Original Article

Trends and Pattern of Diseases Under Integrated Disease Surveillance Project in Jodhpur, Rajasthan: A Retrospective Observational Study

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Abstract

Background: Progress of the Integrated Disease Surveillance (IDSP) is of utmost importance to ensure optimal performance in Jodhpur, Rajasthan, India. The purpose of the study was to document the physical performance of the surveillance system on its core and support functions. **Material and Methods:** Mixed method study was conducted between September 2020 to October 2020. Quantitative data was collected from the district IDSP unit of the Chief Medical and Health Office (CMHO) for various blocks of Rajasthan using syndromic, presumptive, and laboratory-confirmed reporting formats. Ethical clearance was obtained from the Institutional Ethical Committee of AIIMS, Jodhpur. **Results:** Rajasthan reported outbreaks between 0.55 to 1.2% of the national average between 2015-2019. Acute respiratory infections, fever of unknown origin, and acute diarrhea were the leading diseases under the presumptive reporting format. Major syndromic cases reported were cough with/without fever (more than three weeks) and fever less than seven days with the rash. Laboratory-confirmed Dengue, Malaria, and hepatitis were reported more in urban Jodhpur. **Conclusion:** Despite some pitfalls, IDSP has made satisfactory improvements in its core and support functions in the Jodhpur district of Rajasthan. The number of preventable morbidity and mortality cases associated with notifiable infectious diseases in our country can be effectively countered by strengthening the IDSP reporting system.

Keywords: Integrated Disease surveillance project, Jodhpur, trends

Introduction

The world has endured pandemics throughout history, which have significantly caused morbidity and mortality. Pandemics challenge the public health system and disrupt healthcare, economic, social, and political systems.[1] In the past few years, our country has seen outbreaks of the Nipah virus, Chandipura virus (CHPV), Crimean-Congo hemorrhagic fever (CCHF), Japanese encephalitis, Kyasanur Forest Disease (KFD), Zika virus, Avian influenza, Dengue, Chikungunya, and Scrub Typhus. Since March 2020, we have been fighting the outbreak of the COVID-19 pandemic, which has caused a significant public health impact. About 70% of emerging infections are of zoonotic origin.[2] Notification of all the infectious diseases or diseases which have the potential to cause epidemics or pandemics is crucial for timely intervention. There is a considerable gap between the actual occurrence and reporting of communicable diseases in India. This underreporting significantly affects the allocation of human resources and the health budget toward prevention and treatment. Considering this, India adopted an information technology-based decentralized surveillance strategy called Integrated Disease Surveillance Project (IDSP) in 2004 to notify infectious diseases through an effective surveillance system.[3] In this study, we explore the trends and patterns of diseases under IDSP in various blocks of Jodhpur, Rajasthan.

Access this article online

Quick Response Code:

Website: www.ijcm.org.in

DOI: 10.4103/ijcm.ijcm_334_22

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How to cite this article: Shekhawat J, Kumar D, Bhardwaj P, Meena DS, Garg MK. Trends and pattern of diseases under integrated disease surveillance project in Jodhpur, Rajasthan: A retrospective observational study. Indian J Community Med 2023;48:321-5.

Received: 18-04-22, **Accepted:** 09-02-23, **Published:** 07-04-23

Methodology

A mixed-method study was conducted by The School of Public Health, All India Institute of Medical Sciences (AIIMS), Jodhpur, Rajasthan. Data were collected between September 2020 to October 2020. Ethical clearance was obtained from the Institutional Ethical Committee of AIIMS, Jodhpur (Reference Number – AIIMS/IEC/2020-21/3020). The overall purpose of the analysis of qualitative and quantitative data was to have insight into the implementation of IDSP using the existing surveillance systems and identify necessary actions that can be incorporated to improve the disease surveillance system.

Data were collected through two main mechanisms:

1. Quantitative data.
2. Qualitative data through stakeholder interviews with health care staff.

Quantitative data - After obtaining permission from the Chief Medical and Health Officer of the Jodhpur district, quantitative data from 2015 to 2019 was collected from the district IDSP unit of the Chief Medical and Health Office (CMHO). The data was collected from the following blocks – Mandor, Salawas, Bilara, Bhopalgarh, Osian, Phalodi, BAP, Shergarh, Balesar, and Jodhpur. Data were collected in three different reporting formats for syndromic, presumptive, and laboratory-confirmed cases. Secondary quantitative data were analyzed using Microsoft Excel version 10 to observe the trends and patterns of notifiable diseases. Data were presented in tables and graphs to understand the variations in reporting of notifiable diseases under IDSP.

Qualitative study- A qualitative study was done to understand the perspective and to have a better understanding of challenges faced by healthcare workers during the implementation of IDSP activities by health care workers. Primary qualitative data were collected through key informant interviews with selected stakeholders at the four selected health facilities, Keru and Dhawa PHCs, Dhundhara CHC, and Urban health training center (Satellite hospital) in Jodhpur district (Centres adopted by AIIMS, Jodhpur). The study sampled vital informants such as Chief Medical Health Officer, district surveillance officer, Epidemiologist, and Entomologist from the chief medical and health office, IDSP unit, Jodhpur district, who are overseeing the activities in the whole district. All the recorded interviews were transcribed verbatim and translated into the English language. The thematic analysis approach was adopted to analyze the qualitative data. A total of 29 participants consented to be a part of this study, and at the tertiary care center total of 81 participants gave their consent.

Results

A comparison of national statistics with the state of Rajasthan showed that the state reported the maximum number of outbreaks in 2016 (1.2% of India), subsequently decreasing from 2016 to June 2020.[4] A surge in the outbreaks was reported in 2016 (July-August) nationwide. The downward trend was observed till 2018, followed by a rise in 2019 [Table 1]. As of June 2020, 1192 outbreaks were reported throughout the country.

Syndromic cases

Table 2 shows the trends of syndromic cases between 2015 to 2019. There was an increasing trend of cough cases with or without fever from 2015 to 2017, followed by a decreasing number of cases after that. A similar trend was observed for fever with a rash of fewer than seven days. Only a few fever cases of less than seven days with semi-unconsciousness were reported in 2015 and 2016. A downward trend was observed for fever for more than seven days from 2015 onwards, with no cases reported in 2018 and 2019. Similarly, few cases of loose, watery stools with blood were reported between 2016 and 2018. This decline in syndromic cases may be explained by self-limiting disease, lack of reporting, and data attrition. The cause for concern were the cases of Jaundice of less than four weeks and unusual symptoms leading to death or hospitalization seen only in 2018 and 2019. Zero reporting of acute flaccid paralysis (AFP) cases has been found, as shown in Table 2.

Presumptive cases

When we look at presumptive cases in Jodhpur block, acute respiratory infections, fever of unknown origin, and acute diarrheal diseases are the three leading diseases reported. There was a peak of chikungunya, measles, malaria, dengue/dengue hemorrhagic fever, diphtheria, acute encephalitis, chickenpox, and meningitis in 2016 [Table 3]. Acute respiratory infections, fever of unknown origin, Acute flaccid paralysis cases in less than 15 years of age, viral hepatitis, cases of dog bites, and enteric fever were reported more in 2019 [Figure 1]. Snake-bite cases were more in the year 2018 [Figure 1].

Laboratory-confirmed cases

Mosquito-borne diseases like malaria, chikungunya, and dengue fever showed test positivity varying between 0.16% and 25.63%. Out of 93 cases tested for Japanese encephalitis, none were found to be positive. Waterborne infections like hepatitis A and E also showed positive results in 12-16% [Table 4]. No samples were tested for meningococcal meningitis and Shigella dysentery in an urban block of the Jodhpur district between 2015 and 2019.

Qualitative analysis

We also interviewed the healthcare workers about the challenges faced during the implementation of IDSP in the

Table 1: Year wise distribution of outbreaks reported in Rajasthan and India under IDSP

Year	Outbreaks reported in Rajasthan (outbreak proportion compared with Country numbers)	No. of outbreaks reported in Country
2015	27 (0.55%)	3938
2016	58 (1.2%)	4821
2017	40 (0.92%)	4344
2018	31 (0.76%)	4043
2019	26 (0.57%)	4539

Table 2: Year-wise distribution of Syndromic cases in various blocks of Jodhpur, Rajasthan

Diseases reported under IDSP	2015	2016	2017	2018	2019
Cough with or without fever (>3 weeks)	434	676	1010	50	36
Fever <7 days with rash	125	258	289	5	2
Fever <7 days with daze or semi unconsciousness	6	16	NIL	NIL	NIL
Fever >7 days	99	84	84	NIL	NIL
Loose watery stool (<2 weeks) with blood	NIL	14	3	1	NIL
Jaundice <4 weeks and unusual symptom leading to death or hospitalization	NIL	NIL	NIL	7	3
Acute flaccid paralysis	NIL	NIL	NIL	NIL	NIL

Table 3: Distribution of Presumptive cases reported in IDSP in the urban block of Jodhpur from 2015-2019

Presumptive cases in Block Jodhpur	2015	2016	2017	2018	2019
Pyrexia of unknown origin	120765	183003	166417	241496	361325
Acute respiratory infection	216505	291365	387639	438552	625100
Acute diarrheal disease	38078	43637	49320	71311	68107
Chikungunya	1	91	78	14	7
Dengue Haemorrhagic fever	448	3302	1355	1238	1867
Diphtheria	59	157	135	63	59
Measles	212	583	326	150	35
Acute encephalitis	47	358	137	89	93
Chicken pox	330	1342	1075	720	400
meningitis	46	300	62	27	48
Malaria	710	1789	1213	390	418
Dog bite	8061	14555	17259	18910	22852
Snake bite	425	688	539	822	791
Enteric fever	872	1724	1051	1550	2160
Pneumonia	3999	8717	8527	6184	5875

Jodhpur district (summarised in Table 5). We conducted a small questionnaire-based survey at a tertiary care center about the knowledge attitude and practices of IDSP by including residents, interns, and nursing officers as notification of communicable diseases primarily done by health care workers. This study found that 9.8% of HCWs did not even know the meaning of IDSP. Maximum HCWs (74.07%) earned knowledge of IDSP during their undergraduate training; among them, 56.67% HCWs could not recall the primary functions of IDSP. Only 3 (3.7%) HCWs get the training of IDSP regarding reporting of disease. Around 90% of participants have felt the need for IDSP training and perceived it as a positive change in public health surveillance. Their effective training can improve the timeliness and completeness of the reporting.

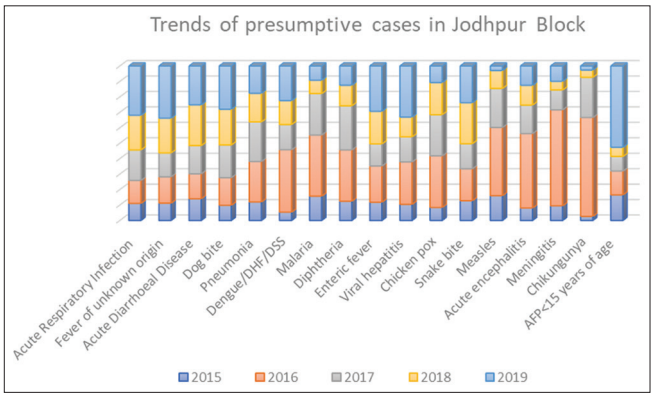

Figure 1: Showing the trends of presumptive cases in Jodhpur, Rajasthan from 2015-2019

Discussion

The country and the state of Rajasthan reported a maximum number of outbreaks in 2016. In India, these outbreaks gradually decreased till 2018, with a surge in 2019. The proportion of cases reported from Rajasthan showed a declining trend till 2019. A similar study conducted in Gujarat showed that the trends of diseases reported under IDSP were compared with national statistics.[5]

When we observe the syndromic cases, cases of cough with/without fever and fever for less than seven days increased steadily between 2015 to 2017, followed by a drastic decrease between 2018-19. An identical downward trend was observed in the case of loose, watery stools for less than two weeks, with some dehydration and fever for more than seven days. Only a few cases of Jaundice and fever of less than seven days with daze were reported in 2018-19 and, 2016-17, respectively. Data related to cases of AFP (Acute flaccid paralysis) and unusual events leading to death or hospitalization were reported as either missing or non-existent. Either a strong public health response by the concerned authorities or poor

Table 4: Distribution of Lab confirmed cases reported in IDSP in Urban Block Jodhpur from 2015-2019

Lab confirmed cases	Sample tested (2015-2019)	Found positive (2015-2019)	2015	2016	2017	2018	2019
Malaria	1711374	2736 (0.16%)	13.6%	0.26%	0.22%	0.13%	0.06%
Chikungunya	296	44 (14.86%)				20.4%	5.4%
Dengue Haemorrhagic fever	7196	1844 (25.63%)			27.4%	19.8%	29.2%
Hepatitis A	601	99 (16.47%)			14.3%	25.5%	8.9%
Hepatitis E	510	61 (11.96%)			18.2%	9.9%	13.4%
Japanese Encephalitis	93	Nil					
Typhoid fever	82294	2532 (3.1%)	2.2%	2.4%		3.1%	3.5%

Table 5: Challenges faced by health care workers during the implementation of IDSP activities in Jodhpur, Rajasthan

Challenges for Medical officers	Challenges for Data Entry Operators	Challenges for ground level workers
Difficulty in Case detection and registration	Interrupted network	No reporting of syndromic cases in COVID-19
Delay in sampling	Delay in reporting	Scared to government action
Inadequate lab facility	No Data analysis at the sub-district level	No Support from public
Epidemic preparedness and response unawareness	Paucity of Human Resources leading to burn out at workplace	Scattered housing and inadequate coverage of population
Paucity of resources		Multitasking
Lack of reporting knowledge		No provision of on job periodic training
Need for Precise Supportive supervision and Monitoring		Technical language of IDSP
		Lack of standard Reporting format
		Lack of communication with ANM
		No transportation facility
		Overburden of work

reporting of cases can explain such fluctuating numbers. If the poor reporting by the lowest cadre of healthcare workers is the cause, it may be because of the fear of being penalized if these cases arise in their area.[6] Even ground-level workers are more aware of the weekly reporting but are unaware of the actual utilization and importance of these weekly reports.[7] The other contributing factors to poor reporting are a surge in the COVID-19 pandemic, myopic reporting of subcenter cases, logistical issues, and low morale. It is imperative for healthcare workers at any level to be motivated and trained about the importance of disease surveillance activity. Under the Presumptive case reporting system, the highest cases of acute respiratory infection (ARI), pyrexia of unknown origin (PUO), and followed by acute diarrheal diseases (ADD) have been majorly reported.

The presumptive diagnosis of ARI, PUO, and ADD is probably easy compared to diseases like Viral Hepatitis, Dengue, Malaria, Diphtheria, and Meningitis. Individuals with a history of fever are usually diagnosed with PUO without paying attention to any signs and symptoms. The lack of good laboratory facilities in rural areas is another contributing factor. The trends of these three major clinical syndromes are increasing in the Jodhpur district till 2019. Identical trends were observed in Jaipur, Rajasthan.[6] Cases of dengue have been reported, more than Malaria and Chikungunya. Similarly, cases of dog bites have been reported more than cases of pneumonia. ARI, PUO, and ADD are the majorly reported cases, followed by cases of Dog bite, Pneumonia, Dengue, Malaria, Diphtheria, Enteric fever, Viral Hepatitis, Chickenpox, Snakebite, Measles, Acute Encephalitis, Meningitis, Chikungunya and AFP under P-form. In developing countries like India, malaria and other non-malarial infections, such as dengue, enteric fever, and Japanese encephalitis, present undifferentiated fever and cause major public health concerns.[8]

Another very important part under IDSP is laboratory-confirmed cases or outbreaks which should be filled in L-format. After the commencement of IDSP, a laboratory network was established in nine states, including Rajasthan, which provided linkage with medical colleges and district diagnostic facilities. In our country, the diagnosis could be difficult if the infection presented only as a fever.[8] Undifferentiated fever from other infections has been highly reported, followed by malaria, typhoid fever, and dengue.[8] Laboratory-confirmed cases of malaria declined from 2015 to 2019 except in 2016. Out of all malaria samples, 97.5% of Plasmodium vivax and 2.5% of Plasmodium falciparum cases have been reported from 2015 to 2019.[6] Typhoid (Culture confirmed) cases have decreased over the years due to health-seeking behavior, the use of antibiotics before the sample collection, and improved sanitation.[9,10] Confirmed cases of Typhoid infections increased from 2015- 2019 except in 2017 when data was not available. Laboratory-confirmed cases of Hepatitis A were reported more than Hepatitis E in Rajasthan in 2015, and in the Jodhpur district, the same findings have been found from 2015 to 2019.[6] These findings strongly indicate the need for integrated mosquito control and water sanitation measures in the state of Rajasthan. To conclude, the Integrated disease surveillance program has, over the decade, made significant progress in the

quest to have a strengthened surveillance system that would effectively be used to detect outbreaks and prevent and control notifiable infectious diseases in the country. Despite some pitfalls, IDSP has made satisfactory improvements in its core and support functions in the Jodhpur district of Rajasthan. The number of preventable morbidity and mortality cases associated with notifiable infectious diseases in our country will continue to rise if existing challenges remain. Therefore, addressing these challenges will improve reporting and paves the way for effective and efficient detection, prevention, and control of notifiable infectious diseases.

Acknowledgements

The authors would like to thank Prof. Kuldeep Singh, Dean Academics and Head of School of Public Health, Head of the department of Pediatrics, AIIMS Jodhpur, Dr. Balwant Manda, Chief Medical and Health Officer, Jodhpur, Nitin Joshi, Yogesh Jain, and Medical Officers and health care staff of Pratapnagar, Keru, Dhawa, and Dhundhara health facilities.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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