

Occurrence of COVID-19 in Kolkata slums during second surge



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ABSTRACT

Background: The clobber of COVID-19 brought a coup-de-grace to humanity in this modern era. New-norms of COVID-19 prevention although appear promising yet often adjunct with non-congruent compliance. The WHO has advocated house-to-house case-linked study to acquire facts on epidemiological and transmissibility traits of COVID-19 in low-income communities. Kolkata experienced the first wave of COVID-19 till November 20, expected second splatter in March 21. **Aims and Objectives:** Thinking through a probable upswing of COVID-19 in Kolkata, it was felt prudent to study the occurrence of COVID-19 among residents of two different slums inter-alia study allied factors, if any. **Materials and Methods:** The study was carried out in two different slums having 395 and 428 members, respectively, in South Kolkata from March 21 to August 21. Sanction was obtained from administrative authority as well from each individual. Questionnaire containing personal details, awareness, and observance of personal protective measures (PPM) on COVID-19 were sent to members through e-mode; those demurred, contacted in-person under new-norm. Data assembled was coded, tabulated and analyzed. Details of COVID-19 (RT-PCR +ve) cases confirmed by Government/private hospitals were incorporated as and when surfaced. **Results:** Communities studied had comparable socio-demographic attributes including education, employment, and economic stand. About 93% of subjects from each slum knew most of the facets of PPM and stated practiced the same. Occurrence rates of COVID-19 were 15.2 and 16.2 per 1000 people of respective communities during study tenure. Majority of indisposed were smoker male (92%) from the lowest SES (53.8%), educated to primary/middle school (46%), and worked as vegetable seller (53.8%). All afflicted stated followed PPM except social distancing (77%) and sanitizer use (53.8%). All affected were smokers/quid-users and shared tobacco sticks/hand-smothered quid for mutual use regularly. The study unveiled unequivocal heterogeneity of COVID-19 transmission in Kolkata slums because of certain unattended socio-graphics besides optimistic reflective of PPM awareness/observance. PPM proffers protection no doubt but its effective role necessitates consistent conformity in the background of certain contextual considerations. **Conclusion:** Further research in urban slums is contemplated to enhance the present effort to extricate facts that may lend a hand in COVID-19 prevention tomorrow.

Key words: COVID-19; PPM; Second surge; Social distancing

INTRODUCTION

The carnage of cankerous COVID 19 has been unprecedented and unheard-of in the history of mankind. Around the world, 216 million have been infected causing 4.45 million fatalities by August 21 with the US leading having estimated 38.5 million cases and India relented for

32.7 million affected.¹ Low-middle-income countries hold the majority of confirmed cases of COVID-19 with India housing the second-highest number of cases in the world.² Preliminary scientific insights about COVID-19 infection originated chiefly from epidemiological data endorsed in the initial stage of cataclysm in China,³ certain European nations,⁴ and North America.^{5,6} Sero-surveillance and

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contact tracing were recommended as critical components of effective public health response to COVID-19 to delineate epidemiological kinetics and transmission dynamics within limited resources in high priority countries.^{7,8} However house-to-house case-oriented study has also been suggested by WHO to generate information on local, epidemiological and transmissibility characteristics of COVID-19.⁹ COVID-19 spreads in communities through daily chores like contact while running errands, eating together, going to work or meeting friends and family. Adherence to strict public control measures is difficult to enforce, often culminating in community-level susceptibility due to uncontrolled actions and behavior of others.¹⁰

Kolkata is thickly populated with ever-expansive trade and business, shops, and markets in the vicinity of close-nit residential, commercial and shanty settlements with perennial sultry climate perhaps posing strong epidemic threat. Kolkata experienced the first wave of COVID-19 up-till around Nov 2020; has been undergoing ravage of resurgence with escalating cases each day since March 21.¹¹

Aims and objectives

Considering the trend, it was decided to determine the occurrence of confirmed COVID-19 cases in two different slums in Kolkata during the strike of the second surge; apropos study associated factors related to such occurrence if any.

MATERIALS AND METHODS

The study was conducted from March 21 to August 21 among the residents of two urban slums located in the Tollygang area, South Kolkata having around 100 and 108 families respectively with about 400 members per colony. Access to these slums was facilitated through local administrative body and sanction was secured from the authorities to carry out the study.

The members were interacted at the outset to explain the intent of the study in March 21 and informed individual consents were collected following necessary COVID-19 precautions. Formal list of all members along with address and mobile no. was made. A relevant questionnaire was arranged after revisiting current literature integrating required modifications due to local factors and issues.

The questionnaire comprised of three segments; the first part contained details of personal attributes besides socio-demographic characteristics with job engagement status of the subjects and the second part had details of understanding of personal protective measures (PPM)

against COVID-19 with real-life practices for the same. The third section housed facts of COVID-19 infection among residents, in case such surfaced. Socio-economic status (SES) was ascertained as per current scale.¹² The questionnaire was circulated among few members initially to decide feasibility and modifications if needed.

The final questionnaire was broached to all the members through mobile/electronic media; or else individually (for those not having mobile) in small groups at a time. Any uncertainty in information generated through e-mode was cleared during personal visit. Name, address, and mobile no. of residents were codified for discretion, but the record was preserved to avoid duplication. Name of head of the family and house no. were maintained as primary distinctive identity of the family. New-norm measures such as utilization of mask, hand sanitizer, and social distancing were followed during the interactions. The data acquired was assimilated, tabulated, and statistically validated to infer the outcome.

Communities were monitored for the occurrence of distinct cases of COVID-19 (RT-PCR +ve) affirmed by the Govt/private hospitals/clinics till August 21. Contacts were checked in centres/home for possible secondary attack. Subjects were reinforced again and again the measures for COVID-19 prevention.

RESULTS

Community 1 and 2 resided in South Kolkata around 1.5 km apart. Residences were by and large masonry work with asbestos top single room, while few of them were temporary provisional type. Municipal toilets, public water supply, water hand-pumps, and street lights are around but not enough to render public comfort at large. Drainage system is open, littered with undue drop-offs. Surrounding is messy with irregular trash disposal. State hospital and Govt. dispensaries with medical conveniences are nearby for both the slums. Being located in midst of busy vegetable and grocery market, the locality found overpopulated and congested.

Communities included 395 and 428 members, respectively, with sex ratio of 945.8 and 936.6 females/1000 males correspondingly (Table 1). Majority of the respondents belonged to Hindu religion. Employable (21–60 yr.) constituted 68.3% and 73.4% of the groups, however in reality 240 (60.7%) and 256 (59.8%) were actually engaged sequentially. Under-20 constituted 27 and 23% of the communities; family size recounted as 3.95 and 3.96 respectively.

Majority (38% and 37.6%) members of respective groups were educated to primary level as compared to 33.4–35.5% accomplished middle school (Table 2). 25 and 38 children in respective groups didn't attend school; hence deemed illiterate. Majority of the families (46.3–46.5%) belonged to lower most SES in contrast to 43.3–44.9% were from lower middle SES in the corresponding groups.

Nearly 93% and more members of both the communities knew most of the aspects of COVID-19 infection including benefits of PPM like hand washing with soap and water, use of mask and sanitizer, personal hygiene, social distancing and reporting a doctor/health care facility in case of need (Table 3). Largely these measures were even practiced by the members of both communities in similar proportion matching to their awareness. About 17–18% subject availed first dose of COVID vaccination. Around 14% of the individuals from each community even sought health advices as required.

There were 6 and 7 confirmed COVID-19 cases among the subjects of the communities respectively estimating to an occurrence rate of 15.2 and 16.4/1000 of study population in the tenure of the study (Table 4). Subjects from 40 to 49 years age group were mostly (69.2%) affected; majority (92%) were male and smokers belonging to lowest SES group (53.8%) generally educated up to primary/middle school (46% each) working as vegetable vendors (53.8%). All the affected subjects used mask, washed hands twice a day before meals and observed “no contact greetings”

however, only 77% could follow social distancing and 53.8% could apply sanitizer. 84.6% believed contracted the disease at work, however, 23% were admitted in hospital on diagnosis and recovered uneventfully. About 61.5% cases occurred in the month of June 21 and contacts of the sick (21 and 23, respectively) got quarantined at home. Children were not affected. All affected and their contacts were tobacco users and exchanged tobacco sticks/quid for mutual puffs/chews regularly.

DISCUSSION

The age-sex configuration, gender quotient and family size of the communities studied depict mutually comparable features aligning national statistics.¹³ 240 (60.7%) and 256 (59.8%) members of the communities were engaged in income generation of which 18% and 20% tendered by fair gender respectively. Men folk mostly worked as vendors, shop runners, hotel attendants, stall workers and security guards; while females worked as domestic help, hospital ayah/sweeper, or extended hand in the work of their spouse. 365(92.1%) and 388 (90.7%) subjects from the communities respectively were literate; that's comparatively higher than documented literacy rate of West Bengal (77%).¹⁴ Around 90% of the subjects hailed from lower-middle and lower-most class of SES. Bare minimum education favoured with small family, trying financial endeavour and meagre social subsistence depicts hardship in human sustenance in Kolkata slums in the face of poor civic facilities.

Table 1: Age, sex, and religion of the subjects

Age group in yrs.	Community 1					Total No. (%)	Community 2				
	Gender		Religion				Gender		Religion		Total No. (%)
	Male	Female	Hindu	Muslim	Other		Male	Female	Hindu	Muslim	
1–10	20	24	40	4	-	44 (11.1)	26	29	50	5	55 (12.8)
11–20	35	27	56	4	2	62 (15.7)	24	20	40	4	44 (10.3)
21–30	48	44	92	-	-	92 (23.2)	58	57	110	5	115 (26.9)
31–40	48	46	90	4	-	94 (23.8)	53	48	93	8	101 (23.6)
41–50	28	26	48	4	2	54 (13.7)	35	32	61	6	67 (15.7)
51–60	14	16	28	2	-	30 (7.6)	16	15	27	4	31 (7.2)
61+	10	9	18	1	-	19 (4.8)	9	6	13	2	15 (3.5)
Total	203 (51.4)	192 (48.6)	372 (94.2)	19 (4.8)	4 (1.0)	395 (100.0)	221 (51.6)	207 (48.4)	394 (92.1)	34 (7.9)	428 (100.0)

Table 2: Education and SES of the subjects

Educational qualification	Community 1 Total (%)	Community 2 Total (%)	Socio-economic status	Community 1 Total (%)	Community 2 Total (%)
Graduate	20 (5.1)	17 (4.0)	Upper	--	--
Secondary	63 (15.9)	58 (13.6)	Upper middle	--	--
Middle School-VIII Std	132 (33.4)	152 (35.5)	Middle	41 (10.4)	37 (8.6)
Primary	150 (38.0)	161 (37.6)	Lower middle	171 (43.3)	192 (44.9)
Illiterate	30 (7.6)	40 (9.3)	Lower	183 (46.3)	199 (46.5)
Total	395 (100.0)	428 (100.0)		395 (100.0)	428 (100.0)

SES: Socio-economic status

Table 3: Awareness and preventive compliance for COVID-19

Current knowledge on COVID-19	Com-1 Aware (No. and %) *n ¹ -351	Com-2 Aware (No. and %) *n ² -373	P value	Preventive measures	Com-1 Obeyed No. (%) n ¹ -351	Com-2 Obeyed No. (%) n ² -373	P value
Aware of ongoing COVID-19 spate	326 (92.9)	350 (93.8)	Chi-sq -0.26, NS	Taken COVID vac first dose	61 (17.3)	67 (18.0)	Chi-sq - 0.04, NS
COVID-19 spreads by cough/sneezing	329 (93.7)	352 (94.4)	Chi-sq - 0.13, NS	Following cough sneeze hygiene	329 (93.7)	351 (94.1)	Chi-sq - 0.04, NS
COVID-19 causes death in aged subjects	331 (94.3)	349 (93.6)	Chi-sq - 0.17, NS	Not spitting in public (Govt. instructions)	330 (94.0)	353 (94.6)	Chi-sq - 0.1, NS
Washing hand with soap and water helps	333 (94.9)	354 (94.9)	Chi-sq - 0.98, NS	Washing hand with soap/water twice a day	329 (93.7)	350 (93.8)	Chi-sq - 0.003, NS
Putting mask while outdoor helps	329 (93.7)	352 (94.4)	Chi-sq - 0.13, NS	Using mask while going out	328 (93.4)	352 (94.4)	Chi-sq - 0.26, NS
Social distancing keeps off COVID	330 (94.0)	353 (94.6)	Chi-sq - 0.13, NS	Social distancing in shops and markets	331 (94.3)	352 (94.4)	Chi-sq - 0.001, NS
Daily bath/personal hygiene/clothes help	329 (93.7)	350 (93.8)	Chi-sq -0.003, NS	Daily bathing and maintaining hygiene	351 (100.0)	373 (100.0)	---
Alcohol based sanitizer disinfects	329 (93.7)	351 (94.1)	Chi-sq - 0.04, NS	Disinfecting hand with sanitizer	329 (93.7)	350 (93.8)	Chi-sq - 0.003, NS
Hand shake/hugging help spread	330 (94.0)	349 (93.6)	Chi-sq - 0.06, NS	Not shaking hand or hugging anyone	330 (94.0)	349 (93.6)	Chi-sq - 0.06, NS
Report a doctor, if cough, cold and fever	328 (93.4)	352 (94.4)	Chi-sq - 0.26, NS	Reported to doctor as and when required	48 (13.7)	53 (14.2)	Chi-sq - 0.04, NS

*Under-10 children were excluded

Nearly more than 93% from both the communities were familiar with all the facets of COVID-19 aside commonly observed PPM and even practiced the same in similar proportion akin to their awareness. Only 17–18% of subjects availed first dose of COVID vaccination and 14% even sought medical advices as needed. It has been documented in the past that substantial no. of subjects were aware about contagiousness (87.3%), incubation period (57.1%), and symptoms of COVID-19 (cent percent).¹⁵ A recent work reported that washing hands and use of alcohol-based sanitizer (23.3%), cough and sneeze discipline along with the use of mask (19.6%), social distancing (16.1%), and following all PPM collectively (40.2%) forestall COVID-19.¹⁵ Authors ascribed around 95-98% of the educated subjects displayed correct preventive knowledge to avert COVID-19 by following PPM.¹⁶ With 80% of Indians being employed in non-organized sectors, it is possible that observance of PPM to restrain COVID-19 could be a trying exigent no doubt.¹⁷ It has been noted that a large no. of subjects followed PPM adequately by using masks (97.2%), social distancing (95.3%), and hand hygiene (91.2%) that apparently corroborates the findings of present work.¹⁶ Strong governmental initiatives coupled with additive effect of awareness, acceptance, and action by the people made it possible to execute public health policies satisfactorily to counter the spikes of COVID-19 infection.¹⁸

The occurrence rates of COVID-19 were 15.2 and 16.2/1000 population of the community members during the study period. Taking into account the no. of COVID-19 infection as 1.54 and 21.9 million in West Bengal and India correspondingly for the year 2021 as on 31 Aug 21, the occurrence rates work out to 15.4 and 16.5/1000 population in West Bengal and India respectively.^{19,20} Rate of occurrence in present endeavor is comparable to state/national statistics though the latter could possibly be laced with factors like under-reporting, missing statistics due to comorbidity and diagnostic errors in rural-remote areas in the setting of colossal state and national population.

Large contingent of men from 40 to 49 years assemblage (69.2%) mostly belonging to the lowest SES group (53.8%) generally educated up to primary/middle school (46% each) working as vegetable vendors (53.8%) were affected. A study from south India reported that low-income group often suffered higher incidence of COVID-19, implying that COVID-19 may unjustly infect poor class.²¹ All indisposed stated used mask, washed hands before meals, and observed distanced-greetings, however, only 77% practiced social distancing and 53.8% used sanitizer.

Tobacco use was generally universal with exchange of tobacco sticks/quid for shared puffs/chews, a sort of habitual customary among vendors/hawkers signifying breach in the protective barrier. Smoking causes goblet cell

Table 4: Socio-demographic characteristics of respondents afflicted with COVID-19

Socio-demographic factors	Community 1	Community 2	Total (%)
Number of subjects affected	6	7	13 (100.0)
Age group			
40–49	4	5	9 (69.2)
50–59	2	2	4 (30.8)
Gender			
Male	5	7	12 (92.3)
Female	1	-	1 (7.7)
SES			
Lower middle	2	4	6 (46.2)
Lower	4	3	7 (53.8)
Education			
Secondary	1	-	1 (7.6)
Middle school	2	4	6 (46.2)
Primary	3	3	6 (46.2)
Worn mask	6	7	13 (100.0)
Washed hands before meals	6	7	13 (100.0)
Social distancing	4	6	10 (76.9)
No contact greetings	6	7	13 (100.0)
Applied sanitizer frequently	4	3	7 (53.8)
Smoking habit	5	7	12 (92.3)
Oral tobacco	4	3	7 (53.8)
Occupation			
Veg vendor	4	3	7 (53.8)
Shop keeper	2	3	5 (38.6)
Tea stall keeper	-	1	1 (7.6)
Suspected place of acquisition			
Work place	5	6	11 (84.6)
Market	1	-	1 (7.7)
Others	-	1	1 (7.7)
Admitted to hospital	1	2	3 (23.1)
Month of acquisition			
May 21	3	2	5 (38.5)
Jun 21	3	5	8 (61.5)
Quarantine of contacts			
Home	21 contacts of 6 affected	23 contacts of 7 affected	13 (100.0)
Center	-	-	-

metaplasia justifying increased levels of ACE2 secreted in the lungs of smokers.²² Goblet cells are the chief source of mucous that renders a prime barricade to inhaled pathogens preventing subsequent invasion and infection. Though it is possible that smoking increases ACE2 expression in the bronchial epithelium facilitating entry of COVID-19, this does not necessarily indicate a higher risk for developing COVID-19 pneumonia.²³ A most up-to-date research demonstrated that increased cumulative smoking in the past was associated with a higher risk of hospitalization and mortality from COVID-19 in a dose-dependent manner.²⁴ Exchange/sharing of half-burnt tobacco-stick or hand-smothered tobacco-quad essentially appears an overriding risk for COVID-19 acquisition undoubtedly.

PPM provides essential defensive shield against COVID-19 convincingly but their optimality calls for congruent application in the lore of contextual reflection like discomfort, indistinct communication, shortness of breath, drinking tea, and smoking.²⁵ Most gratifyingly children were spared and all afflicted, recovered back to well-being.

Cases surfaced mostly in May–Jun 21 among the subjects, substantiated by national report.²⁰

The study showcased the heterogeneity of risks of COVID-19 acquisition prevailing in Kolkata slums in the context of low SES and education, poor civic facilities, crunch of family space and physical environment, sharing of public toilet and water point, marginal workers subsisting on meagre income, working in over-populated high-exposure zone including high-risk cultural dictum that perhaps precludes social distancing and safe-self-sustenance conscience to all possible extent. All these factors contribute, to an extent, higher COVID-19 risk in Kolkata slums through these unattended socio-graphics facilitating social contracting of COVID-19.

The occurrence rates of COVID-19 infection among the communities are reciprocally analogous as well as similar to the state/national figures. Such reflection perhaps indicates that COVID-19 occurrence has probably been influenced by 3rd world socio-graphics in India with millions living

below poverty line, therefore conveys necessity for further exploration.

Limitations of the study

This has been a restricted work among the residents of 2 different slums in south Kolkata for a specific time period during heightened surveillance situation with controlled mobility and out-reach under strict containment; therefore the outcome needs cautious interpretation for comparison.

CONCLUSION

In spite of the confines, the information generated, visualizes that incessant & unfailing observance of PPM could be most pertinent in this sine-die situation till attainment of vaccination of sizeable population. Health education on safe-self-sustenance considering heterogeneity of causes by tweaking and tuning the awareness parameters would be sine-qua-non to avert COVID-19 undeniably. Further research in similar directions may be of assistance to figure out future line of approach to stall the dread along with vaccination.

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