Prevalence of Typhi DOT IGM positive results in COVID-19 patients at primary and secondary health care hospitals in Punjab, Pakistan.

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ABSTRACT… Objective: To determine prevalence of Typhi dot IgM positive results in COVID-19 patients at primary and secondary health care hospitals in Pakistan. Study Design: Descriptive Cross-sectional study. Setting: Tehsil Head Quarter Hospital of Burewala and District Head Quarter Hospital of Vehari. Period: 1st March 2020 to 30th June 2020. Material & Methods: Study was done among diagnosed cases of COVID-19 after taking ethical approval from ethical review board. Results were assessed by using SPSS version-24. Results: Males were predominant (71.30%) in our study as COVID-19 positives than the females. Most of the patients (51.70%) were from middle aged group, i.e. 31-60 years. Only 7.40% patients were from elder age group (more than 60 years). More than half of the patients (51.90%) were found to be positive with IgM typhi dot test. We repeated the tests and found the same results. We also calculated the prevalence of typhoid positive cases in COVID patients according to different demographic variables. As far as gender is concerned, our result was highly statistically significant when associated with typhoid positive results among COVID patients (P=0.0001). Males were predominantly having high rate of typhi dot IgM positives (71.30%) than females. Middle aged patients were found to be more affected by typhi dot positive results. Conclusion: It is concluded that there is a high and significant ratio of typhi dot positive results for IgM in COVID patients at Vihari district.

Key words: COVID-19, Patients, Typhi Dot IGM.

INTRODUCTION
Approaching end of December 2019, came with a catastrophic disease referred to as corona virus disease 2019 (abbreviated as COVID 19) emerging in Wuhan city of China¹ turning into a global pandemic within couple of days as WHO declared it public health emergency on 30th January 2020.² The novel corona virus disease characterized by pneumonia like symptoms belongs to a family of SARS and MERS.² The clinical symptoms include fever, dry cough, fatigue, myalgia, and dyspnea that lead to failure of the respiratory system and death.³ Being a developing country and geographical neighbour of China, Pakistan also facing a real time burden of the novel corona virus as no vaccine or sure short treatment regime is available till date.⁴ In Pakistan, the numbers of COVID-19 are continually on the rise and the condition is worsening, with around 225,283 infected individuals.⁵

In recent era of advancement of COVID19, a parallel and simultaneous spike of typhoid fever cases has been noted within 10 days of June 2020 in Pakistan causing a burden to health care facilities. A total of 220 patients were tested for Salmonella Typhi in Lahore from March 15th June 15th 2020.⁶ Typhoid fever caused by feco-oral transmission of a bacteria salmonella typhi, causing high grade fever, headache, rash, fatigue along with GIT symptoms.⁷ Besides, to the presentation of nonspecific symptoms of typhoid, they are similar to other diseases like malaria, dengue, and COVID-19. Due to the common symptoms of these diseases, it is difficult to identify the actual underlying cause without the proper diagnosis tests.⁷ Doctors are facing complications in the diagnosis and differentiating
both diseases due to almost common symptoms like fever, fatigue, body pain, and diarrhea in some cases. A study was also conducted in west surgical unit Mayo hospital Lahore building a correlation of typhoid fever patients and COVID 19 patients in pre and post lockdown period.

The aim of this study is to establish any possible association between typhoid fever patients and covid19 patients in area of district Vehari.

MATERIAL & METHODS
This cross-sectional survey was conducted at THQ hospital of Burewala and DHQ hospital of Vehari from 1st March 2020 to 30th June 2020 among diagnosed cases of COVID-19 after taking ethical approval (27-14/ERB/27th) from ethical review board.

Sample size was calculated by using following formula;

\[
\text{Sample size} = \frac{Z_{1-\alpha/2}^2 \times p(1-p)}{d^2}
\]

\[Z_{1/2} = \text{is standard normal variate} (at \text{5% type \text{I}} \text{error (P<0.05}) \text{it is 1.96. As in majority of studies P values are considered significant below 0.05 hence 1.96 is used in formula.}
\]

\[p = \text{Expected proportion in population based on previous studies or pilot studies}= 0.60 (7)
\]

\[d = \text{Absolute error or precision}= 0.05
\]

Sample size = 369.
Convenient sampling technique was used.

Only diagnosed cases of COVID-19 cases were included in surgery. Other patients with other diseases were excluded. An informed consent was taken before filling of questionnaire forms. Social distancing was made sure while conducting this study.

Data was assessed by using SPSS version-24. Demographic frequency distributions were calculated along with the percentage frequencies of different responses by the participants to the questions.

RESULTS
Male were predominant (71.30%) in our study as COVID-19 positives than the females. Most of the patients (51.70%) were from middle aged group, i.e. 31-60 years. Only 7.40% patients were from elder age group (more than 60 years). More than half of the patients (51.90%) were found to be positive with IgM typhi dot test. We repeated the tests and found the same results. We also calculated the prevalence of typhoid positive cases in COVID patients according to different demographic variables. As far as gender is concerned, our result was highly statistically significant when associated with typhoid positive results among COVID patients (P=0.0001). Males were predominantly having high rate of typhi dot IgM positives (71.30%) than females. Middle aged patients were found to be more affected by typhi dot positive results.

| Variable              | Groups n (%)          |
|-----------------------|----------------------|
| Gender                | Male 316 (71.30)     |
|                       | Female 127 (28.70)   |
| Age                   | Less than 30 181 (40.90) |
|                       | 31-60 229 (51.70)    |
|                       | More than 60 33 (7.40) |
| Symptoms              | Asymptomatic 334 (75.40) |
|                       | Symptomatic 199 (24.60) |
| Typhi Dot IgM Status  | Positive 230 (51.90) |
|                       | Negative 213 (48.10) |
| Typhi Dot IgG Status  | Positive 38 (8.60)   |
|                       | Negative 404 (91.40) |

Table-I. Demographic characteristics of study sample (n=443).

| Variables | Total (n=443) | Males (n=316) | Females (n=127) | P- Value |
|-----------|--------------|---------------|-----------------|----------|
| Typhi Dot IgM Status | Positive 230 | 164 (71.30) | 66 (28.70) | 0.0001 |
| | Negative 213 | 152 (71.40) | 61 (28.60) |

Table-II. Prevalence of Typhi Dot IgM among COVID-19 patients in Pakistani population stratified by gender (n=443).
DISCUSSION

The total number of COVID-19 positive patients presented to different hospitals of district Vehari was 443. All presented with different symptoms and from different vicinities of district Vehari. There was no previous study which reported number of cases from this district of Punjab.

Males were predominant (71.30%) in our study as COVID-19 positive than the females showing that females showed some kind of immunity against COVID at this district. A recent study showed the same results for gender inclusion.9 We also divided the COVID positive patients according to age into three groups. Most of the patients (51.70%) were from middle aged group, i.e 31-60 years. Only 7.40% patients were from elder age group (more than 60 years). It was contrary to the results of recent study which shows that most of their patients were from elder age group.10 Patients were mostly stable when presented to hospitals (75.40%). The cause of their presentation in the hospital was that they were exposed to the COVID positive contacts. It was also in oppose to a recent study which shows that patients were unstable mostly when presented.11

We also calculated the prevalence of typhoid positive cases in COVID patients according to different demographic variables. As far as gender is concerned, our result was highly statistically significant when associated with typhoid positive results among COVID patients (P=0.0001). Males were predominantly having high rate of typhi dot IgM positives (71.30%) than females. Prevalence of typhi dot positives for IgM among COVID patients stratified by symptoms showed that most of them (77.80%) were asymptomatic. Results were also non-significant (P=1.542). A recent study showed that unstable patients were the most with typhidot positive for IgM.13,14 Similarly non-significant results were found when associated with age groups (P=1.098). Middle aged were found to be more affected by typhi dot positive results.

A recent study suggests that the typhidot positive result for IgM in COVID patients before the diagnosis of COVID was made, led to wrong treatment as such patients were given antibiotics.15 So with the help of our study, every hospital dealing with COVID cases can make it a norm to have typhoid tests as well.

CONCLUSION

Hence it is concluded that there is a high and significant prevalence of typhi dot positive results for IgM in COVID patients at Vihari district. More studies are needed at bigger level in the Punjab.
province with larger sample size and special attention to be paid from higher authorities in this regard.

Conflict of Interest
The authors have no conflicts of interest to declare.

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### AUTHORSHIP AND CONTRIBUTION DECLARATION

| Sr. # | Author(s) Full Name          | Contribution to the paper                                                                 | Author(s) Signature |
|-------|------------------------------|------------------------------------------------------------------------------------------|---------------------|
| 1     | M. Saeed Aslam              | Conception and design of work, results compiling.                                        |                     |
| 2     | Sidra Shabeer               | Help in biostatics and data analysis.                                                     |                     |
| 3     | Rabia Majeed                | Supervision and revising it critically for important intellectual content.               |                     |
| 4     | Fareeha Asghar              | Final approval of the version to be published.                                            |                     |
| 5     | Syeda Rizwana Jafri         | Analysis and interpretation.                                                              |                     |
| 6     | Humera Khan                 | Write up of the article.                                                                  |                     |