

# SAARC-SARS-COV-2 Modelling Regional Cooperation (SAARC) in Khandwa City

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**Abstract:** SAARC-SARS-COV-2 modelling regional cooperation (SAARC) I have created this report regarding Cov-2 where I have updated data related to Khandwa city Table-I Urban area, II-Urban literacy area, Rural area and Rural literacy area consolidated tabular format and shown all the report parameter in graphical format. The work is a literature-based study of the positive cases in Khandwa city. This study is mainly focused on positive, active, discharge and death cases in Khandwa city states with the available literature. Look at the number of confirmed cases in Khandwa city. Analyse the trend over time to determine if the situation is improving, worsening, or remaining stable

**Keywords:** SARS-COV-2, Pandemic, Vaccines

## 2. Introduction

The outbreak of corona virus disease 2019 (COVID-19), caused by the virus severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has already created emergency situations in almost every country of the world. The disease spreads all over the world within a very short period of time after its first identification in Wuhan, China in December, 2019. In India, the outbreak starts on 2nd March, 2020 and after that the cases are increasing exponentially. Very high population density, the unavailability of specific medicines or vaccines, insufficient evidences regarding the transmission mechanism of the disease also make it difficult to fight against the disease properly in India. Mathematical models have been used to predict the disease dynamics and also to assess the efficiency of the intervention strategies in reducing the disease burden. In this work, we propose a mathematical model to describe the disease transmission mechanism between the individuals. We consider the initial phase of the outbreak situation in India and our proposed model is fitted to the daily cumulative new reported cases during the period 2nd March, 2020 to 24th March, 2020. We estimate the basic reproduction number ( $R_0$ ), effective reproduction number ( $R(t)$ ) and epidemic doubling time from the incidence data for the above-mentioned period. We further assess the effect of preventive measures such as spread of awareness, lock-down, proper hand sanitization, etc. in reducing the new cases. Two intervention scenarios are considered depending on the variability of the intervention strength over the period of implementation. Our study suggests that higher intervention effort is required to control the disease outbreak within a shorter period of time in India. Moreover, our analysis reveals that the strength of the intervention should be strengthened over the time to eradicate the disease effectively. For the Supportive Supervision of High Focused Districts, first visit to the district of Khandwa (East Nimar) in Madhya Pradesh from 14th April 2010 to 21st April 2010 was made. The facilities visited and key persons visited for monitoring are enumerated in the Table 1 shown below. The monitoring visit, out of 7 blocks, visit was made to 2 blocks and it

included interaction with the Health staff including the Medical Officers, Block Programme Managers, Nursing Staff and few ASHA's, to gain a better understanding of the processes and difficulties in functioning.

### Method

We retrieved articles published in 2020 and 2021 and current data from official website that narrate the strategy for cov-2 testing issues and challenges, healthcare system insufficiency statistics of cases deaths vaccine nation and vaccine acceptance barriers and beliefs.

The work is a literature-based study of the positive cases in Khandwa city. This study is mainly focused on positive, active, discharge and death cases in khandwa city states with the available literature. Also we discussed the life span of India during the lockdown situation. The external data is collected from online resources like articles, new and various materials.

### Aims and Objectives of Study:

- The main aim of the research work is evaluated the modelling and simulation of the spread of cov-2 with infection latent other specific objectives of the study include
- To find the existence and uniqueness of the solution to the model
- To carry out sensitivity analysis on  $R_0$  to a certain which parameter that is more sensitive and that should be targeted by way of intervention.

The primary objectives of this project is to investigate the patterns and factors influencing the spread of the SARS CoV-2 virus across SAARC countries by utilizing topic modelling we aim to identify key terms and topics related to the disease including risk factors mitigations strategies public perceptions and government response additionally we will develop a simulation model to predict and assess the impact of different interventions strategies on disease transmissions within the SAARC region.

### 3. Methodology

Secondary Data was collected for the structured format from the state and district HMIS data format that was already available at the respective Programme Management Units. Primary data was collected as per the guidelines in the format during interactions with the health staff at the time of visits to the health facilities. Interviews with the patients admitted in the wards and the ones present in the OPD during visits to health facilities and community visits were also conducted to obtain information from the beneficiaries' perspective about the functioning of the health mission. The health facility format was filled in presence of the facility in charge, in order to communicate the parameters on which they were evaluated and to further bring to their notice the key areas of improvement. In order to ensure that the improvements, identified during the visit are made a copy of the commitment format was also made Available to the DPM's for follow-up.

Health facilities from all the three levels and linked in one referral chain were selected for inspection. One referral chain from two blocks namely Khalwa and Chegaon Makhan were selected after discussions with the Chief Medical Officer and the District Program Manager.

From Khalwa block SHC Kheri, PHC, Roshni and CHC Khalwa were visited and from Chegaon Makhan SHC Deshgaon, PHC Chicgon and CHC Chegaon Makhan. In addition to the District Hospital at Khandwa, SHC Jaswadi from Block Jawar were also visited. To gain insights about the beneficiary's perspective about the service delivery, community visits and exit interviews were also done. Villages Jaswadi and Banjhar from Chegaon Makhan Block were chosen for community visits. And during the visits to the health facilities the frontline workers including the ASHA's, LHV and ANM's were also interviewed. The tools used for collecting the relevant data can be seen in the Annexure section of the report.

In the end the section following Inspection of the Health Facilities further is a compilation of actionable points mainly taken from the secondary data collected during the community and health facility visit. The attempt was to find solutions and support the health functionaries in identifying gaps and sensitizing them about the same and then to find areas where action can be taken within their designated capacities.

Khandwa District is situated South West of the state of Madhya Pradesh. The District is in Indore division of Madhya Pradesh. District East Nimar Khandwa is a part of Indore Division of Madhya Pradesh state. The District is bounded on the east by the Betul and Hoshangabad District of Hoshangabad division, and Burhanpur District of Indore Division on south, on the west by West Nimar District of Indore division, and on the north by Dewas District of the Indore Division. It is divided into Five Makhan, Pandhana, Harsud, Khalwa, Baldi, Punasa. And the 3 tehsils are Khandwa, Harsud, Pandhanaa total number of villages is 798 and the number of Gram Panchayats in te district is 432.

And there are a total of 7 towns in the district. Also, Baldi Block HQ has been shifted to Killod, due to submergence of previous area into Indira Sagar Project, Harsud is also a affected block the HQ is decided to be shifted at Chhanera. Amongst the seven blocks, Khalwa block has maximum proportion of tribal population, the main tribe constitutes of the Korku tribe. Pandhana block is the most inaccessible block, especially in the months of July and August i. e. during the rainy season. Baldi is the worst performing (attached with Harsud).

#### Aims and Objectives of Study

The objectives of present study is:-

- The main aim of the research work is evaluate the modelling and simulation of the spread of cov-2 with infection latent other specific objectives of the study include
- To find the existence and uniqueness of the solution to the model
- To carry out sensitivity analysis on Rural and Urban to a certain which parameter that is more sensitive and that should be targeted by way of intervention.

The primary objectives of this project is to investigate the patterns and factors influencing the spread of the SARS CoV-2 virus across SAARC countries by utilizing topic modelling we aim to identify key terms and topics related to the disease including risk factors mitigations strategies public perceptions and government response additionally we will develop a simulation model to predict and assess the impact of different interventions strategies on disease transmissions within the SAARC region.

**Hypotheses:** The hypotheses of the study were stated in null form:-

- What really instigate the study was the massive spread of SARS CoV-2 in Khandwa city and most of the Indian countries. several effort has been put in place by the federal government of Khandwa and world health organization (WHO) through the ministry of health in Khandwa to combat SARS CoV-2
- Secondly mathematics all over the world have come with up with several model to help solve the model and simulate the spread of cov-2 there have been a lot of field model.

### 4. Discussion

Modelling and simulating the spread of SARS-CoV-2 disease with latency in Khandwa city can provide valuable insights into the dynamics of the outbreak and help inform decision-making for public health interventions. By utilizing mathematical models, we can explore different scenarios and assess the potential impact of various measures to control the spread of the virus.

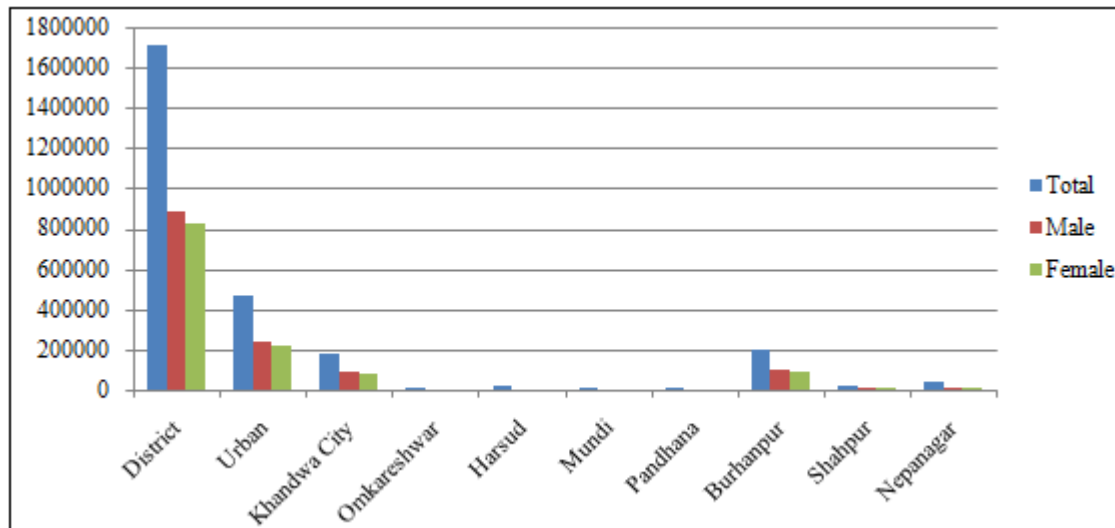
Therefore it is concluded that according to the received data the outbreak of COV-2 will be more in rural areas than in urban areas.

Data collection and sampling:-

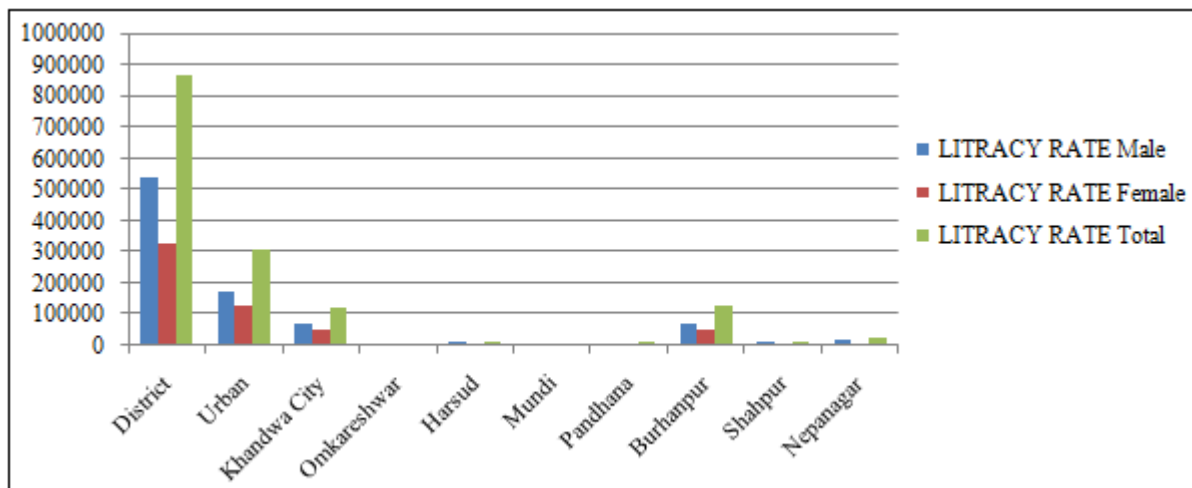
Description	Total	Male	Female	Gender Ration	Density	Literacy rate		
						Male	Female	Total
District	1708170	882371	825799	936159	159	538477	329029	867506
Urban	460332	237773	222559	936		172782	132987	305769
Khandwa City	171976	88859	83117	915		68238	54463	122701
Omkareshwar	6616	3562	3054	947		2238	1184	3422
Harsud	15869	8301	7568	912		6401	4603	11004
Mundi	10667	5541	5126	925		3857	2649	6506
Pandhana	10999	5808	5191	894		4245	2744	6989
Burhanpur	194360	100031	94329	915		69292	54169	123461
Shahpur	18187	9347	8840	916		5915	3889	9804
Neapanagar	31658	16324	15334	932		12596	9286	21882
Rural	1247838	944598	603240	936		365695	196042	561737
Khandwa Tehsil	621120	322114	299006	928		219592	140666	360258
Pandhana Tehsil	129542	66736	62806	941		40796	22561	63354
Harsud Tehsil	321847	166639	155208	931		89754	43823	133577
Burhanpur Tehsil	484554	249419	235135	943		154350	102222	256572
Neapanagae Tehsil	151107	77463	73644	961		33986	19757	53742

Urban (people rate)

Description	Total	Male	Female
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Urban	460332	237773	222559
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Harsud	15869	8301	7568
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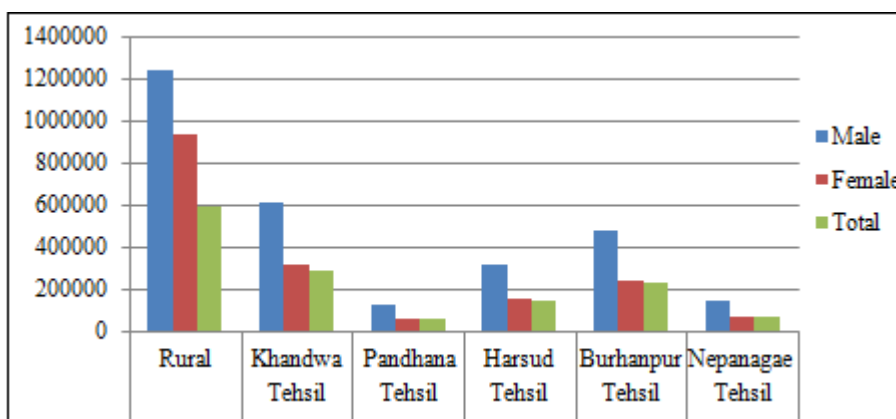


LITRACY RATE			
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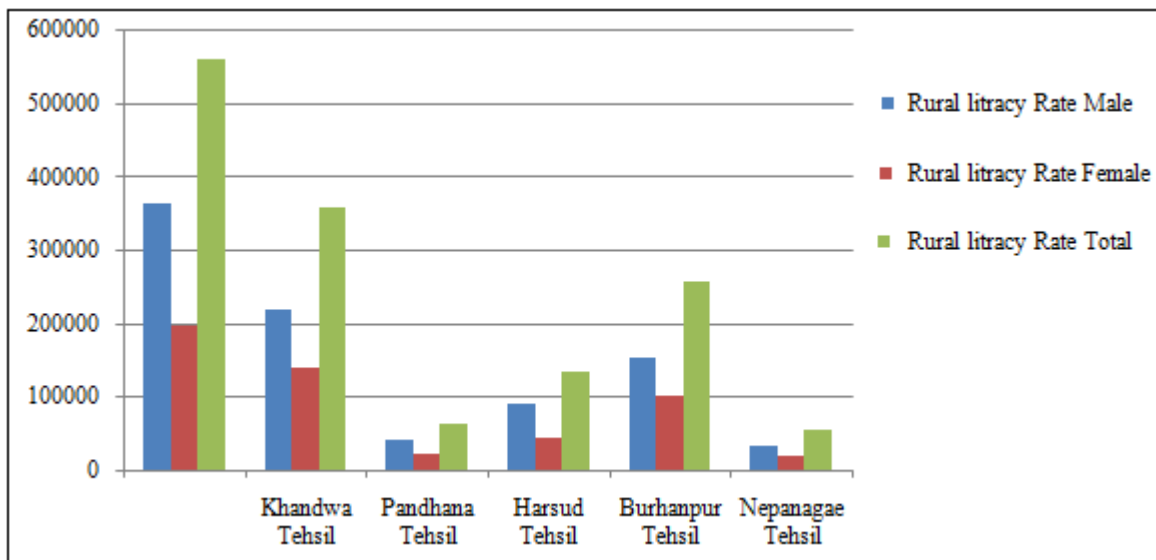


Rural (People Rate)

		Male	Female	Total
	Rural	1247838	944598	603240
Tehsil	Khandwa	621120	322114	299006
Tehsil	Pandhana	129542	66736	62806
Tehsil	Harsud	321847	166639	155208
Tehsil	Burhanpur	484554	249419	235135
Tehsil	Neapanagae	151107	77463	73644



Rural literacy Rate				
	Male	Female	Total	
	365695	196042	561737	
Khandwa Tehsil	219592	140666	360258	
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Burhanpur Tehsil	154350	102222	256572	
Neapanagae Tehsil	33986	19757	53742	



## 5. Conclusion

Modelling and simulating the spread of SARS-CoV-2 disease with latency in Khandwa city can be a valuable tool for understanding the outbreak dynamics and evaluating the potential impact of interventions. By considering the specific characteristics and circumstances of Khandwa city, policymakers and public health officials can make more informed decisions to mitigate the spread of the virus and protect the population. However, it's crucial to interpret the model results cautiously, considering their limitations and ensuring the ongoing calibration and validation of the model with real-world data. The SAIR model has helped understand the disease better. If the model is correct, we may have reached herd immunity with about 380 million people already infected. However, personal protective measures remain crucial. If there was no lockdown, the number of active infections would have peaked at close to 14.7 million, resulted in more than 2.6 million deaths, and the peak would have arrived by June 2020. The number of deaths with the current trends may be less than 0.2 million.

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