A Record Based Study on Clinico-Epidemiological Characteristics of Influenza A (H1N1) Confirmed Cases Admitted in Various Hospitals of Rajkot City, Gujarat, 2015

Harshida K. Namera[1], Vaidehi S. Gohil[1], Zalak R. Matariya[1], Dhara N. Jahangirporia[1], Nirav K. Nimavat[1], Umed V. Patel[2]

[1]Resident Doctor, [2]Associate Professor, PSM Department, P.D.U. Government Medical College, Rajkot

Correspondence: Dr. Harshida Namera, E mail: drharshida205@yahoo.com

Abstract:

Intoduction : The Influenza A (H1N1) disease started in India in May 2009 and the first laboratory-confirmed case was reported from Hyderabad on 16th May 2009. After that, every year large numbers of positive cases were reported throughout India and Gujarat. **Objective:** To study clinico-epidemiological characteristics of confirmed cases of influenza A (H1N1) virus infection, hospitalized in various hospitals of Rajkot city (January 2015 to May 2015) **Method:** In the year 2015 from 1st January to 31st May, total 420 cases of Influenza A (H1N1) were admitted in identified hospitals of Rajkot city. Community Medicine department, P.D.U. Govt. Medical College, Rajkot has collected case record forms of all patients which include information like demographic profiles, high risk factors, clinical profile etc. Data entry and analysis was done by using MS Excel 2007. **Results:** Maximum cases (50.7%) were from the age group of 30-49 years, 57.4% cases were females. Overall case fatality rate was 19.8%. Top five presenting symptoms among cases (n=361) at the time of admission were cough (96.7%), fever (92.5%), shortness of breath (81.2%), sore throat (27.9%) and body ache (14.6%). Out of 372 patients, 44.1% patients had one or more co-morbid disease. Only 19.1% patients had received antiviral wihin 2 days of onset of symptoms. **Conclusion:** Survival rate was 80.2% among admitted patients of Influenza A (H1N1). Early diagnosis and treatment may reduce the severity of the disease.

Key words : Clinico-Epidemiological Characteristics, Influenza A (H1N1),

Introduction :

2009 H1N1 (sometimes called "swine flu") is a new influenza virus causing illness in people. In April 2009, the novel influenza A (H1N1) virus was first detected in Mexico [1] and then in the United States (US).[2,3] This was originally referred to as "swine flu" because many of the genes in this new virus were found in pigs in North America.[4] After wards disease transmitted to many other parts of the world and WHO had declared the pandemic on 11th June 2009.[1] The WHO declared H1N1 post-pandemic on 10thAugust 2010. The pandemic influenza A (H1N1) virus is now circulating as seasonal influenza A (H1N1) virus.[5]

The disease started in India in May 2009 and the first laboratory-confirmed case was reported from Hyderabad on 16thMay 2009 but only few cases were reported till August 2009. [6] From Gujarat state, the first H1N1 positive confirmed case was reported in June 2009.[7] Saurashtra region, in the western part of Gujarat state, reported its first case in August 2009.[8] After that, a large numbers of positive cases were reported throughout India and Gujarat till now.[9]

The symptoms of Influenza A (H1N1) flu virus in people include fever, cough, sore throat, runny or stuffy nose, body aches, headache, chills and fatigue; sometimes vomiting and diarrhea also seen. Severe illnesses and deaths have occurred as a result of illness associated with this virus.

The present study summarizes the clinico-epidemiological characteristics of confirmed cases of influenza A (H1N1) virus infection, hospitalized in various hospitals of Rajkot city of Saurashtra region from January 2015 to May 2015.

Method:

Rajkot district has witnessed three waves of Influenza A(H1N1) from the year 2009 to 2015. Also Rajkot city being the economical capital of the Saurashtra region is most developed city with good connectivity with nearby and all important places and having quite a good number of tertiary care medical facilities. It has one Government Medical College affiliated hospital and 10 private multi-specialty hospitals which are providing admission to serious case of Influenza A (H1N1).

As a part of prevention and control of any outbreak of Influenza A(H1N1) as well as reducing the mortality due to it, state health department has created mechanism to monitor and keep the track of all cases admitted in all the hospitals where ever cases of Influenza A (H1N1) are admitted. Health department under the leadership of Chief District Health Officer is locally coordinating with the related hospitals in this regards. Also local health team is collecting case record forms from the treating hospital as a part of this.

In the year 2015 from 1st January to 31st May total 420 cases of Influenza A(H1N1) were admitted in identified hospitals of Rajkot city and 83 deaths were reported amongst them. Community Medicine department has collected case record forms and analyzed them.

In case record form several types of information were collected. e.g. age, sex, religion, residential area, presenting symptoms and signs at the time of admission, pregnancy, co-existing conditions and outcome status. Other variables were also included like duration of hospital stay, duration between onset of illness and hospital admission/diagnosis etc.

This data was entered and analyzed in MS Excel 2007. Analysis was done using the available information for the particular variable.

Results:

Out of 420 cases, 207 (50.9%) cases were admitted throughout in Government hospital while 178 (43.7%) cases were admitted in Private hospitals throughout. Age group ≤5 years and ≥65 are years considered at greater risk of mortality. Maximum cases belonged to the age group of 30-49 years. Total 11.9% cases were from this high riks group i.e. 2.6% in the age group of 0-5 years and 9.3% were reported in the age group of ⩾ 65 years and 88.1% were reported in the age group 5- 65 years. (Table 1)

More cases were reported among females (57.4%) as compared to males (42.6%). More cases

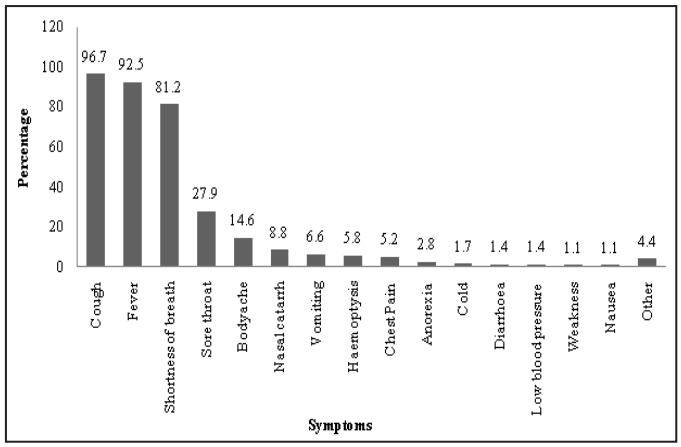
Table 1: Demographic characteristics of confirmed cases of Influenza A(H1N1)admitted in various hospitals of Rajkot city (n = 420)

Pattern of Hospitalization	Frequency	Percentage
Government throughout	207	50.9
Private throughout	178	43.7
Government then transferred to Private	5	1.2
Private then transferred to Government	7	1.7
Private then transferred to another Private	10	2.5
Age		
0-4 Years	11	2.6
5-14 Years	8	1.9
15-29 Years	57	13.6
30-49 Years	213	50.7
50-64 Years	92	21.9
≥65 Years	39	9.3
Sex		
Male	179	42.6
Female	241	57.4
Area type		
Urban	172	41.0
Rural	248	59.0
Area of residency		
Rajkot Corporation	132	31.4
Rajkot District excluding corporation	120	28.6
Other District	168	40.0

(59.0%) were reported from rural area as compared to urban area (41.0%). 60% of cases admitted were from Rajkot district including Rajkot city also. 40.0% of cases were from nearby districts. (Table 1)

Top five presenting symptoms among cases (n=361) at the time of admission were cough (96.7%), fever (92.5%), shortness of breath (81.2%), sore throat (27.9%) and bodyache (14.6%). (Figure 1)

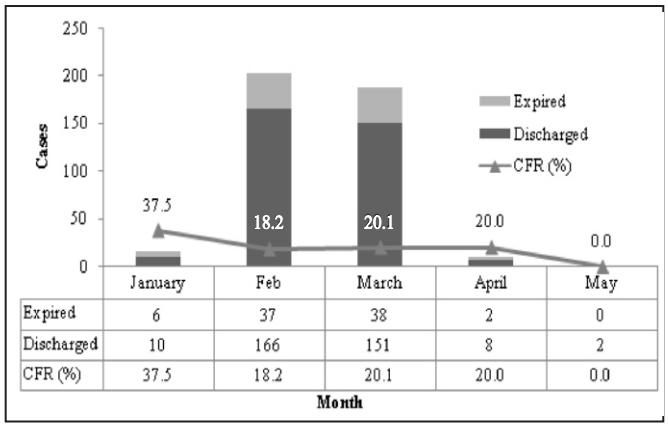
Figure 1: Common presenting symptoms among cases of Influenza A (H1N1) at the time of admission (n=361) *



* Multiple responses considered

Highest number of cases and deaths were reported during February and March month. The first confirmed case was reported in first week of January although total 16 cases were reported during January. Peak started in February and large number of cases were reported during February and March. Then gradually number of cases declined in April and May 2015.(Figure 2)

Figure 2 : Month wise distribution discharged and expired cases (n=420)

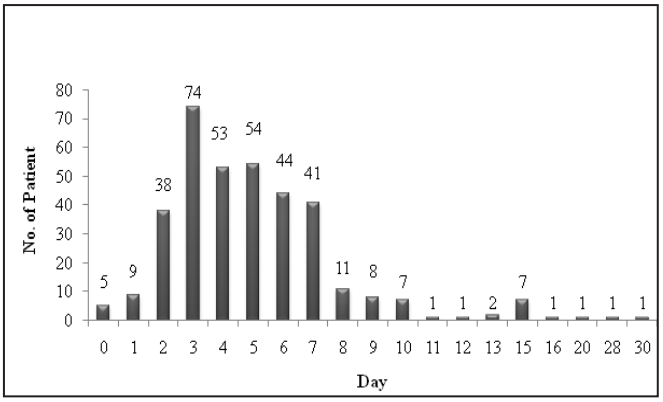


	January	Feb	March	April	May
Expired	6	37	38	2	0
Discharged	10	166	151	8	2
CFR (%)	37.5	18.2	20.1	20.0	0.0

Out of 420 cases, 337 (80.2%) were discharged, 83 (19.8%) were expired. One fifth of the admitted patients died. Overall Case fatality rate was 19.8%. Case fatality rate was highest in January and March month i.e. 37.5% and 20.1% repectively. (Figure 2)

Majority of patients (181) admitted between 3 – 5 days of onset of symptoms. Only 52 patients admitted within 2 days of initiation of symptoms. (Figure 3)

Figure 3: Time interval between onset of symptoms to admission (n=359)



From the available data, it was found that among various comorbid conditions, 18.1% patients had Diabetes Mellitus followed by Hypertension in 11.2% patients. Other comorbid conditions were Coronary Heart Diseases (2.5%), Other heart diseases (2.5%), Chronic Respiratory Diseases (2.5%) and Renal Diseases (2.2%). Out of 184 women, 10 (5.4%) were pregnant. From the available data, it was observed that 87.5% patients had pneumonia and almost two third patients had aneamia, 23.8% patients had thrombocytopenia and 16.9% patients had elevated S. Creatinine level. (Table 2)

Figure 4 : Duration of hosptal stay among survived patients (n=332)

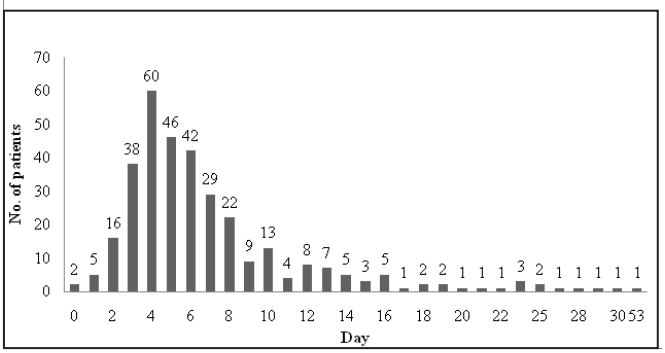


Table 2: Presence of Co-morbid condition among confirmed cases of Influenza A (H1N1)*

	Frequency	Percentage
Presence of Co-morbid disease (n=365)		
Diabetes Mellitus	66	18.1
Hypertension	41	11.2
Coronary Heart Diseases	9	2.5
Other Heart diseases	9	2.5
Chronic Respiratory Diseases	9	2.5
Renal Diseases	8	2.2
Other	37	10.1
Pregnant women (n=184)	10	5.4
Pneumonia (n =352)	308	87.5
Aneamia (n=136)	91	66.9
Thrombocytopenia (n =168)	40	23.8
Elevated Serum Creatinine (n=160)	27	16.9

(* n differs for each variable based on availability of Hospital records)

Majority of survived patients (186) had 3 – 6 days of hospital stay before final outcome. (Figure 4)

Based on available data it was observed that out of 325 cases, 110 (33.9%) patients were first treated by General Practitioner. Majority of patients (87.1%) were given antibiotic. Only 19.1% patients had received antiviral wihin 2 days of onset of symptoms and 36.0% patients were kept on ventilator. (Table 3)

Around two third patients directly went to recognized Influenza A (H1N1) treating hospital. Influenza A (H1N1) is a viral disease although 87.1% patients were given antibiotic for secondary bacterial infection management. Early initiation of antiviral is necessary to reduce severity of disease, but only one fifth patients could receive antiviral within 2 days of initiation of symptom. One third patients needed to be kept on ventilator. Steroid is mainly given to critical patients and 18.9% patients were given steroid. (Table 3)

Table 3: Treatment profile of confirmed cases of Influenza A (H1N1)*

	Frequency	Percentage
First treated by General Practitioner (n=325)	110	33.9
Patients given antibiotic (n=294)	256	87.1
Received antiviral within 2 days (n=357)	68	19.1
Kept on ventilator (n=328)	118	36.0
Patients given steroid (n=296)	56	18.9

(* n differs for each variable based on availability of Hospital records)

Discussion:

The present analysis was carried out in confirmed cases of Influenza A(H1N1) admitted in various hospitals of Rajkot city during January to May, 2015.In the year 2015 from January to May total 420 confirmed cases of Influenza A (H1N1) were admitted in various recognized treating hospitals of Rajkot city.

In our study, most common affecting age group was 30-49 years and females (57.4%) were affected more as compared to males while equal proportion of males and female were found in the study by Domadia et.al.[11] and Patel PB et al.[12] In contrary to our findings, males were affected more in various studies done by Rana et al. [10] (55.6%), Samara et al.[13] (61.5%), Puvanalingam et. al.[14] (55.6%) and Bhatt et.al.[15] (55.8%). Most common affected age group varies in other studies i.e. Rana et. al.[10] (13-45 years), Domadia et.al.[11] (12-40 years), Patel PB et.al.[12] (20-50 years). This difference may be attributed to difference in socio-demographic characteristics in the community surveyed.

Common presenting symptoms among cases at the time of admission in our study were cough (96.7%), fever (92.5%), shortness of breath (81.2%), sore throat (27.9%) and bodyache (14.6%) while similar common presenting symptoms were observed in the study done by Domadia K et al.[11] i.e. fever (80%) followed by sore throat. Similar symptoms observed in the studies done by Li YQ et al.[16] and Torres J P et al.[17]

In our study overall Case Fatality Rate (CFR) was 19.8% while 22.4% CFR reported by Domadia K et al.[11] in Jamnagar and less CFR i.e.5.9 % was observed in 2015 by Patel PB et al.[12] in Surat city. In another study done during the epidemic of 2009 in Gujarat by Rana et al.[10], it was 19.9%. High case fatality rate in January month can be explained due to few cases reported in month of January. In present study maximum cases were seen in February month. Similar finding was observed by Patel PB et al.[12] in February month 76.3% were reported.

The results of the current study show a median of 3-5 days between onset of illness and hospital admission, comapred to 3.8 days in the study done in Surat by Patel PB et al.[12] 3 days in US by Jain S et al.,[18] 4 days in Austalia and New Zealand by Webb SA et al.[19] The time duration between onset of illness and hospital admission and diagnosis is more than other studies.[18,19] Possible expalntation could be that patients from rural areas and small town areas were initially treated at local level by general practitioners and then if not improvement were seen they were refer to the higher centre.

In present study 66.9% pateint had anemia, 23.8% had thrombocytopenia and 5.4% paternts were pregnant. In study done by Chudasama et.al.,[20] 34.6% patients had anemia, 22.9% patients had reported thrombocytopenia and 5.5% were pregnant women. In study done by Jain S et al.[18] had reported 7% pregnant women in US and Chang et.al.[21] reported 16.7% pregnant women in Australia.

Hospital stay in present study was 3-6 days while it was between 5.7 - 6.8 days in Domadia et al.[11] and 6 days in Chudasama et al.[20]

In present study, only 19.1% had received Oseltamivir within two days after the onset of illness, in contrast to 45% in the US by Jain S et al.[19] In study done by Rana et al.,[10] it was observed that oseltamivir was started after 5 days in 52% of cases. Initial primary treatment by general practitioners or local physicians and delayed referral to a higher center may be the possible explanation for the delayed start of Oseltamivir in suspected or confirmed influenza A (H1N1) patients.

Incidence rate of H1N1cases of whole Rajkot district population (excluding the cases of other district) for the period of January-May 2015 was 7.8 per 1 lakh population as compared to 16.4 per 1 lakh population in Jan-March 2015 in Surat.[13] It was 10.7 and 24.7 per 10 lakh population in Gujarat and Delhi respectively in 2015.[22,23]

Limitations:

The data was taken from hospitalized patients, so patients who became infected in the community and did not go to the hospital were not included. Also, patients who were treated on an outpatient basis and who were not tested were not included in the present study. The analysis was done among 420 cases only admitted between January to May 2015. The analysis was done among cases admitted in Rajkot city hospitals only. The analysis was based on secondary data; hence the missing and incomplete data in either survived or deceased may have contributed to the biased findings. The analysis was done using case summary forms and death summary forms, filling of the same by untrained persons may have contributed to the biased findings.

Conclusion:

In our study, more cases were found in females and more cases were reported from rural area. Top five presenting symptoms among cases at the time of admission were cough, fever, shortness of breath, sore throat and bodyache. Survival rate was 80.2% among admitted patients of Influenza A (H1N1). Majority of patients admitted between 3 – 5 days of onset of symptoms. Only 19.1% patients had received antiviral wihin 2 days of onset of symptoms. 44.1% patients had one or more Co-morbid disease. Early diagnosis andtreatment may reduce the severity of the disease.

Recommendations:

Community should be made aware about symptoms of Influenza A(H1N1). They should be educated to consult a qualified doctor as early as possible when symptoms of Influenza A (H1N1) develops. Laboratory parameters like S. Creatinine, total platelet count should be closely monitored on daily basis from the day of admission. Awareness among doctors including General Practitioner regarding identification of symptoms and signs of Influenza A(H1N1) and early initiation of Oseltamivir is must. Special focus should be given in the management of patients having one or more high risk factors(especially co morbid disease, pregnancy etc.).

Acknowledgement:

Authors are thankful to Regional Deputy Director, Rajkot Region; Chief District Health Officer (CDHO), Rajkot District; Epidemic Medical Officer, Rajkot Districts for providing case summary forms and deaths forms of confirmed patients to Community Medicine Department, PDU Govt. Medical College, Rajkot.

Declaration:

Funding: Nil

Conflict of Interest: Nil

References :

1. World Health Organization. Weekly Epidemiological Record No. 41. Available from: http://www.who.int/wer/2009/wer8441/ [Last accessed on 19 Oct 2009].
2. Swine influenza A (H1N1) infection in two children – Southern California, March – April 2009. MMWR Morb Mortal Wkly Rep; 2009:58:400-2. Available from:http://www.cdc.gov/mmwr /preview/mmwrhtml/mm5815a5.htm. [Last accessed on 22 Nov 2016].
3. Swine-origin influenza A (H1N1) virus infection in a school – New York City, April 2009. MmWRMorb Mortal Wkly Rep; 2009: 58:470-2. Available from: http://www.cdc.gov/mmwr/ preview/mmwrhtml/mm5817a6.htm. [Last accessed on 22 Nov 2016].
4. Dawood FS, Jain S, Finelli I, Sbaw MW, Lindatroru S, et al. Novel Swine – Origin Influenza A (H1N1) Virus Investigation Team-Emergence of a novel swine origin influenza A (H1N1) virus in humans. N Engl J Med. 2009; 360:2605-15.
5. Singh M, Savitri S. An epidemiological study of recent outbreak of Influenza A H1N1 (Swine Flu) in Western Rajasthan region of India.
6. Ministry of Health and Family Welfare, Government of India. Pandemic Influenza (H1N1)-Situational Update. [Internet]. Available from: http://mohfw-h1n.nic.in/document/PDF/ [Last accessed on 10 Aug 2015].
7. The Times of India. First swine flu case surfaces in Gujarat [Internet]. Available from:http://www.timesofindia. indiatimes.com/city/ahmedabad/first.swine-flu-case-surfaces-in-Gujarat/artticleshow/4669250.cms [Last accessed on 22 Aug 2015].
8. The Indian Express. Saurashtra's first confirmed swine flu case detected [Internet]. Available from: http://indianexpress.com/ article/cities/ahmedabad/saurashtras-first-confirmed-swine-flu-case-detected-in-bhavnagar/ [Last accessed on 22 Aug 2015].
9. Centers for Disease Control and Prevention. Available from:http://www.cdc.gov/h1n1flu/qa.htm. [Last accessed on 29 Sept 2015].
10. Rana H, Parikh P, Shah AN, Gandhi S. Epidemiology and clinical outcome of H1N1 in Gujarat from July 2009 to March 2010. J Assoc Physicians India. 2012 Feb;60:957.
11. Domadia K, Chatterjee IS, Chatterjee SS, Bhuva D, Mehta MN. Clinical-Epidemiological Profile of Influenza A H1N1 Cases at a Tertiary Care Institute of Western India. Indian Journal of Applied Resaerch.2015; 5(10): 657-659
12. Patel PB, Patel MJ, Patel K, Jadawala H, Prasad R, Bansal RK. Health Care Seeking Interval and Fatality Rate in SwinFl (H1N1) Epidemic in Surat City. Natl J Community Med. 2015; 6(1):25-9.
13. Samara T, Pawar M, Yadav A. One year experience with H1N1 infection Clinical observation from a tertiary care hospital in Northern India. Indian Journal of Community Medicine. 2011; 36:241-43.
14. A Puvanalingam, C Rajendiran, K Sivasubramanian, S Ragunanthanan, Sarada Suresh, S Gopalakrishnan. Case Series Study of the Clinical Profile of H1N1 Swine Flu Influenza. JAPI. 2011;59:14-18.
15. Bhatt KN , Jethw SC, Bhadiyadar D, Patel D, Joshi K. Study of clinical profile in patients with H1N1 influenza in Surat district, June 2009-March 2010. J Assoc Physicians India. 2012 May;60:15-9.
16. Li YQ, Qian Q, Fung LQ, Yang H, Wei MT, Gao Y, et al. Epidemiological characteristics of 420 influenza A (H1N1) cases confirmed in the early stage of the epidemic in Mainland China. Zhonghua Liu Xing Bing XueZaZhi. 2009;30:1102–5
17. Torres JP, Ryan M, Herve B, Espionza R, Acuna G, Manalich J, et al. Impact of the novel influenza A (H1N1) during the 2009 autumn winter season in a large hospital setting in Santiago, Chile. Clin Infect Dis. 2010; 50:860–8.
18. Jain S, Kamimoto L, Bramley AM, Schmitz AM, Benoit SR, Louie J. Pandemic A (H1N1) influenza Virus Hospitalizations Investigation Team (2009). Hospitalized patients with 2009 H1N1 influenza in the United States. N Engl J Med. 2009;361:1935 -44.
19. The ANZIC influenza investigators, Webb SA, Pettilä V, Seppelt I, Bellomo R, Bailey M, Cooper DJ, Cretikos M, Davies AR, Finfer S, Harrigan PW, Hart GK, Howe B, Iredell JR, McArthur C, Mitchell I, Morrison S, Nichol AD, Paterson DL, Peake S, Richards B, Stephens D, Turner A, Yung M (2009) Critical care services and 2009 H1N1 influenza in Australia and New Zealand. N Engl J Med 361: 1925-1934.
20. Chudasama RK, Patel UV, Verma PB. Hospitalizations associated with 2009 influenza A (H1N1) and seasonal influenza in Saurashtra region, India. J Infect Dev Ctries 2010; 4(12):834-841.
21. Chang YS, van Hal SJ, Spencer PM, Gosbell IB, Collett PW(2010) Comparison of adult patients hospitalized with pandemic (H1N1) 2009 influenza and seasonal influenza during the "PROTECT" phase of the pandemic responseMed J Aus 192: 90-93.
22. 2015 Indian swine flu outbreak. Available from: https://en.wikipedia.org/wiki/2015_Indian_swine_flu_outbr e ak.[Last accessed on20 Nov 2016].
23. List of states and union territories of India by population.Available from: https://en.wikipedia.org/wiki/ List_of_states_and_union_territories_of_India_by_population. [Last accessed on 20 Nov 2016].