Prevalence of Suspected COVID-19 Cases in a Tertiary Healthcare Centre of Bihar, India and its Association with Selected Demographic Factors and Vaccination Status

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Abstract

COVID-19 is a global issue and has been declared as pandemic by world health organization. The third COVID-19 wave, fueled by the new variant Omicron spread in India towards the end of 2021. This hospital based study was conducted among the patients attending flu clinic established during third wave of COVID-19 in NSMCH, Bihta over a period of two months to assess the prevalence of suspected cases of COVID-19 based on WHO clinical criteria for suspected cases. Out of 683 respondents, 362 (53%) were suspected COVID-19 cases and 321(47%) cases were not suspected cases. Out of 362 suspected cases, 244() were from age group 18-50 years, 60.5% were female, 80.1% were rural residents, 56.4% were employed and only 26.5% were vaccinated. There existed significant association between prevalence of suspected cases and age group, place of residence, employment status and vaccination status of suspected COVID-19 cases. This study revealed that socio-demographic factors and vaccination status of subjects had an important impact on prevalence of suspected COVID-19 cases. Early identification of the suspected cases of COVID-19 is of utmost importance to reduce the invasion of the virus and to reduce the morbidity and mortality caused by the virus.

Introduction

COVID 19 has been a global health issue. First case of COVID-19 was detected in the year 2020. It spread rapidly across borders and soon became a matter of global health concern. First case of COVID-19 in India was reported in 2021. It was declared as a pandemic by World Health Organization in March 2021. [1] The causative virus was named SARS-CoV2 by WHO. Severe acute respiratory syndrome coronavirus 2 has caused over 42 million confirmed cases of COVID-19 and over 5 million deaths in India.(WHO,2023) The overall pattern of the coronavirus pandemic so far has been a series of COVID-19 waves: surges in new cases followed by declines. [2] The third Covid-19 wave, fueled by the new Omicron variant spread in India towards the end of 2021. Inspite of mass vaccination there was peak in new cases between January and March 2022. [3]

So far during the pandemic, several factors have had an impact on whether new COVID-19 cases are increasing or declining in particular locations. Some of these factors include the socio-demographic profile and vaccination status of people. Since there is paucity of data on suspected cases of COVID-19 in this part of the country, this study was carried out in Bihta following the clinical criteria for suspected cases laid down by WHO. [4]

It is of utmost importance to recognize the suspected cases of COVID-19 so as to contain the spread of virus and to reduce morbidity and mortality due to COVID-19. [5]

The specific objectives of the study were; (a) to assess the prevalence of clinically suspected cases of COVID-19 (b) to find out its association with selected demographic factors of study subjects (c) to find out its association with vaccination status of study subjects.

Material and Methods:

This hospital based study was conducted among the patients attending flu clinic established during third wave of COVID-19 in NSMCH, Bihta from January 2022 to March 2022 . Study subjects were selected by total enumeration of patients attending flu clinic during OPD hours for a period of two months. After excluding patients for whom complete data was not available and who did not consent to participate in the study, a total of 683 patients were included in study.

Data was collected with the help of a pre-designed pre-tested screening test questionnaire. Questionnaire included information regarding socio demographic characteristics like age, sex, place of residence (rural or urban) and employment status. It also contained questions regarding vaccination status and clinical symptoms of COVID-19 as laid down by WHO for suspected case of COVID-19. A person was considered as having vaccinated even if a single dose of COVID 19 vaccine had been received.

Techniques of Study

In this study, the suspected status of participants (yes or no) was considered as the outcome variable. On the basis of clinical criteria, a suspected case of COVID 19 is defined as any person having

1 Acute onset of fever AND cough; **or 2.** Acute onset of ANY THREE OR MORE of the following signs or symptoms: fever, cough, general weakness/fatigue, headache, myalgia, sore throat, coryza, dyspnoea, anorexia/nausea/vomiting, diarrhoea, altered mental status.(WHO,2022)

Information regarding symptoms experienced by patients at the time of presentation was recorded. For practical reasons acute onset of three or more of the above mentioned signs and symptoms were considered for identification of suspected cases. A participant's response "yes" was coded as "1" and "no" was coded as "0." If a subject answered yes for acute onset of fever and cough or sum of the responses recorded "yes" was three or more than three for the above mentioned symptoms was considered suspected. Whereas, a participant responded "yes" for less than three questions was considered "not suspected."

Analysis of Data:

Data thus collected was entered in MS Excel and analyzed with the help of SPSS Version 26th. Appropriate tables were generated and statistics were applied for statistical association and inference. Chi-square test was applied for testing statistical significance and P≤ 0.05 was considered significant.

Results:

Out of 683 subjects enrolled in the study, 69.7% of subjects were from age group 19 -50 years, 23.6%were from age group 51-75 years; only 37 (5.4%) subjects belonged to the age group 0-18 years and 1.3% belonged to age group ≥ 76 years. 58.9% of study subjects were male and 41.1% were female. As much as 88.4% of study subjects belonged to rural community. Maximum no of respondents (41.4%) were engaged in agricultural work and some form of business; 129 subjects (36.6%) had paid employment; 18.% were students and 3.1% were unemployed. As much as 54.5% of respondents were vaccinated and 45.5% were unvaccinated. **(Table 1)**

Tables 1: General characteristic of the study subjects

Variable		No.	%age
AGE	0-18 Years	37	5.4
	19- 50	476	69.7
	51-75	161	23.6
	≥76	9	1.3
SEX	Male	402	58.9
	Female	281	41.1
Residential Status	Rural	604	88.4
	Urban	79	11.6
Employment Status	Student	129	18.9
	Employed	250	36.6
	Unemployed	21	3.1
	Other (Business/Agriculture)	283	41.4
Vaccination Status			
	Vaccinated	372	54.5
	Unvaccinated	311	45.5

Among 683 respondents considered in the study, 372(54.5%), 470 (68.8%%), 362 (53%), 280(55.%), 98 (14.3%) and 80(11.7%) experienced a cough, sense of fever, weakness/fatigue, malaise, sore throat and shortness of inhalation respectively in the last 7 days before the survey. 2.6% respondents had nausea/vomiting, 0.1% had altered mental status and 2%had suffered diarrhoea and 6.3% had headache. **(Table 2)**

Table 2: Demographics and Vaccination Status of study subjects with and without suspected COVID-19

Characteristic	No.	With Suspected COVID-19		Without Suspected COVID-19		Test of Significance
		No. (362)	%age 100	No. (321)	%age 100	
AGE						
0-18 Years	37	13	2.8%	24	7.5%	$\chi 2$ =13.368
19- 50	476	244	67.4%	232	72.3%	df=3
51-75	161	97	26.8%	64	19.9%	P=0.004
≥76	9	8	3%	1	0.3%	
SEX						
Female	402	219	60.5%	183	57%	$\chi 2$ =0.855
Male	281	143	39.5%	138	43%	df=1 P=0.355
Residential Status						
Rural	604	290	80.1%	314	97.8%	χ2=52.161
Urban	79	72	19.9%	7	2.2%	df=1 P=0.000
Employment Status						
Student Employed	129	89	24.6%	40	12.5%	$\chi 2$ =207.411
Unemployed	250	204	56.4%	46	14.3%	df=3
Other	21	5	1.4%	16	5%	P=0.000
(Business/Agriculture)	283	64	17.6%	219	68.2	
Vaccination Status						
Vacinated	372	96	26.5%	276	86%	$\chi 2$ =242.555
Un-Vaccinated	311	266	73.5%	45	14%	df=1 P=0.000

Subjects were classified into suspected COVID-19 and without suspected COVID-19 cases based on WHO clinical criteria for suspected cases.() Out of 683 respondents, 362 (53%) were suspected COVID-19 cases and 321(47%) cases were not suspected cases. Prevalence of suspected COVID-19 status was higher among all age groups as compared to prevalence of without suspected COVID-19 cases except 0-18 years age group where prevalence of without COVID-19 suspected cases was higher. Prevalence of suspected COVID-19 cases was significantly associated (P<0.05) with advancing age group. Out of 362 suspected cases, 244(67.4%) were from age group 18-50 years, Out of 362 suspected cases, 60.5% were female and 9.5%were male. There existed no significant difference (P>0.05) in sex wise prevalence of suspected cases.

As much as 80.1% Subjected from suspected COVID-19 group and 86.7% subjects from without suspected COVID-19 group were rural permanent residents. There existed significant association between prevalence of suspected cases and place of permanent residence.

Of 362 subjects with suspected COVID-19, 204 were employed and 64 were engaged in business and agricultural work 89 were students and 5 were unemployed; among 321 without suspected COVID-19 cases was 46 were employed;219 were engaged in business and agricultural work, 40 were students and 16 were unemployed. Prevalence of suspected cases was significantly associated with employment status of subjects.

Of 362 suspected COVID-19 cases 96 subjects were vaccinated and266 were unvaccinated; corresponding values in the without suspected COVID-19 group was 276 and 45. Prevalence of suspected COVID-19 cases was significantly associated with the vaccination status of study subjects. **(Table 3)**

Table 3: Clinical symptoms presented by the study subjects

Symptoms	No.	%age
Fever	470	68.8
Cough	372	54.5%
Weakness/fatigue	362	53%
Malaise	280	55%
Sore throat	98	14.3%
Dypnoea	80	11.7
Nausea/vomiting	18	2.6%
Altered mental status	1	0.1%
Diarrhoea	14	2%
Headache	43	6.3%

Discussion:

Using WHO clinical criteria for case definition of suspected case, 53 % subjects were categorized as suspected COVID-19 cases. A multi-centric study conducted in Vietnam revealed that 35.1% respondents were suspected COVID-19 cases (Nguyen et al, 2020). Another study reported a much lower prevalence of suspected COVID-19 as 14.9% (Tesfaw et al, 2022). [6]

The present study revealed that 67.4% of suspected cases were from the age group 18-50 years and 60.5% were female. 80.1% of suspected cases were rural permanent residents. Majority (56.4%) of suspected cases were employed having a paid job. Only 26.5% of suspected subjects had been vaccinated as compared to73.5%of suspected cases WHO were unvaccinated. In the present study, the overall prevalence of suspected cases was high, 362(53%) subjects reported ≥3 symptoms suggestive of COVID-19. Majority of subjects (68.8%) presented with fever followed by 54.4% of subjects having cough. [7]

There are very few studies which reported about suspected cases of COVID-19. A similar study conducted by over1288 participants reported 14.9% prevalence of suspected COVID-19 cases. Same study showed that 54.1%of suspected cases were male, 55.6% were employed, 80.9% belonged to rural area and out of all the respondents, majority (16.7%) had sore throat (Tesfaw et al). One of hospital based studies revealed that out of the suspected cases , 63.2% of were male and majority of suspected cases (57.4%) had cough and 28% had fatigue (Chi et al,2020). [8]

The present study revealed that there existed significant association between prevalence of suspected cases and age group, place of residence, employment status and vaccination status of suspected COVID-19 cases. This study revealed that socio-demographic fa0ctors and vaccination status of subjects had an important impact on prevalence of suspected COVID-19 cases. The present study revealed that majority of patients (73.5%) in the suspected cases group were unvaccinated. A study conducted over 4,314 COVID-19 patients aged 12 or older from April 2021 to March 2022, showed that a higher number of vaccinations were associated with lower risk of COVID-19-related health outcomes, not only in the delta variant but also in the omicron variant. (Tomioka et al,2023).

There were some limitations to the present study. First, this was a single-center study and so the number of participants were relatively less.. Second,

the data collection was done only for the patients attending flu clinic which increased their chances of fulfilling the criteria for suspected cases and may be responsible for high overall prevalence of suspected cases as compared to previous studies.

Higher overall prevalence of suspected cases is a warning sign that significant interventions are needed to curb the spread of virus.

Conclusion:

Higher overall prevalence of suspected COVID-19 cases is a warning sign that significant interventions are needed and calls for concerted efforts from all stakeholders. There are significant health and economic gains attached to early identification of suspected covid cases and so preventive strategies should be directed to them for positive impact.

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