

Investigation on the performance of Madhya Pradesh in terms of social health determinants of under nutritio n in mother and child (under age five).

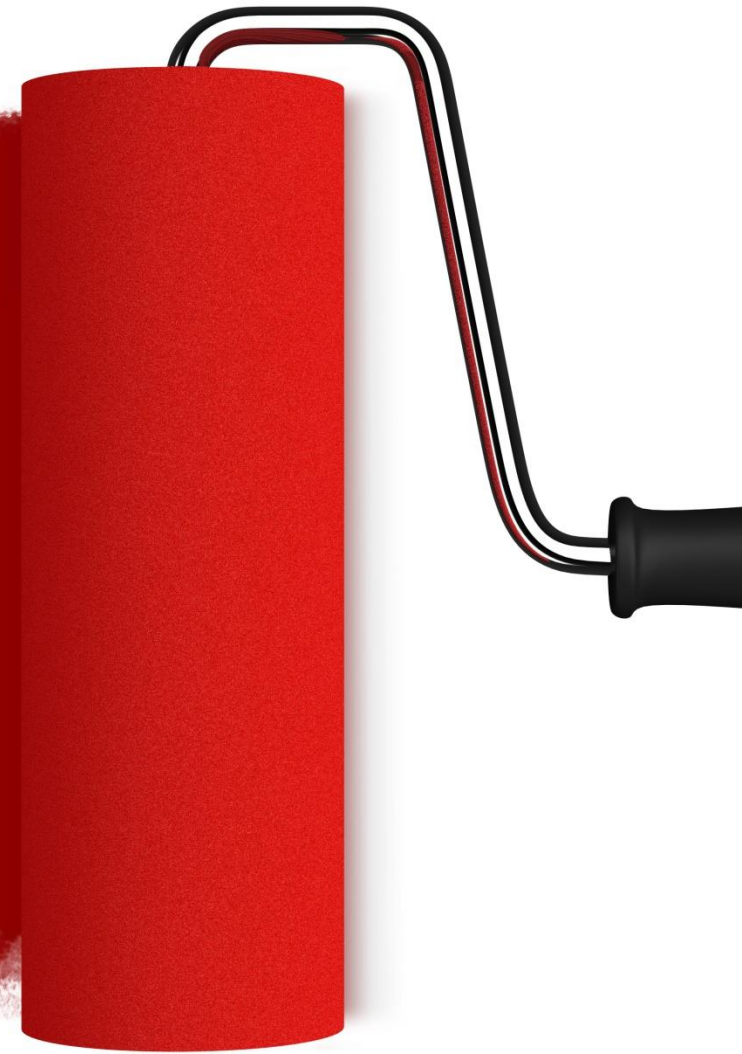
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**Investigation on the performance of
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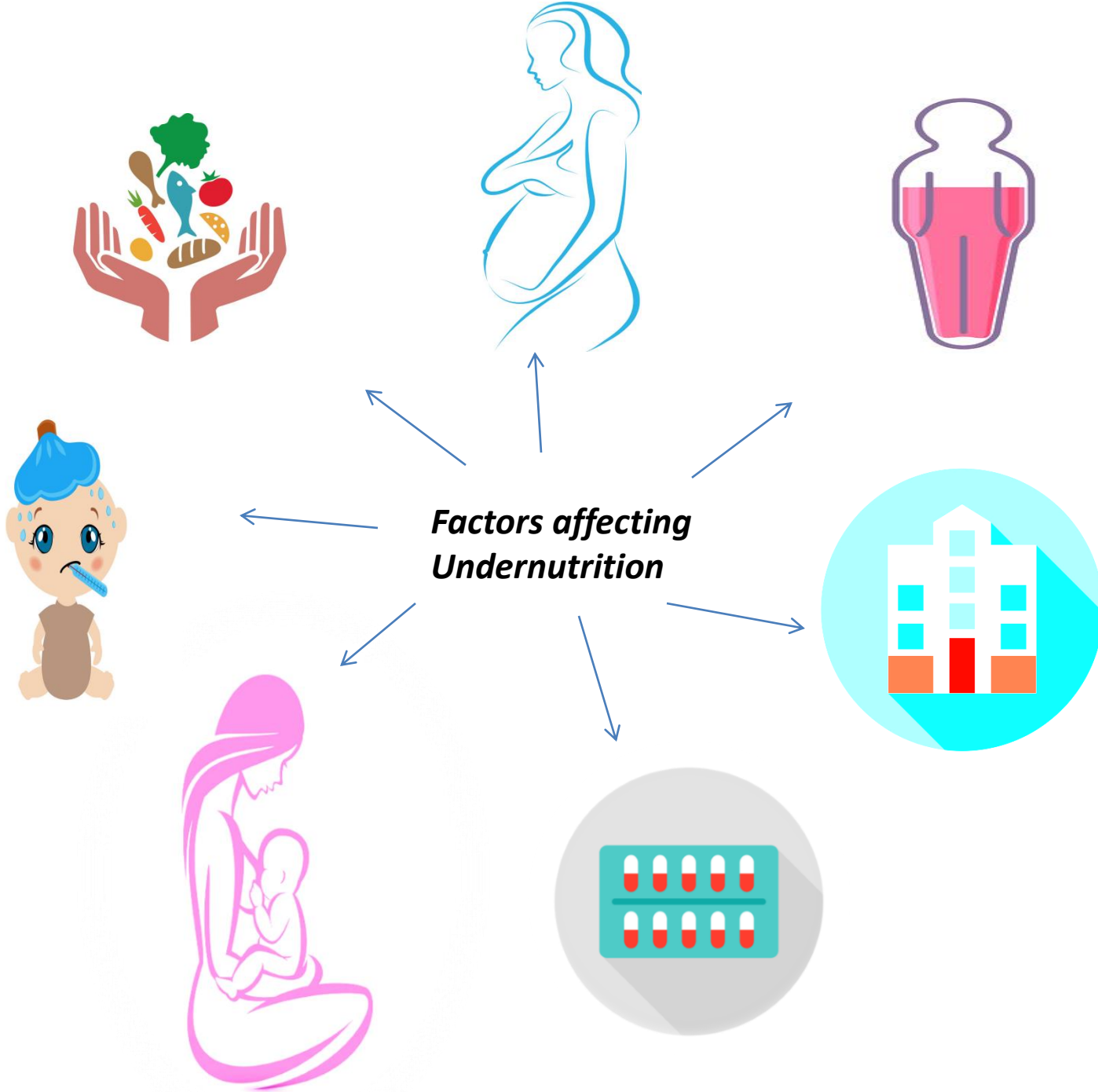
Abstract

In India, Madhya Pradesh comes under one of the worst performing states in terms of achieving Sustainable Development Goal (SDG). M.P is the state which has not achieved any SDG indicator yet, their score is below average in every SDG indicator. Moreover the state stands at third rank in infant mortality rate. It is in this context, we would like to study the various social health determinants of undernutrition in Madhya Pradesh and their variation across different social categories (Schedule caste, schedule tribe, other backward class) and to identify the ongoing government programs and the kind of statistical relationship between budget allocation on programs and prevalence of undernutrition.

The study is based on secondary literature from NFHS-4, SDG India index Score, Government report on ICDS and other associated programs. It is found from the study that from all major communities tribal community comes under the most vulnerable community in terms of nutrition related indicator and utilization of government facilities. After comparing the budget allocation on the govt. programs between the tribal and general population it is seen that most of programs in general population have positive significant relationship with prevalence of stunting which is the most important indicator of undernutrition as it reflects long term scarcity of nutritious food whereas in tribal dominated districts very few programs have significant relationship with stunting.

Introduction

Nutritional status is also influenced by socio economic inequalities also. The kind of environment, food, health and health facility influence the status of nutrition i.e. accessibility, availability to nutritious food. Malnourishment is a stage which catches up with a person due to long periods of deprivation from nutritious food. Each individual requires taking in a minimum amount of nutritious food to keep him healthy. When this minimum requirement is not fulfilled the human body becomes weak and the resistance capacity of the person is reduced considerably. The basic indicator of malnutrition is weight and height which should be proportional to age. Malnourishment paves the way for a number of diseases like fever, vomiting, measles, diarrhea etc to catch up with people easily. Under ordinary circumstances these diseases are not deadly and are curable, but when a malnourished child is caught up with these diseases, it becomes a death trap for it. This explains why, in almost all the malnutrition deaths reported, the prima facie cause may be some ordinary disease, but on ultimate analysis it is evident that the underlying cause of the death was malnutrition. The government authorities, who are always eager to wash their hands off these deaths, are quick in denying the actual cause and declaring that the deaths have been due to the diseases.

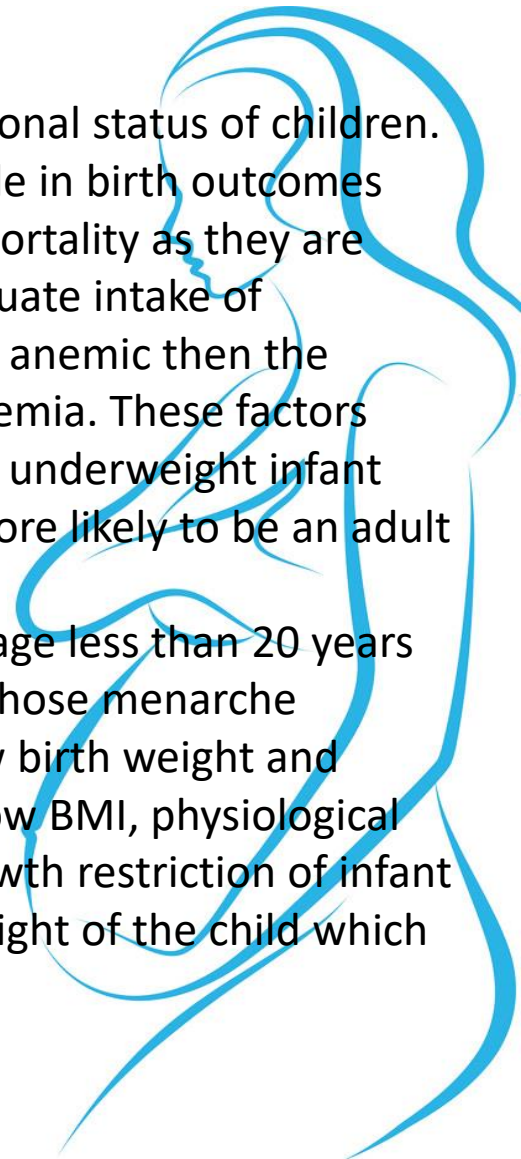


Review of Literature: Underlying Factors Determining Nutritional Status in Children

1. Age of Mother at the time of conception

Various direct and indirect factors are there which influence the nutritional status of children. Factors such as age of mother at the time of birth play an important role in birth outcomes and child health. Teenage mothers are highly vulnerable to maternal mortality as they are weak physically, mostly have low pre pregnancy BMI, are prone inadequate intake of nutritious food especially in lower economic strata and if the mother is anemic then the chances of maternal mortality increases especially in case of severe anemia. These factors hinders the growth of child during the gestational period and results in underweight infant (highly vulnerable to diseases). If the girl is born underweight, she is more likely to be an adult women with short stature in future.

A study done by Fanciele Dinis Ribeiro (2014) shows that mother with age less than 20 years have higher infant mortality than other age groups because mothers whose menarche happened less than two years before pregnancy have higher risk of low birth weight and ultimately leads to neonatal death, non-adherence to pre-natal care, low BMI, physiological immaturity especially uterine. Later low BMI results in intrauterine growth restriction of infant which creates obstacle in the growth of child and leads to low birth weight of the child which causes under absorption of nutrients even after birth.



2. Feeding practices

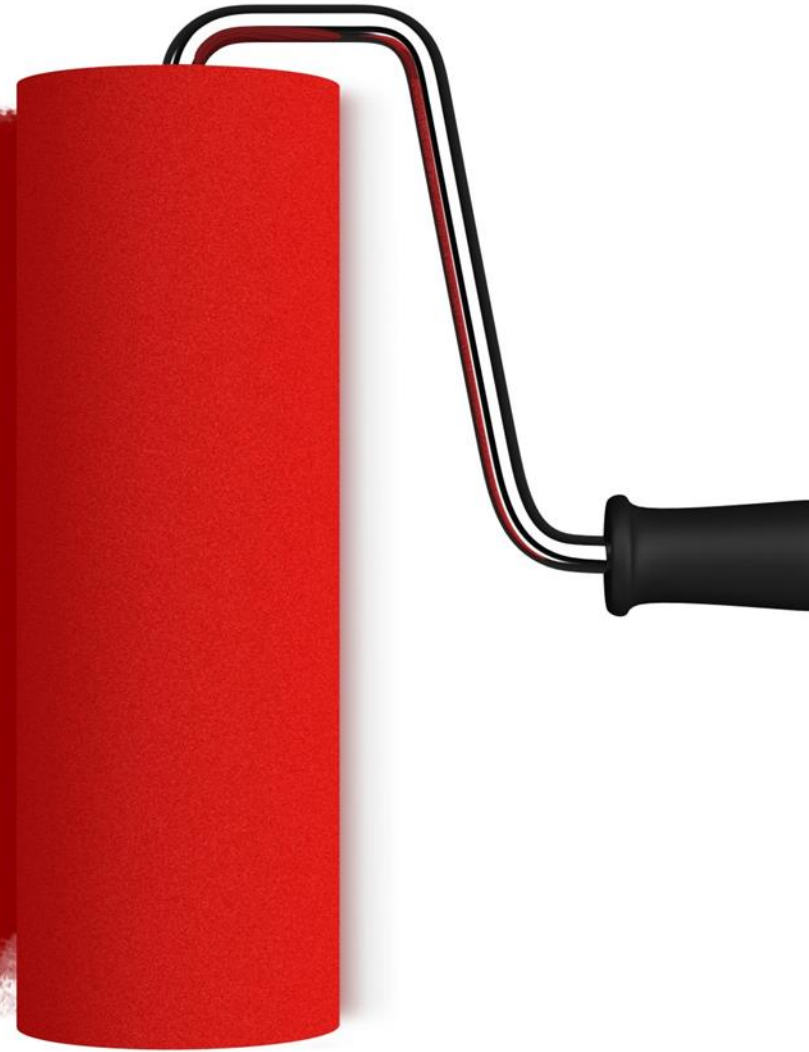
It is seen that teenage mothers are less aware of safe motherhood practices. Breastfeeding is also one of the important factor which influence the nutritional status of the child. Breastfeeding is very crucial for the baby as well as for the mother to protects both of them from certain diseases (mothers who breastfed their child have lower risk of breast and ovarian cancer). Moreover initiation of breastfeeding is also an important factor, breastfeeding within one hour i.e. feeding colostrum which is very important for the child being rich in various protective factors. A study done by Rajesh Mishra (2017) in M.P found that maximum mothers feed colostrum to their child but very few of them were aware about the benefits of feeding colostrum. As per global statistics 3.5 million children's death caused by malnutrition and out of this 1.4 million of death were caused because infants were not exclusively breastfed. A study done by Roland Pongou et al. (2013) justifies that boys have a higher infant mortality than girls as they are biologically weaker than girls and are more susceptible to disease and premature death.

2. ANC visits and IFA consumption

Number of ANC visits also influence mother and child health. As per WHO guideline at least 4 ANC visits are compulsory for the pregnant mother to ensure good health of mother and child. Adequate antenatal care reduces the risk of adverse pregnancy outcome. In ANC counseling of mother is also done by the healthcare worker to have institutional delivery. Institutional deliveries are very important for safe delivery and to reduce the risk of complications that may cause death or illness to mother and child.

A study done by Acharya (2018) found that level of utilization of ANC measured by number of ANC visits, consumption of recommended dose of IFA tablets and deworming tablets were significantly associated with low birth weight. Infants who have low weight at birth are more likely to be stunted. A study done by Ni Ketut Aryastami et al.(2017) justified significant relationship between low birth weight and stunting. It is also found that neonates with past illness history such as diarrhea, acute respiratory infection also may have hindered growth.

Research Question and Objective



Research Question

- **What is the variation in health determinants amongst different caste in M.P which influence nutritional status of mother and child?**
- **What are government programs that address some of these health determinants and how do they perform in terms of budget allocation?**

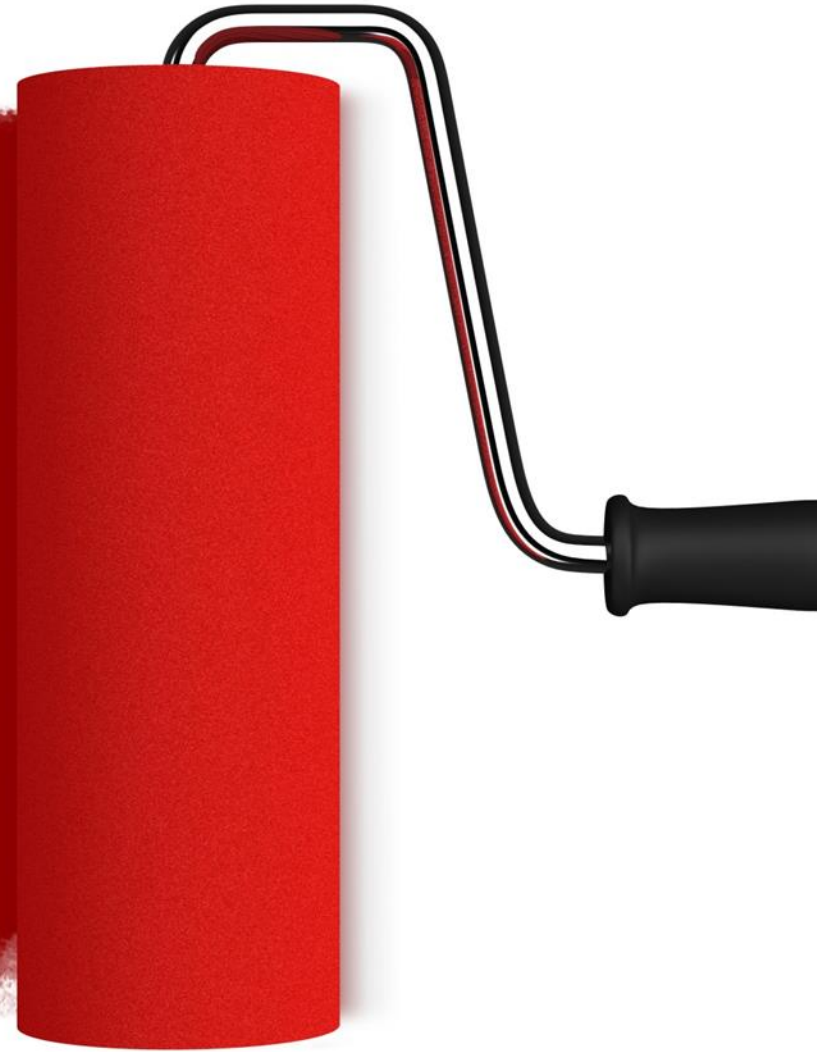
Objective-1

- To understand the variation in health determinants amongst different caste in M.P which influence nutritional status of mother and child.

Objective-2

- To establish the correlation between government program spending at the district level and the outcome indicators (prevalence of stunting).

Material and Methods



Methodology used for the objectives

For Objective - 1

Research Design - Observational Descriptive study on secondary data

- 1) NFHS-4 2015-16
- 2) Annual Health survey 2013-14

Research procedure – Desk review of secondary data was done to understand the cast variation in health determinant.

Study Setting - The study is conducted in 52 districts of Madhya Pradesh.

For objective -2

Research Design- Observational descriptive study on expenditure on ICDS and their associated programs.

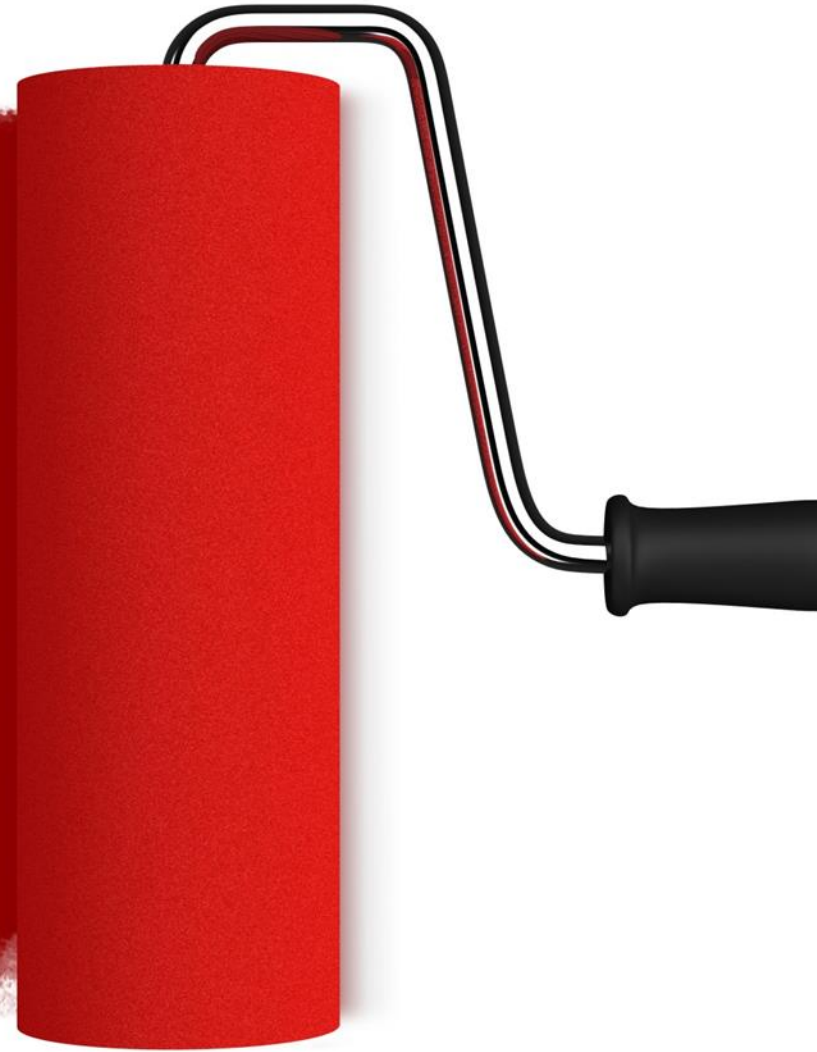
NHM Madhya Pradesh report on maternal and child expenditure.

Research procedure- Using spearman rank correlation, we have tried to see the strength of correlation between the expenditure and prevalence of stunting.

Statistical method used- SPSS (Spearman rank correlation)

Study setting- The study conducted in all districts (52) of Madhya Pradesh.

Variation in Nutritional status of children



Caste wise Variation in the nutritional status of children

Normal height for age



	Stunted (%)	Wasted (%)	Under weight (%)
Schedule caste	47.6	25.5	45.9
<u>Schedule tribe</u>	<u>48.2</u>	<u>30.2</u>	<u>51.5</u>
Other backward class	39.7	24.9	40.73
others	31.6	21.5	30.6

Percentage is based on the number of children surveyed
Source-NFHS-4 2015-16 M.P

Caste wise variation in level of Anemia in children (0-5 yrs)



	Mild (10.0-10.9 g/dl)(%)	Moderate (7.0-9.9 g/dl)(%)	Severe (<7.0 g/dl)(%)	Any anemia (<11.0 g/dl)(%)
Schedule caste	29.9	37.4	2	69.3
<u>Schedule tribe</u>	<u>30.9</u>	<u>42.8</u>	<u>2.4</u>	<u>76.1</u>
Other backward class	28.9	37.5	1.9	65.9
others	29.4	34.5	1.4	65.2

Percentage is based on the number of children surveyed
Source-NFHS-4 2015-16 M.P

Caste wise variation in infant and under five mortality rate



	Infant mortality rate (%)	Under five mortality rate (%)
Schedule caste	54.3	69.6
Schedule tribes	58.9	78.5
Other backward class	51.7	62.6
Others	34.6	42.8

Percentage is based on the number of children surveyed
Source-NFHS-4 2015-16 M.P



Caste wise variation in Body Mass Index of females

	<18.5 (total thin) (%)	<17.0 (moderately/ Severely thin) (%)	≥25.0 (overweight or obese) (%)	≥30.0(obese) (%)
Schedule caste	30.5	12.8	10.4	1.9
<u>Schedule tribe</u>	<u>34.4</u>	<u>13.6</u>	<u>5.9</u>	<u>1</u>
Other backward class	28.1	11.4	13.9	3.1
others	20.2	8.3	24.5	6.6

Percentage is based on the number of females surveyed
Source-NFHS-4 2015-16 M.P

Caste wise variation in utilization Health care facility



	Births delivered in health facility (%)	Women with postnatal checkup (%)	Women with post-natal checkup within 2 days (%)
Schedule caste	84.8	60	57.8
<u>Schedule tribe</u>	<u>60.3</u>	<u>50.6</u>	<u>45.9</u>
Other backward class	87.4	63.1	60
Others	90.6	66.5	63.7

Percentage is based on the number of females surveyed

Caste wise variation in Infant and young child feeding practices



	Children ever breastfed (%)	Breastfed within one hour of birth (%)	Breastfed within one day of birth (%)	Children received a pre lacteal feed (%)
Schedule caste	95.9	36.1	86	10.9
<u>Schedule tribe</u>	<u>95.7</u>	<u>32.4</u>	<u>84.2</u>	<u>11</u>
Other backward class	96.2	35.2	84.4	12.8
others	94.2	34.5	80.3	15.6

Percentage is based on the number of mother surveyed
Source-NFHS-4 2015-16 M.P

Caste wise health seeking behavior in Diarrhea and its treatment



	Children with diarrhea in last two weeks preceding the survey (%)	Children with diarrhea taken to a health facility or health provider.(%)	Children who were given either ORS or gruel.(%)	Children given Zinc supplements (%)
Schedule caste	9.9	69.6	62.1	28.9
<u>Schedule tribe</u>	<u>8.9</u>	<u>63</u>	<u>59.8</u>	<u>23.8</u>
Other backward class	9.5	69.9	60.3	27.7
Others	10.1	69.8	63.3	24.9

Percentage is based on the number of children surveyed

Caste wise variation in utilization of services

	Mother received from an AWC during pregnancy			Mother received from an AWC during lactation period		
	Supplementar y food (%)	Health checkup s (%)	Health and nutrition education (%)	Supple mentar y food (%)	Health checkups (%)	Health and nutrition education (%)
Schedule caste	73.1	65.5	57.6	68.3	57.4	52.4
Schedule tribe	71	61.5	52.6	66.4	52.8	46.7
Other backward class	72.3	63.9	55.9	67.5	55.5	50.3
others	56.4	50.9	45.1	53.3	45	41.2

Percentage is based on the number of children surveyed
Source-NFHS-4 2015-16 M.P



ANC visits and IFA consumption

	Mothers who had ANC visit in the first trimester of pregnancy (%)	Mothers who had full ANC visits (%)	Mothers who were given or bought IFA (%)	Mothers who take IFA for at least 100days (%)
Schedule caste	53.3	9.5	83.5	20.5
Schedule tribe	40.1	7.0	79.5	19.5
Other backward class	56.6	12.5	84.1	24.6
Others	62.1	17.3	84.9	30.3

Allocation of Budget on Government programs

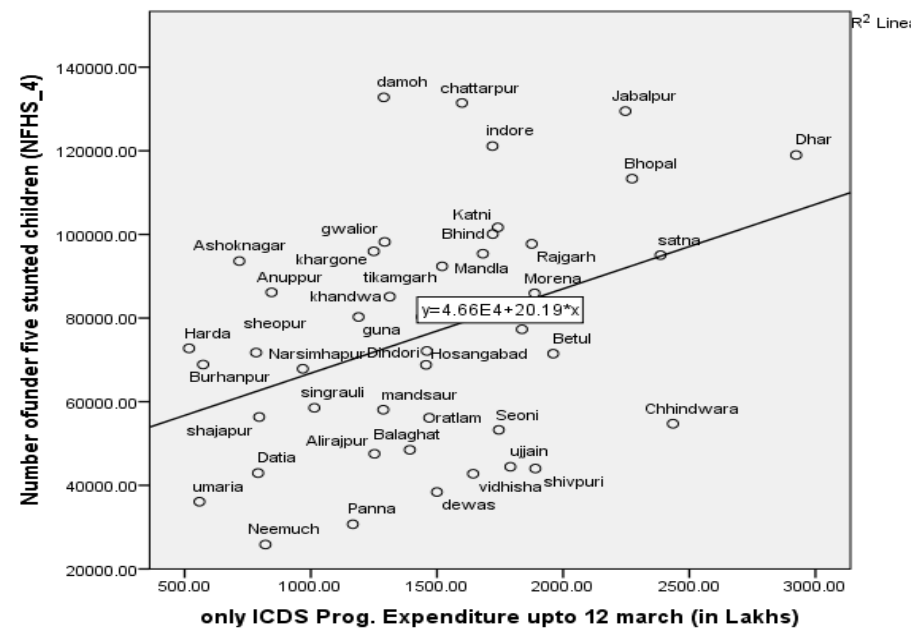


Relationship between program expenditure and under five stunting

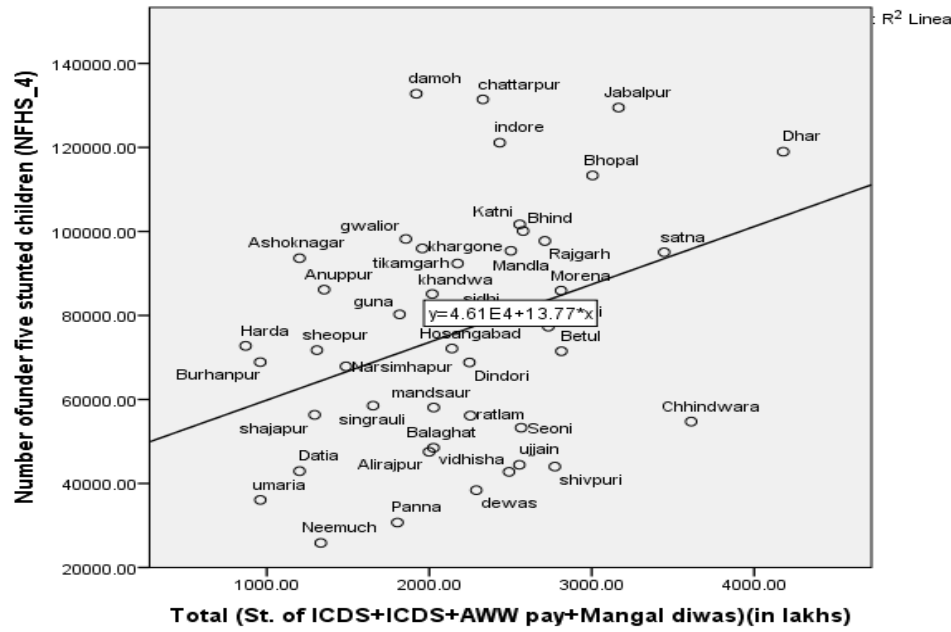
Variation in General population

		Only ICDS	Total ICDS	Mangal Diwas	Atal health mission	Teenager empowerment	Minimum need health prog.	Total expenditure on nutrition program
Spearm an rho	Number of stunted children	0.328 (0.020)	0.292 (0.04)	0.147 (0.132)	-0.063 (0.666)	-0.225 (0.116)	0.406 (0.003)	0.326 (0.021)
Kendall' s tau	Number of stunted children	0.213 (0.029)	0.189 (0.053)	0.220 (0.124)	-0.042 (0.670)	-0.176 (0.095)	0.267 (0.006)	0.226 (0.021)

Comparing the scatter chart Scatter showing relation between expenditure on 1)ICDS 2)

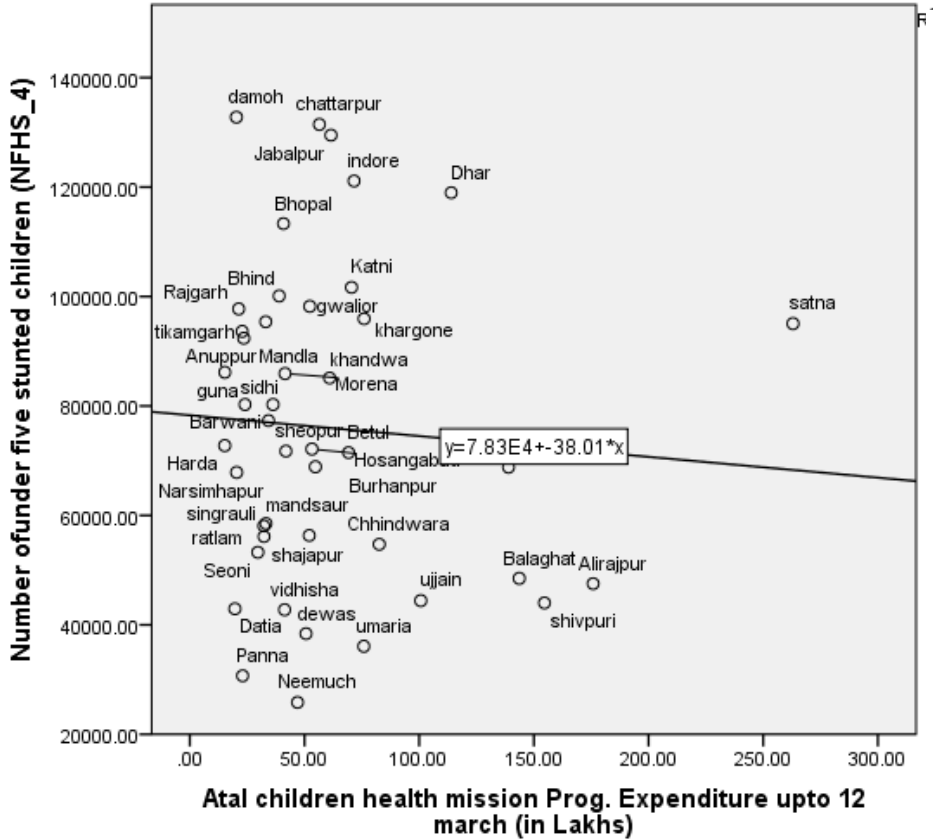


The scatter chart shows the relation between program expenditure and number of stunted children .For ICDS program, districts having higher number of stunted children are receiving higher budget. The line is showing positive trend these two variables.

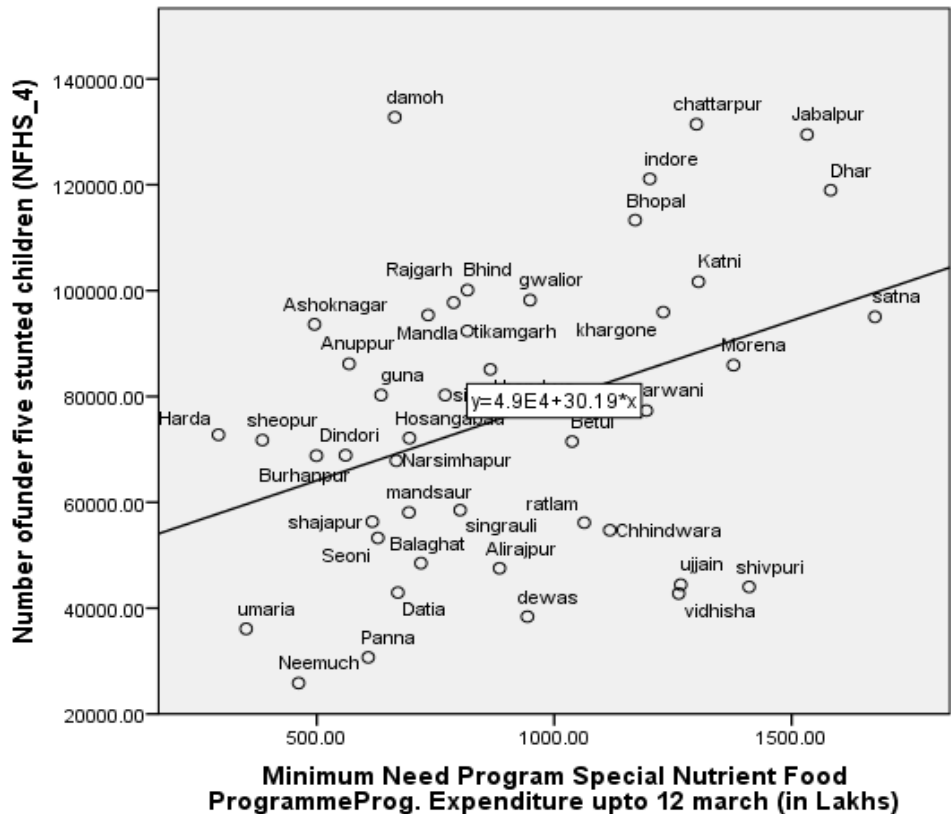


The scatter plot shows positive trend between program expenditure and number of stunted children. Total ICDS has stronger positive relation between the variables.

Scatter plot compairing number of stunted children with 1)Atal children health mission 2) Minimum need program special program

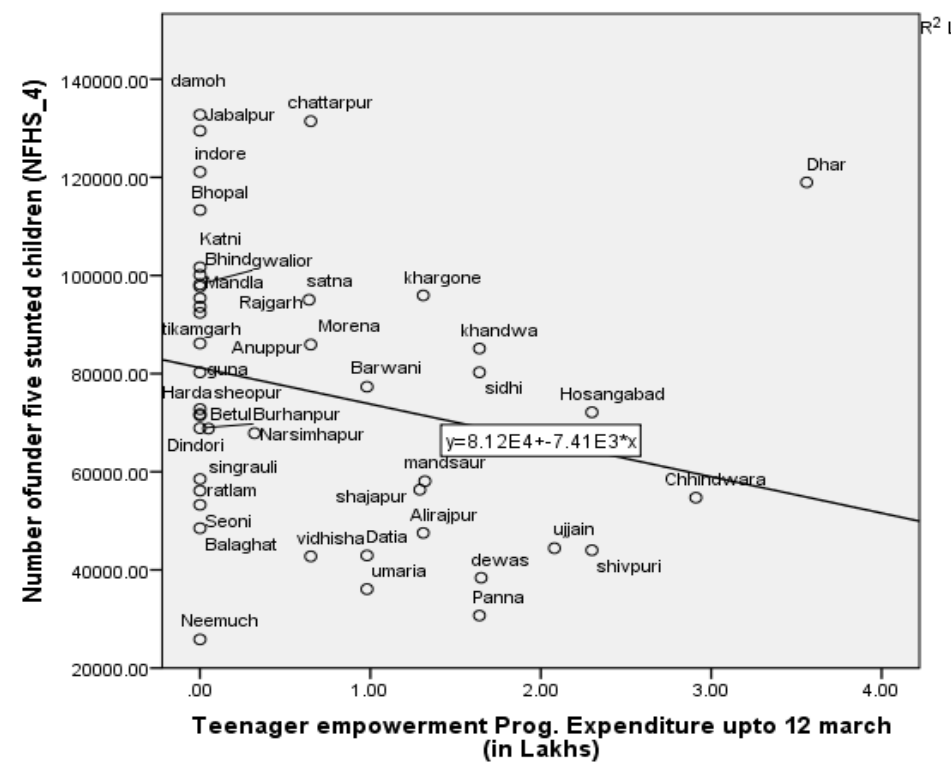


The scatter chart shows the negative relation between program expenditure and number of stunted children .For atal health mission, districts having higher number of stunted children are receiving less budget.

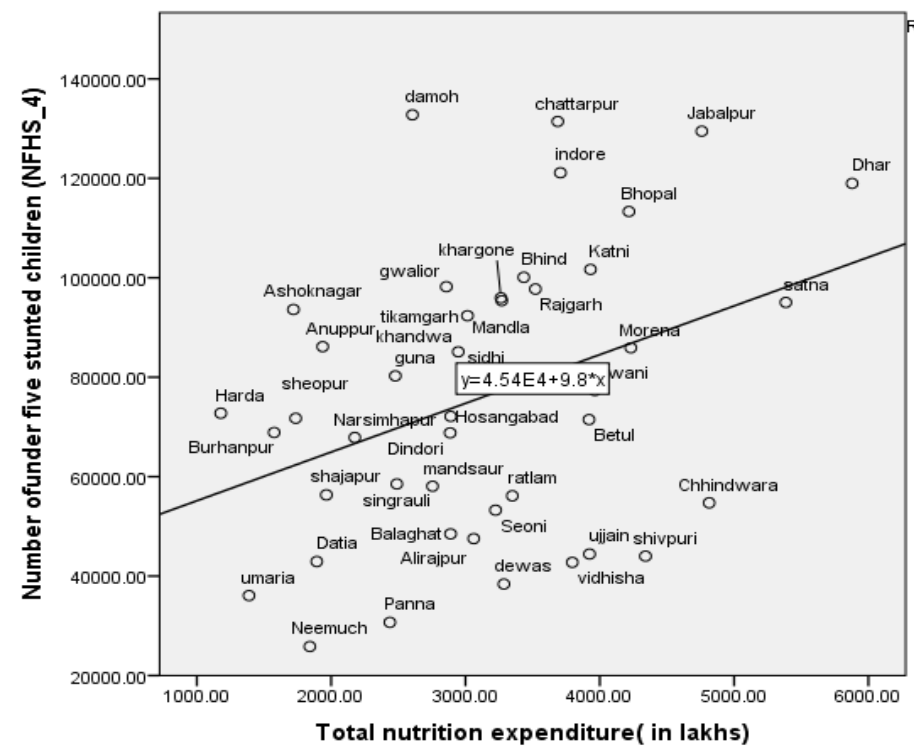


The scatter chart shows the positive relation between program expenditure and number of stunted children .For minimum need program, districts having higher number of stunted children are receiving higher budget.

Scatter plot comparing number of stunted children with 1) Teenager empowerment 2) total nutrtrional expenditure.



The scatter chart shows the negative relation between program expenditure and number of stunted children .For teenager empowerment, districts having higher number of stunted children are receiving less budget.

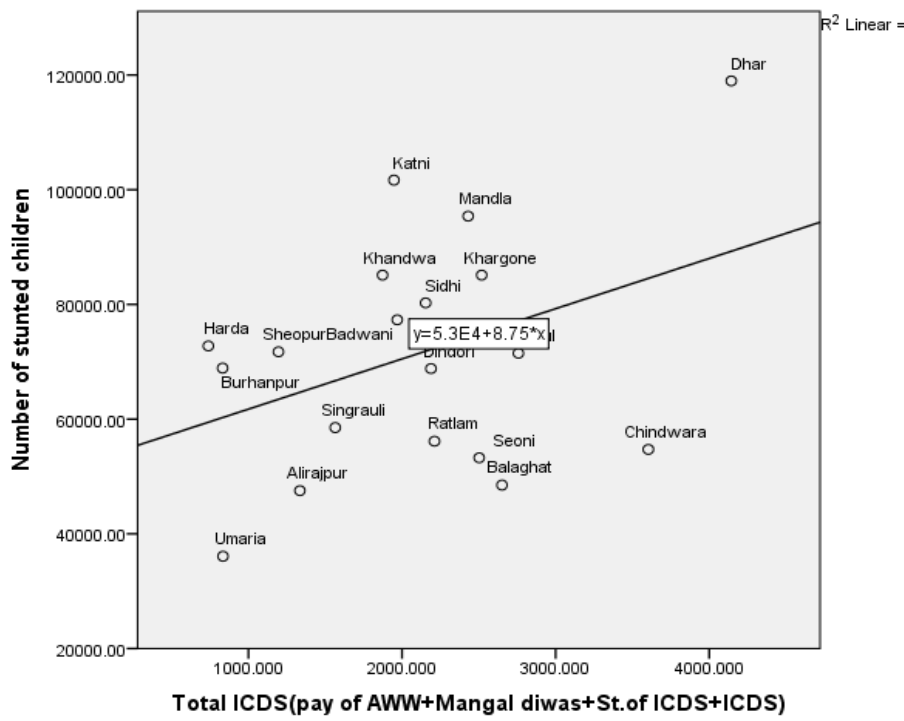
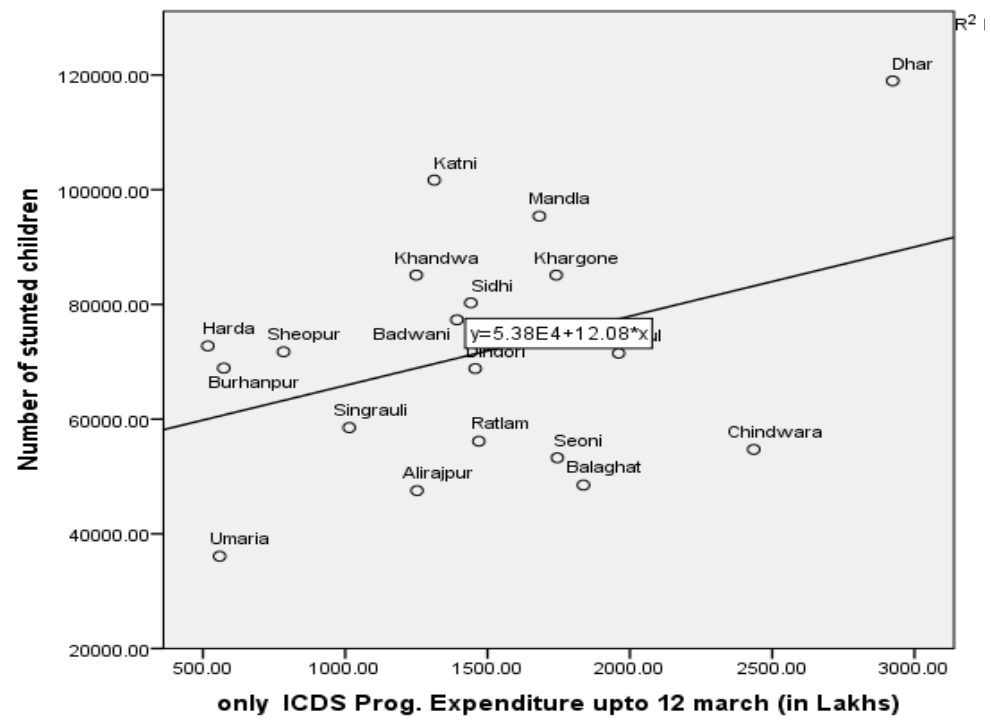


The scatter chart shows the negative relation between program expenditure and number of stunted children total nutrtrional expenditure, districts having higher number of stunted children are receiving less budget.

Relationship between program expenditure and under five stunting in Tribal districts of Madhya Pradesh

		Only ICDS	Total ICDS	Mangal Diwas	Atal health mission	Teenager empowerment	Minimum need health Program	Total expenditure on nutrition program
Spearman rho	Under five stunting	0.139 (0.548)	0.077 (0.741)	0.139 (0.548)	-0.057 (0.806)	0.224 (0.329)	0.490 (0.024)	0.222 (0.333)
Kendall's tau	Under five stunting	0.081 (0.0608)	0.043 (0.786)	0.081 (0.608)	-0.043 (0.786)	0.180 (0.293)	0.358 (0.023)	0.148 (0.349)

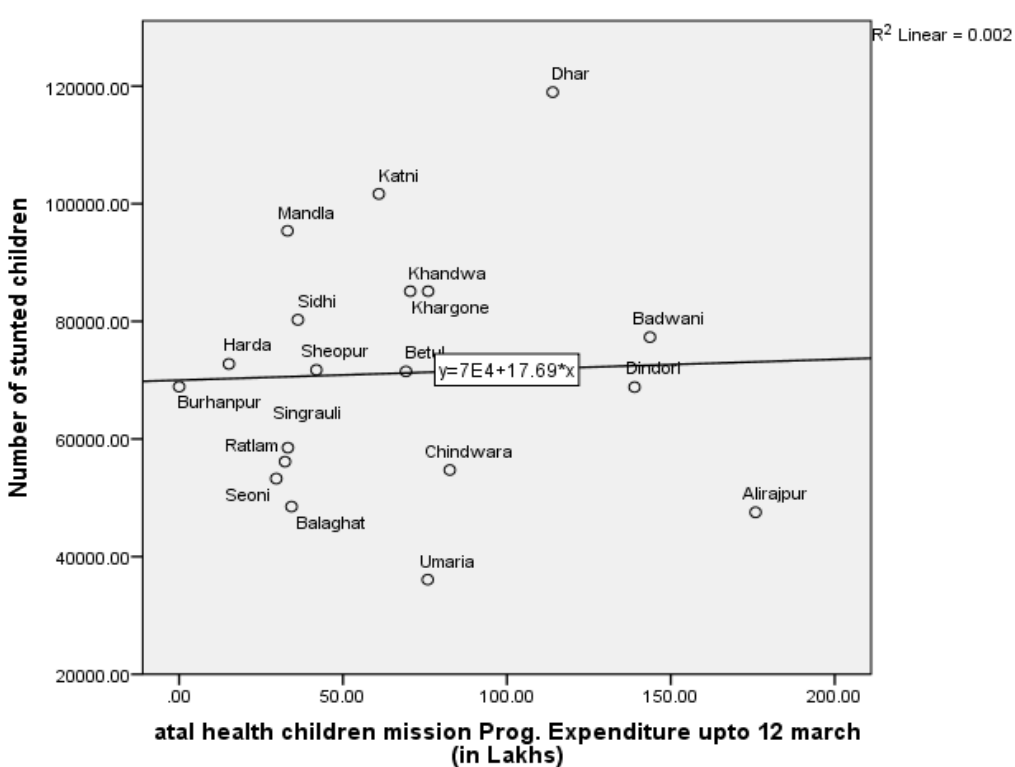
Scatter plot to find out the relation between number of stunted children and 1) Only ICDS 2) Total



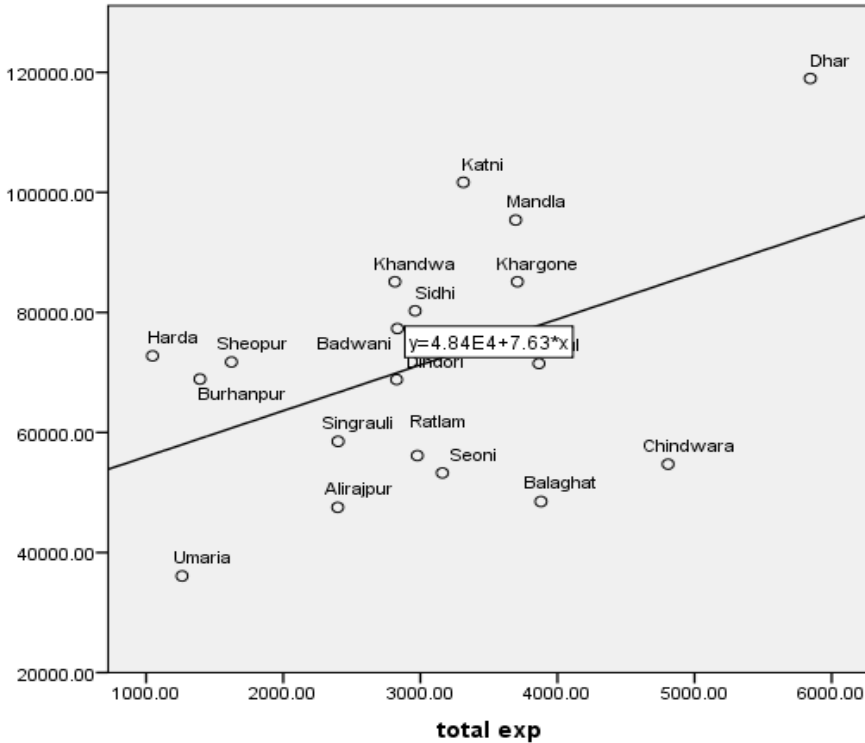
The scatter chart shows the positive relation between program expenditure and number of stunted children. For only ICDS, districts having higher number of stunted children are receiving less budget.

The scatter chart shows the positive relation between program expenditure and number of stunted children. For total ICDS, districts having higher number of stunted children are receiving higher budget.

Scatter plot comparing number of stunted children with 1) Atal health mission 2) total nutrtrional expenditure.



The scatter plot shows the neutral trend between the variables Which means the program do not have any relation with stunting.

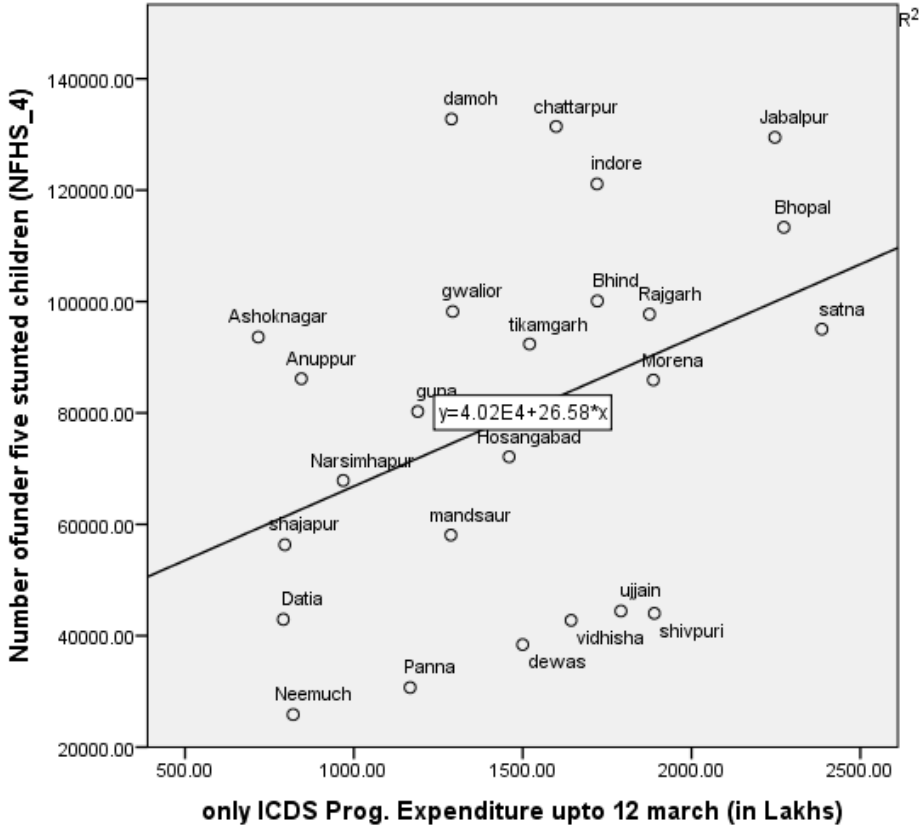


The plot shows the positive trend between the variable which means districts having high number Of stunted children are receiving high budget

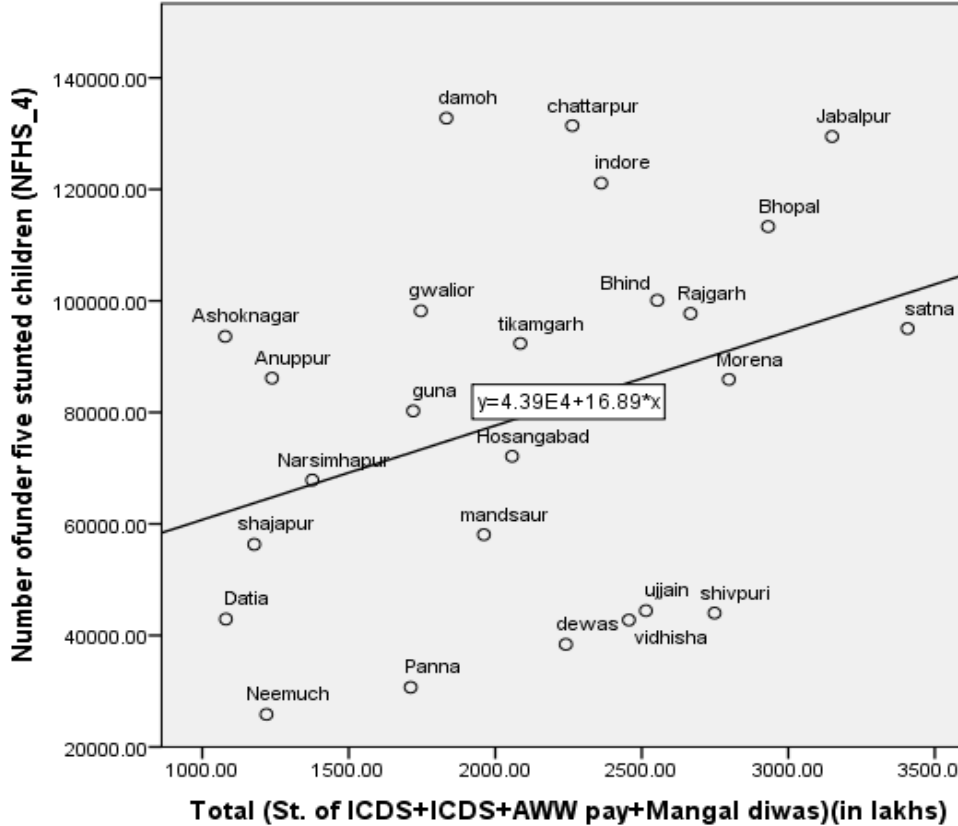
Relationship b/w program expenditure and under five stunting in Non Tribal districts of MP

		Only ICDS	Total ICDS	Mangal Diwas	Atal health mission	Teenager empowerment	Minimum need health prog.	Total expenditure on nutrition program
Spearman rho	Under five stunting	0.384 (0.04)	0.352 (0.061)	0.197 (0.133)	0.114 (0.557)	-0.304 (0.031)	0.401 (0.031)	0.256 (0.051)
Kendall's tau	Under five stunting	0.246 (0.061)	0.241 (0.066)	0.281 (0.132)	0.069 (0.599)	-.0393 (0.035)	0.296 (0.024)	0.361 (0.054)

Scatter plot comparing number of stunted children with 1) ICDS program expenditure 2) total ICDS expenditure.

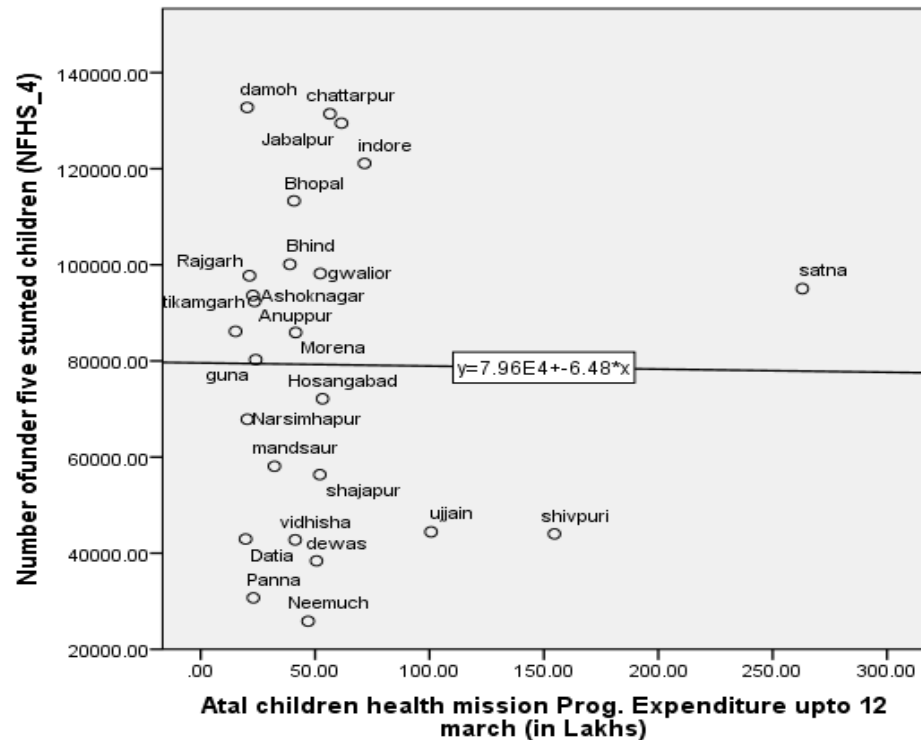


The scatter plot shows the positive trend between the variables .
Which means districts having more stunted children have higher ICDS budget.

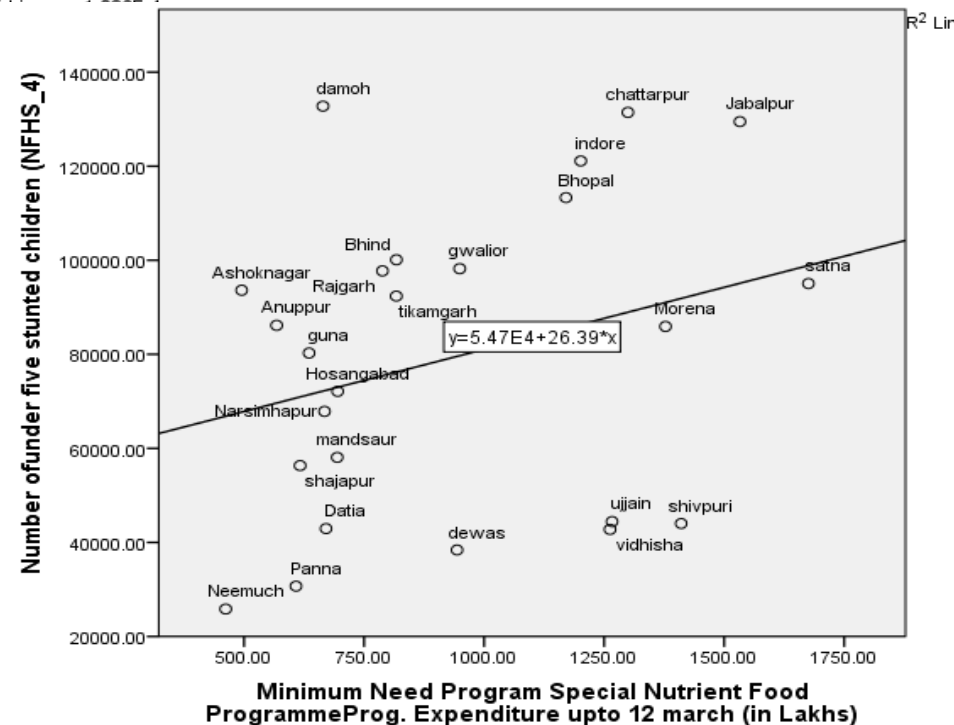


The plot shows the positive trend between the variable.
Which means district having more stunted children have higher total ICDS budget

Scatter plot comparing number of stunted children with 1) Atal health mission program expenditure 2) Minimum need program expenditure.

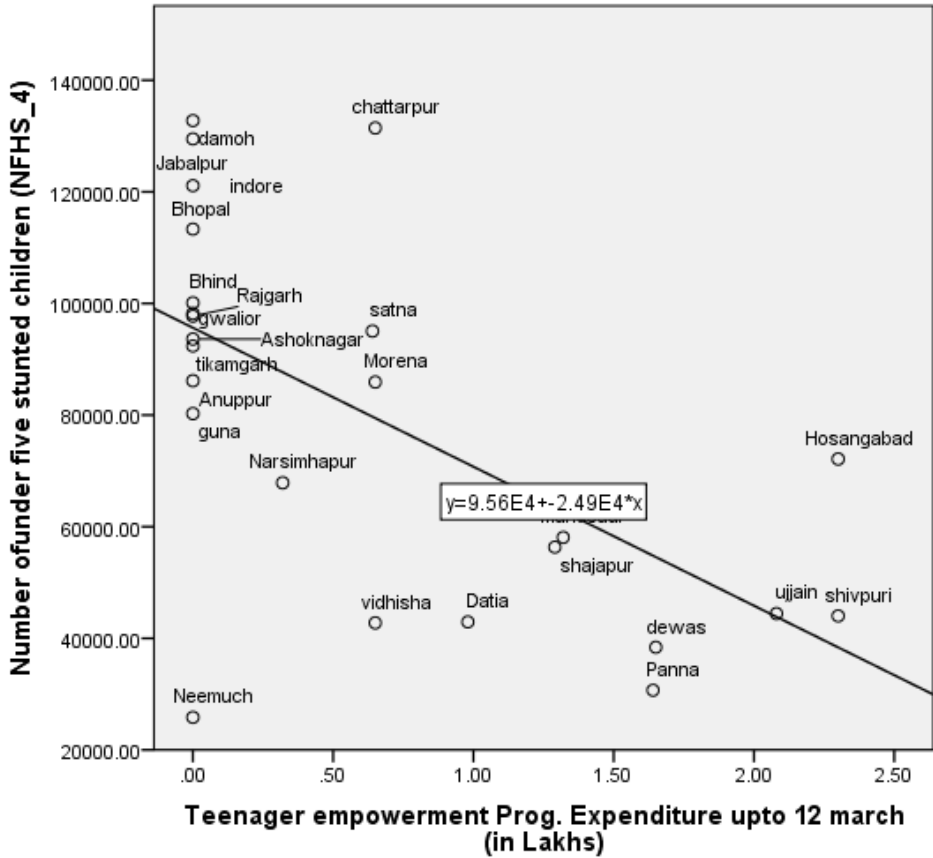


The scatter plot shows no relationship between the variables .
Which means number of stunted children has no relation with program expenditure

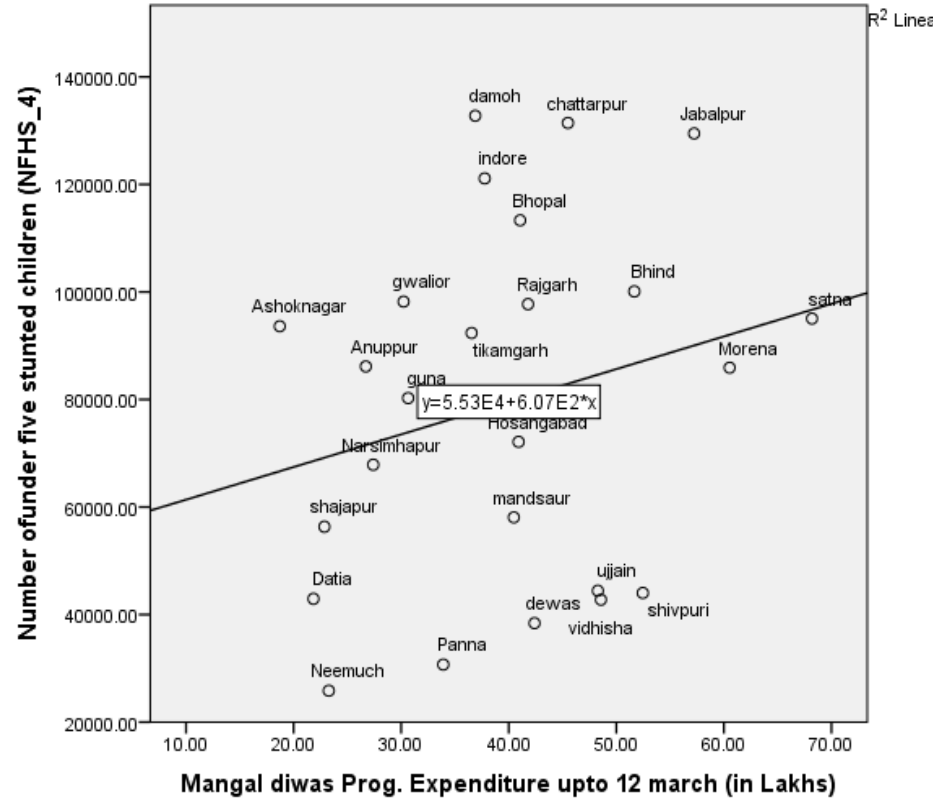


The plot shows the positive trend between the variable.
Which means district having more stunted children have higher Minimum need program expenditure.

Scatter plot comparing number of stunted children with 1) Teenage empowerment program expenditure 2) Mangal diwas program expenditure.

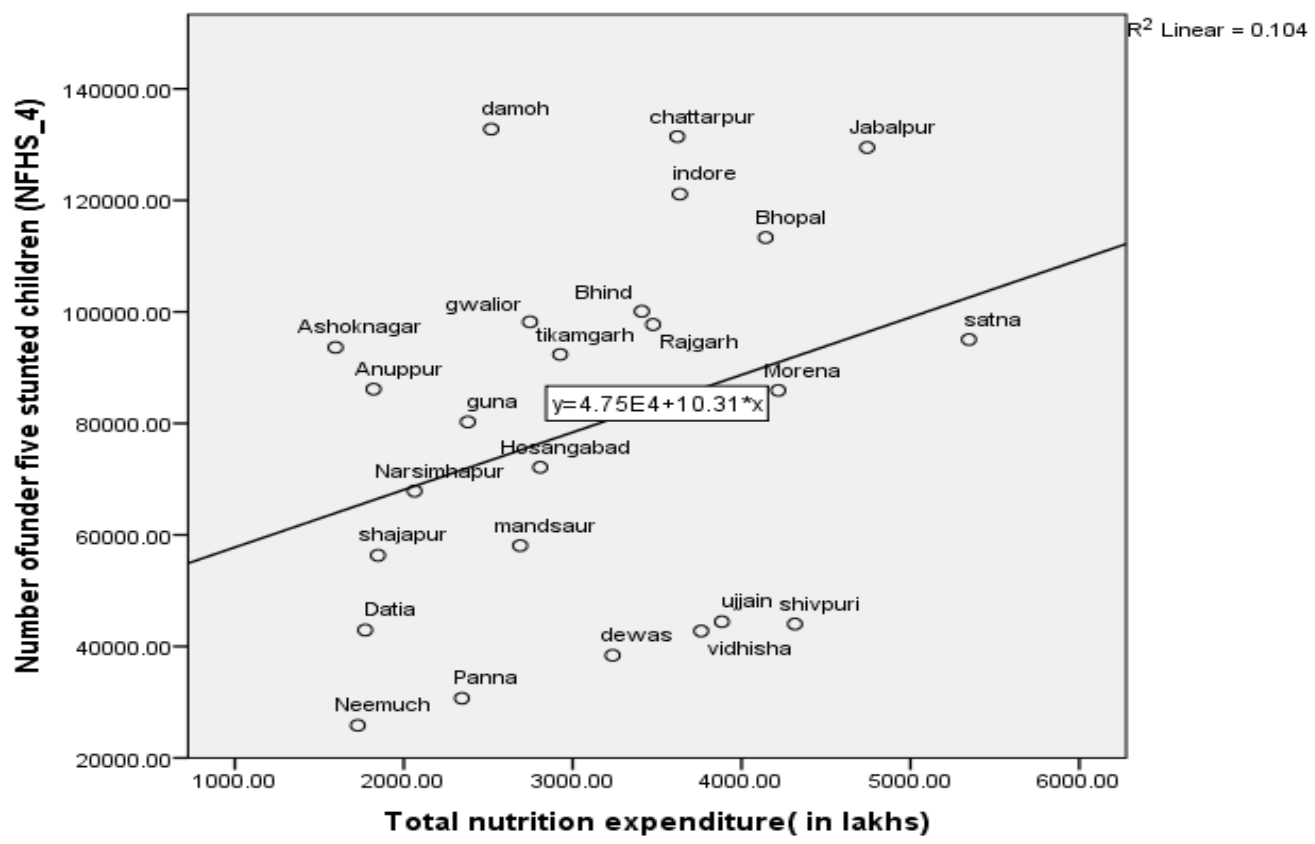


The scatter plot shows negative relation between the variables .
Which means districts having higher number of stunted children receive low budget.



The scatter plot shows positive relation between the variables .
Which means districts having higher number of stunted children receive high budget.

Scatter plot comparing number of stunted children with total nutrition expenditure.



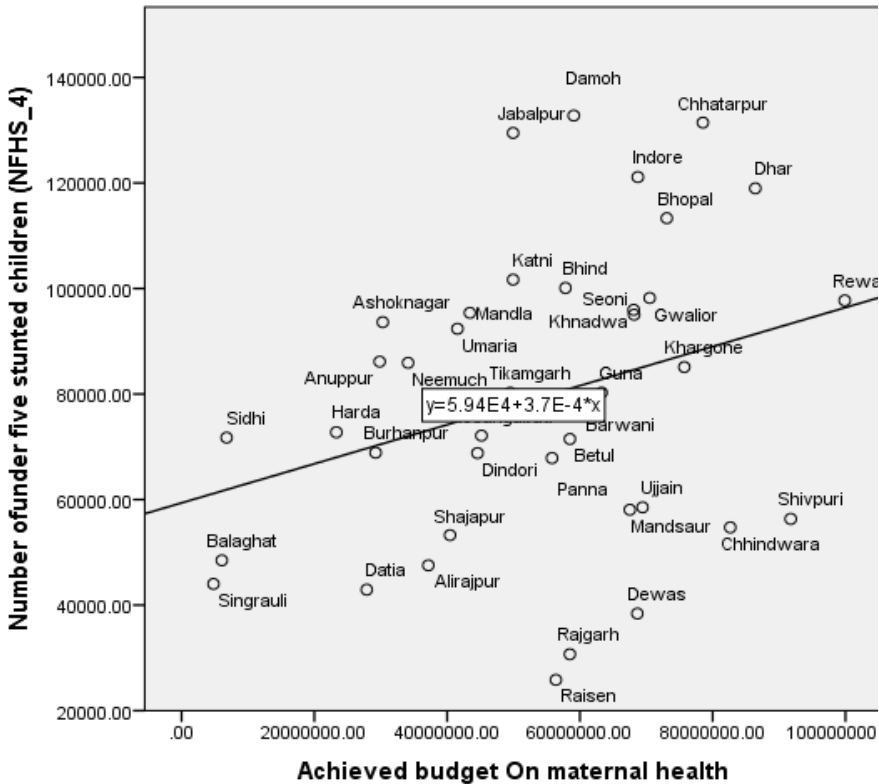
The scatter plot shows positive relation between the variables .
Which means districts having higher number of stunted children receive high budget.

Variation in achieved health budget of NHM.

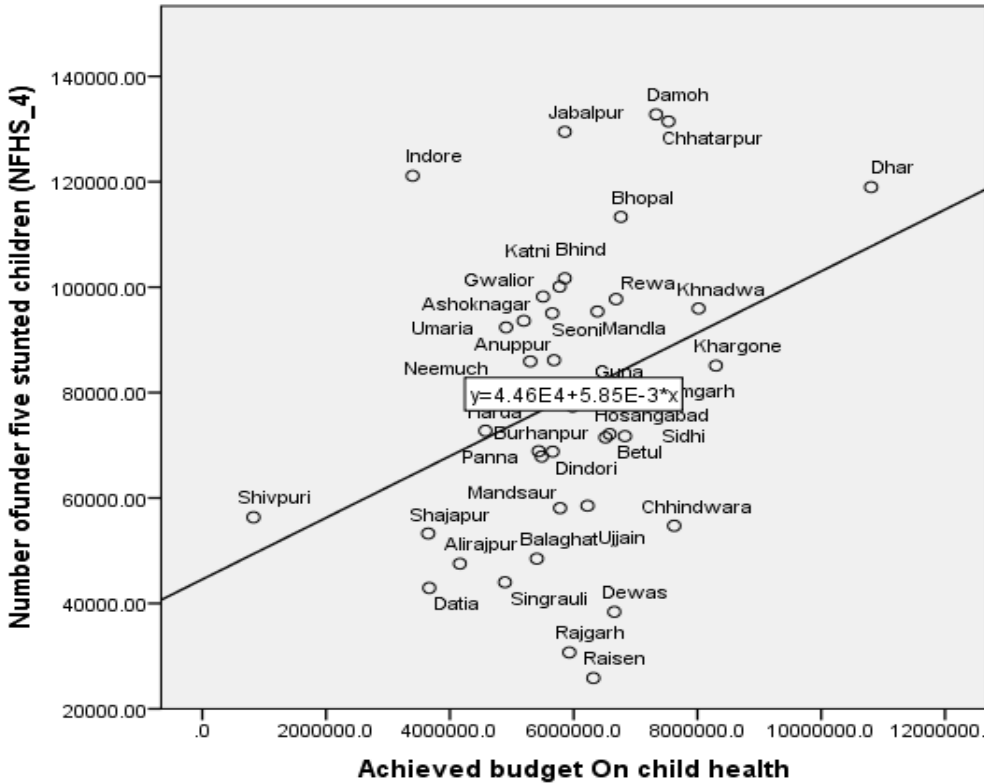
General population

		Maternal health achieved budget	Child health achieved budget	Grand total
Spearman rho	Number of under five stunted children	0.284 (0.046)	0.467 (0.002)	0.229 (0.001)
Kendall's tau	Number of under five stunted children	0.188 (0.054)	0.309 (0.002)	0.149 (0.128)

Scatter plot comparing number of stunted children with 1) Achieved budget on maternal health. 2) Achieved budget on child health.

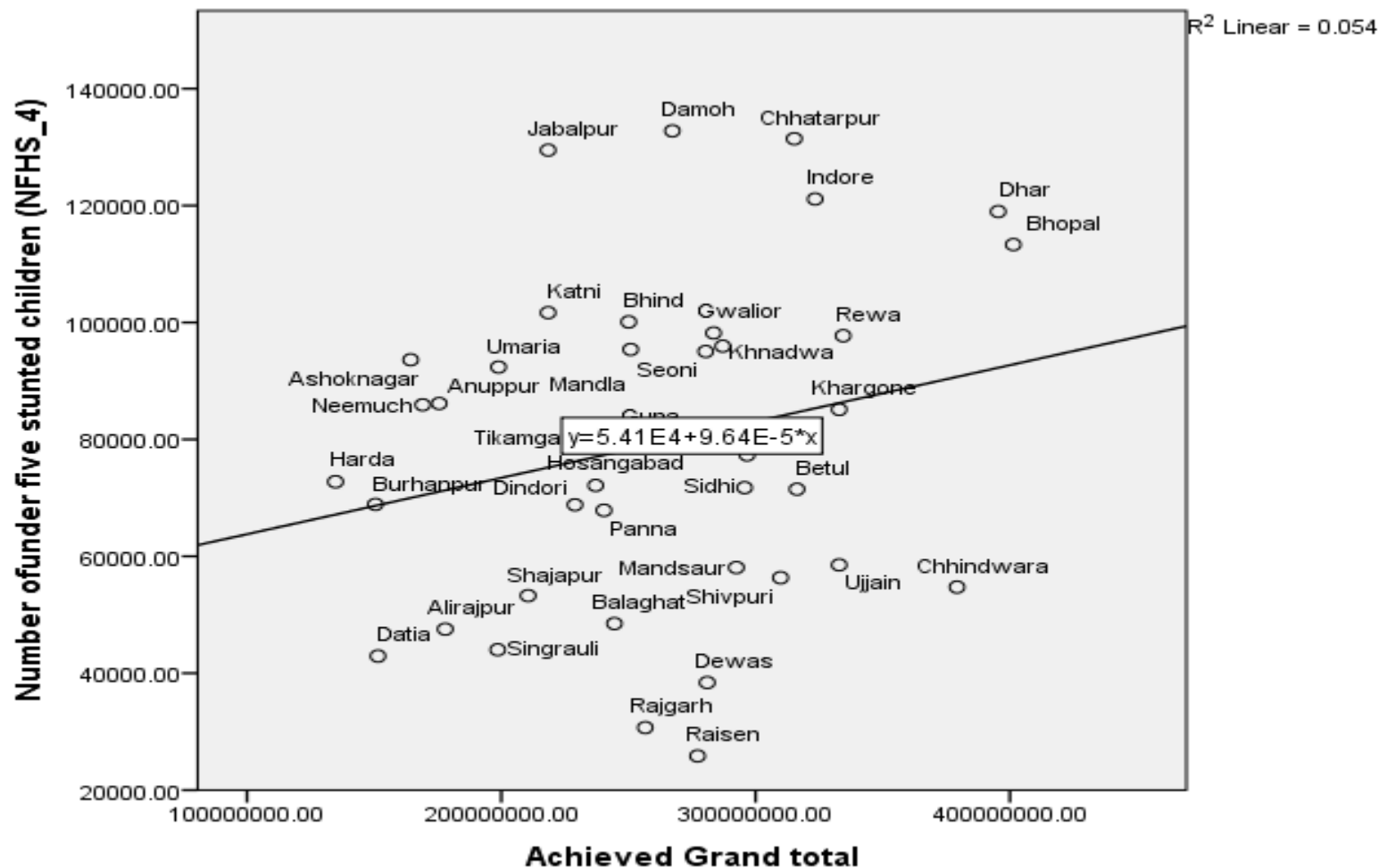


The scatter plot shows positive relation between the variables .
Which means districts having higher number of stunted children receive high budget on maternal health



The scatter plot shows positive relation between the variables .
Which means districts having higher number of stunted children receive high budget on child health.

Scatter plot comparing number of stunted children with Achieved grand total.

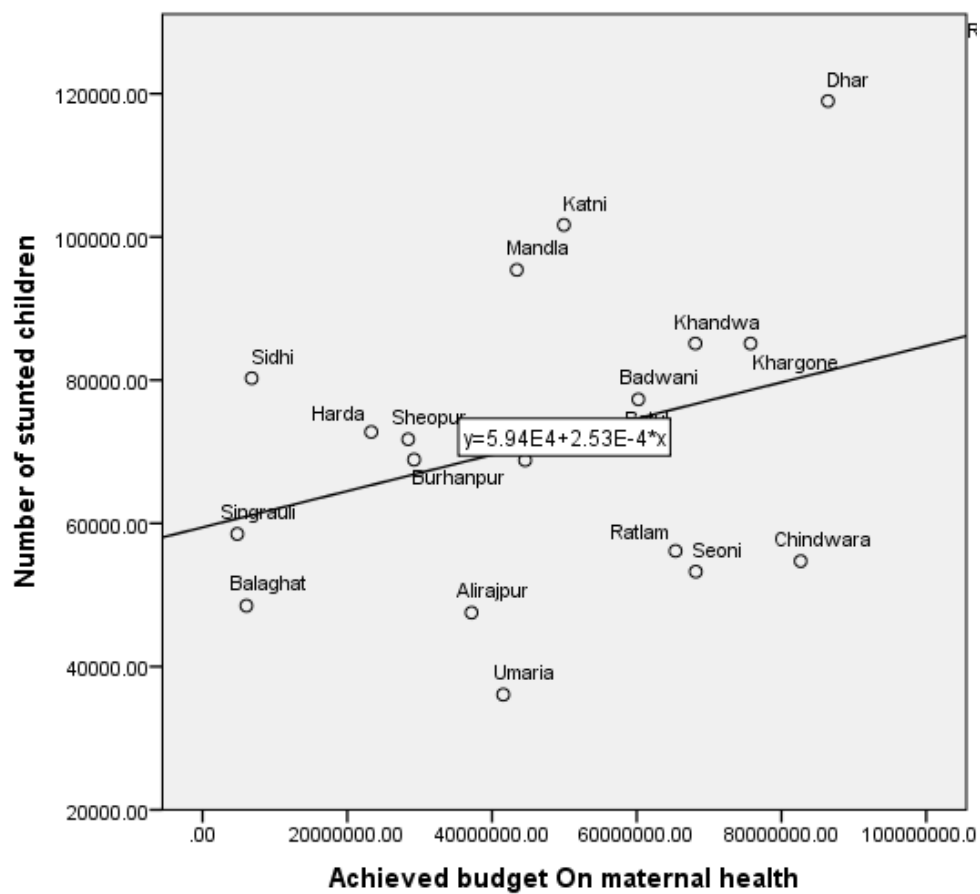


The scatter plot shows positive relation between the variables which means districts having higher number of stunted children have higher budget.

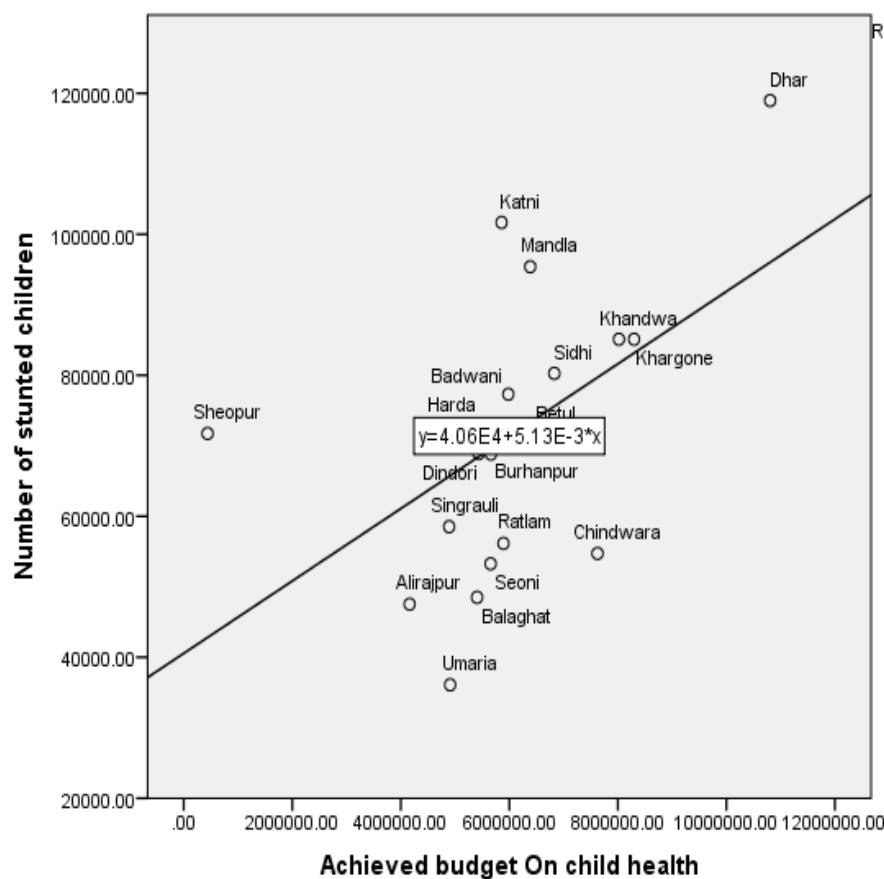
Variation in expenditure on mother and child health in tribal dominated districts

		Maternal health achieved budget	Child health achieved budget	Grand total
Spearman rho	Number of Under five stunted children	0.225 (0.265)	0.572 (0.007)	0.222 (0.333)
Kendall's tau	Number of under five stunted children	0.148 (0.349)	0.406 (0.010)	0.110 (487)

Scatter plot comparing number of stunted children with 1) Achieved budget on maternal health. 2) Achieved budget on child health.

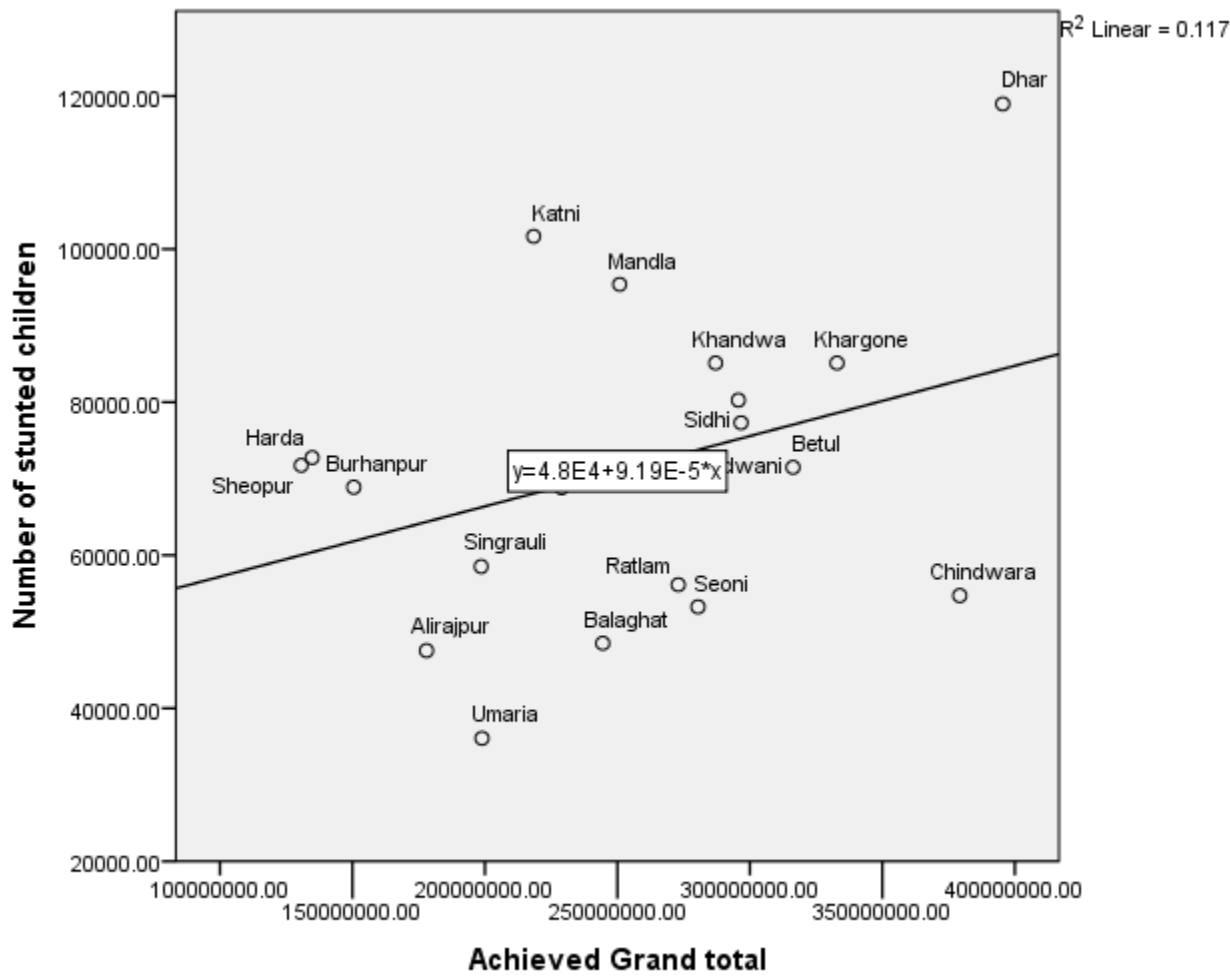


The scatter plot shows positive relation between the variables .
Which means districts having higher number of stunted children receive high budget on maternal health



The scatter plot shows positive relation between the variables .
Which means districts having higher number of stunted children receive high budget on child health.

Scatter plot comparing number of stunted children with Achieved grand total.

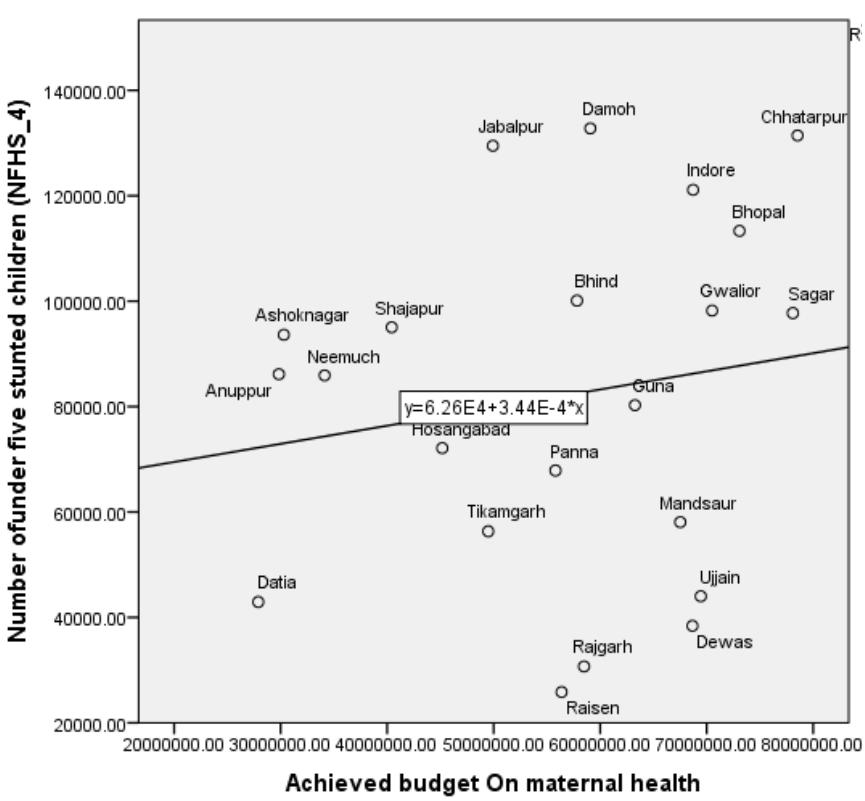


The scatter plot shows positive relation between the variables .
Which means districts having higher number of stunted children receive high budget.

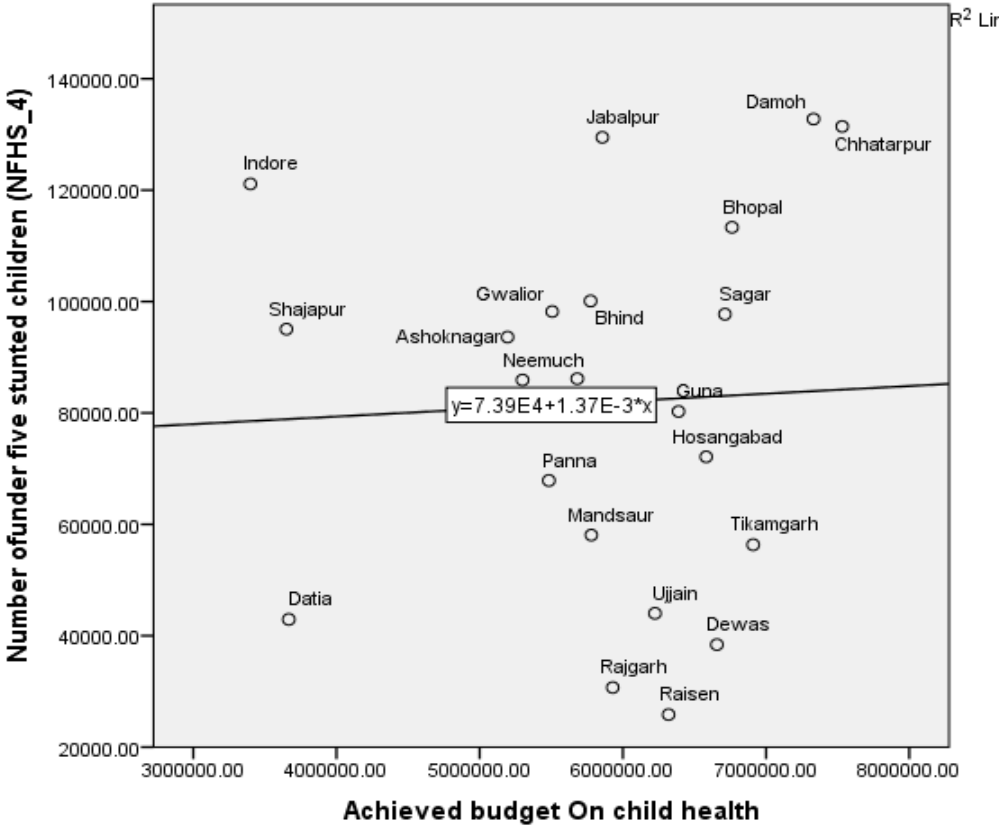
Variation in expenditure on mother and child health in non tribal districts

		Maternal health achieved budget	Child health achieved budget	Grand total
Spearman rho	Number of Under five stunted children	0.461 (0.012)	0.102 (0.599)	0.309 (0.103)
Kendall's tau	Number of under five stunted children	0.296 (0.024)	0.069 (0.599)	0.193 (0.143)

Scatter plot comparing number of stunted children with 1) Achieved budget on maternal health. 2) Achieved budget on child health.

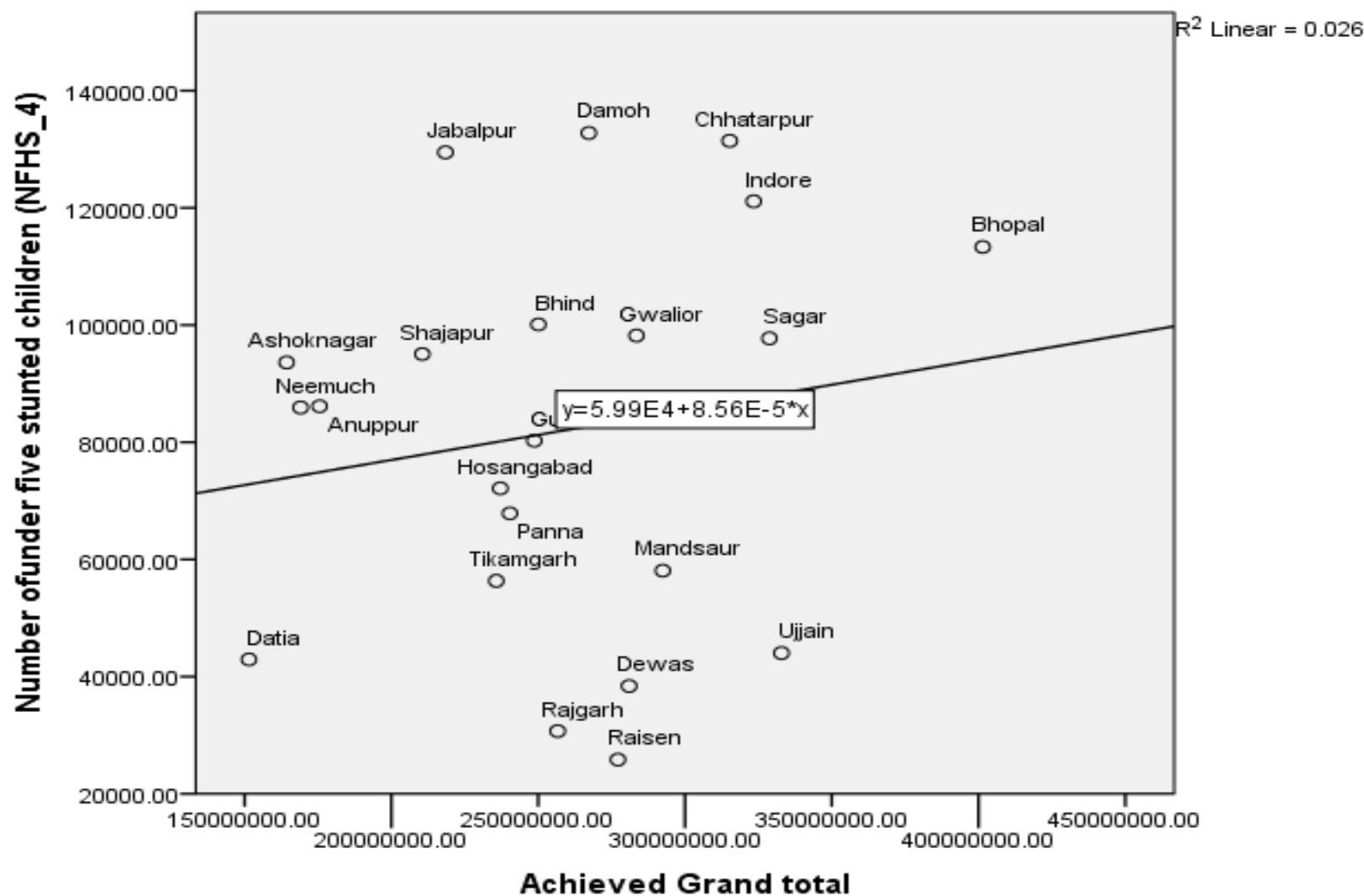


The scatter plot shows positive relation between the variables .
Which means districts having higher number of stunted children receive high budget on maternal health in non tribal districts



The scatter plot shows no relation between the variables .
The number of stunted children have no relation with budget allocation on child health in non tribal districts.

Scatter plot comparing number of stunted children with achieved grand total.



The scatter plot shows minor positive relation between the variables which means districts having higher number of stunted children receive high budget in non tribal districts

Discussion

An attempt has been made to understand the factors which are influencing the nutritional status of tribal community of M P. The tribal community is the most vulnerable community, they live in geographically isolated area with extreme poverty. As per NFHS-4 report infant mortality is very high in teenage mothers i.e.72%.

Role of AWC is very crucial in providing supplementary nutrition to mother and child but unfortunately the food provided at AWC is the main source of food for the entire family i.e. the food provided to the pregnant and lactating mother is the only source of food for entire family. AWC provides take home ration once a week .In tribal communities children under five are at high risk of under nutrition as adequate supplementary food is not provided at AWC.A study done by Rajesh Mishra(2017) justifies that there is very minute difference in the malnutrition level between the children who are taking supplementary food from AWC and children are who are not taking food from AWC.

Apart from this there is very high burden of under nutrition in children which result in overcrowding in NRC . Yogesh Shukla (2017) while conducting his study in Jabalpur, Madhya Pradesh amongst the children admitted in NRC founds that long delay in referral and admission of severe malnourished children is a major challenge. Moreover parents do not stay for 14 days at NRC as most of them are daily wage laborers. Inaccessibility is also one the reason of food insecurity in tribal communities.

To avoid stunting it is very important for the mother to have timely ANC visits and consume adequate nutrition diet during and after pregnancy. Education also plays a key role in utilization of health services. It is observed in the study done by Tulsi Adhikari (2016) while conducting his study on tribal population of Rajasthan, Odisha, Chhattisgarh and Madhya Pradesh found that there is an association between education attainment and ANC visits i.e. Utilization of ANC was highest among those women with level of education 9th class and above.

In M.P various programs are running to upgrade the nutritional status of mother and child such as ICDS , Mangal Diwas, Rajiv Gandhi Teenager Girls Empowerment Scheme, Atal Children Health Mission, Madhya Pradesh Health Area Improvements Program (Foreign Aid), Minimum Need Program Special Nutrient Food Program, Teenager Empowerment Program.

Conclusion



Madhya Pradesh comes under the underperforming states in India in terms of attaining nutrition sensitive and specific indicators for under nutrition. The above study revealed the Scheduled Tribes are the under performing community in terms of nutritional related indicators and utilization of government facilities such as ICDS and other associated programs. Ideally the expenditure on the ongoing program should be according to the prevalence of nutritional indicators i.e. districts having higher number of stunted children receive more budget allocation. There should be a relationship between the nutrition indicators and ongoing program expenditure to ensure `smooth functioning After analyzing the correlation between the expenditure and the prevalence of stunting it is observed that in general population many programmes have significant correlation between the variable but in the case of tribal dominated the situation is not same i.e. very few programs expenditure has correlation with prevalence of stunting . Also for the case of NHM Madhya Pradesh the pattern of expenditure varies with respect to type of cast living in the district. Government program such as ICDS which are supposed to provide supplementary food to the mother and child to improve their nutrition status but in reality especially in tribal dominated areas (Sheopur District tribal news, MP) supplementary source is the primary source of food and is consumed by the whole family instead of only mother and child.