

Supply-Side Factor Affecting Maternal Health Care Utilization
at Sub-Centers in High Priority Blocks of Tribal District Valsad,
Gujarat

By

Hemangini Solanki

*Dissertation submitted for the partial fulfillment of the
MBA Hospital and Health Management*

Academic year, 2015-2017



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TO WHOMSOEVER MAY CONCERN

This is to certify that **Dr. Hemangini Solanki** student of **MBA Hospital and Health Management** from The IIHMR University, Jaipur has undergone internship training at National Health Mission, Gujarat from **February 8th, 2017 to May 7th, 2017**.

The Candidate has successfully carried out the study designated to her during internship training and her approach to the study has been sincere, scientific and analytical.

The Internship is in fulfillment of the course requirements.

I wish her all success in all her future endeavors.



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and has successfully completed her Project on

**Supply-side factors affecting maternal health care utilization at sub-centers in
High Priority Blocks of Tribal District Valsad, Gujarat**

Date: - 8th Feb 2017 to 7th May 2017

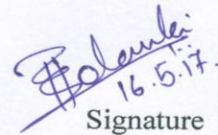
She comes across as a Sincere & Honest; I wish her all the best for
future endeavors

**Chief District Health Officer And
Member Secretary
District Health Society District
Panchayat, Valsad,
Gujarat**

THE IIHMR UNIVERSITY, JAIPUR

CERTIFICATE BY SCHOLAR

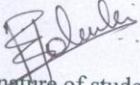
This is to certify that the dissertation titled **Supply-side factors affecting maternal health care utilization at sub-centers in High Priority blocks of Tribal District Valsad, Gujarat** and submitted by Dr. Hemangini Solanki Enrollment No. IIHMR-U/01/2015-17/0285 under the supervision of Dr. Seema Mehta for award of MBA in Hospital and Health of the University carried out during the period from 8th February 2017 to 7th May 2017 embodies my original work and has not formed the basis for the award of any degree, diploma associate ship, fellowship, titles in this or any other institute or other similar institution of higher learning.


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This is to certify that all ethical issues have been considered while collecting data for my dissertation titled "Supply-side factors affecting maternal health care utilization at sub-centers in High Priority blocks of Tribal District Valsad, Gujarat"


Signature of student

ABSTRACT:

The Valsad district is one of the 33 districts and one of the 8 HPDs in Indian state of Gujarat. In the government sector, a Sub-center is a first point of contact between the primary health care system and the community. Women that are die as result of complications during and following pregnancy and childbirth. Most of these complications develop during pregnancy and process of child birth and most are preventable or treatable. To improve maternal health, barriers that limit access to quality maternal health services must be identified and addressed at all levels of the health system These factors operate on both the demand and supply side. The framework identifies three levels of barriers: the community and household level, the health service delivery level.

Objective: To analyze the association of supply side factors and utilization of maternal health in terms of number of ANCs registered, number of deliveries conducted and number of PNCs visited at SC of high priority block of tribal district Valsad, Gujarat.

Methodology:

- **STUDY DESIGN:** A descriptive, Cross-Sectional study design
- **STUDY AREA:** The study was conducted in subcenters of high priority blocks of Valsad District, Gujarat. Two high priority blocks in Valsad namely Kaparada and Dharampur having 86 and 64 sub-center respectively.
- **DURATION OF STUDY:** The study is conducted over a period of three months started from 8th Feb 2017 to 7th May 2017.
- **SAMPLE SIZE:** As this study was facility survey, sample size was taken as 20 percent of total health facilities in the survey. There is 150 Sub-centers in mentioned high priority blocks. 20 percent of 150 is 30. Total 30 Sub-centers were taken up for the study.
- **SAMPLING TECHNIQUE:** Simple random sampling
- **DATA COLLECTION PROCEDURE:** Face to face interview of FHW/ANM at Sub-Center and use of secondary data from facility register.

- **DATA COLLECTION INSTRUMENT:** Questionnaire of DLHS-3 Facility Survey under Reproductive and Child Health Project for Sub center modified as per requirements.
- **DATA ANALYSIS PROCEDURE:** SPSS software version 20. Univariate and bivariate analysis was carried out.

Result & Discussion: Supply side factors for the study were selected from the factsheet of DLHS-3(facility survey) and previous studies done using DLHS-3 data in different state, which were: Health personnel, Drug availability, Equipment, Quality variable, Infrastructure, Quarter for residence and Geographical. There was no association found between no. ANC registered and Independent variables, no. of delivery conducted association with few variables like Instrument sterilizer, hub cutter and hemoglobinometer shows association under equipments and under quality variables integrated skill development training and SBA training shown association.

Conclusion: Supply side factors were not acting as barriers or hurdles in maternal healthcare utilization except a few that was instrument sterilizer. This result shows that to establish this fact further study needs to be carried out because the sample size of study may affect the overall result. Supply side factors that were considered in this study, it can be said that only these factors were not taken to know the utilization of maternal health, there may be chances of other factors that may influence the maternal healthcare utilization and to establish this fact further study needed.

Keywords: Supply side factor, Maternal healthcare utilization, High priority block and tribal District

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I feel privileged in expressing my kindest gratitude to Dr. A. S. Sanghvi (CDHO, Valsad, Gujarat) under whose able guidance and supervision this study was conducted. The keen interest he evinced throughout this period and the graciousness with which he gave his valuable advice was his exclusive acumen.

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I would be failing in my duties if I miss to acknowledge and thank all those co-operating people who formed the subject of this study. These include the entire team of CDHO office, Valsad, Gujarat. They extended their wholehearted co-operation in different phases of my project.

*Without mentioning my mentor **Dr. Seema Mehta** my project would never have completed. I would like to thank her for her guidance and support during my dissertation period.*

*I am indebted to my family especially my parents **Pravinsinh Solanki and Kalaben Solanki** who helped me in every possible way during my training.*

In the end I thank all those fellows and colleagues who have helped me in making this project a success and my apologies to anyone whose name I would have inadvertently forgotten to mention here.

(Dr. Hemangini Solanki)

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LIST OF ABBREVIATIONS:

AD	- Auto Disposable
ANC	- Ante Natal Care
ANM	- Auxillary Nurse Midwife
ASHA	- Accredited Social Health Activist
BP	- Blood Pressure
CDHO	- Chief District Health Officer
CHC	- Community Health Center
DEC	- Di Ethyle Carbamazine
DH	- District Hospital
DLHS	- District Level Household Survey
DOTS	- Directly Observed Treatment Short course
FHW	- Female Health Worker
HBNC	- Home Based Newborn Care
IFA	- Iron and Folic Acid
IMNCI	- Integrated Management of Neonatal and Childhood Illnesses
IUD	- Intra Uterine Device
MDG	- Millennium Development Goal
MMR	- Maternal Mortality Ratio
MPHW	- Multi-Purpose Health Worker
ORS	- Oral Rehydration Solution

PF	- Plasmodium Falciparum
PHC	- Primary Health Center
PNC	- Post Natal Care
RCH	- Reproductive and Child Health
SBA	- Skilled Birth Attendance
SC	- Sub-Center
SDG	- Sustainable Development Goal
TB	- Tuberculosis
VBDCP	- Vector Borne Disease Control Programme
VHND	- Village Health and Nutrition Day
VHSC	- Village Health and Sanitation Committee

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1.1 BACKGROUND

The Valsad district is one of the 33 districts and one of the 8 HPDs in Indian state of Gujarat. It is bound by in north by Navsari district, Nashik district of Maharashtra state to the east, and to the south Dadra and Nagar Haveli union territory and Palghar district of Maharashtra. The Arabian Sea lies to west of the district. On the north, east, and southern coastal Daman enclave of Daman and Diu union territory is bounded. The district's administrative capital is Valsad. The district's largest city is Vapi. A Valsad is the one of the tribal district of Gujarat. Valsad district divided into six blocks: Valsad, Vapi, Pardi, Umargam, Kaparada and Dharampur. Table-1.1 showing the district profile as per Census 2011 and 2001 and table-2 having the district comparison between rural and urban area.

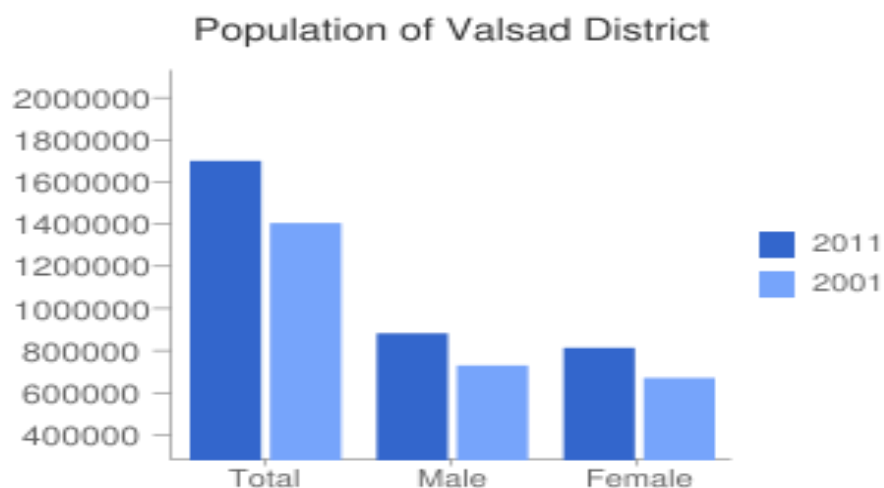
Table-1.1 Valsad District profile as per Census 2011 and 2001

Description	2011	2001
Actual Population	1,705,678	1,410,553
Male	887,222	734,799
Female	818,456	675,754
Population Growth (Percent)	20.92	29.65
Area sq km	3008	3008
Density /Km ²	567	465
Proportion to Gujarat Population (Percent)	2.82	2.78
Sex Ratio (per 1000 male)	922	920
Child Sex Ratio (0-6 years)	925	933
Average Literacy	78.55	69.15
Male Literacy	84.55	77.90
Female Literacy	72.06	59.62

Table-1.2 Comparison of Valsad district profile in Rural and Urban area as per census 2011

Description	Rural	Urban
Population (percentage)	62.74	37.26
Total Population	1,070,177	635,501
Male Population	542,644	344,578
Female Population	527,533	290,923
Sex Ratio	972	844
Child Sex Ratio (0-6)	947	885
Average Literacy (percent)	72.32	88.84
Male Literacy (percent)	79.27	92.65
Female Literacy (percent)	65.20	84.31

Figure-1.1 Comparison of population of Valsad District in male and female as per census 2011 and 2001.



As per NHM, Gujarat there are two high priority block of Valsad district that are Kaparada and Dharampur. These two blocks having the highest tribal population residing in most difficult and out reached area of the district.

In the government sector, a Sub-center is the most peripheral and first point of contact between government health system and the community. A Sub-center provides interface with the community at the grass-root level, providing all the primary health care services. The purpose of the Sub-center is largely preventive and promotive, but it also provides a basic level of curative care. As per population norms, there shall be one Sub-center established for every 5000 population in plain areas and for every 3000 population in hilly/tribal/desert areas. There is no uniformity of the population density in the country, application of same norm all over the country is not advisable. In view of the current highly variable situation of Sub-centers in different parts of the country and even within the same State, that have been categorized into two types - type A and type B. Categorization has taken into consideration various factors namely catchment area, health seeking behavior, case load, location of other facilities like PHC/CHC/FRU/Hospitals in vicinity of the Sub-center.

2.1 REVIEW OF LITERATURE

As Maternal mortality is unacceptably high, About 830 women die from pregnancy- or childbirth-related complications around the world every day. That was estimated that in 2015, roughly 303 000 women died during and following pregnancy and childbirth. Almost of these deaths occurred in low-resource settings, and almost could have been prevented. Between 1990 and 2015, maternal mortality worldwide reduced by about 44 percent. Between 2016 and 2030, as part of the Sustainable Development Goals, target is to reduce the global maternal mortality ratio to less than 70 per 100 000 live births. As per the author, The high number of maternal deaths few areas of the world reflects inequities in access to healthcare services, and highlights the gap between rich and poor. Almost all maternal deaths (99percent) occur in developing countries. Almost one third occur in South Asia. India contributes to twenty percent of the global burden of absolute maternal deaths despite experiencing a sustained decline in maternal mortality in the last two decades (S. Kumar & E. Dansareue, 2014).

Women who ever die as result of complications during and following pregnancy and childbirth. Most of these complications develop during pregnancy and process of delivery and most are preventable or treatable. Each and every women need access to antenatal care in pregnancy, skilled care during childbirth, and care and support in the weeks after childbirth. Poor women in out-reach areas are the least likely to receive adequate health care. Factors that were preventing women from seeking and receiving care during pregnancy and childbirth are: poverty, distance, lack of information, inadequate services & cultural practices. To improve maternal health, hurdels that limit access to quality maternal health services must be identified and addressed at all levels of the healthcare system (WHO, factsheet).

Pregnancy related complications are the leading causes of maternal death and disability for women of reproductive age group. Most of the maternal deaths can be saved by strengthening the healthcare facilities (R.K.Singh & S. Patra, 2013). India is the second most populous country in the world and has fast changing socio-political-demographic patterns that have been drawing worldwide attention in recent years. About one quarter of

all pregnancy and delivery related maternal deaths worldwide occur in India. Reasons why woman die in pregnancy and child birth have many layers. Despite of direct, indirect, and co-incidental causes, there are also logistic causes that is failure in the health care system, lack of transport, lack of manpower and apathy towards patient care. (Sanjay Gole, 2015)

One of the important determinants in improving maternal health and reducing maternal morbidity, mortality and fetal deaths is access to quality health services for antenatal and natal care. A proper antenatal check-up provides necessary care to the mother and helps identify any pregnancy related complications. (Solanki et al, 2017)

In India, a Sub-Centre (SC) is first contact point between the government health care system and the rural community. As per the present population norms, one SC is meant to serve every 5000 population in plain areas and every 3000 population in hilly, tribal and backward areas. It is the lowest rung of a three-tier health care delivery system in the country. Keeping Auxillary Nurse Midwife (ANM) as the instrument, a SC provides interface with the community at the grass-root level, delivering all the primary health care services from maternal and child health care to treatment of minor ailments in outdoor set-up. But it seems that in spite of having adequate efforts, there still remain many loopholes in some parts of the delivery system, which has an impact on the overall performance and quality of health services, particularly in the rural area. (M.P.Roy et al, 2014)

Given that the provision of healthcare services is strongly related to improved population health, it is of top most importance to understand the many factors that affect both the utilization and provision of health care services. As per the author, These factors operate on both the demand and supply side. which can be explained in a multilevel framework described by previous studies. The framework identifies three levels of barriers: the community and household level, the health service delivery level, and the health sector policy and strategic management level. At the community and household level, the use of health services is limited by physical, financial, and social barriers, which are also known as demand side barriers. Income, distance to the health facility, and socioeconomic characteristics influence the use of healthcare by Indian households. Supply side barriers operate at the service delivery level. They are characteristics of the healthcare system that exist outside the control of potential health service users and obstruct uptake by

individuals, households, or the community. Lastly, both supply and demand side barriers can be addressed at the policy and strategic management level, where policy makers require reliable information to make informed decisions. (S. Kumar & E. Dansareue, 2014)

The state of Gujarat is one of the few states that has achieved more on the front of Millenium Development Goals in comparison to other states in the country. Gujarat has come long way in improving health of people of the state. Government is committed to make health system more available, accessible, accountable, equitable, transparent and cost effective. Furthermore, state is duty bound to compose all efforts for reaching the unreached and serve the underserved population.

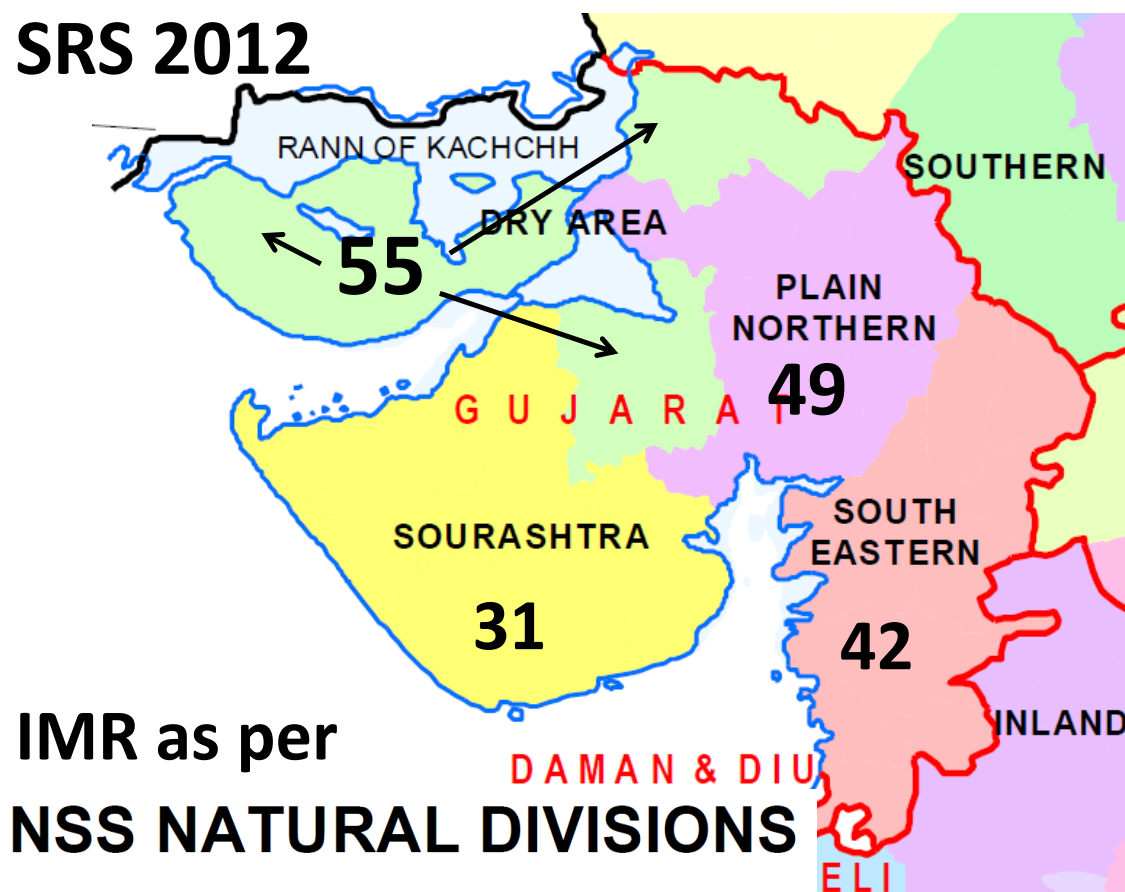
Various health indicators, in line with Millennium Development Goals (MDG 4 & 5), have shown impressive progress in last couple of years. Gujarat has not only sustained improvement but accelerated the speed of improvement. Three major indicators Infant Mortality Rate (IMR), Under Five Mortality Rate (U5MR) and Maternal Mortality Ratio (MMR) have shown decline in Gujarat. However, there is huge inequality between rural and urban area in these indicators. Table 2.1 describes rural urban differences in various health indicators.

Table-2.1 Comparison of different Indicators of Gujarat in rural and urban area. (HPT concept paper, Gujarat)

Sn	Indicator	Total	Urban	Rural
1	Under Five Mortality Rate (per 1000 live births)	48	32	56
2	Infant Mortality Rate (per 1000 live births)	38	24	45
3	Neo-natal Mortality Rate (per 1000 live births)	28	17	33
4	Early Neo-natal Mortality Rate (per 1000 live births)	21	15	24

Furthermore, apart from rural urban divide, health scenario is further complicated by regional variations. Figure 2.1 shows different infant mortality across all districts of Gujarat.

Figure 2.1 different Infant Mortality across all districts of Gujarat for selection of HPT



Based on the above findings, health department undertook mammoth task of identifying high priority areas, where concentrated efforts can be made for improving overall health.

Maternal Mortality Ratio, Gujarat over a period of time 160, 148, 122, 112 in respective year that is 2004-06, 2007-09, 2010-12, 2011-13 per 100000 live births. (SRS) that shows tremendous improvement over last decade. As Valsad is the tribal district of the state with having two high priority blocks namely Dharampur and Kaparada.

3.1 RATIONALE

There is a Number of previous study had identified several demand-side factors as important obstacles to health care utilization in developing countries. Even though, only a few have truly addressed supply-side barriers. However many studies had documented the shortages of drugs, equipment, physical infrastructure, finances, and human resources in the provision of health care. There is an evidence on how these supply-side factors affect service provision at publicly funded rural healthcare facilities in India was still very sparse (M.P.Roy et al, 2014). If taken into the consideration of rural India, Tribal India was also an important part that need more attention than general, and what were the supply-side factors affecting the maternal health care utilization in high priority blocks of the tribal District Valsad.

4.1 OPERATIONAL DEFINATION

Maternal Healthcare Utilization: here in study, maternal health care utilization taken in terms of the number of ANC registered, number of delivery conducted and number of PNC visited.

5.1STUDY HYPOTHESES

There is an association between supply side factors and maternal healthcare utilization at SC in high priority blocksof tribal district Valsad, Gujarat.

6.1 RESEARCH QUESTION

What are the Supply-side factors which affect the maternal health care utilization in terms of number of ANC registered, number of delivery conducted and number of PNC visitedat Sub-Centers of high priority blocks of tribal DistrictValsad, Gujarat?

7.1 OBJECTIVES

1. To find out supply side factors affecting maternal health care utilization in reference of number of ANC registered, number of delivery conducted and number of PNC visited at SC of high priority block of tribal district Valsad, Gujarat.
2. To find out percent of availability of the characteristics of SC in high priority blocks, Valsad.
3. To analyze the association of supply side factors and utilization of maternal health in reference of number of ANC registered, number of delivery conducted and number of PNC visited at SC of high priority block of tribal district Valsad, Gujarat.

8.1 ETHICAL CONSIDERATION

Permission for doing this study work was taken from the CDHO sir (Chief District Health Officer) and informed consent taken from all the participant. Confidentiality of the data was maintained.

9.1 MATERIAL AND METHODS

9.1.1 STUDY DESIGN: A descriptive, Cross-Sectional study design had been chosen as it described the status and characteristics of the current situation.

9.1.2 STUDY AREA: As per 2011 Census, Valsad had population of 1,705,678. And 62.74 percent of population lives in rural areas and 37.26 percent lives in urban regions of district.

The study was conducted in subcenters of high priority blocks of Valsad Districts of Gujarat. Valsad districts having total six blocks namely Valsad, Pardi, Vapi, Umargam, Dharampur and Kaparada in which two blocks were high priority blocks that were Dharampur and Kaparada. Dharampur and Kaparada both had 64 and 86 sub-centers respectively that was taken up for study.

9.1.3 DURATION OF STUDY: The study is conducted over a period of three months started from 8th Feb 2017 to 7th May 2017.

9.1.4 SAMPLE SIZE: As this study was facility survey, sample size was taken that was 20 percent of total health facilities in a survey. There were 150 Sub-centers in mentioned high priority blocks. 20 percent of 150 was 30. Total 30 Sub-centers taken up for the study.

9.1.5 SAMPLING TECHNIQUE: Simple random sampling used for selection of sample size 30. That was done by listing all the sub-center with unique-Id code and from that unique-Id code simple random sampling done using random number generator on google.

9.1.6 DATA COLLECTION PROCEDURE: Data collection procedure was done through face to face interview of FHW/ANM at Sub-Center and use of secondary data from facility register to know the work done in maternal health care utilization and observation also made at so many points like Hub-cutter present or not SC building condition, attached labour room present at SC or not, etc.

9.1.7 DATA COLLECTION INSTRUMENT: Questionnaire of DLHS-3 Facility Survey under reproductive and Child Health Project for Sub center modified as per

requirements. DLHS-3 Facility survey questionnaire translated in Local language that is Gujarati and in section 7 from 7.6 onwards questions are not taken for study. Interview only done with ANM/FHW so, training related questions of MHW were not asked and study was focused on maternal health care utilization that include number of ANC registered, number of delivery conducted by ANM/FHW and Number of PNC visit was done. Therefore in DLHS-3 facility survey instruments for SC modified accordingly.

9.1.8 DATA ANALYSIS PROCEDURE: Data was analyzed by using SPSS software version 20 by applying Univariate and bivariate analysis. .Univariate analysis was carried out to know distribution of characteristics of Sub Centers. Bivariate (chi-square) analysis was done to know the significant association between dependent and independent variables. This study used information on 30Sub-Centers to examine the association between number of supply-side factors (health personnel, infrastructure, medical equipment, drug availability, and so on) and the utilization of maternal health care services.

9.1.8.1 Dependent variables-

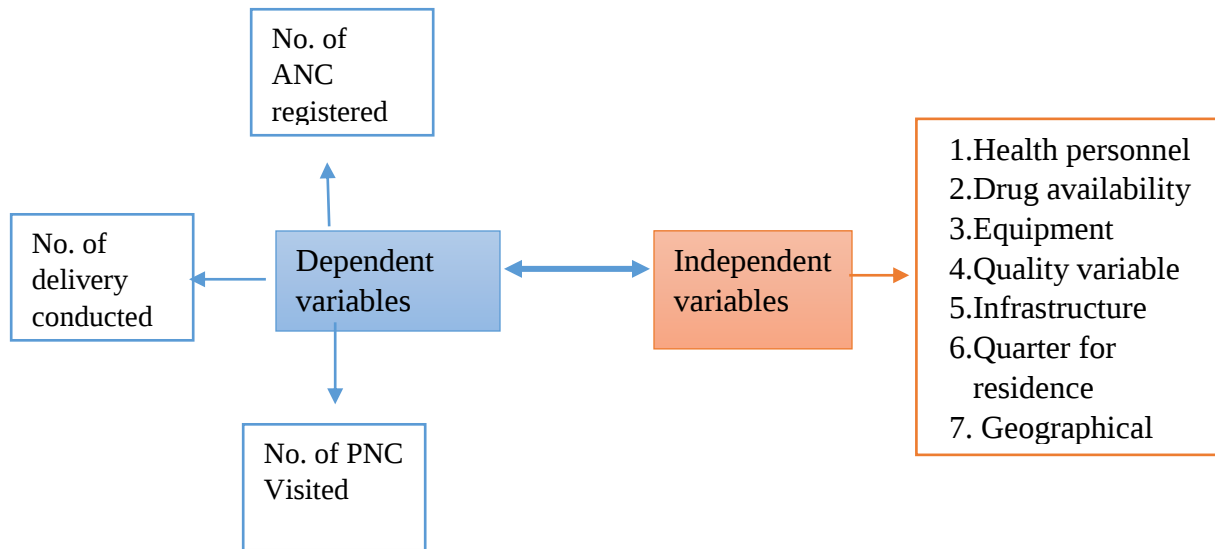
In this study examined Maternal care service utilization at sub center using three dependent variables– namely, the number of antenatal care registrations, the number of deliveries conducted, and the number of postnatal care visited in each facility taken in the study during the month preceding the survey that was taken March-2017.

9.1.8.2 Independent variables-

This study included these supply-side factors that were available in the DLHS-3 dataset. Supply side factors such as human resource, drugs availability, physical infrastructure, in-service training and equipment. These factors can be divided into seven categories: (a) health personnel, (b) drugs availability, (c) equipment, (d) infrastructure, (e) quality-related variables, (f) quarter for residence and (g) geographical.

10.1 RESULT & DISCUSSION:

Figure 10.1 Characteristics of dependent and independent variable



10.1.1 Supply side factors for the study were selected from the factsheet of DLHS-3(facility survey) and previous studies done using DLHS-3 data in different state, which were

1. Health personnel: ANM/FHW, MHW, additional ANM and others
2. Drug Availability: Tab. IFA, Vitamin-A solution and Tab. Misoprostol
3. Equipment: instrument sterilizer, AD syringe, hub-cutter, BP Instrument, Weighing machine, examination table, labor table, heamoglobinometer, foetoscope and SIMS speculam
4. Quality variable: Integrated skills development training (RCH), Immunization Training and SBA training,
5. Infrastructure: designated government building, SC having labor room, Water supply, electricity supply, toilet facility and mobile facility,
6. Quarters for residence of ANM/FHW: ANM/FHW quarter attached with SC and where ANM/FHW staying
7. Distance of ANM/FHW house from SC.

10.1.2 To find out the distribution of the supply side factors among SC in study Univariate analysis was done using frequency and result was described as below:

Table-10.1 Distribution of Sub Center characteristics (n=30, 4 non-response)

Sr. No.	Independent Variable		Response	N	Percent		
1	Healthpersonnel	ANM/FHW	Yes	25	96.2		
			No	1	3.8		
		MHW	Yes	18	69.2		
			No	8	30.8		
		Additional ANM	Yes	0	0		
			No	26	100		
		Others	Yes	26	100		
			No	0	0		
2	Drug Availability	IFA Tablets	Yes	26	100		
			No	0	0		
		Vitamin-A Solution	Yes	26	100		
			No	0	0		
		Tab. Misoprostol	Yes	25	96.2		
			No	1	3.8		
		3.	Equipment	Instrument Sterilizer	Yes	4	15.4
					No	22	84.6
AD Syringe	Yes			26	100		
	No			0	0		
Hub Cutter	Yes			17	65.4		
	No			9	34.6		
Blood pressure Instrument	Yes			26	100		
	No			0	0		
Weighing machine (Adult)	Yes			26	100		
	No			0	0		
Examination Table	Yes			24	92.3		
	No			2	7.7		
Labor Table	Yes	1	3.8				
	No	25	96.2				
Heamoglobinometer	Yes	17	65.4				
	No	9	34.6				

4.	Quality variables		No	9	34.6
		Foetoscope	Yes	20	76.9
			No	6	23.1
		Sims Spaculam	Yes	15	57.7
			No	11	42.3
		Integrated skills development training	Yes	14	53.8
			No	12	46.2
		Immunization Training	Yes	19	73.1
			No	7	26.9
		Skilled birth Attendant training	Yes	18	69.2
5	Infrastructure		No	8	30.8
		Designated Government Building	Yes	15	57.7
			No	11	42.3
		SC having Labor room	Yes	3	11.5
			No	23	88.5
		Water supply	Yes	10	38.5
			No	16	61.5
		Electricity	Regular supply	7	26.9
			Irregular supply	10	38.5
			No connection	9	34.6
6	Quarter for residence		Yes	14	53.8
		Toilet	No	12	46.2
		Mobile facility	Yes	26	100
			No	0	0
		ANM quarter attached with SC	Yes	4	15.4
			No	22	84.6
		ANM Staying	Within the Village of SC	3	11.5
			Outside the Village of SC	23	88.5
7	Other variable	ANM/FHW's Residence from Sub-center	< 5 km	3	11.5
			5-20 km	13	50
			21-40 km	5	19.2
			>40 km	5	19.2

Table-10.1 represent distribution of the different characteristics of sub-center. Characteristics divided in to seven characteristics namely 1) Health personnel that was sub divided into four characteristics that were ANM/FHW, MHW, additional FHW/ANM and other staff, 2) Drug availability was sub divided into Tab. IFA, Vitamin-A Solution and Tab. Misoprostol, 3) Equipment was having sub division like instrument sterilizer, AD syringe, hub-cutter, BP Instrument, Weighing machine, examination table, labor table, heamoglobinometer, foetoscope and SIMS speculam, 4) Quality variable included Integrated skills development training (RCH), Immunization Training and SBA training, 5) Infrastructure included variables like designated government building, SC having labor room, Water supply, electricity supply, toilet facility and mobile facility, 6) Quarters for residence of ANM/FHW included ANM/FHW quarter attached with SC and where ANM/FHW staying and lastly 7) Distance of ANM/FHW house from SC.

10.1.3 To analyze the association between the supply-side factors and maternal healthcare utilization bivariate analysis was done using chi square test between one dependent variable and all independent variable. As in study, there were three dependent variables taken that were number of ANC registration, number of delivery conducted and number of PNC visited. Discussion of association between both variable that was each dependent variable and independent variable was done individually in below paragraphs.

In below table-10.2, shown association between no. of ANC registered and characteristics of the SC. As mentioned in above table-10.2 all characteristics were not taken up for the no. of ANC registered, because of characteristics like health personnel that were additional ANM/FHW and others, drug availabilities like Tab. IFA and Vitamin-A solution, equipment that were AD syringe, BP instrument, weighing machine (adult) and in infrastructure mobile facility these were characteristics had only one answer given by all respondent that was the reason that chi-square test was not performed on them. So, mentioned characteristics or variables were excluded from performing a chi-square test.

After bivariate analysis to know the association between the variable only one shown significance that was electricity supply to the SC, and result came out that irregular electricity supply and no electricity supply to SC had more number of ANC registration that was 90 percent, 89 percent and 29 percent respectively. Besides this other variable

show that presence of ANM/FHW at SC didn't improve the number of ANC registration. And same result came out with presence of MHW. Characteristic like drug availability had also shown that type of result that was availability didn't improve number of ANC registration. In equipment, Instrument sterilizer shown that presence of instrument sterilizer in SC shown number of ANC registration that was five or more. Other variables in equipment shown similar result that was presence of the equipment like hub cutter, examination table, heamoglobinometer, foetoscope and SIMS speculam not improve number of ANC registration five or more.

Table-10.2 Association between No. of ANC registered and characteristics of SC

Sr. No.	Characteristics		% of ANC Registered (5 or more)	Total
1	Health personnel	ANM/FHW	Yes	72 (18)
			No	100 (1)
		MHW	Yes	72.2 (13)
			No	75 (6)
2	Drug Availability	Tab. Misoprostol	Yes	72 (18)
			No	100 (1)
3.	Equipment	Instrument Sterilizer	Yes	100 (4)
			No	68.2 (15)
		Hub Cutter	Yes	64.7 (11)
			No	88.9 (8)
		Examination Table	Yes	70 (17)
			No	100 (2)
		Labour Table	Yes	0 (0)
			No	76 (19)
		Heamoglobinometer	Yes	64.7(11)
			No	88.9 (8)
		Foetoscope	Yes	70 (14)
			No	83.2 (5)
		Sims Spaculam	Yes	66.7 (10)
			No	81.8 (9)
4.	Quality variables	Integrated skills development training	Yes	64.3 (9)
			No	83.3 (10)

		Immunization Training	Yes	68.4 (13)	19
			No	85.7 (6)	7
		Skilled birth Attendant training	Yes	66.7 (12)	18
			No	87.5 (7)	8
5	Infrastructure	Designated Government Building	Yes	73.3 (11)	15
			No	72.7 (8)	11
		SC having Labour room	Yes	33.3 (1)	3
			No	78.3 (18)	23
		Water supply	Yes	60 (6)	10
			No	81.2 (13)	16
		Electricity*	Regular supply	28.6 (2)	7
			Irregular supply	90 (9)	10
			No connection	88.9 (8)	9
		Toilet	Yes	64.3 (9)	14
	No	83.3 (10)	12		
6	Quarter for residence	ANM quarter attached with SC	Yes	50 (2)	4
			No	77.3 (17)	22
		ANM Staying	Within the Village of SC	33.3 (1)	3
			Outside the Village of SC	78.3 (18)	23
7	Geographical	ANM/FHW's Residence from Sub-center	< 5 km	33.3 (1)	3
			5-20 km	69.2 (9)	13
			21-40 km	100 (5)	5
			>40 km	80 (4)	5

(* = $p < 0.05$)

Quality variables like integrated skill development training, immunization training and SBA training all didn't improve number of ANC registration. Likewise, in infrastructure all variables/characteristics shown same result.

In below, Table-10.3 bivariate analysis was carried out between Independent variables and No. of delivery conducted (one or two) and from the analysis it was observed that independent variable like instrument sterilizer, hub cutter, heamoglobinometer, Integrated skill development training, and SBA training were variable shown association between

number of delivery conducted and presence/absence of mentioned variable had chi-square value $p < 0.05$. All other factors shown no association.

Table-10.3 Association between SC characteristics and delivery conducted by ANM/FHW (n=5).

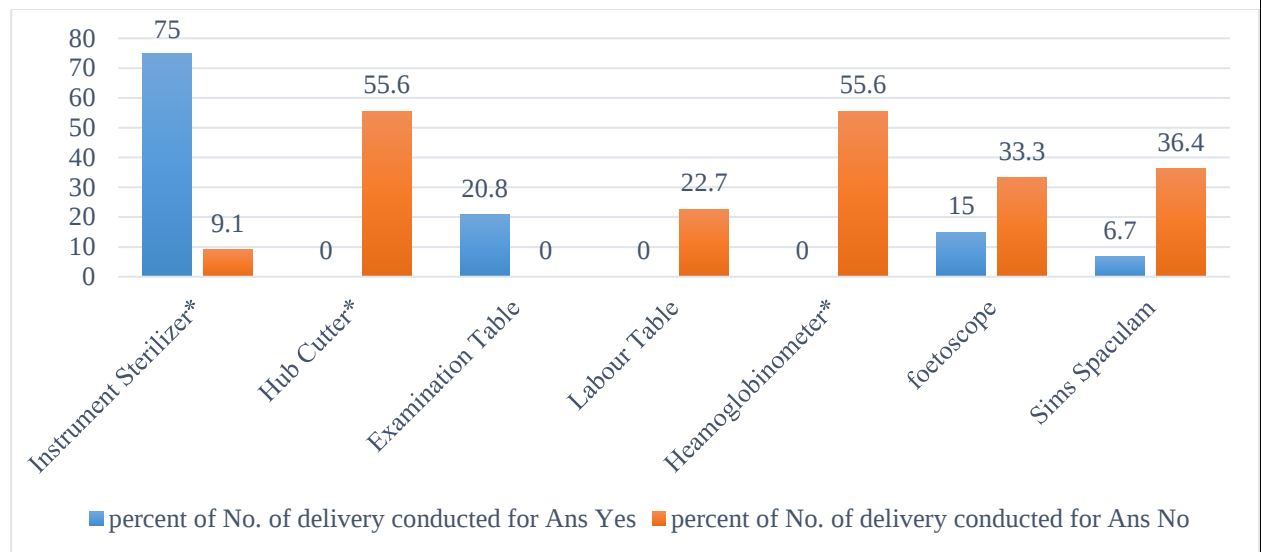
Sr. No.	Characteristics		% of delivery conducted by ANM/FHW (1 or 2)	Total
1	Health personnel	ANM/FHW	Yes	20 (5)
			No	0 (0)
		MHW	Yes	22.2 (4)
			No	12.5 (1)
2	Drug Availability	Tab. Misoprostol	Yes	20 (5)
			No	0 (0)
3.	Equipment	Instrument Sterilizer*	Yes	75 (3)
			No	9.1 (2)
		Hub Cutter*	Yes	0 (0)
			No	55.6 (9)
		Examination Table	Yes	20.8 (5)
			No	0 (0)
		Labour Table	Yes	0 (0)
			No	22.7 (5)
		Heamoglobinometer*	Yes	0 (0)
			No	55.6 (5)
		Foetoscope	Yes	15 (3)
			No	33.3 (2)
		Sims Spaculam	Yes	6.7 (1)
			No	36.4 (4)
4.	Quality variables	Integrated skills development training*	Yes	0 (0)
			No	26.3 (5)
		Immunization Training	Yes	10.5 (2)
			No	42.9 (3)
		Skilled birth Attendant training*	Yes	5.6 (1)
			No	50 (4)

5	Infrastructure	Designated Government Building	Yes	13.3 (2)	15
			No	27.3 (3)	11
		SC having Labour room	Yes	0 (0)	3
			No	21.7 (5)	23
		Water supply	Yes	20 (2)	10
			No	18.8 (3)	16
		Electricity	Regular supply	0 (0)	7
			Irregular supply	20 (3)	10
			No connection	22.2 (2)	9
6	Quarter for residence	ANM quarter attached with SC	Yes	0 (0)	4
			No	22.7 (5)	22
		ANM Staying	Within the Village of SC	0 (0)	3
			Outside the Village of SC	21.7 (5)	23
7	Geographical	ANM/FHW's Residence from Sub-center	< 5 km	0 (0)	3
			5-20 km	23.1 (3)	13
			21-40 km	40 (2)	5
			>40 km	0 (0)	5
8	ANC registered	No. of ANC Registered	< 5	0 (0)	7
			5 and above	26.3 (5)	19

(* = $p < 0.05$)

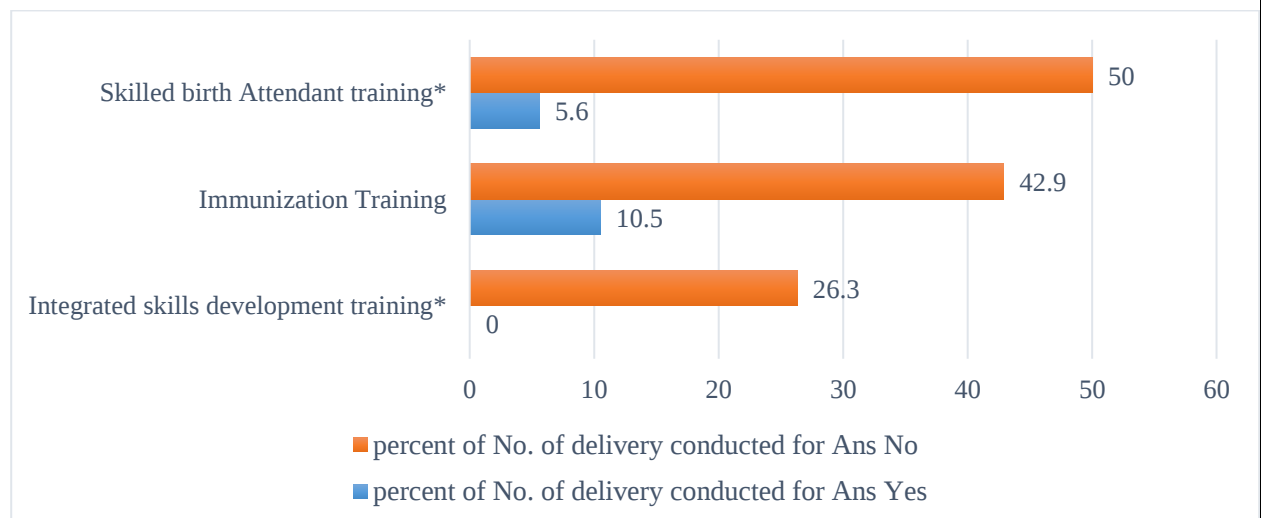
Association between number of delivery conducted taken as one or two delivery conducted and all other independent variable that are taken up for the number of ANC registered. Two characteristics like Equipment and quality variable shown that there was an association that also shown in below Figure-10.2 and Figure-10.3, respectively.

Figure-10.2 Association between No. of Delivery Conducted and equipment variables (n=5)



(*p<0.05)

Figure-10.3 Association between No. of Delivery Conducted and Quality variables (n=5)



(*p<0.05)

In last table-10.4 shown the association between number of PNC visit and Independent variable taken up. For analyzing association between number of PNC registered, dependent variable like number of delivery conducted and number of ANC registered also taken into

consideration as independent variable that means association between these two variables with the number of PNC registered also shown.

Table-10.4 Association between SC characteristics and number of PNC visit (n=20).

Sr. No.	Characteristics			% of PNC visited (4 or more)	Total
1	Health personnel	ANM/FHW	Yes	76 (19)	25
			No	100 (1)	1
		MHW	Yes	72.2 (13)	18
			No	87.5 (7)	8
2	Drug Availability	Tab. Misoprostol	Yes	76 (19)	25
			No	100 (1)	1
3.	Equipment	Instrument Sterilizer	Yes	100 (4)	4
			No	72.7 (16)	22
		Heamoglobinometer	Yes	76.5 (13)	17
			No	77.8 (7)	9
		Sims Spaculam	Yes	73.3 (11)	15
			No	81.8 (9)	11
4.	Quality variables	Integrated skills development training	Yes	71.4 (10)	14
			No	83.3 (10)	12
		Immunization Training	Yes	78.9 (15)	19
			No	71.4 (5)	7
		Skilled birth Attendant training	Yes	72.2 (13)	18
			No	87.5 (7)	8
5	Infrastructure	Designated Government Building	Yes	73.3 (11)	15
			No	81.8 (9)	11
		Water supply	Yes	87.5 (14)	16
			No	60 (6)	10
		Electricity	Regular supply	57.1 (4)	7
			Irregular supply	80 (8)	10
			No connection	88.9 (9)	9
		Toilet	Yes		
			No		
6	Quarter for residence	ANM quarter attached with SC	Yes	75 (3)	4
			No	77.3 (17)	22

		ANM Staying	Within the Village of SC	66.7 (2)	3
			Outside the Village of SC	78.3 (18)	23
7	Other variable	ANM/FHW's Residence from Sub-center	< 5 km	66.7 (2)	3
			5-20 km	61.5 (8)	13
			21-40 km	100 (5)	5
			>40 km	100 (5)	5
8	No. of ANC Registered by ANM/FHW*		<5	42.9 (3)	7
			5 and more	89.5 (17)	19
9	No. delivery conducted by ANM/FHW		Zero	71.4 (15)	21
			1 or 2	100 (5)	5

(* = p<0.05)

11.1 CONCLUSION

Supply side factors were not acting as barriers or hurdles in maternal healthcare utilization except a few that was instrument sterilizer. This result shows that to establish this fact further study needs to be carried out because the sample size of study may affect the overall result. Supply side factors that were considered in this study, it can be said that only these factors were not taken to know the utilization of maternal health, there may be chances of other factors that may influence the maternal healthcare utilization and to establish this fact further study needed.

12.1 APPENDIX

12.1.1 Data collection Tool: DLHS-3 Questionnaire for facility survey (Sub Center) Click on this hyperlink for detail: [8 SUB CENTRE Questionnaire.pdf](#)

12.1.2 Sample Selection table:

Table-12.1.1 Line-listing of all SC of Kaparada and Dharampur block with showing selection of sample (N=30)

Line Listing of sub-centers of Kaparada & Dharampur					
Unique Id	subcenters	selected number by using random number generator	PHCs	unique id for PHC	block
1	કરચોડ		દહીખેડ	1	Kaparada
2	વારોલીજંગલ	22			
3	દહીખેડ	21			
4	બુરવડ				
5	ફતેપુર				
6	પેઢારદેવી				
7	નિલોશી		લવકર	2	
8	નારવડ				
9	ચાવશાલા				
10	ટોકરપાડા				
11	લવકર				
12	આંબાજંગલ				
13	કરજુન	x			
14	ઘોટણ	4			
15	દીક્ષલ	5			
16	વરવટ	x			
17	અરણાઈ		દાબખલ	3	

18	ઓઝરડા	23			
19	નાંદગાંવ				
20	માંડવા	24			
21	મેણધા				
22	વેરીભવાડા				
23	દાબખલ	6			
24	ચાંદવેગણ (ચાંદગુન)				
25	કપરાડા-૧				
26	માતુનીયા				
27	કપરાડા-૨				
28	મોટાપોંઢા-૧				
29	મોટાપોંઢા-૨				
30	મોટાપોંઢા-૩				
31	અંભેટી-૧	3			
32	અંભેટી-૨	2			
33	કાકડકોપર	1			
34	ઓઝર				
35	વારણા				
36	ભંડારકચ્છ				
37	કોઠાર				
38	વાજવટ				
39	ચેપા	7			
40	લીખવડ				
			મોટાપોંઢા	4	
			રોહિયાળજંગલ	5	

41	સુલિયા	8			
42	મોટીપલસાણ				
43	રોહિયાળજંગલ				
44	તેરીચીખલી				
45	શાહુડા	9			
46	સુથારપાડા				
47	વાવર				
48	માલધર	10	સુથારપાડા	6	
49	હૂંડા				
50	બારપુડા				
51	માની	25			
52	નાનાપોંઢા				
53	જોગવેલ	26			
54	પાનસ	27			
55	ખુટલી				
56	આમધા				
57	મોટીવહિયાળ				
58	વડખંભા				
59	બાલચોંડી	28			
60	બાબરખડક				
61	ઘોઘડકુવા				
62	સુખાલા				
63	વારોલીતલાટ				
64	કાજલી				
65	જીરવલ				
66	મનાલા	29			
67	નડીમધની				

68	રોહિયાળતલાટ				
69	ઘાણવેરી				
70	સિલધા				
71	બુરલા				
72	અસ્ટોલ				
73	વાડીજંગલ				
74	તિસ્કરીજંગલ				
75	ખડકવાડ				
76	મેઘવાડ				
77	નગર				
78	મધુબન				
79	ઘાડવી				
80	ટુકવાડા				
81	ભુરવડ				
82	આસલોણા	30			
83	ગીરનારા				
84	પીપલસેત	11			
85	વડોલી				
86	વિરક્ષેત્ર				
87	સીદુમ્બર - ૧				
88	સીદુમ્બર - ૨				
89	બીલપુડી - ૧				
90	બીલપુડી - ૨				
91	બીલપુડી - ૩				
92	આવધા	15			
93	ઉગતા				
94	કેળવણી				
95	પાનવા				

96	માલનપાડા			
97	ઓઝરપાડા			
98	મોહનગઢ			
99	નાનીઢોલડુંગરી	16		
100	રાજપુરીતલાટ	12		
101	આસુરા			
102	કરંજવેરી	17		
103	ભાંભા		નાનીઢોલડુંગરી	12
104	બામટી			
105	ખારવેલ			
106	બારસોલ			
107	મરઘમાળ			
108	તુતરખેડ			
109	ગુંદીયા			
110	પીપરોળ			
111	ભાનવળ	18		
112	પંગારબારી	14		
113	પીડવળ			
114	ખડકી			
115	નાનીકોસબાડી			
116	ધામણી	19		
117	તામછડી			
118	ભેંસદરા			
119	ફૂલવાડી			
120	ઝરીયા	13		
121	માકડબન			
122	કાકડકુવા			
123	બારોલીયા		કાકડકુવા	15

124	કુરગામ			
125	તીસ્કરીતલાટ - ૧			
126	તીસ્કરીતલાટ - ૨			
127	તુંબી			
128	નાનીવહીયાળ			
129	હનમતમાળ			
130	રાજપુરીજંગલ			
131	જાગીરી			
132	નડગધરી			
133	બોપી			
134	ખાંડા			
135	આંબાતલાટ-૧			
136	આંબાતલાટ-૨			
137	કાંગવી			
138	લુહેરી			
139	જામલીયા			
140	મુરદડ			
141	આંબોસી			
142	બિલ્ધા	20		
143	ગડી			
144	મામાભાયા			
145	સાડળવેરા			
146	પેણધા			
147	હેદરી			
148	મોહનાકાવયાળી			
149	મોહપાડા			
150	મોટીકોરવડ			

12.1.3 Raw Data: Herewith hyperlink showing Raw data fed in SPSS version 20.
[valsaddistrict.sav](#)

12.1.4 Data Analysis output of SPSS: Hyperlink here shown data analysis output of SPSS version 20.

[Output final.spv](#)

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