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Does the PMGSY have Impact on Rural Health System? A Case Study in Arunachal Pradesh

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Abstract

Road connectivity is one of the important key factors for the development and growth of rural health care system. The proper road connectivity is correlated with health indicators of the region. The adequate road connectivity in countryside helps the rural population to easily access the health, education, others economic& social services. Improved the road connectivity is indispensable in rural areas for creation of employment, income and also augment the production of agriculture and industrial sectors. In short, we can deduce that the road connectivity in a rural areas open the door of all the economic sectors as well as better health service. The entirestudy is based on primary data and is collected by adopting stratified random sampling technique. The total surveyed households in the study were158. Thus, the study found that PMGSY has significant impact on improving health care service and health indicators in the sample district. There is positive relation between improved road connectivity and better health care system in the rural region and vice-versa.

Keywords:Rural connectivity, Health indicators', Health care facilities, and PMGSY.

1. Introduction

The growth and development of region mainly bank upon the availability of developed infrastructure like, road connectivity, road transportation system, communication facilities, and education and health care facilities along with better agriculture and industrial infrastructures. Health indicators are one of the main components of Human Development Index, UNDP and The SDG India Index 2020–21 is developed in collaboration with the United

Nations in India andNITI Aayog. SDG index also recognized health parameter '***Good health and well-being'*** is third important component for assessingSDG Indexamong various states and UTs.Various researchers and academicians stated that improved road connectivity enhanced directly or indirectly the growth and development of the Health care system. Health and education are two important social aspects of every household. These two have direct link with the family income. It is the general observation in any society that as the domestic income increases, the household expenditure on health and education increases. Many researchers have tried to find out the relationship of various rural development programmes and the health and education status of the households. According to Hartwing (1999) after the formation of SHG the family income, food security and children's education of the SHG members are improved.

Bell, C. and Dillen, S.V. (2015) in their research title "on the way to Good Health, Rural Roads and Morbidity in Upland Orissa" found that PMGSY has reduced the morbidity in rural areas. The number sick person and expected disease fallen with the introduction of the PMGSY. PMGSY has showed positive relation between the falls of sick person with increase in visit of health staff in the rural areas. It could lead to better health facilities and preventive health campaign have led to better nutrition from higher incomes consequent to road construction, and higher education for women facilitated by roads leads to better socio-economic outcomes.

Maniram, S. and Lakshmi, K. Bhagya (2011) in their studies on impact of IT application and infrastructure development in rural health care system found that ICT has brought significant rural health care revolution in terms of management and structuring, staffing skills, processing and behavioral intention of the rural populations.

ADB (April, 2011), found that health care system could be improvised by integrating the rural water supply, sanitation and hygiene. Development of health infrastructure and water supply will deliver meaningful health outcomes especially for poor and disadvantage groups.

Panth, A.S. (2012) in her studies observed that poorer states are worse-off in creating access to public health facility. It can be deduced that poor health infrastructure is having direct impact on the health status of the rural people as indicated by Infant Mortality Rate and Human Development Index. C. Susana Caxaj, (2016) through their paper revealed that they have tried to study the mental health experiences of residents in rural regions of Canada. [1]Common barriers

[1]https://in.booksc.eu/book/63767778/aa7c8c

to access services, Social isolations, shortage of manpower, and economic restructuring are compounded by cultural or gender inequalities, socio-economic conditions, and occupational vulnerabilities that impact mental health help-seeking and outcomes. Tele psychiatry and the integration of mental health care into primary care settings and a diversity of community-based approaches have great potential to improve the mental health and well-being of rural populations in British Columbia. Community-based approaches are perhaps the most appropriate strategy to help enhance local capacity, building on community strengths towards positive mental health. Researchers can aidthe community-based mental health interventions by working in collaboration with community leaders to assess the geographic, cultural, social, and economic factors that may influence the success of such programme.

Tolosana, Elvira Sanz (2015) opined that Health Impact assessment (HIA) on rural areas is a predictive tool to support decisions in policy-making. The ultimate goal of this HIA framework is to maximize health gains and, as far as possible, to reduce health inequalities. The implementation of HIA makes it possible to include the rural dimension into the development of national, regional and local policies, maximize health profits and reduce or avoid the negative impacts. An efficacy mainly known due to its huge versatility: in strategic planning, small scale projects or in promoting collaborations projects. HIA raises awareness and understanding of the effects upon the population's health caused by policies regarding food and agriculture, development, employment, housing, transport, social services, healthcare services, etc. [2]In order to progress with the HIA implementation in countryside, it would be necessary to impart additional effort to achieve a desired goal. Present health infrastructures in most of the states are in very pathetic condition and it has draws negative feedback, thereby public have lost their faith in government health care services and rise in epidemiology disease related to respiratory and malaria (nayar,1999).

Sharma, J. K. and Narang, R. (2011), the study reveals that the quality of primary healthcare services in rural areas, Uttar Pradesh in India. The study shows that the government and policy makers have to consider the perceptions of patients as well in order to affect improvement in the quality of services and subsequently increase their utilization. Immediate

[2]https://www.scielo.br/j/sausoc/a/Lm5mZHpbmNmnbF4NvLvRSYn/?lang=en

steps need to be undertaken to ensure availability of doctors, medical equipment's, and good quality of drug.

Rao, S. Vlassoff, C and Sarode, J.(2014) in their studies found that economic development alone is insufficient to bring about changes in reproductive health in rural India. The influence of social and economic empowerment of womenin countryside had greater impact on women's reproductive health at both state and village level.

Senarath&Gunawardena, 2009), which emphasizes the importance of women's economic empowerment for overall societal development. [3]They also challenge the widespread opinion in rural India that women's education is justifiable as an end in it because it improves marriage prospects and equips women to better care for their children.

Chotia, V. and Rao, NVM (2015) in their studies through principal component analysis to compute a composite infrastructure index (CII) for 21 Indian states by combining individual indicators pertaining to the major sectors of health, education, transport, agriculture & industries. They stated that Developed states with good health indicator also have better social structure organization, which ultimately transfers to inclusive sharing of development benefits. Focused investment to expand health and education and improve transport, agriculture, and energy infrastructure will expedite the overall growth prospects of the Indian states, specially the poorer states. The main objective of improving the major sectors of health, education, transport, agriculture, and energy is to help the poor states in order to emerge from poverty and participate more effectively in the socio-economic process.

Pradhan Mantri Gram Sadak Yojona (PMGSY)

In the year 2000, December 25 Government of India is introduced the PMGSY for connecting the rural India by constructing roads. It was launched under the Ministry of Rural Development (MoRD) and funded by the central government through the central road fund. [4]It designed to provide all-weather road access for all habitations of population of more than 1000 by 2003 and greater than 500 in plains and greater than 250 persons in desert, hilly and tribal

[3]https://www.researchgate.net/publication/227361590_Does_family_planning_help_the_employment_of_women_The_case_of_India.
[4]http://ijariie.com/AdminUploadPdf/RURAL_DEVELOPMENT_PROGRAMMES_IN_INDIA__A_LITERATURE_REVIEW_ijariie13174.pdf.

areas and 250 persons in hill States of J & K, Himachal Pradesh, Northern Eastern States the tribal and the desert areas by the end of the Tenth Five Year plan in 2007.The total costs were to be shared between the Centre and States/UTs on 75:25 for the plains and 90:10 basis for the special areas. The sharing of total cost is effect from the 1st April, 2015. While centre and state ratio is 90:10 in respect of NE states and hill states of Himachal Pradesh, Jammu & Kashmir and Uttarakhand, it is 60:40 for other states.A total road length of around 5,99,090 Km covering all the states and UTs has been constructed under the PMGSY-I, PMGSY-II and RCPLWEA Scheme since the inception of the scheme.[5]PMGSY Phase-III, On July 2019, Cabinet Committee on Economic Affairs has given its approval for kick off Pradhan Mantri Gram Sadak Yojana-lll (PMGSY-III***)***. Under the PMGSY-III Scheme, it is proposed to cover around 1,25,000 Km road length in the States& UTs. It involves construction of routes and major rural road connectivity of habitations connecting to Gramin Agricultural Markets (GrAMs), higher secondary schools and ***hospitals***.

In 2002, the National Rural Road Development Agency (NRRDA) was established to provide management and technical support to the states in implementing PMGSY. At the state level, the State Rural Road Development Agencies (SRRDA) monitors PMGSY works, which are implemented by Public Works Departments (PWD), Rural Development Department and similar agencies.In Arunachal Pradesh, 64.56 percent road works is found to complete under PMGSY till March, 2020. Out of the total completed road under PMGSY in the State, around 69.29 percent completed roadswere newly connected and 8.33 percent completed roadswereupgradated. The total length of completed road in the State under PMGSY was 9549 km till March, 2020. (Source: http://ruraldiksha.nic.in/RuralDashboard/PMGSY_NEW.aspx)

Hence, in this study an attempt is made to examine the health care system in the surveyed areas after the road construction under PMGSY and also examine the impact on health indicators and health services as well as parameters affecting the health care system in the rural areas.

2.Objectives

There are three objectives in this study. These are as follows:

[5]https://www.businesstoday.in/sectors/infra/modi-govt-to-spend-over-rs-80000-crore-to-boost-rural-connectivity/story/363290.html

i. To study the impact of PMGSY on Health care facilities in the sample districts.

ii. To examine the impact of PMGSY on Health Indicators in the Sample districts

iii. To examine the impact of PMGSY on other Aspects of health indicators of in sample districts.

Hypotheses: There is no significant impact of PMGSY on Health care facilities, Health indicators and others aspects of health indicators in sample districts.

3. Methodology

The present study is a descriptive in nature. The whole study basically depends on primary source of data. The primary data are collected by adopting stratified random sampling technique. At first, one districts viz., West Siang is selected purposively on the basis of roads constructed under PMGSY. At the second stage, total threeblocks are randomly selected, where PMGSY scheme is implemented. At third stage, total 12 villages (4 villages from each block) are again selected randomly from the selected blocks. Finally, 40 per cent of households from the selected villages are surveyed randomly. Thus, a total of 158 households from selected 12 villages have been chosen for collecting primary data in this study.

An attempt in the study is also made for proper assessment of the health care system in rural areas under influence of PMGSY scheme in the study area. Therefore, 3 village level respondents such as one village Head, one Teacher/Educationist/Health worker and one Panchayat Member are purposively selected from each selected village. Thus, in total 36 respondents other than 158 selected households are chosen for gathering village level information

The household information is collected from 158 sample families with the help of well-designed questionnaires. On the other hand, the village level schedule is designed keeping in view of impact of PMGSY on health, supply of drugs a& medicines, PDS, administration, impact on electricity, awareness, transportation etc. Most importantly, the Focus Group Discussions technique is used for collecting the information from key stakeholders during the survey.

Table 1: Sample Design of the Sample Districts

State	Sample Districts	Household information			Village Level information
Arunachal Pradesh		Sample Block	Sample village	Selected 40% from each sample village	
	West Siang	Menchuka	4	48	12
		Basar	4	58	12
		Gensi	4	52	12
Total Sample households			12	158	36
ALL Total				**158 + 36 =194 Respondents**	

Source: Compiled from Field study

For the purpose of data analysis, data are scrutinized, processed and tabulated. The tabular method is used for average and percentage. At the same time, and the 5-point Likert Scale are also estimated for ascertaining the opinions of the respondents on some questions.

For the collection of vital information related to the effect of PMGSY at village level, a total of 36 respondents are selected randomly from surveyed villages.

The block-wise and village-wise number of surveyed households is shown in the Table 1, while the lists of roads constructed and developed through PMGSY in the surveyed districts are presented in the Table2. The questionnaires used for household survey and village survey.

Table 2: Sample Roads of the Sample Districts

Arunachal Pradesh	District	Block Name	No. of Roads study	Pavement Length KM	Year of the Construction/completion	Total Cost (Rs in lakh)	Cost per Km
	West Siang	Menchuka	2	15	2009-2010	1127.41	43.99
		Basar	2	14.65	2012-2013	812.88	37.45
		Gensi	1	14.62	2006-2007	447.65	16.32
Total			**5**	**73.95**	**--**	**1976.64**	**97.76**

Note: Total Cost = Maintenances Cost +Pavements Cost.

Source: compile from MIS OMMAS, PMGSY.

. **4. Discussion and Findings:-**

4.1 Impact of the PMGSY Implementation on Health Facilities

In order to assess the impact of PMGSY on health sector in the state certain health care facilities questions were asked from the village respondents of the study area. The responses of the respondents of the study are depicted in Table 3. In most of the questions majority of respondents are saying that health facilities in the study area have strengthened due to better road connectivity which was resulted because of the implementation of PMGSY in the state in General and sample districts specific. In all the listed health facility and health care measures minimum 19 % to 81 % respondents in the West Siang district and while minimum 22 % to maximum 78 % respondents have confirmed that facilities have improved considerably in the area.

Table 3: Impact of Road on Access to Health Care Facilities in Surveyed areas

Status of the health facilities within the village	**West Siang**	
	Yes	No
Health sub-centre	29	7
Availability of the Govt. doctors	29	7
No. of the ANMs	28	8
Improved in Appointments of ASHA	22	14
Whether govt. supply medicine are available than before?	29	7
Availability of the all-weather road connectivity to the nearest health care facilities.	29	7
Availability of the all-weather road connectivity to the nearest Govt. hospitals?	29	7
Has there been increase in the frequency of visit of the health worker/ ANM in the village after construction PMGSY?	29	7
Has there been an improvement of drugs & medical supplies after PMSGY?	29	7

Source: Field survey

The study area found that Minimum 21 % maximum 79 % villages agreeing that rural health facilities have been positively impacted due to PMGSY. As there is increased in number of health workers like ANM and ASHA workers, there is increase the frequency of visit in the surveyed areas in both West Siang.

Table 4: Improvement of Health Indicators in Surveyed Area after PMGSY

Has there been an improvement in the general awareness on health and hygiene related issues after PMGSY construction?	West Siang	
	Yes	No
Improvement in immunization rate of children from the village	29	07

Reduction in infant mortality rates	28	08
Reduction in maternal mortality rates	22	14
Reduction in mortality rates	29	07
Reduction in occurrence of communicable disease in the habitation	28	08

Source: Field survey.

As per the respondents in both the surveyed districts, there is improvement in supply of the drugs and medical supplies after PMGSY road in the surveyed areas. Further, the health condition, Infant mortality rate (IMR), Maternal Mortality Rate (MMR), General Mortality Rate (GMR) in the study area are studied. Out of 72 respondents about 69 per cent of respondents in the study area are saying that there is reduction of IMR after the construction of road and the rest 31 per cent did not agree with the other respondents. The details are shown in Table 4

Similarly, in case of MMR, 22 respondents in West Siang district are found agreeing that MMR has reduced after the construction of road in their villages. Similarly, the mortality rate in the surveyed district has decreased after the road constructed under PMGSY.

Regarding the occurrence of communicable disease in the habitation, out of the total 36 respondents, 28 respondents in West Siang district found supporting that occurrence of communicable disease has decreased after the construction of road. (The details are given in (Table 4).Again the impact of PMGSY on health sector has been measured by taking the responses of surveyed households through Likert scale. Out of 158 surveyed families in the survey area about 56 % and 29 % respondents are strongly agreeing and agreeing to the statement “Has it improved the health care service in your village”. While only about 14 % respondents’ views are in opposite manner (Table 5). As the total score comes to 190 it can be concluded that people of the PMGSY implemented area are having strong positive on the impact of PMGSY on state health care facility and health indicators.

Table 5: Opinions of the respondents regarding availing the health facilities In the surveyed area after the construction of the road

Has it improved the healthcare service in your village?	**West Siang**		**Scores**
	H/H	%	
Strongly Agree (+2)	88	55.69	**176**
Agree (+1)	46	29.11	**46**
No Comment (0)	02	1.26	**0**
Disagree(-1)	12	7.59	**12**
Strongly Disagree (-2)	10	6.32	**20**
Total	**158**	**100**	**190**

Source: Field survey

Hypothesis "The PMGSY has no significant impact on health care facilities"

In the view of the discussion made in preceding paragraphs in the Table 4, 5 and 6the above hypothesis **"There is no significant impact of PMGSY on Health care facilities, Health indicators and others aspects of health indicators in sample districts is rejected**". Thus, it can be concluded that the implementation of PMGSY scheme has improved the health care facilities like-availability of doctor, nurse, medicine, and reduction in MMR, IMR and other basic facilities in the surveyed areas.

5. Impact of PMGSY on other Aspects in the Surveyed District

Some studies stated that improved health care system is not solely depended on improved road connectivity and implementation of PMGSY not only impact on the health education, agriculture sector etc. but is also associated with access administrative services, PDS, rural electricity etc. Health care facilities are explicit or implicitly influence by sanitation, electricity, PDS, law and order situation in the region etc. thereby they play huge role in the health conditions as well as health indicators. Hence, an attempt was made here to analyses the impact of PMGSY on the access of administration facilities by the villagers, sanitations facilities, improved the connectivity of NGO's with villages or not and PDSfacilities in the villages etc.

5.1 PMGSY Road on Access Other Aspects

Table 6 shows that the impacts of PMGSY road on access other aspects in the surveyed districts. It could be seen that construction of latrine or toilets were increased after the road in the surveyed district and number of supporter in West Siang district is 29 that is 80 percent respondents in the surveyed areas are found to support the increased the number of construction

of latrine or toilets in their areas after the road and rest 19 percent did not support the others view.

Table 6: Impact of PMGSY Road on Access Other Aspects

Status of other aspectin the village	**West Siang**	
	Yes	No
Has there been an increase in the construction of latrine/toilet after the construction of this road?	29	07
Has there been an increase in the frequency of visit of police patrol to the Village after construction of this road?	28	08
Has there been an increase in the frequency of visit of administrative officers to the village after construction of this road?	22	14
Has the construction of this road resulted in the increase in number of NGOs visiting the village for various purposes?	29	07

Note: Figure within the bracket indicates percentage.
Source: Field survey

Regarding the visits of police in the surveyed areas after the road constructed is found that around 28 (78 %) respondents out of the total 36 respondents in West Siang district is supported the improved of police patrols visits to the village and rest 22.2 percent is found as non-supporter with the other. In case of the frequency of visit of administrative officers and various NGO's to the surveyed village in the surveyed district was found to increase after the road constructed. Major portion around 61 per cent and 80.55 per cent respondents' administrative officer and NGOs respectively in the district were found to support it.

5.2 Connectivity status to various administrative centers

Table 7 reveals the connectivity status to various administrative centers' from the village before and after the construction of PMGSY road in the respective areas. It has been seen that the number of supporter in availability of all-weather road connectivity to the BDO, circle office, post office, police station and bank were high before the PMGSY road as compared to the after the road in West Siang district. However, more than 55 percent respondents were found to support regarding the increase of all-weather of roads to the administrative office like-

BDO,CO,PO,PS etc., in the respective surveyed districts. The details are clearly shown in Table 7

Table 7: Connectivity Status to Various Administrative Offices in the Surveyed Areas

Particulars	**West Siang**			
	Before PMGSY		After PMGSY	
Availability of all-weather road connectivity to the BDO office	20	16	22	14
Availability of all-weather road connectivity to the Circle HQ	22	14	29	7
Availability of all-weather road connectivity to the Post Office	22	14	28	8
Availability of all-weather road connectivity to Police Station	20	16	22	14
Availability of all-weather road connectivity to Bank	22	14	28	8

Source: Field survey

5.3 Travel Time to reach the Administrative Office

At the same time, an attempt was made to examine thereduced of time travel to reach the different administrative office. The details are given in Table 8. It could be seen that more than 55 percent respondents in West Siang district were found to support that after the PMGSY road constructed travel time to reach the different administrative office is reduced. Time saves and speed gain shows positive impact on PMGSY on the travel time.

Table 8: Travel Time to reach the Administrative Office in the Surveyed Districts

Travel Time to reach the Administrative Office	**West Siang**		
	After PMGSY		
	Yes	**No**	**Time Save (minutes)**
Whether Travel time reduces to reach the BDO office? (minutes)	22	14	12
Whether Travel timereduces to reach the Circle HQ? (minutes)	20	16	14
Whether Travel time reduces to reach the Post Office? (minutes)	22	14	22
Whether Travel time reduces o reach the Police Station? (minutes)	22	14	26
Whether Travel time reduces to reach the Bank? (minutes)	20	16	35

Note: Figure within the bracket indicates percentage.
Source: Field survey

5.4 Status of Public Distribution System (PDS)

Table 9 shows that status of public distribution system (PDS) in the surveyed districts. It has been seen that there were no changes found in case of numbers of PDS Fair Price Shopin the surveyed district after and before the PMGSY road constructed. But, number of BPL card holder families in the surveyed districts is found to increase after the implementation of PMGSY scheme.However, the numbers of new 55 BPL card holders were added after the PMGSY road was constructed in the surveyed districts. The details are given in Table 9.

Table 9: Status of Public Distribution System (PDS) in the Surveyed Districts

Status of Public Distribution System (PDS) in the Habitation	**West Siang**	
	Before PMGSY	**After PMGSY**
No. of PDS shops within the village	**3**	**3**
No. of households having BPL cards from this village	**94**	**55**

Source: Field survey

5.5 Status of Rural electrification

Table 10 shows the status of rural electrification programme in the surveyed village. It has been seen that the number of electricity connected households in West Siang district was 210 before the PMGSY and it is increased up to 310 out of 360 households after the road constructed.It is implies that still in the surveyed areas some households did not have electricity connection. At the same time, as per the respondents there is no electricity supply throughout the year in the surveyed districts. Since out of the total 36 respondents, 14 respondents in each surveyed district i.e., West Siang said that there is no electricity throughout the year after the PMGSY scheme.

Table 10: Status of Rural Electrification Programme in the Surveyed Areas

Status of Rural Electrification	West Siang			
	Before		After	
No. of Households having electricity after the construction of the roads	**210 H/H**		**310H/H**	
No. of Street Lights post in the village	**2**		**5**	
Has there been electricity supply throughout the	**Yes**	**No**	**Yes**	**No**

year?	28	8	22	14

Source: Field survey

Regarding the number of street light post, there were seen some changes after the construction of road in the surveyed areas. For example- the number of street light before the PMGSY road in West Siang district was only 2. After the road was constructed, it increased to 5 street light posts.

6. Conclusion

From the entire study, it is found that after the implementation of PMGSY scheme in the surveyed villages, health facilities are improved. It is evident that improved numbers of health centres', medicines, doctors and nurse are available in the surveyed areas. At the same time, number of visits by the health workers, ANM and doctors in the villages are also increased after the PMGSY. On the other hand, the travel time to the hospital inside or outside the villages is declined after the road. Result, increased the number of patients to consult or treat with the doctors and decreased the patient to consult with the faith healer in the village. It leads to improve the IMR, MMR and mortality rate etc., in the surveyed areas.

On the other hand, some other aspects which directly or indirectly influence health factors like- latrines facility, police patrolling, frequency visits of administrative officers and number of NGOs in the surveyed villages are increased as per the respondent after the construction of PMGSY road. Regarding the connectivity of all-weather road to the various administrative offices like- BDO, SDO, CO, HQ, PO and banks etc., are found to improve after the implementation of PMGSY. At the same time, constructions of all-weather connectivity roads in the surveyed villages are reduced the travel time to reach the various administrative offices.

In case of number of PDS Fair price shop in the surveyed districts are found to remain same after and before the PMGSY scheme. But, the number of BPL card holder families is increased after the road in the surveyed districts. Regarding, electricity connection of the households is increased after the construction of road in the surveyed villages but there is no electricity supply throughout the year as per the respondents.

Further, there is need for high priority basis investments in health infrastructure by investing capital as well as institutional expenditures' in the surveyed districts for Human Development and reduce deprivation of health infrastructure between Rural-Urban.

Hence, it is concluded that PMGSY road connectivity in the surveyed villages in the districts has improved their health care system and health's indicators. It helps in creating human capital and increase the HDI.

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