use.

Material & Methods: It was a cross-sectional descriptive study conducted among woman residing in the vicinity of MCH center at IPH. The 140 women of reproductive age (15-49 years) who delivered within one year were included in the study and questions were asked about contraceptive usage.

Results: Study showed that postpartum contraceptive method utilization was 80%.Most of the respondents, 78.6% were satisfied with the contraceptive methods. The main reason to use contraception was child spacing (89.2%). The main source of knowledge was lady health visitors (61.4%). Education was found statistically significant (p = 0.002). Age and income was also found insignificant (p= 0.701 and p = 0.985) respectively

Conclusion: Contraceptive utilization in postpartum period leads to reduction in maternal and infant mortality rates. The frequent reasons of unmet need for family planning are inconvenience, inadequate services, lack of counseling, concerns about contraceptive side effects, prices, effectiveness, resistance from husband and relatives.

Key Words: Contraception, Post-Partum, Family Planning, Counseling.

Introduction

The term contraception means the intentional prevention of conception by any medicine, method or devices. The term postpartum family planning means the commencement of family planning within the first 42 days after birth and later persistent use of the selected method or if required shift to another method.[1,2] In Pakistan, although the contraception prevalence rate has increased but still there are more women with an unmet need for family planning than those who get benefit from family planning services.[3] WHO recommends ideally a gap of 24 months before trying to conceive again.[4] The women in their first year postpartum are more motivated to accept contraceptives but still more than 50% have an unmet need for contraception.[5] There are multiple reasons for contraception use. The most important is to decrease unwanted births and to prevent unsafe abortion which further leads to reduction in maternal mortality rate.[6,7] To decrease infant mortality rate an interval of at least 2 years is needed.[8,9] Highly effective and safe contraceptive processes are available specifically meant for the postpartum period requirements so as to be available as per women's personal desires and choices.[10] To increase the CPR, counseling plays an integral part.[11,12] This is

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needed for choosing appropriate contraception method and should be done before delivery, ideally in the 3rd trimester.[13] The current study is being carried out to find the frequency of post-partum women using contraception and to identify the different variables affecting postpartum contraception in an urban setting of Lahore.

Method

It was a cross-sectional descriptive study done with pur-posive convenient sampling conducted in Maternal and Child Health (MCH) center at IPH Lahore. In MCH antenatal, post natal and neonatal services are provided to the pregnant females along with immunization and family planning services. Formal consent and permission was taking from concerned authority and verbal consent from respondents. Confidentiality was ensured and data was only utilized for academic purpose. The sample included women in reproductive age (15-49 years) who had given birth within 1 year. Women who have delivered more than 1 year and those who refused to participate were excluded. Sample size comprised of 140 women within 1 year of delivery. Data was then entered and analyzed using SPSS (Statistical Package for Social Sciences) version 20.0. Frequency tables were generated for all possible variables. Means and other parameters of central tendency were calculated for continuous data. Chi square test was applied to see for associated factors. P-value <0.25 was taken as statistically significance.

Results

The sample of 140 women was selected from the MCH catchment area. The women of reproductive age (15-49) till 1 year after delivery were included in the study. The socio-demographic characteristics of the respondents showed that out of 140 respondents 16(11.4) were less than 20 years of age and the youngest was 17 years old. The majority of respondents were Muslims (118) and 22 were Christian. The data also showed that out of 140, 123 were educated and only 26 were uneducated which proved that it's an urban educated population. Most of the women are housewives (128) and only 12 were working women. Majority of their husbands were also educated (108) and only 32 were illiterate. Only 10 of them were unemployed while the rest were employed. The 94 families (67.1%) were mostly joint families and only 46(32.9%) were nuclear families. Frequency of contraceptive use among respondents is shown below.

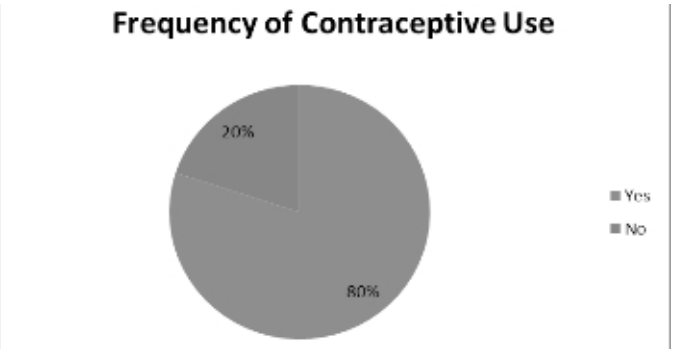

Fig 1: *Frequency of contraceptive use among respondents (n=140)*

As far as practice of contraceptive method utilization is concerned, 56(50%) used condoms, 12(10.7%) used injections,12(10.7%) used IUCD,12(10.7%) used coitus interruptus,12(10.7%) used COCs and 8(7.2%) used tubal ligation. Factors for compliance and non-compliance of contraceptives utilization by postpartum women is described in Table 1

Table 1: *Factors for compliance and non-compliance of contraceptives by postpartum women (n=112)*

Reasons for compliance	Frequency	Percentage
Child spacing	100	89.2
Doctor/LHV advice	6	5.4
Friends/family advice	6	5.4
Total	112	100
Reasons For Non Compliance	**Frequency**	**Percentage**
Husband objection	8	33.3
Irregular cycles	6	25
Vaginal discharge	6	25
Difficult to use	4	16.7
Total	24	100

Table 2: *Inferential statistics*
Association between contraception and education of respondents using postpartum contraception

Education	Contraception		
	Yes	No	Total
Illiterate	16	10	26
Primary	4	0	4
Middle	20	0	20
Matric and above	72	18	90
Total	112	28	140

P. value: 0.002*; *significant value

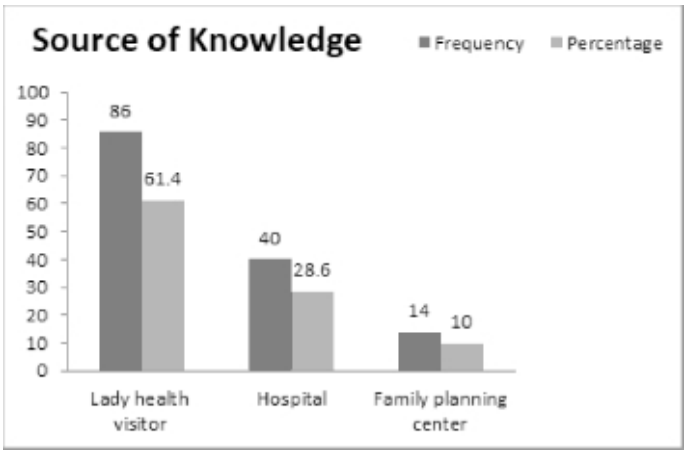

Fig 2: *Sources of contraceptive knowledge and association between contraceptive and education of respondents (n=140)*

Discussion

Postpartum family planning's main objective is to avoid undesired and closely spaced pregnancies.[3,4] It is a transitional time for women and her family.[5,6] Evidence shows that family planning can avert about 30 % of maternal deaths and 10% of child mortality if there is two or more than two years interval between child birth.[14] In addition, twenty seven developing countries data shows that 95% of postpartum women desire to avert pregnancy for at least 2 years and 65% of women for one year but are not using any contraceptive method.[15] Therefore studying the contraceptive practice of women in the extended postpartum period has a vital importance to improve contraceptive utilization in Pakistan.

The contraceptive used in this study was 80% as compared to the National figure of PDHS 2016-17 which is 51%[16] it might be due to provision of good quality family planning services including counseling at MCH and due to small sample size. Information regarding contraceptive method is basic requirement for initiation of contraceptive use. Information regarding contraception knowledge was collected during the study by asking post-partum women methods through which a couple could delay or avoid pregnancy. Most of the respondents, 64.4% has education till matric and above. It was found statistically significant (p=0.002). Most of the sample respondents (92.9%), family income was more than 10,000 rupees. The cross tabulated showed insignificant results between contraceptive usage and income (p= 0.985) and this might be due to availability of free consultation and contraception products at MCH. This encourages the client to use contraception. Age was also found statistically insignificant (p=0.701) Among respondents who adopted postpartum contraception, 50% used condoms while others preferred 10.7% used injectable, coitus interruptus, IUCD or COCs as they were afraid of condom breakage. Among currently married women, pills (92%), female sterilization (87%), IUCD (75%) and condoms (68%) were the most known methods of family planning. This distraction was due to small sample size and catchment population.

A study conducted in 2021 in Accra, university of Ghana, Data indicates that a big proportion of postpartum women i.e. 40% never used any contraceptive method in one year duration after birth. Sixty percent women who used contraceptive methods, 40% relied on traditional methods. Whereas, 29% of women started using a method immediately; one-month post-birth. Moreover, results showed that postpartum modern contraceptive uptake was significantly associated with higher education, having more live births and being currently in a union.[17]

A study was conducted in 2021 in which a baseline and 3-month survey was completed by sixty-nine women. Results showed that at three months postpartum, forty-one percent of women with OASIS (Outcome and Assessment Information Set) and 36% without OASIS were not using contraception. One-third of women in each group reported using at least moderately effective contraception (p = 0.9), where moderately effective contraception is hormonal method or intrauterine contraceptive device, excluding condoms. Most women with OASIS (54%) desired to wait 1 to 2 years before attempting another pregnancy. One fifth of women with and without OASIS desired another pregnancy within the next year (p = 0.4)[18]

Counseling plays a vital role so women who had family planning advice during ante-natal period were more likely to use contraceptive method than those who did not receive such advice. Women, who exclusively breast-fed and not using contraceptive, are more prone to conceive.[19] WHO states that the combined pill has more advantages than progestin only pill due to fewer side effects such as irregular bleeding, more effectiveness and continued utilization. One main problem of mother in postpartum period is irregular cyclical bleeding and treatment with OCP can resolve this issue.[20] In a study of 2021, current knowledge of Progestin-Only Pills have an important place in hormonal contraception methods and in birth control. The availability of different progestin i.e. without the presence of estrogen can pro-

vide a good contraceptive effect even during breast-feeding. In this study, 78.6% were satisfied with the contraceptive methods they were using. Husband attitudes have a positive effect on postpartum contraception utilization. As our community is a male-controlled society so women do not possess a control over their own sexual health and reproductive lives, so, it counseling program should specially be designed for husbands.[21] Use of emergency oral contraception was also noted with total of 10 (7.1%) women used emergency contraceptive pills and out of them 6(60%) used these tablets once in a month while remaining 4 (40%) used twice as they were not using any other regular method of contraception. In certain studies, emergency contraceptive usages were not documented in post-partum period and might be due to use of regular contraception methods among participants.[22]

Conclusion

Contraceptive Utilization in postpartum period considerably reduces maternal and infant mortality. In this study, clients were using post-partum contraception for child spacing because they were living in the catchment areas of MCH center where free counseling and contraceptive services were available. In addition majority of respondents and their husbands were educated and aware of the importance of post-partum contraceptive usage. Referral services for special cases were also available in surrounding tertiary care hospitals.

It concludes that if effective counseling and free services are provided, it can increase the contraceptive prevalence rate to control growth rate of our country keeping in view the need of time.

Conflict of Interest None

Funding Source None

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Bacteria Associated with Houseflies Collected from Teaching Hospitals of Faisalabad

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Abstract

Objective: To determine prevalence of houseflies in 4 hospitals in Faisalabad and study bacteria associated with houseflies from these sites.

Methods: Cross-sectional hospital based study was conducted in 2 public (A and B) and 2 private (C and D) hospitals, Faisalabad. 300 houseflies were collected from five areas of each hospital and transported to labs at University of Agriculture Faisalabad for fly and bacteria species identification. A pre-designed questionnaire was administered to respondents from these hospitals. Data was analyzed using SPSS version 24.0.

Results: Gram positive bacteria, staphylococci were present in 22.5%, staphylococci and bacilli in 77.5%. Gram negative bacteria E. coli were identified in 36.3% samples, 33.8% showed both Salmonella and E. coli, 15% had pseudomonas and E. coli, 6.3% showed salmonella and Shigella/E. coli and 2.5% showed Shigella alone. Public sector hospital houseflies had 10% positivity for staphylococci compared to 30% and 40% among private sector hospitals. For staphylococci/bacilli it was 90% in Hospital A and B and 70% and 80% respectively for Hospital C & Hospital D. 98.8% respondents had heard about houseflies, 98.5% thought it to be involved in transmission of diseases such as diarrhoea (90.2%), dysentery (67.7%)and cholera (86.4%) transmission.

Conclusion: The studied hospitals were positive for high density of Houseflies (Musca Domestica) and these houseflies were highly positive for bacteria. Houseflies contaminated with staphylococci/bacilli were most common in cafeteria followed by OPD and doctor's mess. Difference in contamination with Gram positive bacteria between public and private was statistically significant.

Key words: Musca Domestica, House Flies, Gram positive bacteria, Gram negative bacteria, Hospitals.

Introduction

House fly (Musca domestica Linnaeus), hails from the order Diptera and family Muscidae and has been known as an insect of medical importance insect all over the world.[1] M. domestica lives in closely with humans and is able to complete its entire lifecycle within human and animal habitats.[2] Houseflies are abundant in areas where humans live and also act as potential disease vector.[3] Females houseflies mate multiple times and will lay around 100-150 eggs approximately 6 times during their lifetime. M. domestica is diurnal and the adult housefly activity consists of seeking food and water, feeding, mating, resting and oviposition. House flies are most active during the day and like warm places, they show preference for direct sunshine.

Musca domestica is a mechanical vector[4] for diseases transmission, i.e., through contaminated water, food handlers with poor hygiene practices.[5] Pathogens can be transmitted by one of three possible routes: - 1) By flies' contaminated feet, body hairs and mouthparts 2) By flies vomiting on food 3) By defecation ; this is likely to be the most important method of transmission.[6]

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House flies can carry the organisms on their feet and mouth parts such as Shigella that causes dysentery, Eberthella Typhosa that can cause typhoid fever and Vibrio Cholera, the causative organism for Cholera. They have also been linked to the spread of Rickettsiae of Q fever (Coxiella burnetii), Virus such as Polio, Coxsackie and Hepatitis and protozoans including Entamoeba, Cryptosporidium and Giardia, in addition houseflies may carry eggs of helminths such as Taenia, Ankylostoma, Dipylidium, Diphyllobothrium, Enterobius, Trichuris and Ascaris. Fungi such as Microsporum canis causing 'tinea capitis' in humans have also been found in fly's excreta. Many of the pathogens are also spread by another fly species, the greater house flies (Muscina stabulans). Both species have also been hypothesised as a vector of poliomyelitis.[7]

The flies in areas with poor hygiene usually carry more pathogens. Some housefly strains have acquired resistance to common insecticides. Flies cannot live for more than 48 hour without water and need to eat 2-3 times a day ,their common food sources such as milk, sugar, blood, meat, animal dung and excreta. Females lay their eggs on fermenting or rotting organic material of both animal or vegetable origin. During the daytime when not actively feeding, they rest on floor, walls, ceilings as well as outdoor on the ground, fences, walls, latrines and garbage cans, etc. These resting spots are usually near food sources and breeding areas and shelter them from the wind. Bacteria that stick to the body or legs of flies survive for a few hours, but those that are ingested with the food may survive in fly's gut for several days and are transmitted when the fly comes in contact with people or food. If they get the chance, flies lay eggs on the wounds of humans and animals.[8] The pathogens carried by houseflies depends on where the insect was collected from; house flies found in hospitals often carry antimicrobial resistant bacteria and fungi.[2,10] and they are also linked to transmission of nosocomial infections.[9,11,12]

Methods

It was a hospital-based cross-sectional study which was conducted at four teaching hospital of Faisalabad (2 public and 2 private hospitals). The duration of study was three months from 1-10-19 to 30-12-19, sample collection was accomplished in one month period taking samples of houseflies weekly twice a day from each hospital. The sample size of the study was 300 houseflies (75 from each hospital). Convenient sampling technique was used. Only live housefly specimens were included in the study. Dead houseflies were excluded from the study. Other species of flies were also excluded from the study. A checklist / proforma was prepared by researcher in collaboration with two experts of the subject and finalized after pre-testing. House flies were collected from four tertiary care hospitals of Faisalabad in plastic jars and transported to parasitology department of University of Agriculture Faisalabad for species identification and then were shifted to microbiology lab of the University for the detection and identification of bacteria. After that results obtained from laboratory were noted on the checklist / proforma.

Houseflies were collected from different locations of two public and two private teaching hospitals of Faisalabad at two different timings i.e., morning and afternoon. These locations were cafeteria, doctors' mess, emergency department, OPD and waiting area of Operation Theater. The names of hospitals were not mentioned due to ethical consideration. To measure the density of houseflies, fly grill (Scudder grill) count method was used. In each location five scudder grill counts were taken and then an average count was calculated.

After density estimation houseflies were collected with self-made sweep nets. Sample size was 300. Houseflies collected from each location in the morning and afternoon was put in a separate pool. Houseflies were brought to parasitology department of University of Agriculture Faisalabad, where species were identified and then shifted to microbiology lab of the University for detection and identification of bacteria. Distilled water was added, houseflies were mixed and crushed. Streaking/ Inoculation of houseflies mixed water sample on microbiological media were done. The microbiological media used for this purpose were Nutrient Agar, Salmonella-Shigella Agar, MacCkoney's Agar, Citrimide Agar and Staph 110. Incubation was done at 37°C. Growth appeared after 24 hours. Colony characteristics of bacteria on media/agar were observed and bacteria species identified according to colony characteristics.

Data was entered and analyzed using SPSS (Statistical Package for Social Sciences) version 24.0. Frequency tables were generated for all possible variables. Means and parameters of central tendency were calculated for continuous data. Chi-square test was applied to find out association between categorical variables. p-value < 0.05 was statistically significant.

Results

There were total five areas chosen from each of the four hospitals i.e., cafeteria, doctor's mess, emergency department, Outpatient department (OPD) and waiting area of operation theatre for houseflies collection. The total samples taken were 80. The median (IQR) of collected houseflies in morning was 6 (5.75) and in afternoon it was 8 (5.75) flies. Whereas density drop of Scudder Grill technique in morning showed median (IQR) was 6 (3) flies and it was 5 (2) flies in the afternoon. These houseflies were than subjected to analysis for presence of bacteria. Overall results showed that gram positive bacteria, staphylococci was present in 18 (22.5%) samples and 62 (77.5%) showed staphylococci and bacilli. While gram negative bacteria shown in samples were E. coli among 29 (36.3%) samples, 27 (33.8%) showed Salmonella and E. coli, 12 (15%) showed pseudomonas and E. coli among samples, 05 (6.3%) showed salmonella and Shigella/E. coli among each of the samples and only 02 (2.5%) showed Shigella alone in houseflies samples.

The frequency of houseflies contaminated with various bacteria species varied between hospitals, Table 1 shows the percentages of various Gram positive and Negative bacteria cultured from houseflies from various hospitals.

The results show that there was a statistically significant difference in the percentage of Staphylococci/ Bacilli found in Public sector hospitals (Hospitals A and B) compared to Private hospitals ($p = 0.047$) There was no statistically significant difference between

Table 1: *Percentages of various Gram positive and Negative bacteria cultured from houseflies from various hospitals*

Hospital Names	Gram Positive Bacteria		Total	Chi-Square/ p-value
	Staphylococci n (%)	Staphylococci/ Bacilli n (%)		
Hospital A	2 (10)	18 (90)	20	7.945/ 0.047*
Hospital B	2 (10)	18 (90)	20	
Hospital C	6 (30)	14 (70)	20	
Hospital D	8 (40)	12 (60)	20	
Totals	18(22.5)	62 (77.5)	80	
Hospital Names	**Gram Negative Bacteria**			**Chi-Square/ p-value**
	E. Coli n (%)	**E. Coli & Others n (%)**	**Salmonella & Shigella n (%)**	
Hospital A	6 (30)	10 (50)	04 (20)	7.485/ 0.278
Hospital B	6 (30)	13 (65)	01 (05)	
Hospital C	9 (45)	11 (55)	00	
Hospital D	8 (40)	10 (50)	02 (10)	
Totals	29(36.2)	44 (55)	07 (8.8)	

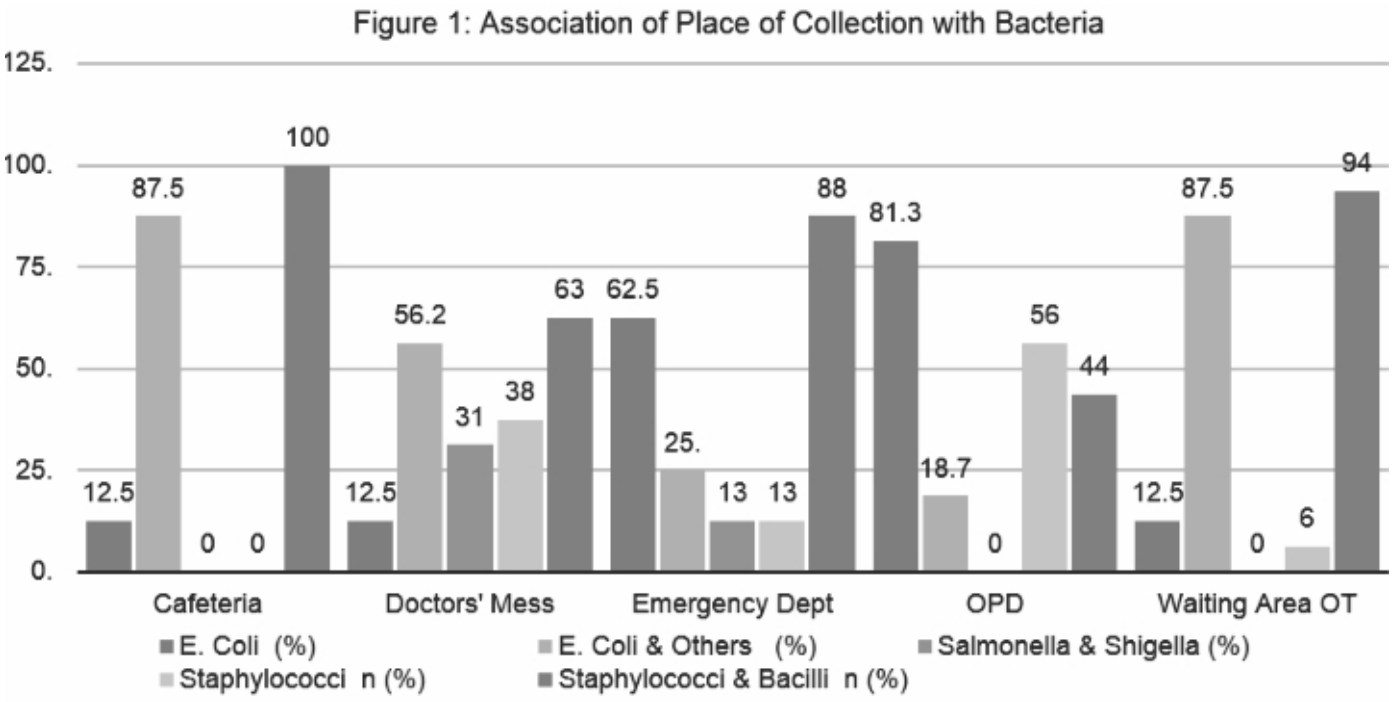

Figure 1: *The detail of individual reports from the 05 areas of the four hospitals is given in these tables.*

public and private sector hospitals in the percentages of Gram negative bacteria (p-value=0.278).

The association of the place of collection with various bacteria species is graphically presented in figure 1. The difference in staphylococci percentages between various sites was statistically highly significant (p-value<0.001). The difference between percentages of Salmonella and Shigella present between doctors mess and emergency department was statistically significant (p-value<0.001).

A total of 337 hospital workers were included in this Knowledge Attitude and Practices study. Age of the respondents showed that the Mean±SD was 32.37±9.26 years. There were 160 (47.5%) females and 177 (52.5%) were males. Regarding profession in the hospitals, the respondents who were doctors or specialists were 167 (49.6%) and paramedical and supportive staff was 170(50.4%). The number of respondents involved from Hospital A was 95 (28.2%), the most respondents were from Hospital B i.e., 151 (44.8%), while from private hospitals, the respondents were 61(18.1%) from Hospital C and 30 (8.9%) were from Hospital D, Faisalabad.

Regarding knowledge of the respondents, 332 (98.5%) thought it to be involved in transmission of diseases, 304 (90.2%) knew involvement in diarrhea, 228 (67.7%) dysentery transmission, 291 (86.4%) cholera and 206 (61.1%) knew houseflies transmit typhoid fever. Out of 337, 331 (98.2%) knew it contaminates food and water and 273 (81%) knew these cause infections. Visiting to hospital for gastro disturbance was known to 324 (96.1%) respondents.

Table 2: *Frequency Distribution of Knowledge about Prevention of Houseflies among Respondents*

	Variable	Frequency	Percentage
Cleaning Schedule Hospital	Once a day	78	23.1%
	Twice a day	61	18.1%
	Thrice a day	175	51.9%
	Four Times	10	3%
	Five Times	13	3.9%
Prevention Strategies	Fly Papers	210	62.3%
	Insecticides	268	79.5%
	Sanitation	305	90.5%
	Fans	198	58.8%
	Planting Mint	125	37.1%
	Neem Essential Oil	160	47.5%
	Electric Fly Killer	277	82.2%
	Chemical Repellents	297	88.1%
	Covering Items	301	89.3%
	Various Methods	324	96.1%
Houseflies Preventable	Yes	225	66.8%
	Don't Know	59	17.5%

Table 1 shows the knowledge of the respondents on how to prevent houseflies in hospital settings.

Discussion

Houseflies (M. domestica) are a nuisance and a sign of unhygienic conditions and are therefore reported to have psychological impacts.[13] The flies pick up disease causing organisms and they contaminate food items while feeding.

There were total five areas chosen from each of the four hospitals i.e., cafeteria, doctor's mess, emergency department, Outpatient department (OPD) and waiting area of operation theatre for houseflies collection. Overall results showed that gram positive bacteria, staphylococci were present in 22.5% samples and remaining 77.5% showed staphylococci and bacilli. While gram negative bacteria shown in samples were E.coli among 36.3% samples, 33.8% showed Salmonella and E. coli, 15% showed pseudomonas and E. coli among samples, 6.3% showed salmonella and Shigella/E. coli among each of the samples and only 2.5% showed Shigella alone in housefly samples. Nazari and colleagues performed a study and revealed that 394 strains of bacteria were isolated from house flies. Bacillus species was most commonly detected (31.1%), followed by Staphylococcus spp. (22.9%), Escherichia coli (11.6%). Enterococcus spp. was the least prevalent type of bacteria in the collected house flies.[1] The maximum bacteria were found in houseflies from around garbage collections. Study concluded that houseflies can mechanically carry pathogens and be a source of spreading infection and flies from hospital settings were more heavily contaminated, as they are in contact with the sick and carriers of many pathogens.[11] A study conducted by Akpan and coworkers at 2 hospitals found that at both hospitals, Escherichia coli was the most prevalent, 34% at UCTH and 37% at GHC, followed by the enteropathogens, Salmonella and Shigella. Escherichia coli-Pseudomonas aeruginosa were both found in 30% flies at first hospital and 35% at the second hospital.[14] A study was done by Kappel and assistants revealed that most (86.4%) of the houseflies carry one or more species of bacteria on their body surfaces. 68.2%

of the bacteria isolated were Gram-positive bacilli or cocci (40.9%), and 18.2% were Gram-negative bacilli. Insects collected inside the hospital were found to carry pathogenic bacteria and it was recommended that to prevent infections in already immuno compromised patients, flies need to be controlled effectively.[15] Rahuma and fellows carried out a study in hospital, 42% was positive for Escherichia coli, 70% for Klebsiella spp., 96%, for Pseudomonas spp., 20%, Staphylococcus spp., and 24%, Streptococcus spp., respectively. They concluded that houseflies can carry such pathogens from hospitals settings to surrounding communities, and vice versa.[16]

The results obtained in the present study were somewhat agree with the report of in Malaysia where they isolated Bacillus species, Escherichia species, and Salmonella species.[17] Also, in a study of the vector potential of house flies (M. domestica) in India, found that bacteria of the genus Klebsiella were present in the cuticle and gut of houseflies, further affirming the hypothesis that M. domestica harbour pathogenic bacteria species in its organs and can transmit them mechanically.[18]

Regarding knowledge of the respondents, there were 98.8% respondents had heard about houseflies, 95.8% knew it was nuisance to humans, 98.5% thought it to be involved in transmission of diseases and 90.2% knew involvement in diarrhea. Out of 337, 98.2% knew it contaminates food and water and 81% knew these cause infections. In a study by Hafiz Azhar and associates in 4 districts of Punjab revealed that from Faisalabad district all of the respondents heard about houseflies, 20.93% knew it cause nuisance to humans, 13.95% thought these cause diseases in humans and animals, 27.78% knew it cause diarrhea.[19]

The breeding place for houseflies was filth by 15.1%, 16.6% by human excreta and animal excreta was breeding place of houseflies by 7.4%. Compared to s study in Faisalabad which showed the breeding place was filth known to 25.58%, 30.23% human excreta and 2.33% knew animal excreta as breeding place.[19]

Conclusions

It is concluded that Public & Private Hospitals of district Faisalabad were highly positive for high density of Houseflies (Musca Domestica) and these houseflies were highly positive for different kinds of disease causing bacteria.

The percentage of staphylococci among private hospitals was high (30 & 40 percent) while staphylococci/ bacilli was present abundantly in public hospitals (90%). E. coli were present almost same in number among both public and private hospitals ranging from 30 to 45 percent. Other gram negative bacteria and E. coli was also present in both type of hospitals. The highest area of contaminated houseflies with staphylococci/bacilli was cafeteria followed by OPD and then doctor's mess. The presence of E. coli was mostly in OPD followed by emergency department while E. coli and others were mostly seen in waiting area of operation theatre. Occurrence of gram positive bacteria was significantly associated between public and private hospitals as compared to gram negative bacteria.

Conflict of Interest None

Funding disclosure None

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Validity of Giemsa Staining of Plasma B-cell Lymphocytes in Diagnosing Acute Dengue Infection Taking Anti-Dengue IgM Antibody and NS-1Ag as Gold Standard

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Abstract

Nearly half of the population around the world is at risk of getting Dengue infection. Dengue fever is a mosquito borne viral disease caused by Dengue Virus (DENV), having four serotypes. The fever is caused by infection with one of the serotypes being transmitted to human by female mosquito Aedes Aegypti and Aedes Albopictus. The various laboratory investigations are performed to diagnose acute dengue infection.

Objective: To evaluate the diagnostic validity of Giemsa Staining of Plasma B cell lymphocytes in diagnosing acute dengue infection using IgM antibody and NS-1Ag as gold standard.

Methodology: The eighty-two patients were divided into two groups on the basis of their febrile illness days. NS1Ag test was performed on the patients who were presented with the fever from 1-3 days. Whereas, Anti-Dengue IgM Antibody test was performed on the patients who had fever for more than 4-6 days. Afterwards, blood of both groups was tested by making peripheral blood films that were stained with Giemsa dye and the peripheral Plasma B Lymphocytes was counted under microscope.

Results: The result depicts that Plasma B cell lymphocytes were present in 20 (52.6%) of the cases who tested positive for Anti Dengue IgM Antibody while absent in 18 (47.4%) cases. Plasma Cells were found in 10 (33.3%) of the cases who were tested positive for NS-1Ag while absent in 20 (66.6%) cases.

Conclusion: This study revealed that leukopenia and thrombocytopenia is present in cases of dengue fever. There was also increased chance of presence of Plasma B-Cell Lymphocytes in Peripheral Blood Film if patients had previous exposure to dengue infection. However, study showed that there was an association between presence of plasma B cell lymphocytes in peripheral blood film and Anti Dengue IgM Antibody.

Key words: Giemsa Staining, Dengue Infection, Anti-Dengue IgM Antibody, NS-1Ag and Plasma B-cell Lymphocytes.

Introduction

Dengue fever is a mosquito borne viral disease caused by Dengue Virus (DENV) from family Flaviviridae. It is caused by infection with one of the four serotypes DENV 1-4, transmitted to human by bite of female mosquitoes of Aedes Aegypti and Aedes Albopictus. The incidence of dengue has expanded significantly around the world. About 3.9 billion people from 128 countries are at risk of infection with dengue virus.[1,2]

The bone marrow inferred B lymphocytes are the ones that produce antibodies and are the effecter cells of humoral immunity. B cells make upto 10-20 % of flowing peripheral lymphocytes additionally present in bone marrow and lymphoid organs. After stimulation, B cells isolate into plasma cells which discharge five types of immunoglobulins that are IgG, IgM, IgA, IgD and IgE, which are arbitrators of humoral immunity. IgM rises in acute primary infection whereas IgG rises in chronic infection. Plasma cells are not normally present in peripheral blood. Plasmacytosis can occur in response to certain drugs, inflammation or infection. Reactive Lymphocytosis with increased B cells has been found in dengue fever cases but the mechanism

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is still unclear.[3-7]

Currently, there are two diagnostic tests available for detection, NS1 Antigen (NS1Ag), Anti Dengue IgM and IgG antibodies. NS1 indicates replication of virus and it is detectable at first day of fever. It is the quickest test usually reported within 5-10 minutes. It has high specificity and low sensitivity depending of the type of kit used. The percentage of positivity decreases and it usually becomes negative on the 5-7 days of illness. The test is positive in patients with primary infections than those who have secondary infection. The negative NS1Ag doesn't rule out dengue infection. However, patient should be treated and managed if clinical symptoms are fulfilling the criteria of Dengue.[8-10]

Furthermore, Anti-Dengue IgM and IgG antibodies usually become positive on fifth day so it is not used for the early detection of the disease. If only IgM antibody is present, then it is a primary infection whereas positive IgG shows the past infection with dengue virus respectively. If both IgM and IgG antibodies are detected, then it is secondary infection. IgM can remain positive up to 1-2 months while the IgG antibodies can remain positive upto 1-2 years.[11]

Additionally, increased number of Peripheral Plasma cells exceeding 1-2 % in blood film is rare. The increased Plasmacytosis of greater than 20% indicates Plasma Cell Leukemia and Multiple Myeloma. However, reactive increase in Plasma cells has been noted in association with inflammation, infection and intoxication. A case was reported in USA with high grade fever with vomiting and loose stools. Serologic tests were positive for Anti Dengue IgM. Patient's peripheral blood film showed White Blood Cell count of 5800/μL with 37% Polymorphonuclear leucocytes, 27% lymphocytes, 19% Plasma cells (1100/μL), 9% Plasmacytoid lymphocytes, 3% band forms, 4% monocytes and 1% eosinophills.[12]

A research showed magnitude of the plasmiblast response in acute Dengue Infection is significantly greater than that induced by vaccination or other febrile illnesses. The circulating B cells in dengue patients were proliferating, activated and apopotic in comparison to the patients with other clinical illnesses. This increased response occurs in secondary DENV infection and is directly associated with disease severity.[13]

Another study exhibited increased number of Plasma cells in blood is a very frequent hematological finding in acute dengue infection. It depends upon the days of illness at introduction; increased number of Plasma cells in blood was seen in 64% to 73% of the cases. Plasmacytosis was noticeable before 7 days of ailment and declined quickly from that point, hence disappearing totally on 14th day.[14]

The study was conducted in Sudan, to review the prior exposure of febrile patients visiting OPD and sixty samples of sera were obtained and conserved at -20°C until the analysis carried out. For the detection of Dengue Virus IgG antibodies indirect ELISA assay was used. It was demonstrated that 76% samples were found reactive for Dengue Virus IgG antibodies while 23.3% were found non-reactive. An elevated percentage regarding exposure to the dengue virus was observed in this area. Thus, it is indicated that strong vaccination campaigns must be done to prevent population from dengue.[15]

In another study, participants were tested for Dengue specific NS1 antigen and IgG, IgM antibodies by immuno-chromatography and ELISA respectively. It was revealed that among 175 patients with fever, 56% were infected with dengue virus. Among these nine-eight who were diagnosed as confirmed dengue cases, 60.20%, 75.51%, 40.81% were NS-1 antigen positive, IgM specific antibodies and IgG specific antibodies respectively. The study showed significant association of IgM antibody and NS1 antigen in the dengue patients. Results pointed out that 59% of the patients had primary dengue infectivity and 41% had secondary dengue infectivity.[16]

Additionally, hospital based study in six healthcare facilities of Bangladesh explore etiology of febrile illnesses. It depicted that among 720 patients over one year, 9.6 were found positive for IgM antibodies against the dengue virus on ELISA testing and 0.56% patients with malaria were confirmed on slide micro-scopic examination and immune-chromatography tests. Dengue cases belonged to 49% from rural areas and 51% from urban areas. The study concluded that dengue infectivity is common all over Bangladesh while malaria is unusual. Therefore, cause of the fever as malaria must not be presumed without confirmation on laboratory investigations.[17]

A study was performed to assess dengue virus seroprevalence in febrile patients in Mali. During this study 95% were obtained from human serum regarding laboratory testing of both IgM and IgG by ELISA specific for DENV. Amongst these samples, 93% were found positive for anti-dengue virus IgG antibodies. Among thirteen IgG positive samples subset, two samples

neutralized mono-typically against dengue virus types 1 and 2, while three others neutralized mostly against Yellow fever virus and several dengue viruses. However, no PCR positives for dengue fever were detected, dengue virus NS1 was confirmed in 1 among 20 acute samples tested. Based on serological testing it was indicated that dengue and yellow fever viruses found mutually in Mali.[18]

This study is of first kind that is conducted to check diagnostic validity of Giemsa staining of Plasma B Cell Lymphocytes in peripheral blood of acute dengue cases and to correlate its findings with gold standards such as NS1Ag and Anti Dengue IgM Antibody. In developed and under-developed countries including Pakistan where advance and specialized labs facilities are not available in primary health care setting. Thus, Geimsa staining will help to diagnose patients of acute dengue infection in these settings. It will be cost effective because Anti IgM Antibody and NS1Ag are quite expensive diagnostic tests.

Methods

The Descriptive Cross-sectional study was conducted in Mayo and Services Hospital, Lahore. The eighty-two patients in Mayo and Services Hospitals were selected by Non-Probability Convenient Sampling. Both male and female patients who were willing to participate and labeled as probable case and admitted to Dengue Isolation Ward and subjected to dengue confirmatory tests were included in the study. All the patients who were any other febrile illness and who came to hospital for any other medical or surgical problem and having fever more than seven days were excluded from the study. The sample was divided into two groups; first group comprises of patients with febrile illness of 1-3 days while other group have patients with febrile illness of 4-6 days. The first group was tested for Ns1Ag and the second group was tested for Anti Dengue IgM Antibody respectively. The Plasma B Lymphocytes was counted in peripheral blood film of both groups stained with Giemsa dye. Following are the operational definition of our study:

Probable Dengue

A clinical case compatible with features of classic dengue fever or severe dengue fever with the laboratory reports indicating probable infection.[19]

Confirmed Dengue

A clinical case compatible with symptoms and features of classic dengue fever or severe dengue fever with the laboratory results confirming the diagnosis.[2]

Diagnostic Validity Of Giemsa Staining

Diagnostic validity of Giemsa staining in diagnosing Acute Dengue Infection is presence of Plasma cells (>1%) in Peripheral Blood Film which indicates active Dengue Infection.

Results

Table 1 depicted that out of 82 patients, 67 (81.7%) patients were found to have Leukopenia in their blood while 15 of the patients were found to have normal white blood cell count in their blood. Whereas, all of the 82 (100%) patients were found to have Thrombocytopenia in their blood.

Table 2 indicated that Anti-Dengue IgM Antibody test was performed on the patients who had fever for more than 4 days. Out of 82 patients, the test was performed on 51 (62.2%) patients. Out of those patients 38 (46.3%) had positive result while 13 (15.9%) had negative result. NS1Ag test was performed on the patients who were presented with the fever from 1-4 days. Out of 82 patients, NS1Ag test was performed on 35 (42.7%) patients. Out of those patients, 30 (36.6%) had positive results while the remaining 5 (6.1%) had negative results.

Giemsa Staining of the Peripheral Blood Smear is performed on all 82 patients and revealed presence of Plasma Cells in peripheral blood film in 38 (46.3%) patients while no plasma cell was seen in 47 (53.7%) cases.

Table 3 showed that as the p value (0.006) is less than 0.05 there is strong association between present between previous history of dengue and presence of plasma cells in peripheral blood film. All of the patients, who had previous history of dengue, had plasma cells present in their peripheral blood film. Table 4 exhibited that as the p value (0.029) is less than 0.05, there is association between Anti Dengue IgM Antibody Test and presence of Plasma cells in peripheral Blood Film. Plasma cells were present in 20 (52.6%) of the cases tested positive for Anti Dengue IgM Anti-body while absent in 18 (47.4%) cases. However, results showed that as the p-value (0.162) is greater than 0.05, there is no association between NS1Ag and Presence of Plasma cells in Peripheral Blood Film. Plasma Cells were found in 10 (33.3%) of the cases who were tested positive for NS1Ag while absent in 20 (66.6%) cases.

Discussion

To our knowledge, this is the first Descriptive Cross-sectional study demonstrating the validity of Giemsa Staining of Plasma B-cell Lymphocytes in diagnosing Acute Dengue Infection. Out of 82 patients, Plasma Cells were found in 38 (46.3%) of the patients which was similar to the cases reported in study done by Thai KTD, et.al, where blood plasmacytosis is a very common hematological finding (64% to 73%) by morphological examination and flow-cytometric method.[14]

The WHO has considered thrombocytopenia as one of the indicators for the clinical severity of the disease in dengue infection.[20] Similarly, in our study we found thrombocytopenia is 100% among dengue cases. Even though the process of thrombocytopenia during dengue infection is not fully explained, it has been proposed that DENV reduces proliferative capacity of hemato-poietic cells in the bone marrow.[21,22]

Moreover, study was conducted in Brazil among 387 dengue patients, 156 depicted thrombocytopenia and presence of leucopenia were identified as risk factors associated with the development of thrombocytopenia in this population.[23] Likewise, there was Leukopenia among 67 (81.7%) patients in our study.

Though Plasma extravasation leads to a high hematocrit value, which is the initial abnormality associated with dengue infection. A hematocrit value >20% over the baseline value is an important diagnostic criterion for dengue.[24] Whereas, other studies have considered the presence of thrombocytopenia as the main hematological change in dengue fever.[25,26] This study is the first to examine Plasma B Cell Lymphocytes changes by Giemsa Staining in association with the development of leukopenia and thrombocytopenia.

Table 1: *Frequency distribution of all patients according to their CBC. (n=82)*

CBC on which patient was labeled as Probable Case of Dengue Fever		
Leukopenia		
Variables	**Frequency**	**Percentage**
Yes	67	81.7
No	15	18.3
Total	82	100
Thrombocytopenia		
Yes	82	100
No	0	0.0
Total	82	100

Table 2: *Frequency distribution of patients according to the Confirmatory tests and Giemsa Staining of Peripheral Blood Film. (n=82)*

Dengue IgM Antibody		
Variables	**Frequency**	**Percentage**
Present	38	46.3
Absent	13	15.9
Not Done	31	37.8
Total	82	
NS1Ag Test		
Present	30	36.6
Absent	5	6.1
Not Done	47	57.3
Total	82	
Giemsa Staining showing Plasma B Cell Lymphocytes		
Present	38	46.3
Absent	47	53.7
Total	82	

Table 3: *Association between Presence of Plasma Cells in Peripheral Blood Film with Previous History of Dengue. (n=82)*

Previous History	Plasma Cells				Total (%)		p-value
	Present		Absent				
Yes	6	100%	0	0%	6	100 %	0.006*
No	32	42.1%	44	57.9%	76	100%	
Total	38	46.3%	44	53.7%	82	100%	

*Significant p-value

Table 4: *Association between Anti Dengue IgM Antibody and NS1Ag Test with Plasma Cell in Peripheral Blood Film. (n=82)*

Association between Anti -Dengue IgM Anti body Test with Plasma Cell in Peripheral Blood Film							
Dengue IgM Antibody test	**Plasma Cells Present**		**Plasma Cells Absent**		**Total (%)**		**p-value**
Positive	20	52.6%	18	47.4%	38	100 %	
Negative	9	69.2%	4	30.8%	13	100%	0.029*
Not Done	9	29.0%	22	71.0%	31	100%	
NS1Ag Test							
Positive	10	33.3%	20	66.7%	30	100 %	
Negative	2	40.0%	3	60.0%	5	100%	0.162
Not Done	26	55.3%	21	44.7%	47	100%	
Total	38	46.3%	44	53.7%	82	100%	

*Significant p-value

Although, our study was limited mainly due to small sample size. But exhibited significant association between Anti Dengue IgM Antibody Test and Presence of Plasma cells in peripheral Blood Film that is 0.029 (p value <0.05). Whereas, there is no association between NS1Ag and Presence of Plasma cells in Peripheral Blood Film i.e. 0.162 (p-value >0.05). As, Plasma Cells were found in 10 (33.3%) of the cases who were tested positive for NS1Ag while absent in 20 (66.6%) cases.

In our study, due to limited resources sample size was small. Thus, it is highly recommended that to find the validity of Giemsa Staining of Plasma B Cell Lymphocytes in peripheral blood further study with large sample size will be conducted. This will help to diagnose patients of acute dengue infection in primary health care setting where the specialized tests like NS1Ag and Anti Dengue IgM Antibody are not available. In this way Giemsa Staining of Plasma B Cell Lymphocytes will prove to be cost effective and will substitute expensive tests like Anti IgM Antibody and NS1Ag.

Conclusion

This study showed that there was an increased chance of presence of Plasma B-Cell Lymphocytes in Peripheral Blood Film if patients had previous exposure to dengue infection. This study also exhibited that there was an association between presence of plasma cells in peripheral blood film and Anti Dengue IgM Antibody. The total leukocyte count and Platelet count are also low in cases of dengue fever. Hence, it was observed during study that there was decreased surveillance activity by the health department and a proactive approach must be instituted by the concerned department to prevent dengue infection.

Conflict of interest None

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Estimation of Sodium & Potassium Content in Naan & Roti and Awareness among General Population

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Abstract

Objective: Assessment of knowledge of general public regarding sodium and potassium content of tandoori naan and roti.

Methods: Samples were collected from 35 tandoors of Johar town Lahore by technique of random sample technique Estimation of dietary sodium and potassium was done in nutrition department of institute of Public Health. A cross sectional study was conducted. A planned questionnaire used to collect data IBM- SPSS statistical software, version 23.0 was used.

Result: The mean value of sodium in 100 grams of naan was 1049±322 mg and in roti was 892±806 The mean value of Potassium in a 100 grams of naan was 93±61 and in roti was 176 ± 61. The maximum value of sodium in 100 grams of naan was 2300mg, minimum value of sodium in naan is 608mg and range is 1691.The maximum value of sodium in 100 grams of roti is 5342 mg, minimum value of sodium in roti is 322 mg and range is 5019 mg. The maximum value of potassium in a 100 grams of naan is 61 mg, minimum value of potassium in a 100 grams of roti is 375 mg. Minimum value of potassium in roti is 108 mg and range is 267 Among total number of 350 participants mean knowledge score was 53±24.

Conclusion: This study concluded that the amount of dietary sodium was high while the amount of dietary potassium was low in tandoori naan and roti. The comparison of the knowledge of general public was not updated and unsatisfactory. But educated population had better knowledge.

Keywords: Sodium, Potassium, naan, roti, hypertension.

Introduction

Sodium and potassium both are alkaline metals. These metals were discovered by the scientist Sir Humphry Dave in 1807 who was a British and chemist and discovered other elements (calcium, Magnesium, Strontium and Barium) with the electrolysis and awarded for his discoveries with medals. Sodium and potassium has a major role in body fluid homeostasis. Excess of sodium in extra cellular fluid leads to excess in fluid retention which leads to increase in volume of blood and blood pressure.[1-4]

In order to prevent chronic non communicable diseases, WHO has announced the goal of 4 grams per day per individual of vegetables and fruits (rich in potassium), furthermore, WHO recommends adult consumption of sodium less than 2000 mg and more than 3500mg potassium per day.[5] Diets having high sodium to potassium ratio 2:1 (inadequate potassium and surplus sodium) known to be known determinants of raised blood pressure and cardiovascular diseases mortality. Renin Angiotensin system has a key role in the maintenance of the sodium homeostasis in the body.[6-7]

Serum potassium levels also play an important role in insulin secretion from the Beta cells of the pancreas. The

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diuretic use produces hypokalemia which is directly linked with dysglycemia. Independent of diuretic use, there is a hypothesis that adults with decreased dietary potassium intake and lower serum potassium levels are at high risk for development of diabetes mellitus.[8-11]

Methods

A cross Sectional Study was conducted in johar Town, District Lahore. The study duration was 4 Months starting from November 2019 to February 2020. 35 samples of Naan and 35 samples of roti were collected. 350 participants were enrolled of general population with questioners having 14 questions in it. Sampling Technique was Random sampling.

Results

Table no 1, 64.6%of the people mentioned the correct answer that excess of sodium causes blood pressure, while 8% said jaundice , 4.3% said Liver Cancer and 2.9 % said all diseases and 20.3% people don't know the reason for use of salt.

Table no 2 shows that 19% people said that potassium deficiency causes heart problem, while 26 % people said that potassium deficiency did not causes any heart problem and 54.6 % people don't know the role of potassium.

In table no 3, demonstrates that 57% people said that excess of sodium causes heart problem, while 8% people said that excess sodium doses not causes heart problem and 34.9 % don't know the exact status of sodium problem.

In table no 4 the post statistical analysis performed with the independent t-test to check the significance level between the knowledge of hypertensive and non-hypertensive and the amount of sodium and potassium achieved after analysis was not significant. The results are also showing that increasing amount of sodium and potassium in naan and roti having no significance by the knowledge of hypertensive and non- hypertensive.

Hypertensive patients which is 49.74+ 24.6 showing that it is significant and hypertensive patients having awareness about the utilization of sodium and potassium in naan and roti.

Table 1: *Frequency distribution of disease caused by sodium*

Disease Caused by sodium		
Disease	**Frequency**	**Percent**
Blood Pressure	226	64.6 %
Jaundice	28	8.0%
Liver Cancer	15	4.3 %
All Above	10	2.9 %
Don't Know	71	20.3 %
Total	350	100.0 %

Table 2: *Frequency distribution of Potassium deficiency causing heart problem*

Can potassium deficiency cause heart problem		
Answer	**Frequency**	**Percent**
Yes	67	19.1 %
No	92	26.3 %
Don't Know	191	54.6 %
Total	350	100.0 %

Table 3: *Frequency distribution of heart problem be caused by excess amount of salt intake*

Can heart problem be caused by excess amount of salt intake		
Answer	**Frequency**	**Percent**
Yes	200	57.1 %
No	28	8.0 %
Don't Know	122	34.9 %
Total	350	100.0 %

Table 4: . *Comparison of mean score between knowledge of hypertensive and non-hypertensive status of the respondents*

Variable	Hypertensive Mean +SD	Non-Hypertensive Mean + SD	t -Test Value	p_ Value	Remarks
Score	67.08+24.94	49.74+24.6	6.111	<0.001	Significant
Naan Sodium	1045.29+281.85	1050.3914+333.59	-0.121	0.904	Not Significant
Naan Potassim	92.56+18.07	92.56+18.66	-2.31	0.8187	Not Significant
Roti Sodium	856.98+784.20	902.82+814.17	-0.436	0.663	Not Significant
Roti Potassium	170.70+64.28	177.82+61.09	-0.885	0.377	Not Significant

Discussion

Regular intake of balanced diet is very important for the healthy body. Sodium and potassium are the two essential nutrients which possess a very important place in growth and health maintenance of any individual. Changing dietary habits and disturbance in ratio of dietary sodium and dietary potassium ratio has put the human health in a potential danger. This sodium potassium ratio disturbance in diet and in serum initiates and progresses number of serious diseases like hypertension and diabetes along with their serious complications like cardiovascular diseases, congestive heart failure, kidney diseases gastric cancer, overeating, salt sensitivity and stroke even resulting in morbidity and mortality including miserable death.[14-17] After these studies WHO took a serious notice and set the current goal to reduce hypertension prevalence up to 35 % by the year 2019.[18] As excess dietary sodium intake and decreased potassium intake is directly concerned with the production of prehypertension and hypertension along with other diseases, WHO set a global target of cutting down dietary salt intake by up to 30% by year 2025.[19-20]

Keeping the warning of the WHO regarding imbalance in ratio for the use of dietary sodium and dietary potassium in diet. This study was designed for the local population of Lahore Punjab, Pakistan. The other reasons for performing this study is no study exist or available which may guide the public health experts to develop SOPs regarding the drastic results of injudicious use of dietary sodium and dietary potassium in tandoor items. This will help the local population not only to prevent the initiation and development of chronic non communicable diseases but also prevention of their complications along with risk reduction of morbidity and mortality.

Conclusion

This study concluded that the mean amount of dietary sodium analyzed in naan was quiet higher as compared to the recommended amount of WHO dietary sodium intake guidelines (2300mg/day). while the mean amount of dietary potassium was are quiet lower as compared to the recommended amount of WHO dietary potassium intake guidelines (3500 mg/day).

Conflict of interest None

Funding Source None

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Iron status of the Healthy Blood Donors in Pakistani Population

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Abstract

In Pakistan, there are 1830 blood centers with an annual estimated blood collection of 3.5 million. The major problem of blood donation is it is associated with reduce body iron stores resulting in iron deficiency. This Iron deficiency can occur with or without anemia. Serum ferritin reflects the level of iron stores in body and can be measured by analyzers in the laboratory.

Objective: To determine the iron status based on serum ferritin levels of healthy blood donors presenting in blood bank of Sheikh Zayed Hospital.

Methods: It was a descriptive, cross-sectional study conducted at Blood Bank unit, Sheikh Zayed Hospital Lahore. The duration of study was from 3-July-2018 to 2-Jan-2019. A total number of 181 healthy male and female blood donors having age 18-65 years were included in this study. Data analysis was carried out using SPSS version 24. Frequency and percentage were calculated.

Results: The results showed that mean baseline hemoglobin levels of donors were 13.95+0.90 g/dL. Mean serum ferritin levels of blood donors were 26.93+15.86 µg/L. 99 (54.70%) blood donors were having adequate iron status, 44 (24.31%) were having low iron stores and 38 (20.99%) were having absent iron stores.

Conclusion: It was concluded that among blood donors with normal haemoglobin levels, depletion of iron stores is common. So serum ferritin levels should be measured in blood donors having normal haemoglobin to determine iron stores status before blood donation.

Keywords: Blood Donors, hemoglobin, serum ferritin, iron deficiency.

Introduction

Blood collection from elected, non-commissioned donors is a salient measure for confirming the quality, safety, accessibility and availability of blood.[1] There are 1830 blood centres with a calculated average 3.5 million of blood collection annually in Pakistan.[2] The on-going process of haemoglobin screening of donor in blood banks of Pakistan is that they identify and defer the iron deficient donors linked with anemia.[3] Blood ferritin represents the levels of iron stores in human body and analysers can measure it in the laboratory.[4] When blood is donated by donors, iron deficiency anaemia aggravates more causing its symptoms.[5] in a research conducted by Goldman et al in 2016, it was recommended that serum ferritin levels of regular blood donors should be estimated to find if they are iron deficient or not.[6] In the past era, the target of blood safety studies has transformed from infectious to non-infectious risks progressively.[7] All donors are screened on every visit for their haemoglobin level. Deficiency of iron is frequent among donors with normal haemoglobin values. That is why, only Hb levels are not enough to distinguish iron deficiency without anaemia in blood donors.[8-10] In another study, Norashikin et al found remarkably low levels of serum ferritin in frequently volunteered blood donors. Many researchers noted the notable decrease in ferritin levels with increasing levels of donations.[11] Another research evaluated by Cable et al. observed level of serum ferritin lower than 45-50 mcg/litre to worsen instable legs syndrome.[12] A survey of donors

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assessed for low Hb levels found that 77% of donors were suffering from iron deficiency. Determination of haemoglobin solely is not a well indicator to check iron status.[13] In a study, iron deficiency defined as IDE or AIS was evaluated using ferritin measurements and soluble transferrin receptor as formerly defined. The educational planning groups were given a letter having tests results of their ferritin. Post-ponded donation for 6 months and iron supplements were recommended to donors of group who received letters of iron status.[14] In a study, observers found that ferritin is calculated for all donors at every donation in Switzerland.[15] A ferritin receptor is also lies on placental membranes. Of interest, ferritin receptor binding sites are in more abundance in pregnant women having light or moderate levels of iron deficiency than in women with normal iron levels during pregnancy.[16] Another study mentioned that 25% of females with absent sustainable bone marrow iron had levels of serum ferritin more than 15 ng/ml, which confirmed that deficiency of iron can occur with ferritin levels in normal range too. [17]

Methods

This study was a descriptive, cross sectional study and evaluated in blood bank unit at Sheikh Zayed Hospital, Lahore. The duration of study was started from 3rd July 2018 to 2nd January 2019 with sample size of 181, calculated at 6.0% level of significance and 6.0% margin of error and taking expected frequency of blood donors 15.5% who suffered from severe iron deficiency. Sampling technique was non-probability, consecutive sampling. All healthy male and female blood donors with age range from 18 to 65 years and who had not donated blood in the last 6 months were included after taking approval from research evaluation unit of College of Physicians and Surgeons Pakistan and IRB of Sheikh Zayed Hospital Lahore. Data analysis was carried out using SPSS version 24.00. Mean and standard deviation, frequency and percentage were calculated. Post-stratification Chi-square test was applied. p-value <0.05 was taken as statistical significant.

Results

In table 1, mean baseline haemoglobin levels of donors were 13.95+0.90 g/dL. Minimum Hb levels were 12.50 g/dL and maximum Hb levels were 16.70 g/dL. Result showed that mean serum ferritin levels of blood donors were 26.93+15.86 µg/L. Minimum serum ferritin levels were 5 µg/L and maximum serum ferritin levels were 51 µg/L.

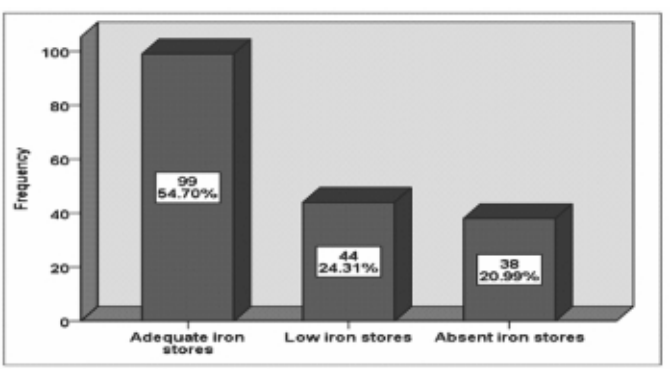
Regarding iron stores status, 99 (54.70%) blood donors were having adequate iron status, 44 (24.31%) were having low iron stores and 38 (20.99%) were having absent iron stores as shown in figure 1.

Figure 1: *Frequency of Iron Stores Status*

In donors having baseline Hb >14 g/dL, low and absent iron stores were found in 22 and 21 donors respectively. This difference was not statistically significant with p-value of 0.63 as shown in table 2.

Table 1: *Descriptive Statistics of Baseline Hemoglobin (Hb) Levels and of Serum Ferritin Levels.*

Baseline Hemoglobin (g/dL)	
Mean	13.95
S.D.	0.90
Minimum	12.50
Maximum	16.70
Serum Ferritin Levels (ng/mL)	
Mean	26.93
S.D.	15.86
Minimum	5
Maximum	89



Discussion:

In a study, Rosvik AS et al, proposed the necessity for a better management of supplementation of iron to blood donors in accordance with blood serum ferritin levels. The assessment of serum ferritin one time in a year is required to direct the iron supplementation. The author suggested that iron should be provided after donation

Table 2: *Stratification of Baseline Hemoglobin (Hb).*

Baseline Hb (g/dL)	Iron Stores Status			P-value
	Adequate	Low	Absent	
< 14.0 g/dL	41	22	17	0.63
≥ 14.0 g/dL	58	22	21	

to the donors with early donation serum ferritin that is < 50 microgram per litre whilst extra iron is not necessary to donors who had serum ferritin >80 microgram/L.[18] Current study has many strengths in evaluating the possible advantages of testing ferritin mentioning following and testing the huge numbers of donors in an operational procedure. In our study, it was observed that 44 (24.31%) had low iron stores, 38(20.99%) had absent iron stores while 99 (54.7%) had normal level of iron store. Results from REDS-II Donor Iron Status Evaluation (RISE) study supported our investigations and confirmed the high frequency of iron deficiency in constant blood donors and found iron status of 2425 female and male donors. Ranges of ferritin less than 12 mcg/L were used to interpret the absent iron store as well as log serum transferrin receptor. Ferritin with value of 2.07 or more was used to mark iron deficient erythropoiesis and found that 42% and 15% of donors had iron-deficient erythropoiesis and absent iron stores.[19] In this study, we found 20(68%) had normal level iron store, 5(18%) had low and 4(14%) had absent iron stores among females while 79(51%) males had sufficient iron stores, 39(25%) had low values of iron store and 34(22%) had absent iron store. Mittal et al observed that 46% of females and 21% of males were deficient in iron stores range ferritin <15 µg per litre. [20]

Conclusion

Among blood donors with normal haemoglobin levels, depletion of iron stores is common. So serum ferritin levels should be measured in blood donors having normal haemoglobin to determine iron stores status before blood donation.

Conflict of Interest None

Funding Source None

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