

## Rapid assessment of covid appropriate norms for public transport in a city of Eastern India, Bhubaneswar during pandemic of Covid 19.

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### Abstract:

Pandemic of Covid 19 has forced every country to change its life and routine and being an airborne disease, most dramatic changes have been adopted in the travel or transport sector. This is of immense relevance for a country like India, where the population crowding is maximal for any public transport facility. Buses, trains, and airways, in the order of cost-effectiveness and affordability, have always been the preferred form of public transport, and norms of hygiene, crowding, and safety in these sectors have always been the subject of concern and compromise for any place in the country. So in the given situation of the pandemic, an uphill task is confronting the policymakers and public to break their habits and behaviour and cope and comply with the new directives, as for this disease, in the absence of a cure, the best measure is prevention alone.

Bhubaneswar, the capital of Odisha, a state in Eastern India, is an educational and industrial hub, has come up rapidly as a fast developing city in the last decade. A descriptive qualitative study was done to review the covid appropriate norms put up for all the common usage public transport in the city, to understand the level of integration between the state norms and the public compliance. This city has been the hot spot for cases in both the phases (July 2020 and then resurge in May 2021) of the pandemic and hence offered a good understanding of the curbs reinforced on travel and their effectiveness. The article reinforces that with a shocking comeback of the realm of infectious disease, the norms of travel as having come out in the article should and would perhaps stay for a long time. The disease resells the need for public calm and discipline at the time of travel, much contrary to our reckless practices of human habits of overcrowding, eating, spitting, and spilling garbage anywhere and high on priority use of masks, every time we step out of the house.

**Keywords:** public transport, lockdown, masks, RT PCR, and sanitization.

### Introduction:

The key to global advancement is the ability of humans to travel to any desired place, maybe for work or otherwise. For individuals, it may be the bread earner and for nations a money-spinner as they call in the tourism sector. From mediocre to elite, all have preferred choice of transportation and hence the term called Public Transport System(PTS) was coined and availed by the general public based on requisite fare and ply with scheduled times. (1) This is an integral part of urban and rural areas alike.

However, the scenario has changed due to the outbreak of coronavirus disease 2019 or COVID-19 or SARS-CoV-2 worldwide (2), as within a short period it has halted all movement around the globe or definitely slowed and controlled it to a great extent. The virus that is transmitted by the respiratory route and

now also proven to be airborne (3) and hence COVID-19 is poised to become one of the most severe pandemics hindering public health and the inflicting a major economic crisis for the world in this twenty-first century.

Worst affected is the PTS as there is a higher risk of disease transmission in PTS, sourced by its nature of accommodating a large number of people in a confined space with limited exchanges of ventilation. In India, broadly we have Roadways, Railways, and Airways that focus on mass or passenger transportation as it primarily depends on the demand of the people, unlike the freight transportation system, which is dependent on the movement of the essential goods and commodities. The rate of virus transmission is less in freight transportation compared to mass transportation because mass transportations are directly associated with the carriage of people between the places. Government mandates

(lockdown and social distancing) and institutional protective decisions to avoid the infection have also reasserted wide restrictions on this sector. This sector as per human needs was expanded aggressively to meet the developmental needs, wherein human crowding and subsequent waning of hygiene and safety were facing great compromise especially in the middle and low-income countries. Buses and railways are a sight in India, wherein norms of occupancy, cleanliness, and human appropriate behavior was violated in real and now as if nature is bringing in rules to set the situations right

Bhubaneswar, the capital of Odisha had its share of some of the highest caseloads in this middle-level state in the country and has shown great restraint in managing the Pandemic in terms of prompt preventive and promotive actions (4, 5). Abiding by national laid norms of lockdown and then gradual unlocking by July 2020. only to see a surge in cases till disease was contained by November 2020, Bhubaneswar has exercised stringent regulations to contain the pandemic. Public health has matched the challenges of the pandemic by putting up criteria for PTS in the city, as this houses most of the industrial estates, educational centers, and state directorates. This called for sustained travel to the city by the working class and being a middle-level city, the dependency on PTS is evident. Hence, the opportunity was used by a study team from a medical college in Bhubaneswar to study the functional milieu of PTS and its effectiveness to contain the pandemic in the city.

**Objective:** To assess the adaptive covid appropriate norms for the public transport system in Bhubaneswar.

**Methods:**

**Study site:** Bhubaneswar City, Odisha

**Study sample and population:** The working premises, passengers availing the public transport facility (Airlines, Railways & Roadways) and staffs working in the respective sectors.

**Study design:** A point descriptive observational study was conducted from June 2020 to May, 2021 using a semi-structured checklist for the three types of PTS i.e. Airways, Railways, and Roadways, that were structured to assess the norms being followed. (4,5)

**Sampling:** Feasibility sampling was used to collect data from the 3 these important and frequently used sectors of public transport i.e. Railways, Airlines, and Roadways in the Bhubaneswar city.

Indian Railways has various categories of trains plying under it, with passenger trains and goods train being the two major categories catered under it, since, this study was done to assess the public safety and appropriateness of covid norms, passenger trains which have both AC and non AC compartments and plying inter – districts (02 trains being selected which runs across 02 different and opposite routes starting from Bhubaneswar railway station) and 02 trains covering bordering states like West Bengal, Chattishgarh, Jharkhand, Andhra Pradesh were included in the study. Goods trains were excluded from the study as it has minimal human interaction for their operation.

Roadways sector assessment were done by selecting 04 routes of public buses plying under the guidelines of the city municipal corporation and the transport department, with longest routes covering different parts of the Bhubaneswar city, which were selected from the official road map displaying routes of public buses tagged as “Mo Bus” (6).

Airline sector was assessed by a self-created, open-ended interview for 10 travelers, who were either medical students or accessible faculties, who boarded their flights from Bhubaneswar city airport for domestic travel or returned back through airlines to Bhubaneswar city airport, within the study time frame.

**Detailed methods:** The list of the trains starting from Bhubaneswar railway station were obtained from the Indian railway's website (7), out of that 02 trains running inter-district and 02 trains running inter-state were selected. A study team was formed and was given specific responsibility to observe and note the various study parameters using the checklists. First, the railways were assessed starting from the entry point of the station to the platforms where boarding/deboarding of passengers occur along with the general assessment of the platforms for cleanliness. Passengers boarding the trains were interviewed briefly with due verbal consent, the same procedure was adopted for passengers deboarding at Bhubaneswar railway station. Workforce under the railway division, who have direct interaction with passengers/public were also interviewed briefly during the study team visit to the railway station.

For assessment of roadways sector, public buses plying within the city were assessed and other small vehicles like auto-rickshaws and private app cabs were excluded from the study as those are availed by a limited number of people as compared to buses. Same process was followed for the buses, the study team member, to have added evidence, himself/herself boarded the bus from its starting point to observe the norms being followed before boarding, onboard and after deboarding along an assigned route covered by the bus, bus drivers and conductors were interviewed in brief with due verbal consent regarding the norms.

Airlines sector, being more stringent with rules and regulations regarding entry permission of a visitor at the airport arena, other than those traveling, was not being able to assess physically, so a detailed interview of the travelers with the recent history of air travel through Bhubaneswar airport was conducted with due verbal consent. All those interviewed were either medical students or faculty, to obtain reliable and responsible information. For assessing the workforce under the airport authority, a telephonic interview was organized. This method of study was adopted in view of minimizing the exposure and contact risk of both the study participants and the researcher team.

**Ethical Approval:** The study was a part of the routine health promotional activity for protection against covid 19 and campaign to generate awareness and willingness for vaccination, and hence exempted from ethical approval. Moreover, the data was purely observational and self-reported data.

**Data Analysis:** All questionnaires were checked for completeness at the end of data collection. Data were entered into a Microsoft excel 2007 spreadsheet and analyzed using SPSS software. Responses from the questions were coded before entry into the computer. For categorical variables, frequencies and percentages were used.

### Results and Discussion

All the findings from the 3 PTS in terms of preparedness for travel in a pandemic state are summarized in Table 1 and discussed below

**Table 01: Comparing the covid appropriate behaviour for all 3 modes of transport:**

	Roadways	Railways	Airways
<b>A. Promotive Practices</b>			
IEC charts	No	Yes	Yes
Social distancing	Yes- inside as 50% occupancy; Yes – at stops	Yes	Yes
Proper use of mask	Not always	Yes	Yes
<b>B. Preventive Practices</b>			
Hand hygiene/ Sanitizer for person	No	Yes	Yes
Vehicle sanitization	No	Yes	Yes
Clean toilets	NA	Yes	Yes
Water and soap availability	NA	Yes	Yes
Thermal Scanning	No	No	Yes
RTPCR report check	No	Yes	Yes
Quarantine after travel	No (not there even in case of inter-district travel)	Yes	Yes
Ventilation ( natural/ assisted)	No	Yes	Yes
Occupancy	50%	100%	75-80%
Premises cleanliness(5 visits)	75%	100%	100%
Users satisfaction( Likert scale- below *average/average/good/very good ; responses from 50 passengers )	Below average- 74% N=50	Good-93% N=50	Very Good 100% N=10
Cost in terms of affordability(Range of cost in INR rupees)*	Low (10Rs to 50Rs)	Medium (550Rs to 4400Rs)	High (5500Rs-23500Rs)
Escalation of cost	None	Nominal	Yes
Vaccination of staff*	10%	55%	100%
People feel safe to travel*	Desires more safety	Yes	Yes

\*Recorded responses of randomly quizzed 50 passengers for roadways and railways at the time of boarding or deboarding  
Rest of all are observatory findings

**Railways:** Contrary to the crowded and messy sights pre lockdown, the team's findings from the way to the station to the platform were very satisfactory. There were very limited vehicles in the parking area of the station; all destitute, hawkers and random people who would otherwise crowd the entrance had been wiped clean and the sight was akin to that of airways. For all four visits, only passengers were spotted who were distanced adequately (more than 1m), with basic permissible luggage, which was foremost sanitized heavily, all people ie passengers, railway staff and security have masks, 100% properly worn and in fact, security had face shields on too; well-demarcated counters (at least 5 or 6) were put up for verification of RTPCR reports before entry. No thermal screening was done maybe perhaps as RTPCR (before/within 72 hours) supported travelers were accepted and caseload was less compared to states like Delhi and Maharashtra(8) where it is mandatory. The exit similarly has a stamping facility at 3 to 4 counters to ascertain the travel and mark their period of quarantine which was 14 days during 2020 and 7 days in Phase 2 of the epidemic, but if it were from hot spot states like Delhi, Uttar Pradesh, Telangana, West Bengal, and Maharashtra it was 14days. Porters or coolies as they are called, who carry luggage have been completely called off, no platform tickets were issued as no relatives or accompanying person was allowed.

In the station area, the view is far from a common sight in India in terms of countable people mainly seated at a good distance, clean platforms, toilets and even otherwise at regular points washing hand facility with soap is there, health counter placed inside the station with a doctor and a nurse on duty, which is not a common site on routine days.

4 trains with longest routes, 2 inter-district, and 2 interstates were observed at the time of entry at the station. The staff informed that 100% occupancy of the seats was there as train number had declined, so people travel in the trains that are being permitted, manual or online booking continues, at the start points trains are sanitized with isopropyl alcohol 760ml (99%), hydrogen peroxide 42ml (3%), 15ml of glycerine and 183ml of distilled water. Pantry cars are shut and packeted food was alone permitted and no removal of masks was permitted throughout the journey. The toilets too were clean with running water and soap available for hand wash. Linen and blankets were not provided and out of 100 people who were asked at the time of boarding or deboarding if they felt the travel was safe, 80% were satisfied with the services, though all insisted that personal caution is most important. This came from all travelers irrespective of age, gender, and class that one common message that was concluded by all that the pandemic is serious and personal safety is the best precaution. Among Railway staff, 54.7% were vaccinated at least with one dose, those who fell under the comorbidity group as vaccinations for 18 to 45 years had not started during the study period. Thus all the norms of WHO recommendations for travel were found to be adhered to for railways travel. (9)

The railway staff opined that services were stringently followed and were possible in the scenario of restricted travel as the number of trains and passengers opting for travel are low. They suggested

that travel curbs should continue till definite reports of the disease being curbed are out as then only the staff can adhere to the norms specified. Once travel opens up as regular services, these standards would be impossible to maintain as are being stated the reasons for the second peak of the disease.

**For roadways,** the bus services were reviewed in the unlock period between late November 2020 to March 2021, a convenient sample of 12 buses routes was reviewed by the team as an observation note in the ratio of 4: 8 air-conditioned and normal buses. The bus service was public: private in ratio 8:4 which was based on the public requirements. Indian bus service is one of the cheapest and most exploited modes of travel, but unfortunately most disorganized. Drivers' and attendants' usage of masks was 100% but in non-ac buses usually they dropped the masks below the nose due to discomfort. Only 10.8% were vaccinated and no use of gloves or sanitizers was observed. Only in public buses, they carried small pocket sanitizers at their own cost for handling tickets. No sanitization of buses was done, only routine cleaning, no thermal checking of passengers, and only 4 children were seen in the 12 trips. The only saving grace was that the buses have invariably 47 to 55% occupancy of seats, thus addressing social distancing and the common site of buses teeming with passengers standing and sitting was not seen. All passengers wore masks which were mainly fabric masks, not medical ones, only 15% of the passengers who were working directly or remotely in health or allied sectors like a municipal corporation or civic bodies wore the medical masks. All occupants stated that they had no option but to travel in buses and the purpose was either to work or some mandatory official or health checkups. They all ie 100% expressed that bus travel should be made safer in terms of humidifiers being inbuilt, vaccinated staff, thermal checking, and most importantly bleaching solution sanitization should be done. This travel was opted by the lower-middle to middle-upper class and they all felt that more measures should be taken to make bus travel safe. Similar results were reported in Indian studies (10) and another study in Ethiopia (11) where 30.7% of users of road transport reported anxiety with similar concerns as cited in this study. **Airways** was the most organized and availed under emergency and by the upper class at times of emergency due to the costs involved. All 10 (100%) of the questionnaires were taken by recent 3 months travelers, who had undertaken air travel, reported similar and consistent practices at the Bhubaneswar International Airport. Flight thoroughfare had been curbed, especially from places like Delhi, Mumbai, or South India cities depending on reports on National figures. Aerodromes have tight security, all reported sanitation of bags on entry, no-touch techniques for verification of documents, airport staff masked with gloves, face shields and sanitizers put up for use at every counter, middle seats were left out and alternate occupancy inside flights, no food items permitted and stamping on exit during 1st phase but not thereafter, quarantine now for 7 days and pre and post RTPCR reports mandated.

Thus, the article brings out strongly a dramatic change in travel policy in a middle-level city for a pandemic that thrives on congregating population. The data derived shows a brave and

concerted effort to break chains of transmission in the absence of a cure or complete vaccination, in sectors that were the main triggers to the disease becoming a pandemic. The article could have been robust by introducing an interview with occupants of the various modes and getting descriptive data on their demographics, but the risks involved made the team limit it to just one or two pertinent questions as the main objective was to assess the preparedness of the travel sector during the unlock period and more so because the second wave too set in soon, implying that the pandemic continues to challenge all human effort to curb it.

The regulations introduced in the air and rail sector were noted satisfactory and welcome for all times to come, as they brought in some uniformity and standards to protect any infectious airborne disease in the future. Studies have hinted at record temporary reductions in noise, road accidents, and air pollution. (12,13,14) The travel modes for more commoners i.e. the buses, however, need more focus and improvisation. The major planning would be to make up the economic losses incurred in this sector as in most countries these are the major revenue churning sectors. A complete revamping of human's residence, their workplaces, and leisures triad has to be attempted and some recommendations (15) have been aptly put forward like staggered shifts, alternate dates of travel, more online work, and limiting unwarranted gatherings are to be strictly followed in coming years.

Table 01 shows a brief overview of the covid appropriate norms adopted for public transport systems.

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## References:

1. Paul B, Sarkar S. The Contagion Effects of COVID-19 and Public Transportation System: Conceptualizing the Shifting Paradigm in India. COVID-19 Pandemic Trajectory in the Developing World. 2020 Dec 29:231–55. doi: 10.1007/978-981-33-6440-0\_10. PMID: PMC7981506.
2. Singh MK, Neog Y (2020) Contagion effect of COVID-19 outbreak: another recipe for disaster on Indian economy. J Public Aff, e2171:1–8. 10.1002/pa.2171
3. World Health Organization (2020d) Transmission of SARS-CoV-2: implications for infection prevention precautions. <https://www.who.int/publications/i/item/modes-of-transmission-of-virus-causing-covid-19-implications-for-ipc-precaution-recommendations>. Accessed 20 July 2020
4. <https://www.livemint.com/news/india/odisha-lockdown-guidelines-what-is-allowed-and-what-is-not-11619933468255.html>
5. <https://www.financialexpress.com/lifestyle/health/travelling-to-odisha-by-bus-train-flight-or-car-covid-19-negative-rt-pcr-report-is-mandatory-for-entry/2229690/>
6. Capital region urban transport.Operational route.Available from: <https://www.capitalregiontransport.in/operational-route>
7. Indian Railways Enquiry. Available from <http://www.indianrail.gov.in/enquiry/StaticPages/StaticEnquiry.jsp?StaticPage=index.html&locale=en>
8. <https://www.outlookindia.com/outlooktraveller/travelnews/story/71486/latest-covid-19-travel-guidelines-for-railway-passengers>
9. <https://www.who.int/news-room/q-a-detail/coronavirus-disease-covid-19-travel-advice-for-the-general-public>
10. Ahmad, A., Rahman, I., & Agarwal, M. (2020). Early psychosocial predictors of mental health among Indians during coronavirus disease 2019 outbreak. *Journal of Health Sciences*, 10(2), 147–156.
11. Kassaw C, Pandey D. COVID-19 Pandemic Related to Anxiety Disorder Among Communities Using Public Transport at Addis Ababa, Ethiopia, March 2020: Cross-sectional Study Design. *Human Arenas*. 2021 Jan 4:1-0.
12. Mahato, S., *et al.*, 2020. Effect of lockdown amid COVID-19 pandemic on air quality of the megacity Delhi, India. *Science of the total environment*, 730, 139086.doi:10.1016/j.scitotenv.2020.139086
13. Myllyvirta, L. and Thieriot, H., 2020. *11,000 air pollution-related deaths avoided in Europe as coal, oil consumption plummet*. Centre for Research on Energy and Clean Air. Available from: <https://energyandcleanair.org/wp/wp-content/uploads/2020/04/CREA-Europe-COVIDimpacts.pdf>
14. Tobias, A., *et al.*, 2020. Changes in air quality during the lockdown in Barcelona (Spain) one month into the SARS-CoV-2 epidemic. *Science of the total environment*, 726, 138540. doi:10.1016/j.scitotenv.2020.138540
15. Bandyopadhyay, S. Public transport during pandemic. *Clean Techn Environ Policy* 22, 1755–1756 (2020). <https://doi.org/10.1007/s10098-020-01958->