

Original Research Article

Antenatal care coverage of pregnant mothers in Tamil Nadu: evidence from National Family Health Survey 4

Mohankumar Raju*

Medical officer, Directorate of Public Health and Preventive Medicine, Chennai, Tamil Nadu, India

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***Correspondence:**

Dr. Mohankumar Raju,

E-mail: rmkhari2000@yahoo.com

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ABSTRACT

Background: The sustainable development goal emphasises on reduction in mothers dying due to pregnancy. Recommended care for the pregnant mothers will help achieve this goal. Tamil Nadu is one of the best performing state in maternal and child health care. Author analysed the full antenatal care coverage of pregnant mothers of the districts of Tamil Nadu by using National Family Health Survey (NFHS)-4 data.

Methods: Author did a secondary data analysis of NFHS 4 data for the districts of Tamil Nadu for understanding the MCH coverage.

Results: Tamil Nadu showed 45% full AN coverage with 46.3% in urban and 43.8% in rural population, among 32 districts, Krishnagiri (65.5%) is the best performing and Virudhunagar (13.7%) is the poorest performing district of Tamil Nadu. Full AN coverage includes at least 4 AN check-up, vaccination of tetanus toxoid and consumption of 100 IFA tablets in last pregnancy. Tamil Nadu showed 81.1% of at-least 4 AN visit, 71% with vaccination for TT and 64% on consumption of 100 IFA tables. Similar coverage trend among the components of full ANC coverage is seen among all the districts of Tamil Nadu.

Conclusion: Focusing on the coverage of IFA tablet consumption and also showing special interest among the rural population will increase the coverage. A detailed assessment for understanding the reasons for poor performance among the districts of Tamil Nadu is needed for better evidence-based practices.

Key words: Antenatal care, Coverage, Iron and folic acid, NFHS-4, TT vaccination

INTRODUCTION

Globally, maternal mortality ratio reduced by 44% over the past 25 years, from 385 per 100000 live births in 1990 to 216 per 100000 live births in 2015.¹ Developing countries contribute approximately 99% (302,000) of the global maternal deaths in 2015, with sub-Saharan Africa alone accounting for roughly 66% (201,000), followed by Southern Asia (66,000). India contributes to 15% of the global maternal deaths in 2015, standing second to Nigeria. Although, India have reduced its maternal mortality rate (MMR from 556 per 100000 live births in 1990 to 174 per 100000 live births in 2015, with a reduction of 68.7%.

India is a signatory to millennium declaration at UN general assembly in 2000 and affirmed its commitment to better maternal health care along with other 7 goals. The strategy of availability of trained medical professionals at the field level, infrastructure development for maternal health care and financial schemes like conditional cash benefit schemes and Janani Suraksha yojanas made significance impact in better maternal health care of the community.^{1,2} The momentum of millennium development goals (MDG) is continued with sustainable development goals (SGD) with emphasis on reduction of maternal mortality and promotion of universal health coverage.¹

Government of India have implemented several maternal and child health (MCH) innovative programmes from time to time and updated the strategy in order to improve the health status of women and children and fulfil the unmet need of the MCH care in all the states of India. Tamil Nadu is one of the better health care's providing state in India with better MCH care. Lot of initiations like conditional cast transfer, Birth companion scheme, online mother and child tracking system and widely expanded infrastructure facilities at the rural levels are initiated, pioneering in the country. The state also addresses the gap in MCH services by new approaches like birth waiting rooms and special mobile medical camps. Although Tamil Nadu have achieved the target of MDG earlier, there are differences among the districts in various components of Maternal and child health care. The National Family Health Survey (NFHS) is a large-scale, multi-round survey conducted in a representative sample

of households throughout India. The first NFHS was conducted in 1992-93. The second and third NFHS Surveys were done in 1998-99 and 2005-06 respectively. NFHS 4 was conducted in 2015-16. Information including population and household profile, maternal health, child health, family planning, nutrition status and information on HIV were collected. The information collected through NFHS 4 are available as tables till the district level. Author intend to understand the MCH care given to the population at the district level of Tamil Nadu state.

METHODS

Author would a secondary data analysis of the NFHS 4 data which was collected for all states under Ministry of Health and Family Welfare.

Table 1: Total eligible women interviewed at the districts of Tamil Nadu for NFHS 4 survey, 2015-16.

Districts	# Eligible women interviewed			Eligible women response rate
	Urban	Rural	Total	
Ariyalur	97	709	806	99.1
Chennai	928	NA	928	99.9
Coimbatore	746	263	1,009	99.6
Cuddalore	468	493	961	98.4
Dharmapuri	205	760	965	99.5
Dindigul	474	521	995	99.5
Erode	500	503	1,003	99.8
Kancheepuram	454	504	958	99.0
Kanniyakumari	682	154	836	95.3
Karur	483	490	973	99.5
Krishnagiri	273	847	1,120	99.6
Madurai	413	383	796	97.4
Nagapattinam	200	735	935	98.2
Namakkal	450	451	901	99.7
Perambalur	172	740	912	99.7
Pudukkottai	186	726	912	98.2
Ramanathapuram	384	393	777	93.2
Salem	487	501	988	99.8
Sivagangai	443	433	876	96.6
Thanjavur	426	442	868	98.1
The Nilgiris	492	481	973	99.7
Theni	391	401	792	98.1
Thiruvallur	438	473	911	99.0
Tiruvarur	188	699	887	96.9
Thoothukudi	410	351	761	96.6
Tiruchirappalli	384	401	785	97.9
Tirunelveli	359	350	709	94.9
Tiruppur	447	436	883	99.7
Tiruvannamalai	188	728	916	99.1
Vellore	508	446	954	99.2
Viluppuram	171	821	992	99.5
Virudhunagar	359	379	738	97.1
Tamil Nadu	12,806	16,014	28,820	98.5

This survey of conducted in 2015-16 in the month of August 2015. International institute of population sciences, Mumbai conducted this survey in collaboration with other national and international agencies . For Tamil Nadu, a total population of 28,820 were covered in the survey (Table 1). This survey collected information on population demographics, maternal and child health, nutrition and HIV for the states and union territories. Special focus on women of reproductive age group (15-49 years) were given in the survey.

This study was secondary data analysis of the NFHS 4 data collected during the year 2015-16. It was conducted June to November 2019. The data was collected during the period of 2015-16

Data collection methods

Author collected the information of Tamil Nadu from the NFHS 4 fact sheets report and entered in excel sheet. Similarly, information on the districts of Tamil Nadu were also obtained as fact sheets from the NFHS website. Author abstracted the fact sheets data into excel. Author used Microsoft excel and epi-info for analysis.²

Case definitions

Full ante natal care coverage: Full antenatal care is at least four antenatal visits, at least one tetanus toxoid (TT) injection and iron folic acid tablets or syrup taken for 100 or more days.²

The data was calculated for the proportion of ANC coverage by using Epi info 7.2.3.1.

RESULTS

Tamil Nadu showed 45% of Mothers who had full ANC coverage (Table 2). Of the total of 32 districts of Tamil

Nadu, Krishnagiri and Coimbatore districts had more than 60% with 65.5% and 64% respectively. Nine districts namely, Vellore, Tiruppur, Dindigul, Karur, Tiruvarur, Salem, Chennai, Sivagangai and Cuddalore showed more than 50% full ANC coverage. Virudhunagar (13.7%), Theni (19.3%), Ariyalur (25.3%), Tirunelveli (26.4%) and Thoothukudi (29%) are the least performing five districts of the state (Figure 1).

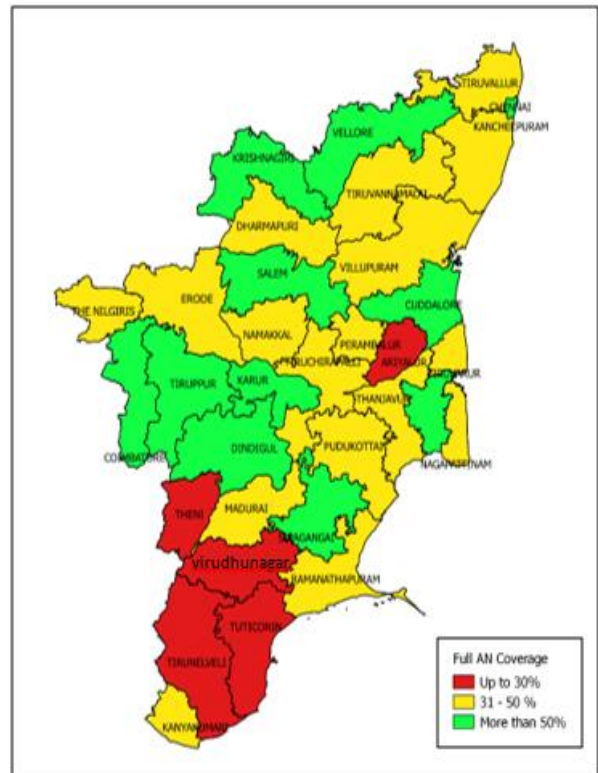


Figure 1: Full antenatal coverage among the pregnant mothers in the districts of Tamil Nadu, India; NFHS 4, 2015-16.

Source: Developed using QGIS 2.18

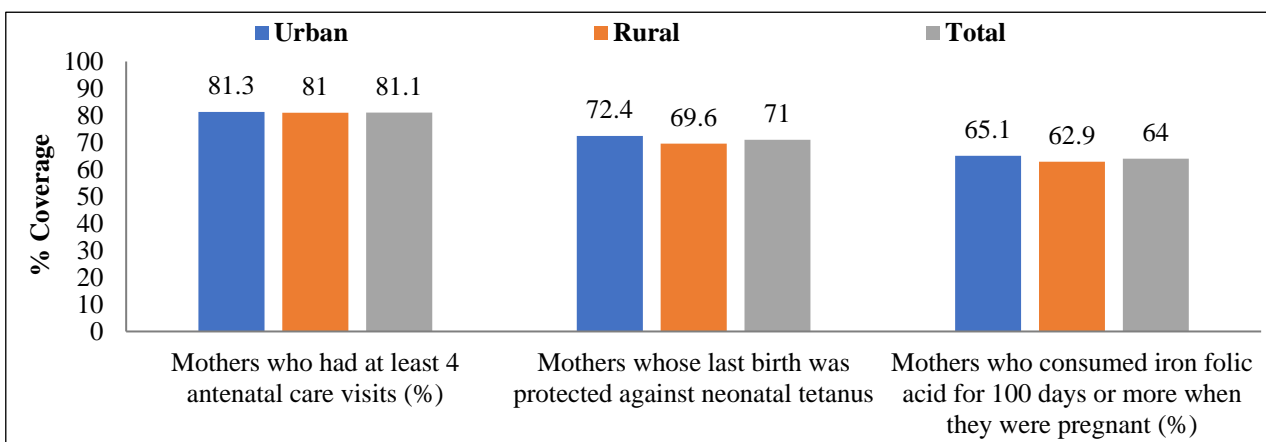


Figure 2: Coverage of components of full antenatal coverage among the pregnant mothers of Tamil Nadu, India; NFHS 4, 2015-16.

The full ANC coverage of rural population of Tamil Nadu was 43.8% (Table 2), which is lower compared to the overall performance of the state.

Table 2: Coverage of mothers with full antenatal care services among the districts of Tamil Nadu, NFHS 4, 2015-16.

State/District	Rural (%)	Urban (%)	Total (%)
Krishnagiri	66.8		65.5
Coimbatore		59.9	64
Vellore	58.3	56.3	57.2
Tiruppur	46.8	58.6	55
Dindigul	51.6	61.1	54.8
Karur	50.3	61.4	54.7
Tiruvarur	62.5		54.2
Salem	50.7	54.6	52.3
Chennai		51.6	51.6
Sivagangai	48.8	58.6	51.3
Cuddalore	47.2	57.1	50.1
Thiruvallur	48.7	47.8	48.1
Villupuram	46.8		47.2
Thanjavur	53.6	33.1	46.3
The Nilgiris	49.6	42.6	45
Tamilnadu	43.8	46.3	45
Pudukkottai	39.7		45
Perambalur	47.1		43.9
Erode	45.7	40.2	42.8
Namakkal	42.7	42.2	42.5
Nagercoil		39.5	40
Kancheepuram	37.5	39.4	38.8
Tiruchirapalli	33.2	44.5	38.6
Thiruvannamalai	33.4		34.9
Dharmapuri	34.8		34.3
Madurai	20.9	38.7	32.8
Ramanathapuram	33.6	25.3	30.9
Nagapattinam	29.8		30.7
Thoothukudi	21.5	35.1	29
Tirunelveli	24.7	28.7	26.4
Ariyalur	23.6		25.3
Theni	27.6	13.7	19.3
Virudhunagar	13.4	14.1	13.7

At the district level, data on rural coverage is not available for Coimbatore, Chennai and Nagercoil. Of the 29 districts for which data is available for rural ANC coverage, Krishnagiri (66.8%) and Tiruvarur (62.5%) had full ANC coverage more than 60%. The least performing five districts in rural population were Virudhunagar (13.4%), Madurai (20.9%), Thoothukudi (21.5%), Ariyalur (23.6%) and Tirunelveli (24.7%).

For urban population, the full ANC coverage for Tamil Nadu is 46.3%, which is higher compared to the rural

coverage of 43.8%. At the district level, the data is not available for 9 districts. Of the remaining 23 districts, Karur (61.4%) and Dindigul (61.1%) had full ANC coverage of more than 60%. The least performing five districts in urban population are Theni (13.7%), Virudhunagar (14.1%), Ramanathapuram (25.3%), Tirunelveli (28.7%) and Thanjavur (33.1%).

The three components for calculating full ANC coverage are Mother had at least 4 ANC visits, Mother protected with Tetanus and mother consumed Iron and folic acid for 100 days.

Tamil Nadu showed 81.1% coverage for Mothers with at least 4 ANC check-ups (Figure 2). At the district level, Vellore (92.5%), Thiruvallur (91.6%) and Thanjavur (90.6%) had coverage more than 90% (Table 3). The poor performing district is Thoothukudi (64.8%) followed by Virudhunagar (65.9%), Ramanathapuram (65.9%), Nagapattinam (68.3%) and Madurai (69.5%). The coverage of mothers with at least 4 ANC check-ups are equal in rural and urban areas of Tamil Nadu with 81%.

Although there are minor variations in the difference among the urban and rural population among the districts of Tamil Nadu, the least performing districts for 4 ANC check-up coverages are Thoothukudi, Virudhunagar, Ramanathapuram, Nagapattinam and Madurai among the rural population and Ramanathapuram (66.9%), Tirunelveli (68.2%), Madurai (68.8%), Erode (69.1%) and Virudhunagar (70.2%) are the last 5 performing districts among the urban population.

Regarding the coverage of Mothers whose last birth was protected against neonatal tetanus, Tamil Nadu showed a total coverage of 71% with rural coverage of 69.6% and urban 72.4% (Table 3). The best performing district is Coimbatore (85.4%) followed by Salem (85.1%). The poor performing district is Theni (40.3%) followed by Virudhunagar (46.9%), Tiruchirapalli (51.5%), Ariyalur (51.5%) and Tirunelveli (55.9%). Among the rural population, Krishnagiri was the best performing district with the coverage of 85.8% followed by Tiruvarur (84.2%). The poor performing district was Madurai with 38.1%, followed by Virudhunagar (47.5%), Tiruchirapalli (48.6%), Ariyalur (50.3%) and Theni (50.9%). Among the urban population, Salem district is the top performer with 89.9% followed by Tiruppur (84.6%). The districts that had poor coverage for vaccination of mothers with tetanus toxoid are Theni (33%), Virudhunagar (46.3%), Tiruchirapalli (54.7%), Tirunelveli (56.9%) and Nagercoil (61.2%).

Consumption of 100 Iron and Folic acid (IFA) tablets by pregnant mothers is another factor for full ANC coverage. Tamil Nadu state showed the coverage of 64% with 65.1% in urban population and 62.9% among the rural population (Table 3). Krishnagiri (81.2%) showed top performance followed by Coimbatore (75.3%). Among the rural population, Krishnagiri (81.1%) and Erode

(75.1%) showed top performance. The poor performing districts for IFA tablets consumption coverage are Virudhunagar (37.5%), Thoothukudi (39.4%), Tirunelveli (43.3%), Dharmapuri (51.9%) and Madurai (52.3%). Among the urban population, Karur is the top performer

with 76.6% followed by Thiruvallur (74.4%). The least five poor performing districts are Virudhunagar (37.5%), Tirunelveli (47.3%), Theni (47.8%), Thanjavur (50.2%) and Ramanathapuram (53.5%).

Table 3: Coverage of mothers with full antenatal care services among the districts of Tamil Nadu, NFHS 4, 2015-16.

State/District	Mothers who had at least 4 antenatal care visits (%)			Mothers whose last birth was protected against neonatal tetanus (%)			Mothers who consumed iron folic acid for 100 days or more when they were pregnant (%)		
	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban	Total
Krishnagiri	86.8		86.6	85.8		82.4	81.1		81.2
Coimbatore		86	88.5		83.1	85.4		73	75.3
Vellore	88	96.4	92.5	82.7	82.5	82.6	68.7	70	69.4
Tiruppur	86.1	90.9	89.5	72.5	84.6	80.9	64.5	69.6	68.1
Dindigul	87.4	91.7	88.8	76.8	67.1	73.5	65.4	70.6	67.1
Karur	81.2	85.5	82.9	76.9	81.5	78.7	70.6	76.6	73
Tiruvarur	84.1		83.4	84.2		79.7	74.5		70.3
Salem	76.1	82.2	78.7	81.7	89.9	85.1	61.3	67.5	63.9
Chennai		78.3	78.3		80.9	80.9		70.1	70.1
Sivagangai	86.4	85.5	86.2	57.2	78.2	62.5	68.8	71.6	69.5
Cuddalore	83.7	89.8	85.5	79.1	78.6	79	62.7	66.9	63.9
Thiruvallur	89.7	92.6	91.6	72	68.3	69.7	66.4	74.4	71.4
Villupuram	80.1		79.5	75.8		76.8	62.2		61.7
Thanjavur	91.3	88.4	90.2	65.8	65.8	65.8	72.5	50.2	64.6
The Nilgiris	94.5	85.8	88.8	74.1	65	68.1	61.9	54.9	57.3
Tamil Nadu	81	81.3	81.1	69.6	72.4	71	62.9	65.1	64
Pudukkottai	74.1		76.9	71.4		75.4	56.8		60.2
Perambalur	77.5		77.7	73.4		71	60.5		57.3
Erode	86.8	69.1	77.2	65.7	61.4	63.4	75.1	62.6	68.3
Namakkal	85.6	75.4	81.6	58.7	63.5	60.6	68.9	63.6	66.8
Nagercoil		81.3	81.5		61.2	62		68.7	70.2
Kancheepuram	74.2	73.4	73.6	74	75.9	75.3	65.5	57.8	60.4
Tiruchirapalli	81.3	90.5	85.8	48.6	54.7	51.5	64.8	54.5	59.8
Thiruvannamalai	83.6		83.5	62.6		62.2	54.9		58.9
Dharmapuri	87.5		86.3	59.9		60.4	51.9		50.8
Madurai	71	68.8	69.5	38.1	76	63.5	52.3	71.9	65.4
Ramanathapuram	65.5	66.9	65.9	70.2	61.4	67.4	53.6	53.5	53.5
Nagapattinam	69.4		68.3	71.4		68.1	54.2		53.4
Thoothukudi	57.4	70.8	64.8	61.4	61.8	61.7	39.4	61.5	51.6
Tirunelveli	73.8	68.2	71.4	55.1	56.9	55.9	43.3	47.3	45
Ariyalur	77.9		79.1	50.3		51.5	52.9		52.3
Theni	76.2	75.8	75.9	50.9	33	40.3	66.8	47.8	55.5
Virudhunagar	62.2	70.2	65.9	47.5	46.3	46.9	37.5	35.5	36.6

DISCUSSION

Antenatal care is one of the main strategies for positive pregnancy outcome.^{2,3} Many studies have proved the effectiveness of antenatal care in pregnancy outcome.^{2,4} For instance, non-communicable diseases, one of the

increasing trends of illness is better monitored among pregnant mothers by ANC care.²

Full ANC care is a package of antenatal care recommended by WHO and adopted by Health and Family Welfare department of India, which includes 4 ANC check-ups, one dose of tetanus toxoid vaccination

and consumption of 100 IFA tablets. National Family Health Survey collected information on Full ANC coverage among the states and districts of India. The data was available specific to urban and rural also.

India shows full ANC coverage of 21%. Among the southern states, Kerala has better coverage with 61.2% followed by Tamil Nadu (45%), Andhra Pradesh (43.9%) and Karnataka (32.8%).⁶ Other states of India including Delhi (39%), Himachal Pradesh (36.8%), Gujarat (30.7%), and West Bengal (21.8%) had coverages below Tamil Nadu.⁶

Tamil Nadu showed full ANC coverage of 45% in 2015 - 16. Comparing 27.5% coverage in 2005-06, there is a 63% increase over a period of 10 years. Although there is a marked improvement in the full ANC coverage, there is a need for improvement. The Government of Tamil Nadu had implemented lot of activities for better maternal health care. Availability of Village health Nurse for every health sub-centre, focusing and give special importance for MCH activities at the primary health centres, exclusive availability of district level MCH officer for monitoring the MCH care are available in the state. Initiatives like online tracking of pregnancy cohort for better MCH care, conditional cash benefit scheme for first two pregnancies and availability of lab facilities and ultrasound scan facilities at the block level are also implemented. Awareness among the community for enrolment and continuum of care of pregnant mothers are also widely disseminated in the state. Lower coverage in spite of the efforts taken by health department of Govt of Tamil Nadu need to be evaluated to find gaps and design appropriate strategies to improve.

Author can see a wide variation in the coverage of Full AN care within the districts of Tamil Nadu, ranging from 65.5% in Krishnagiri to 13.7% in Virudhunagar. Of the 32 districts of Tamil Nadu, less than quarter districts had coverage more than 50% ANC coverage. Five districts had coverage less than 30% which impacted the overall reduction of full AN care of the state. Virudhunagar and Theni are having less than 20% full AN coverage. These districts need special attention to elevate to districts like Krishnagiri and Coimbatore. The facilities available in the districts are the same throughout the state. Variation in performance in spite of the common facilities available for all the districts, need to be evaluated.

In the neighbouring state of Kerala, Kannur (71.5%) and Kozhikode (71.4%) districts could achieve more than 70% coverage on full AN care with 13 of 14 districts having coverage more than 50%. This indicates the possibility level of achievement and efforts health department of Tamil Nadu have to take.

When authors compare the coverage on components of full AN care of Tamil Nadu, authors can see that, the state had better coverage on at-least 4 ANC visits by pregnant mothers (81.1%) followed by 71% for TT coverage. But

for consumption of IFA, the coverage is 64%, which indicates that more attention is to be given for better coverage for IFA consumption among the pregnant mothers. Also, there are scopes for improvement for improved coverage for TT vaccination among the pregnant mothers and increasing the frequency of ANC care among the pregnant mothers.

Krishnagiri, the best performing district with 65.5% in full AN coverage could achieve more than 80% in all the three components. Although Vellore topped in coverage of 4 ANC visits with 93.5%, reduced coverage of IFA consumption of 69.4% pushed the district to 4th place. For Virudhunagar, the lower performance of at least 4 ANC visits coverages (65.9%), administration of TT vaccination (46.9%) and consumption of 100 IFAs (36.6%) have pushed the districts to last in the state. The contributing factor for making Theni stand second last in the full AN coverage is coverage of TT vaccination (40.3%), in spite of better performance in at-least 4 AN checks-up (75.9%) and consumption of 100 IFA tablets (55.5%). Hence, it is necessary for the health officials of the districts to focus on the key areas of poor performance to improve the coverage.

CONCLUSION

Focusing on the coverage of IFA tablet consumption is the key area of focus. Special interest among the rural population is needed to increase the coverage in this population. A detailed assessment for understanding the factors for poor performance among the districts of Tamil Nadu is needed for better evidence-based practices.

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