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IMPACT OF SOLAR ELECTRIFICATION ON HEALTH CARE OF RURAL WOMEN: A STUDY IN POUNDI-UPRODA BLOCK OF CHHATTISGARH

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ABSTRACT

*Poundi Uproda is the biggest block in Korba district of Chhattisgarh State. There are **205** villages in this block and many of them are in remote and forest areas. The Chhattisgarh Government did extensive and much significant work of rural electrification programme through CREDA (Chhattisgarh Renewable Energy Development Agency) in the villages. Using Solar Panels is the most common method of electrification in these remote areas. In this research paper I have studied the impact of Solar Electrification on Health Care of rural women's of Poundi- Uprora. The focus of study is on the Health of pregnant Women and safe delivery under medical observation. On the basis of analysis of primary data collected it was found that the medical facilities have improved after the electrification of Health centers through solar devices. Thus the maternity period of pregnant women are much safer in present days and further the child care and population control through sterlisation of males and females are also taken care of. On analysis of secondary data it was found that delivery of children in their homes have been reduced to only **4.5 %** over the period of five years from **2015 to 2019**, and presently the rural women gives birth to her child in PHC or CHC under supervision of trained medical staff. The PHC and CHC are operational 24x7with electrically supported medical equipments. Under the special regulation of Chhattisgarh Govt. all the primary health centers as well as the Community health centers of rural areas have been electrified and the systems are also maintained by the Government. The health centers are also provided with solar Drinking water systems. Thus, the research paper concludes that there had been a significant positive impact of solar electrification on the health care of rural women.*

Keywords: *Solar Electrification, Primary Health Center, Community Health Center, Rural Women Health*.

Introduction

Chhattisgarh State came into existence on 1st Nov' 2000, separated from Madhya Pradesh. This State has an area of 135,192 Km^2 being 2nd largest state of the country. This state is in 16th position for being most populated state, with a population of 25.5 million as per 2011 census. Out of the total population 43.4% represent the schedule caste and schedule Tribes who reside in forest and also remote areas. 44% area of this State is covered by forest. The sex ratio of the state is 991 females for 1000 males. Chhattisgarh state has 27 districts. It ranks 2nd position in Mineral production. The state is rich in biodiversity and also have good agro produces, specially rice. Chhattisgarh is popular for having uninterrupted Quality Power supply in India. Korba is the power hub of the state.

In this research paper I am concerned about two important challenges of the State. Though Chhattisgarh is one of the highest Power Generation State but the challenge lies to electrify the rural and remote areas of the State.

Secondly, an important challenge of the State is also to take care of the health of rural women and reduce the child mortality rate by proving standard medical services.

If I correlate then it can be stated as, "Electrification can lead to standard medical services in rural areas of Chhattisgarh."

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To promote clean and green energy, Chhattisgarh Govt. established a nodal agency named CREDA(Chhattisgarh State Renewable Energy Development Agency) in the year 2000.This organization had immense contribution in implementation of programmes like Rural Village Electrification, Biogas Development and using various modes of non-conventional sources of energy. It also contributes in Energy conservation.

Strategies of CREDA, Contributing to Success of Rural Village Electrification (RVE)

- The Central and State Govt. provide financial support for system installation.
- State Govt. supports in Organizational setup for every plant for its functionality and monitoring system.
- Encouraging community participation in the projects
- Installation of demand based capacity systems.
- Completion of projects on time and capacity enhancement whenever required.

Literature Review

Abhijit Banerjee, et al (2004) writes on "Health Care Delivery in Rural Rajasthan" in 'Economic & Political Weekly'. This paper reports on a survey conducted in rural Udaipur to gauge the delivery of health care and the impact it has on the health status of the largely poor population of the region. The study shows that the quality of public service is extremely low and that unqualified private providers account for the bulk of health care provision. The low quality of public facilities has also had an adverse influence on people's health.

Ashok Vikhe Patil, et al (2002) published an article entitled "Current Health Scenario in Rural India" in the 'Australian Journal of Rural Health'. In this study it reveals about 75% of health infrastructure, medical manpower, and other health resources are concentrated in urban areas where 27% of the population lives. The health status of Indians, is still a cause for grave concern, especially that of the rural population. This is reflected in the life expectancy (63 years), the infant mortality rate (80/1000 live births), the maternal mortality rate (438/100 000 live births)

Mehrotra (2008) published a research article on "Public Health System in UP: What Can Be Done?" in 'Economic & Political Weekly'. The paper offers a menu of options for reform of Uttar Pradesh's public health system. Though some actions have been taken after the introduction of the National Rural Health Mission in late 2005, a large number of very serious problems remain. Unless they are addressed, the monitor able targets of the Eleventh Five-Year Plan in regard to health and nutrition in India will not be met, since UP has such a large weight in the unmet needs of public health in the country.

Sunil S Amrith (2009) published a research paper entitled "Health in India since Independence". This paper suggests that history is essential to an understanding of the challenges facing health policy in India today. Institutional trajectories matter and the paper tries to show that a history of under-investment and poor health infrastructure in the colonial period continued to shape the conditions of possibility for health policy in India after independence.

Study of Oxfam related to contribution of solar power and other renewable powers on primary education and primary health of rural India.

Objective of the Study

The objective of this research paper is described as follows:

- To study about the improvement in medical facilities in the rural areas of Chhattisgarh through Solar Electrification.
- To study the impact of solar electrification on the health of pregnant women in context of safe child delivery in rural areas of Chhattisgarh State.

Hypothesis

On the basis of above objectives the following Hypothesis has been framed which can be statistically tested for acceptance or rejection.

H_0: There exists a significant correlation between solar electrification and improved medical facility in rural areas of Chhattisgarh.

H_1: There exists a significant positive impact of solar electrification on the health of pregnant women in context of safe child delivery

Research Methodology

To conduct study on the impact of solar electrification on health of rural women I had choosen the Podi Uprora block of Korba District in Chhattisgarh.

Primary data was collected from the beneficiaries of health centers. The sample size of the research was 300, based on random sampling in the following villages: Konkona, Madai, Aitma nagar, Banjiban, Tanakhar and Gursiya.

Secondary data was collected from the in-charge of PHC and CHC in Poundi-Uprora block. An interview schedule was prepared to collect data from the beneficiaries of PHC and CHC. The questions were focused to interrogate about the medical facilities available, the healthcare awareness during pregnancy, immunization of the child, treatment for other ailments, sterlisation programmes for population control and laboratory facilities. The secondary data was collected regarding the no. of cases of child birth at home and the child birth at PHC and CHC.

Tabulation of Data for Analysis and Interpretation

The primary data collected has been classified and tabulated as follows:

Questions	% of Yes	% of No	% of No Reply	Remarks
Availability of medical facilities	**92**	**08**	**Nil**	People also complained about the distance
Healthcare awareness during pregnancy	**78**	**10**	**02**	People also reported about less frequency of such programmes
Delivery Units	**97**	**00**	**03**	-
Emergency Services	**84**	**07**	**09**	People also reported about delay in services
Sterlisation programmes for population control	**64**	**00**	**36**	People hesitated to answer
Child immunization	**82**	**12**	**06**	People appreciated about door to door service of Polio drops
Laboratory facilities.	**42**	**54**	**04**	People reported about limited services
Technologically advanced equipments for investigation	**10**	**86**	**04**	People appreciated about solar electrification.

Test of Hypothesis H_0

Application of Pearson's Correlation Test

Let the data for (% of Yes) be X values

Let the data for (% of No) be Y values

X Values

$\sum = 549$

Mean = 68.625

$\sum(X - Mx)2 = SSx = 6021.875$

Y Values

$\sum = 177$

Mean = 22.125

$\sum(Y - My)2 = SSy = 6752.875$

X and Y Combined

N = 8

$\sum(X - Mx)(Y - My) = -5930.625$

R Calculation

$r = \sum((X - My)(Y - Mx)) / \sqrt{((SSx)(SSy))}$

$r = -5930.625 / \sqrt{((6021.875)(6752.875))} = -0.93$

r = -0.93

This is a strong negative correlation, which means that high X variable scores go with low Y variable scores (and vice versa).

The result signifies that the X values means the percentage of "Yes" reporting are significantly higher than the Y values, and this is possible because the PHC and CHC are operational 24x7 on the basis of electricity supply through solar electrification. The delivery units function through many electrically supported equipments and the electricity is supplied through the solar panels. **Thus, it can be stated that there is a significant positive impact of solar electrification on the improved medical facility in rural areas of Chhattisgarh and H_0 has been accepted.**

Secondary Data has been collected from CHC of Poundi-Uprora block of Korba District reflect that over the period of last five years the delivery of babies at home has been reduced from **579** in year 2015-16 to **26** in the year 2019h aware of-20. This significant reduced figure indicates that in present scenario the rural women are much aware about her safe delivery under medical supervision and further child care. The figures also indicate the population control phenomenon among the rural areas also.

Schedule of Delivery Cases in Pondi-Uproda Block

Table 1

Delivery Cases	2015-16	2016-17	2017-18	2018-19	2019-20	Total
Delivery of child at Home	**579**	**626**	**360**	**272**	**26**	**1,863**
Delivery of Child at PHC,CHC and Dist. Hospital (including C-Section)	**3,097**	**2,874**	**3,093**	**2,736**	**1,517**	**13,290**
Total	**3,676**	**3,500**	**3,453**	**3,008**	**1,543**	**15,153**

Source: CHC, Poundi-Uprora Block, Korba

Graphical Representation of the Data

Figure 1: % of Child Birth at Home and in Hospital

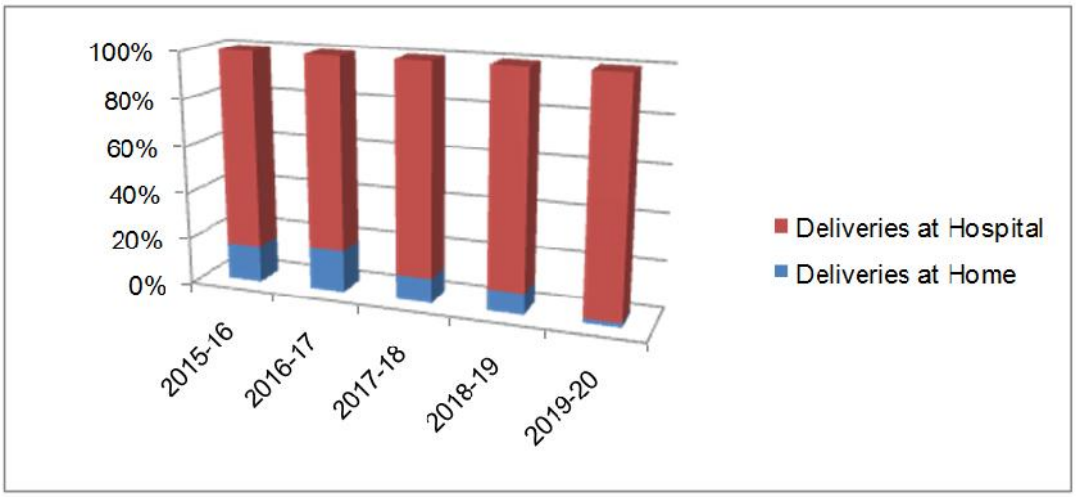


Figure 2: Reducing No. of Deliveries at Home

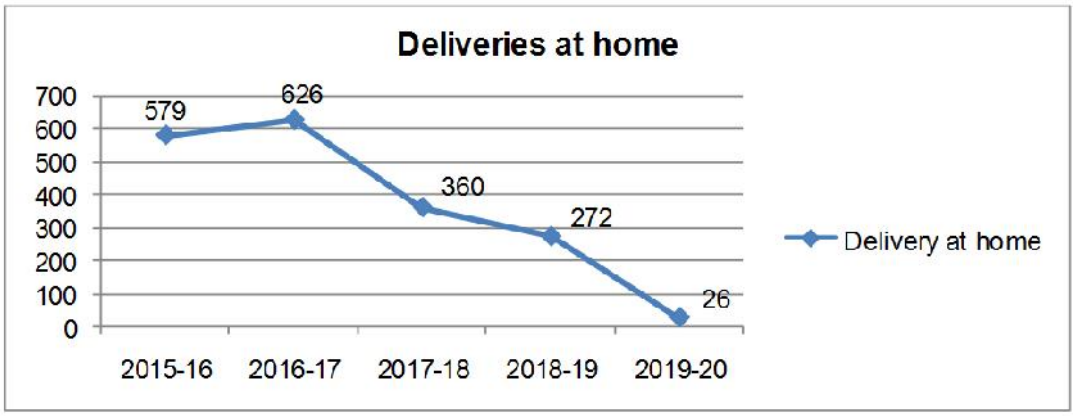


Figure 3: Graph of Deliveries in Health Centers

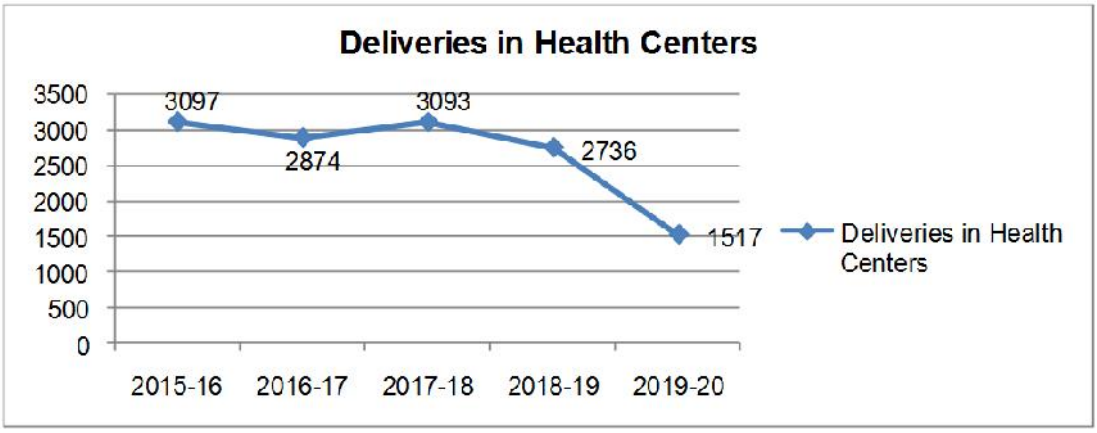


Figure 4: Reduction in Birth Rate followed by Population Control

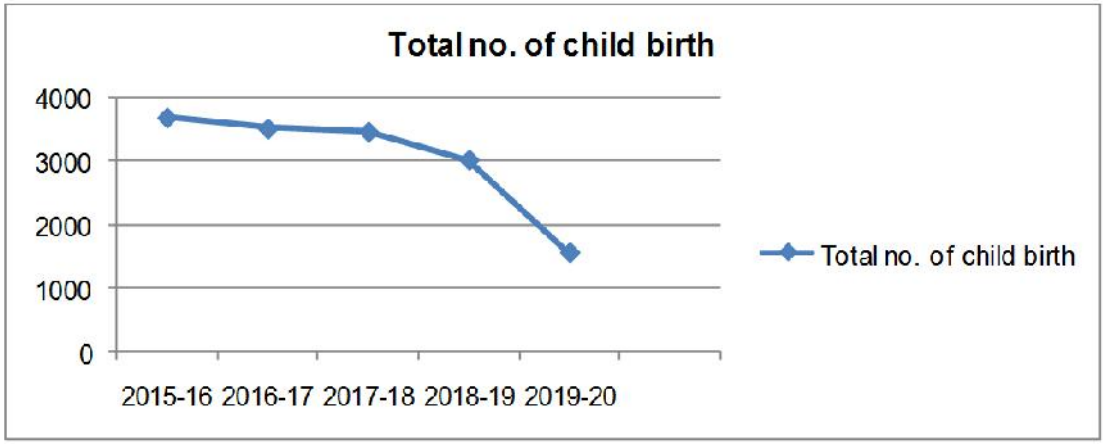
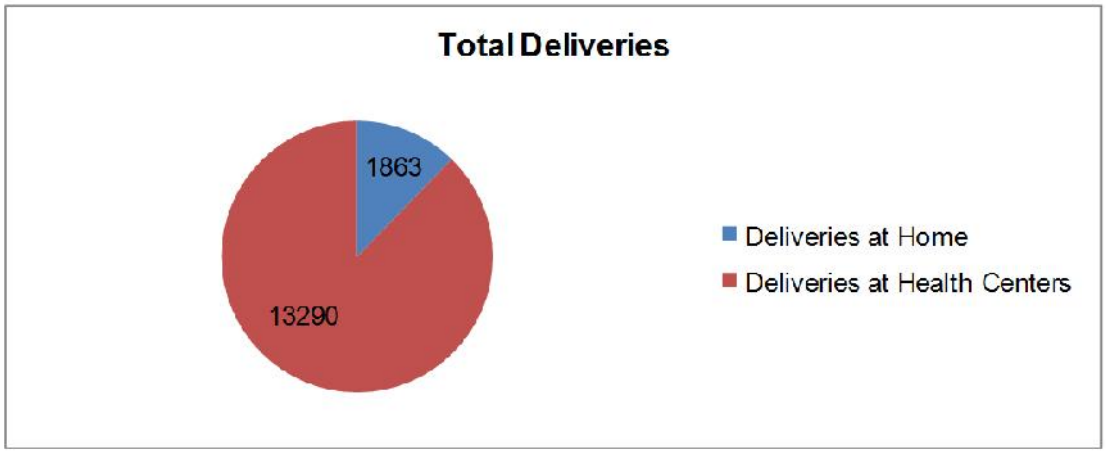


Figure 5: Pie Chart of Comparison of Total No. of Deliveries at Home and in Health Center in Five Years



Total recorded deliveries in the in the period of 5 years 7(from 2015-16 to 2019-20) = **15,153**

% of deliveries at homes = **14.018 %**

% of deliveries at Hospitals = **85.982%**

Test of Hypothesis H_1

Deliveries at Home (X_1)	Diff (X_1 - M)	Sq. Diff (X_1 - M)^2	Total Deliveries (X_2)	Diff (X_2 - M)	Sq. Diff (X_2 - M)^2
579	206.40	42600.96	3676	640.00	409600.00
626	253.40	64211.56	3500	464.00	215296.00
360	-12.60	158.76	3453	417.00	173889.00
272	-100.60	10120.36	3008	-28.00	784.00
26	-346.60	120131.56	1543	-1493.00	2229049.00
	M: 372.60	SS: 237223.20		M: 3036.00	SS: 3028618.00

Treatment of X_1

N_1: 5

$df_1 = N - 1 = 5 - 1 = 4$

M_1: 372.6

SS_1: 237223.2

$s^2_1 = SS_1/(N - 1) = 237223.2/(5-1) = 59305.8$

Treatment of X_2

N_2: 5

$df_2 = N - 1 = 5 - 1 = 4$

M_2: 3036

SS_2: 3028618

$s^2_2 = SS_2/(N - 1) = 3028618/(5-1) = 757154.5$

T-value Calculation

$s^2p = ((df1/(df_1 + df_2)) * s^2_1) + ((df_2/(df_2 + df_2)) * s^2_2)$

$= ((4/8) * 59305.8) + ((4/8) * 757154.5)$

$= 408230.15$

$s^2M_1 = s^2p/N_1 = 408230.15/5 = 81646.03$

$s^2M_2 = s^2p/N_2 = 408230.15/5 = 81646.03$

$t = (M_1 - M_2)/\sqrt{(s^2M_1 + s^2M_2)}$

$= -2663.4/\sqrt{163292.06}$

$= -6.59$

Significance Level: 0.5

The t-value is -6.59104. The p-value is .000085. The result is significant at p < .05.

Thus, it can be stated that there is a significant positive impact of solar electrification on the health of pregnant women in context of safe child delivery in rural areas of Chhattisgarh State.

Interpretation

The reduction in the figure of deliveries at home is due to the following factors:

- There is one PHC (Primary Health Center) in the population of 15,000 and One CHC (Community Health Center) in the population of 25,000 – 30,000 people.
- In Pondi-Uprora block there are 205 villages, 07 Sub-health centers, 10 PHC and 01 CHC.
- All the PHC's and CHC are electrified with solar panel.
- The services of PHC and CHC are rendering 24x7services including emergencies.
- The CHC has laboratory with limited facility which gives the report of medical tests within 6 hours.
- The CHC conducts regular awareness programmes for good health of pregnant ladies and safe deliveries under supervision of medical experts.
- C-section cases are referred to district hospitals.

Conclusion

The conclusion of the above study can be briefed as follows:

- In respect of my first objective it can be clearly stated that there is an immense contribution of solar electrification in improving the medical facilities of rural villages of Chhattisgarh State.
- The medical facilities are provided through sub-health center, primary health center and Community health center. All the PHC's and the CHC of Poundi Uprora block of Korba district are electrified with solar panels and thus they are capable of providing services 24 x 7.
- A team of medical experts are providing medical services through PHC and CHC which contains Dental Unit, Delivery Unit (24 hours operational) and a functional laboratory.
- The medical facilities are also extended for accidental emergency and also organizing camps for free operation for male and female sterlisation and child immunization.
- In respect of my second objective there has been a significant change of rural women to give birth to their child in PHC or CHC under proper medical supervision. The study revealed that irrespective of belonging to least privileged areas they are aware of their health concerns during pregnancy and also about their child care.
- Thus, the solar electrification is not only providing clean and green energy from renewable source but also contributing in social issues like the health of rural women in Chhattisgarh State.

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