

Disparities in Health Infrastructure in India: Kerala Vs Punjab

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Abstract

Punjab is considered to be an affluent state with considerable per capita income situated in the north of India. The incidence of poverty and hunger is least in the state of Punjab. But its position in Human Development Index is not convincing. The growth is more in quantitative dimension. The state of Kerala is situated in extreme south of the country. Though the state has less progressive agriculture as compared to Punjab, still it tops in Human Development Index in the country. It is due to marvellous improvement in the indicators related to health and education and focus on qualitative growth. Punjab is lagging behind in health and education. The Green revolution and White revolution ensured quantitative growth only. India launched National Rural Health Mission and National Urban Health Mission to provide health infrastructure. Kerala is better placed with respect to health infrastructure whereas Punjab is lagging behind. Within the states the disparities are wide across the districts. The t-test is applied to check the disparities in infrastructure, number of hospitals and number of sanctioned beds. The test showed significant disparities in health infrastructure across the districts of both the states of India. The present paper calls for policy paradigm shift in favour of health related indicators. Punjab needs better budgetary allocation to health facilities, inviting private players in medical field, providing sufficient medical and para-medical staff, laboratory services and provision of supplementary inputs like electricity to uplift the standard of health facilities in the state.

KEYWORDS: Health infrastructure, Human development index, Budget allocation, National Rural Health Mission, National Urban Health Mission, Community Health Centre(CHC), Primary Health Centre(PHC).

Introduction

Punjab is an ancient state of India which enjoyed the best facilities due to its situation along Grand Trunk Road. The state enjoys high per capita income and good health standards. The society has many features of modernism like low birth rate, death rate and infant mortality rate. Lately, the state is experiencing decline in the health standards. The incidence of disease such as cancer is on the rise. International Institute of Population Studies rated Punjab as the worst performer in the sector of health.

The data published in Punjab Governance Reform Commission Report suggests that the prevalence of diseases (person ailing per 1000 population) in Punjab is higher than the national average (136 in rural area in Punjab as compared to 88 in India and 107 in urban Punjab as compared to 99 in India). Under National Rural Health Mission, two collaborations with MAX hospital under Public Private Partnership are running successfully in S A S Nagar and Bathinda. Two other collaborations in Fatehgarh Sahib and Nangal have been stalled.

Kerala is also one of the ancient and prosperous states of India. It lies to south of the country. Its boundary line meets Indian Ocean on one side and Arabian Sea on the other. The state is industrially developed and also receives maximum foreign remittances in the country. The state is performing well on health and education related indicators. It is the only state which

has sex ratio in favour of females and has achieved 100 percent literacy many years back. The state attracts a large number of tourists due to its exotic locations.

Review of Literature

Many studies are carried out to examine the status of health in Punjab. Recent studies lay more stress on cancer.

AditiAkhzer in her article titled, 'Punjab Health spends more on salaries; less on care,' in Indian Express concluded that on one hand budget allocation on health is very small and then major amount is spent on salaries of the medical staff. Very less amount is left for expansion and maintenance of the infrastructure. Health sector faces negligence in the state which is not good for development.

SatinderBains in his article titled, 'Health Care Crisis in Punjab; Rise in Disease and Poor state of Health,' in Punjab News Express concluded that there is crisis in health care in Punjab. The state faces acute shortage of doctors, nurses and other Para medical staff. These workers leave their jobs for greener pastures in private sector or other countries.

Objectives

The health and education are considered assets for economic development. A state which is enjoying high per capita income should support healthy people. National Rural Health Mission was launched by the Central Government to provide health facilities. Under this scheme much money was spent on providing health infrastructure. The main objective of the paper is:

- a) To analyze the status of health infrastructure across the districts of Punjab and Kerala in India.
- b) To compare the disparities in health infrastructure between the two states of India.
- a) To make recommendations for up-liftment in the health infrastructure in Punjab.

Data Source and Methodology

The data used is secondary and compiled from Statistical Abstract of Punjab and Kerala 2015. Some data is compiled from the reports of Health Department, Punjab.

The methodology used is t-test which is applied to check the health infrastructure, disparities in the hospitals and no of sanctioned beds across the districts of both the States.

Analysis

The analysis part is divided into three parts.

In first part, the analysis of vital statistics regarding birth rate, death rate and infant mortality rate of both the states is done. In the second part, the number of hospitals, CHCs, PHCs, and beds in medical institutions across the districts of Punjab and Kerala is analyzed. In third part, the comparison of disparities in health infrastructure between the two States is made.

Table 1**Vital Statistics of Punjab and Kerala**

(BR, DR and IMR are in number per thousand)

Year	BR(Punjab)	BR(Kerala)	DR(Punjab)	DR(Kerala)	IMR(Punjab)	IMR(Kerala)
2000	20.7	18	6.9	5.4	49	7.1
2010	16.2	15.7	7.6	6.8	33	7.4
2013	15.5	14.8	6.5	7.4	21	5.5

Source: Statistical Abstract of Punjab, 2015

BR---Birth Rate DR----- Death Rate IMR----- Infant Mortality Rate

Birth Rate is number of births per one thousand populations. As far as birth rate is concerned, the gap between Kerala (18) and Punjab (20.7) was not high in 2000 (Table No 1). The gap is continuously declining. There is improvement in birth rate in Punjab.

Death Rate is number of deaths per thousand populations. The gap between death rate of Kerala (5.4) and Punjab (6.9) is also not wide. The gap decreased further in 2010 and 2013. The birth rate and death rate were considerably low in the states and there is very less scope for further decrease.

IMR is number of children who die before attaining the age of five years. The gap between infant mortality rates was also high in Kerala (7.1) and Punjab (49) in 2000. But in 2010, in Punjab, this indicator registered a significant decrease to 33 and further declined to 21 in 2013. In Kerala, there is less scope for further decline. The birth rate, death rate and infant mortality rate was very near to Millennium Development Goal (MDG).

For the improvement in health facilities, the government has provided many medical institutions as recommended in National Rural Health Mission. The institutions are classified according to population and area. The hilly areas of the country are less populated so the upper limit of population is decreased for hilly areas.

Primary Health Centre (PHC)

There should be one Primary Health Centre for a population of 5,000 to 30,000 (20,000 for hilly areas). The PHC should be equipped with all the laboratory facilities as minor surgeries are also done. Maternal and Natal facilities should be available. These have only out-patient door facilities. For in-patient door facilities, patients are referred to CHCs or hospital. It covers one hundred square kilometres of area and an average of 26 villages.

Community Health Centre (CHC)

There should be Community Health Centre for population up-to 1, 20,000 (80,000 for hilly areas). These are in large towns and fully equipped with laboratory and surgical facilities. These have the facility for in-door patients also. These have full team of doctors and Para medical staff. In case of emergencies, the patients are referred to the hospitals in the cities. It covers 383 square kilometres of the area and 101 villages on an average.

Hospital

There should be at least one hospital for population more than 1, 20,000. They have every testing facility with expert doctor. There are facilities for indoor patients.

Let us examine the number of hospitals, CHCs, PHCs across the various districts of Punjab.

Table 2 shows the position of health infrastructure in the districts of Punjab. The number of hospitals was good in Amritsar (7), Ludhiana (5), Sangrur (5) and Bathinda (4). The number of hospitals was highest in Amritsar and Patiala (6) which is due to medical colleges and dental colleges in these districts. It was lowest in Moga and Pathankot (1 each) as these are newly carved districts.

The number of Community Health Centres was highest in Gurdaspur (13) and Hoshiarpur and Jalandhar (12). The health infrastructure was more developed in border districts of Amritsar and Gurdaspur due to security reasons. But it is lowest in SBS Nagar, Mansa, Rupnagar and Pathankot. The health infrastructure is not evenly distributed among the districts. The district with more large towns had more CHCs.

Table 2

District wise Number of Hospitals, CHC, and PHC in Punjab in 2015

Sr.no.	District	Hospital	CHC	PHC
1.	Gurdaspur	2	13	30
2.	Pathankot	1	4	9
3.	Amritsar	7	6	33
4.	Tarantaran	3	11	17
5.	Kapurthala	4	5	12
6.	Jalandhar	3	12	28
7.	S B S Nagar	2	3	17
8.	Hoshiarpur	4	12	31
9.	Rupnagar	2	4	12
10.	S A S Nagar	3	5	12
11.	Ludhiana	5	5	31
12.	Ferozepur	2	4	17
13.	Fazilka	2	6	19
14.	Faridkot	3	3	8
15.	Muktsar	3	5	19
16.	Moga	1	6	21
17.	Bathinda	4	9	19
18.	Mansa	3	4	13
19.	Sangrur	5	8	28
20.	Barnala	2	4	10
21.	Patiala	6	10	28
22.	Fatehgarh Sahib	2	5	13

Source: Statistical Abstract of Punjab, 2015.

The number of Primary Health Centres (PHC) was highest in Hoshiarpur (31) followed by Gurdaspur at 30. It was lowest in Pathankot (9) and Faridkot (8). These are situated in small towns of the district. Amritsar, Jalandhar, Ludhiana, Sangrur and Patiala also had high number of PHCs. Only 17 PHCs in the state are working for 24 hours a day and seven days a week which is poor as compared to Kerala.

Table 3**District wise Hospitals, CHC and PHC in Kerala in 2015**

Sr. No.	Districts	GH	DH	TH	CHC	PHC	PHC24*7
1.	Thiruvananthapuram	2	2	6	23	64	6
2.	Kollam	0	1	8	17	52	6
3.	Pathananthittu	2	1	4	12	38	5
4.	Allapuzha	1	1	7	16	42	17
5.	Kottayam	4	0	3	19	43	12
6.	Idukki	0	1	4	14	31	11
7.	Ernakulam	2	1	11	22	42	34
8.	Thirissur	2	1	6	24	68	11
9.	Palakkad	0	1	6	19	65	11
10.	Malappuram	1	3	6	20	66	20
11.	Kozhikode	1	1	7	15	57	7
12.	Waynad	1	1	2	9	14	8
13.	Kannur	1	1	7	11	70	13
14.	Kasragod	1	1	2	9	30	10

Source: Statistical Abstract of Kerala, 2015

It was observed from Table No 3 that the number of hospitals was highest in Ernakulam (14), Thiruvananthapuram (10), Thrissur (9) and Malappuram (10). It was lowest in Kasragod (4), Idduki(5) and Waynad (4). But these districts have low population in the state.

The number of CHCs was highest in Thiruvananthapuram (23), Ernakulam (22) and Malappuram (20). But it was lowest in Waynad and Kasragod (9).The number of PHCs was highest in Thrissur (68), Malappuram (66) and Palakkad (65). It was lowest in Waynad (14). There were huge inter-district disparities.The number of PHCs working 24*7 was highest in Ernakulam (34) and Malappuram (20). It was lowest in Thiruvananthapuram and Kollam (6 each).

When we compared the number of hospitals in two States, Punjab has highest number in Amritsar (7) but Ernakulam has highest number (14) in Kerala. So the number of hospitals in Kerala is quite high and the disparities between Punjab and Kerala is high. Even the districts at the bottom also show disparities.

When we compared number of CHCs, it is 13 for Gurdaspur and 12 for Jalandhar. But it was 23 for Thiruvananthapuram and 22 for Ernakulam. The gap between two states is wide. The lowest number of CHCs in Punjab was 5 for SBS Nagar but 9 for Waynad and Kasragod in Kerala. Again the disparities are high.

While comparing PHCs, it was observed that the highest number was with Hoshiarpur (31)and Gurdaspur(30) in Punjab while it was 68 for Thrissur and 66 for Malappuram in Kerala. The disparities are glaring. The lowest number for Punjab was Pathankot(9) and Faridkot (8) whereas it (14) for Waynad in Kerala. In Punjab only 17 PHCs were working 24*7 whereas in Kerala 171 PHCs were working 24*7 with highest number in Ernakulam 34 and Malappuram 20. But in Punjab, some districts have no PHC working 24*7. It implies that the health infrastructure in Punjab is poorly placed when compared to that in Kerala.

T-TEST :Punjab hospitals
24X7)

Kerala hospitals(CHC+PHC+PHC

N1: 22	N2: 14
df1 = N - 1 = 22 - 1 = 21	df2 = N - 1 = 14 - 1 = 13
M1: 29.09	M2: 76.79
SS1: 2731.82	SS2: 6680.36
s21 = SS1/(N - 1) = 2731.82/(22-1) = 130.09	s22 = SS2/(N - 1) = 6680.36/(14-1) = 513.87

T-value Calculation

$$s^2_p = ((df_1/(df_1 + df_2)) * s^2_1) + ((df_2/(df_2 + df_2)) * s^2_2) = ((21/34) * 130.09) + ((13/34) * 513.87) = 276.83$$

$$s^2_{M1} = s^2_p/N_1 = 276.83/22 = 12.58$$

$$s^2_{M2} = s^2_p/N_2 = 276.83/14 = 19.77$$

t = (M₁ - M₂)/√(s²_{M1} + s²_{M2}) = -47.69/√32.36 = -8.38

The t-value is -8.38474. The p-value is < .00001. The result is significant at p < .05.

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PART 2 –t-tests to compare Punjab hospitals with GH+DH+TH

Difference Scores Calculations:Punjab hospitals	Kerala hospitals GH+DH+TH
N1: 22	N2: 14
df1 = N - 1 = 22 - 1 = 21	df2 = N - 1 = 14 - 1 = 13
M1: 29.09	M2: 8.07
SS1: 2731.82	SS2: 92.93
s21 = SS1/(N - 1) = 2731.82/(22-1) = 130.09	s22 = SS2/(N - 1) = 92.93/(14-1) = 7.15

T-value Calculation

$$s2p = ((df1/(df1 + df2)) * s21) + ((df2/(df2 + df2)) * s22) = ((21/34) * 130.09) + ((13/34) * 7.15) = 83.08$$

$$s2M1 = s2p/N1 = 83.08/22 = 3.78$$

$$s2M2 = s2p/N2 = 83.08/14 = 5.93$$

$$t = (M1 - M2)/√(s2M1 + s2M2) = 21.02/√9.71 = 6.75$$

The t-value is 6.74522. The p-value is < .00001. The result is significant at p < .05.

So it is concluded that disparities in number of hospitals between Kerala and Punjab are significant.

Table 4
District wise Sanctioned Beds and Population Served per Doctor in Punjab in 2015

Sr.no.	District	No.of Sanctioned Beds	Population served per Doctor
1.	Gurdaspur	1202	1102
2.	Pathankot	352	7132
3.	Amritsar	3182	685
4.	TaranTaran	881	20568
5.	Kapurthala	714	1271
6.	Jalandhar	1535	762
7.	S B S Nagar	576	2758
8.	Hoshiarpur	1363	1097
9.	Rupnagar	525	866
10.	S A S Nagar	714	2644
11.	Ludhiana	1492	811
12.	Ferozepur	585	1112
13.	Fazilka	772	10620
14.	Faridkot	830	511
15.	Muktsar	703	4079
16.	Moga	634	4093
17.	Bathinda	1060	931
18.	Mansa	545	2892
19.	Sangrur	1114	1459
20.	Barnala	517	3748
21.	Patiala	2254	554
22.	Fatehgarh Sahib	512	4137

Source; Statistical Abstract of Punjab 2015

The beds in medical institutions also form a part of health infrastructure. A hospital bed is designed in such a way that the patient with a particular disease feels comfortable. Table No 4 revealed that the number of sanctioned beds in medical institution was highest in Amritsar(3182) and minimum in Pathankot. The disparities are huge as the district with maximum number of beds is enjoying four times the number of beds in the district which is at the bottom. But it is observed that most of the districts fall around the average.

Table 5 shows no. of sanctioned beds across the districts of Kerala. The district with highest number of beds was Thiruvananthapuram at 4853 and Ernakulam at 4586. It was lowest in Idduki (1085) and Kasragod (1093). It clearly shows the wide variations across the districts.

When we compared number of sanctioned beds between Punjab and Kerala, we observed that the disparities were high with Thiruvananthapuram (Kerala) at 4853 and in Punjab, Amritsar at 3182.

Table No 5
District wise no. of Sanctioned beds and Population served in Kerala in 2015

Sr.No	Districts	No. of Sanctioned Beds	Population served per doctor
1	Thiruvananthapuram	4853	6875
2	Kollam	2388	8321
3	Pathananthittu	1942	4981

4	Allapuzha	3404	6569
5	Kottayam	2949	4158
6	Idukki	1085	6221
7	Ernakulam	4586	9732
8	Thirissur	3519	7387
9	Palakkad	2764	4133
10	Malappuram	2627	9764
11	Kozhikode	2820	7426
12	Waynad	1141	4613
13	Kannur	3070	6345
14	Kasragod	1093	6612

Source; Statistical Abstract of Kerala, 2015

T-Test on No of Sanctioned Beds in Both the States

Punjab (No of Sanctioned Beds)

Kerala (No of Sanctioned Beds)

N1: 22

N2: 14

df1 = N - 1 = 22 - 1 = 21

df2 = N - 1 = 14 - 1 = 13

M1: 1002.82

M2: 2731.5

SS1: 9207713.27

SS2: 17860679.5

s21 = SS1/(N - 1) = 9207713.27/(22-1) = 438462.54
1) = 1373898.42

s22=SS2/(N-1)=17860679.5/(14-

T-value Calculation

s2p = ((df1/(df1 + df2)) * s21) + ((df2/(df2 + df2)) * s22) = ((21/34) * 438462.54) + ((13/34) * 1373898.42) = 796129.2

s2M1 = s2p/N1 = 796129.2/22 = 36187.69

s2M2 = s2p/N2 = 796129.2/14 = 56866.37

t = (M1 - M2)/√(s2M1 + s2M2) = -1728.68/√93054.06 = -5.67

The t-value is -5.66692. The p-value is < .00001. The result is significant at p < .05. Again the disparities between the two states regarding sanctioned beds are significant.

Population served per doctor

The population served per doctor can be a part of health infrastructure. The physical infrastructure comprises of the medical institutions, hospitals, laboratory equipment, buildings etc. Ultimately the entire physical infrastructure will be put to use by doctors, nurses and other technicians. So the availability of doctors and nurses is of utmost importance.

The population served per doctor has inverse relation with the condition of health infrastructure. The population served per doctor was highest in Tarantaran which was 20568 persons per doctor as is shown in table no 4 depicting very poor condition. It a new district and comprises of large rural area. Its neighbouring district Amritsar had less population per

doctor which was 685 persons. Amritsar is an old district. The districts which share international border with Pakistan are well equipped in health infrastructure and have less population served per doctor.

The population served per doctor was lowest in Faridkot(511). However, Patiala(554), Ludhiana(811), Jalandhar (762) and Rupnagar(866) also had less population served per doctor. The disparities were not huge. The private hospitals and practicing doctors supplement the infrastructure. The situation of health infrastructure is not very bad in the districts of Punjab.

Table no 5 shows population served per doctor in the districts of Kerala. It was highest in Mallapuram at 9764 and Ernakulam at 9732. But it was low for Pallakad at 4133 and Kottayam at 4158. The disparities were not high among the districts.

But when comparison was made between the two States, Punjab was at the losing end as the district at the top had the value of 20568 persons per doctor whereas in Kerala it was 9764 persons per doctor. But the district at the lowest position in Punjab had the value of persons per doctor at 554 whereas in Kerala it was 4133.

Most of the districts of Kerala are having less population as compared to the districts of Punjab. In Punjab, the district with highest population is having population around 35 lakhs whereas in Kerala it is as low as 13 lakhs. The health infrastructure is more and population is less in Kerala. So, more facilities per person are available in Kerala which put Kerala at better position as compared to Punjab.

Conclusion

It is concluded that Punjab is facing acute shortage of health infrastructure. The number of hospitals, CHCs, PHCs, number of sanctioned beds is high in the districts of Kerala. Most of the districts are placed at comfortable position. Though state is having hilly terrain yet the infrastructure is at place. In Punjab the districts are more populous. The district with highest population in Kerala is just above the district of Punjab having the least population. So population served per doctor is low in Kerala and high in Punjab. But some districts like Faridkot and Patiala are having very low population served per doctor. The disparities between the two states are large. The results of t-test are significant for the disparities in the two states for health infrastructure, number of hospitals and number of sanctioned beds.

Recommendations

- The government should rationalise the remuneration to doctors and paramedical staff. They should be given some incentives. The medical students should be taught about their duty towards society and some moral values should be inculcated so that they do not run after making bucks but should understand the value of their profession. Any type of monetary or moral corruption must be curbed.
- There should be more health infrastructure in private sector. The private hospitals should be encouraged to set up their units in rural areas also. There should be proper check on the fees charged by these hospitals. They should be given incentives if they reduce their charges for poor patients. A certain percentage of their income should go for charity. The PPP collaboration in Fatehgarh Sahib and SAS Nagar must be facilitated.
- The budget allocation on health must be increased. Now the government is spending 0.79% of expenditure on health which is very meagre.

- The state health insurance scheme should be implemented effectively. The health insurance must be given to the people so that treatment of disease becomes easy for them.
- The laboratory and diagnostic equipment should be made available in each CHC, PHC or hospital.
- The availability of electricity should be made smooth. Most of laboratory facilities require gadgets based on electricity.
- There is immigration of nurses and doctors to other countries after acquiring training from here. The government should check this tendency.

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