Major Activities of the Centre during January– June, 2017

1. Dr. Jyoti S. Hallad, J. A. Golandaj, Arinkar, Krishnamurthy J, B. M. Ramesh, R. V. Deshpande and B. I. Pundappanavar, published a paper "Household Expenditure on Maternal Care Services in Rural North Karnataka" in PRC Compendium.
2. Dr. Shriprasad H. and M. S. Kampli, published a paper "An Overview of the Status of Determinant Inputs in SNCUs under Public Health System in North Karnataka" in PRC Compendium.
3. Mr. R. V. Deshpande and H. R. Channakki, published a paper "Status of AYUSH in Co-located Public Health Facilities in Karnataka" in PRC Compendium
4. Dr.Rajarama K.E.T. and C. N. Noolvi, published a paper "Role of Living Conditions and Hygienic Practices on Childhood Diarrhoea in Rural Karnataka" in PRC Compendium.
5. Dr.Jyoti S. Hallad, Director, delivered a lecture on Health and Gender in-equality in the workshop on "Be Bold for Change; Moving towards Gender in-equality" organized by Karnataka University, Dharwad on 8th March, 2017.
6. Dr.Jyoti S. Hallad, Director and Dr.Shriprasad H., Jt. Director attended the Annual Work Plan (AWP) meeting held on 22nd and 23rd March, 2017 at Guwahati, Assam organized by Ministry of Health & Family Welfare, Govt. of India.
7. The central conducted *Longitudinal ageing Study in India* (LASI, Main Wave-I) Project for Karnataka and Goa States, funded by MoHFW/IIPS, Mumbai.
8. Dr. Shriprasad and Dr. Rajarama KET, published an article 'Sexual Morbidity and treatment seeking behaviour among adolescents and young clients of female sex worker in emerging health issues across the life stages'. Ed by Jamala Prakash and Komal M, Aayu Publications, New Delhi.

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Intention of Infant Feeding Practices Among HIV Positive Women in Odisha: A Cross Sectional Study

Ananta Basudev Sahu[1] and Nagarajan[2]

Abstract : *It is estimated that 27 million deliveries take place in India annually, and 97,200 of these occur in HIV positive pregnant women resulting in a yearly cohort of 21,000 HIV positive children (NACO, 2012). A cross sectional study was designed to explore the intention of infant feeding options among HIV positive mothers in Odisha. The study revealed that 51 per cent and 36 per cent of the respondents intended to Exclusive Breast Feeding (EBF) and Exclusive Replacement feeding (ERF), respectively. Mixed feeding intention was very low at 9 per cent. EBF and ERF are recommended feeding practices. Educational status of the respondent, family income, living in a joint family and disclosure of HIV status to spouses and in-laws were associated with recommended feeding practices ($p < 0.05$) in the study settings.*

Background

Epidemiological evidence indicates that sexual contact continues to be the major mode of spread of HIV transmission in developing countries, leading to high prevalence of HIV infection in women of child-bearing age (Shmid et al., 2004). World-wide, one in seven of those who become newly infected with HIV are children under the age of 15 years (UNAIDS, 2008). It is estimated that 2.3 million of the 33 million (30.3-36.1) people currently living with HIV worldwide are children under the age of 15 years. The Prevention of Parent to Child Transmission (PPTCT) programme in India reveals that 27 million pregnancies occur annually in India. Of those, 34,675 pregnant women (0.13 per cent) were found HIV positive annually (NACO, 2012). As per the 2012 HIV estimation for India, children less than 15 years account for 7 per cent (1.45 lakh) of all infections and 14,500 children are newly infected annually (NACO, 2012). The HIV can be transmitted to infants during pregnancy, especially in the last trimester, during child-birth and breast feeding. Without any intervention about two-thirds of transmissions occur during pregnancy or at delivery, and about one-third through unsafe breast feeding practices (De Cock et al., 2000). Infant feeding practices have significant effects on both mothers and children. Proper infant feeding, starting from the time of birth, is important for the physical and mental development of children. Breast feeding improves the nutritional status of young children and reduces morbidity and mortality. Breast milk not only provides important nutrients but also protects them child from infection. The timing and type of supplementary foods introduced in an infant's diet also have significant effects on the child's nutritional status. The Government of India recommends that initiation of breast feeding should begin immediately after childbirth, preferably within one hour (MoWCD, 2006).

Literature Review

Several studies suggested that mother to child transmission of HIV through breast-feeding depends on the pattern of breast-feeding (exclusive or mixed feeding) and not simply on all breast-feeding, (Miller M et al., 2002). HIV transmission during the breast-feeding period is a significant source of infection

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that accounts for one-third of all transmissions that occurs in children from their mothers in developing countries (WHO, 2003). Despite recent advances in the use of antiretroviral, there is a critical need to make infant feeding safer as breast feeding is a major factor in HIV transmission (Nicoll, Newell & Pecham, 2000). A cross sectional study of north-west Ethopia suggests that the exclusive breast feeding and the exclusive replacement feeding are recommended feeding practices and mixed feeding is not recommended as a feeding practice (Muluye et al., 2012). In a small cohort of Indian women who chose not to exclusively breast feed, overall mother to child transmission (MTCT) probability is 8 per cent during one year follow-up. Among the women who exclusively formula fed their infants, the transmission was 3 per cent (Gupta et al. 2007). According to WHO, "When replacement feeding is acceptable, feasible, affordable, sustainable and safe (AFASS), avoidance of all breast-feeding by HIV-positive mothers is recommended. Otherwise, exclusive breast-feeding is recommended during the first months of life. To minimize HIV transmission risk, breast-feeding should be discontinued as soon as feasible, taking into account local circumstances, the individual woman's situation and the risks of replacement feeding." (WHO, 2001. p.). Exclusive breast-feeding is recommended for all infants for first six months of their life. After that complementary foods should be introduced for infants. Exclusive replacement feeding should be done only when AFASS criteria are fulfilled (NACO, 2011 and NACO, 2013).

The prime objective of this study is to explore the intention of infant feeding options and associated factors determining the feeding practices among HIV positive women in selected health facilities of Odisha.

Study Design

A cross sectional study was designed to meet the objective of this study. The study was carried out in high HIV prevalence 'A' (Ganjam district), medium prevalence 'B' (Khordha district) and low prevalence "C" (Cuttack district) category districts of Odisha as per the National AIDS Control Programme Phase-III categorization. For the study, three centres were selected purposively in each selected district where Prevention of Parent to Child Transmission (PPTCT) centres integrated with [Antiretroviral Therapy (ART) centre and have a number volume of ANC (Antenatal Care) clients. The selected centres are serving for the community as the centres of excellence for providing health care and HIV care in the particular districts. The study was based on purposive selection of 152 HIV positive mothers from the three selected health facilities.

Sample design: As for the sampling design, a random sample of women living with HIV/AIDS is difficult to obtain as enumeration of the entire population of HIV infected women is not possible. Therefore, this study was based on a purposive selection of the respondents and restricted to only those HIV positive mothers who were identified as HIV positive during ANC and delivery care and came for post-test counselling and follow-up stage. In all 290 HIV positive deliveries took place during 2011-13. Of these 290 deliveries, 152 HIV positive mothers who came for ANC check-up and post-natal follow-up visit to the hospitals were included as sample. All of them were interviewed with the help of standard structured questionnaire method. The required information was collected through face to face interview. HIV infected women/positive mothers who were willing and consented for participation were included in the study. HIV positive mothers who refused to participate after explanation about the purpose of the study were not interviewed. The fieldwork for the study was carried out during the period from November, 2012 to September, 2013.

Ethical consideration and informed consent

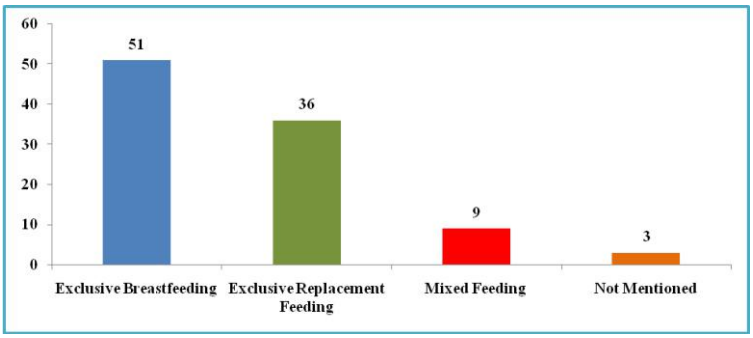
Ethical clearance and approval was taken from Ethical Review Committee of the Gokhale Institute of Politics and Economic (GIPE), Pune and Data Analysis and Dissemination Unit of National AIDS Control Organization. This study did not cost additional expenses on the study subjects. Information which was communicated with individual subjects was kept private and maintained confidential.

Results

Infant feeding practices of HIV positive mothers is the prime factor which contributes to improvement of health of children. During HIV counselling, infant feeding methods were elaborated, i.e., exclusive breast feeding, exclusive replacement feeding and mixed feeding. As per the national guidelines, exclusive breast feeding is recommended for the first six months of age and exclusive replacement feeding is recommended when AFASS criteria are fulfilled. Mixed feeding is not recommended at all as a feeding practice. In this study, HIV positive women were asked about their intention for feeding practices and the same is illustrated in Figure 1.

Of the total HIV positive women, 51 per cent intended for exclusive breast-feeding, 36 per cent intended for replacement/formula feeding and 9 per cent chose breast-feeding with some solid and semi-solid foods and formula feeding along with breast-feeding (mixed feeding). More awareness on the appropriate feeding practices should be created through awareness campaign, advertisement on mass media, training and sensitization programme to curb the situation.

Figure 1: Intention of infant feeding practices of HIV positive women (N=152)



Intention of exclusive breast-feeding and formula/replacement feeding

To know about it one has to understand the background characteristics of HIV positive women who intended breast-feeding and formula/replacement feeding, a bi-variate analysis was done (Tables 1 and 2). Table 1 illustrates the intention of breast-feeding practices of HIV positive women with their background characteristics. It is observed that the higher proportion of HIV positive women who reside in rural areas intended to breast-fed their children in comparison to their urban counterparts. It was found that increase in age and income of the family was adversely related to the intention of breast-feeding. Association of feeding practices with monthly family income is statistically significant. This, looking at the other background characteristics, it is found that HIV positive women who lived in a joint family were more prone to practice breast feeding with the association being statistically significant.

The HIV positive women who did not disclose their HIV positive status to their husbands or in-laws were less likely to opt for breast feeding.

Table 1. Infant feeding intentions (willing to exclusive breast feeding) of HIV positive women by background characteristics (N=152)

Background characteristics	Willing to breast feed	
Age	**Yes**	**No**
24 years & below	54.2	45.2
25 to 35 years	36.8	63.2
Place of residence		
Rural	59.2	40.8
Urban	39.7	60.3
Education		
Illiterate	45.5	54.5
Primary and upper primary	62.4	37.6
Secondary and above	42.4	57.6
Family type *		
Nuclear	45.3	54.7
Joint	61.6	38.4
Occupation of the respondent		
Housewife	64.6	35.4
Wage labourer	53.4	46.6
Others	42.8	57.2
Income of the family **		
Below Rs. 2000	69.4	30.6
Rs. 2000 to 5000	54.8	45.2
Above Rs. 5000	36.3	63.7
Received infant feeding counseling		
Yes	61.4	39.6
No	38.2	61.8
Received ARV/Sd NVP		
Yes	34.5	65.5
No	66.4	33.6
HIV Test report disclosed to the husbands or in-laws *		
Yes	45.6	54.4
No	70.2	29.8
Total	51.6	48.3

*N=78, Chi-square level of significance. *10%, ** 5% and ***1%.*

Table 2. Infant feeding intentions (willing to formula/replacement feeding) of HIV positive women by background characteristics (N= 152)

Background characteristics	Willing to formula feed	
Age	**Yes**	**No**
24 years & below	24.6	75.4
25 to 35 years	38.3	61.7
Place of residence**		
Rural	40.1	59.9
Urban	66.4	33.6
Education*		
Illiterate	32.4	67.6
Primary and upper primary	45.3	54.7
Secondary and above	51.2	48.8
Family type		
Nuclear	40.4	59.6
Joint	33.2	66.8
Occupation of the respondent		
Housewife	33.2	66.8
Wage labourer	51.3	48.7
Others	31.5	68.5
Income of the family***		
Below Rs. 2000	18.2	81.8
Rs. 2000 to 5000	34.5	65.5
Above Rs. 5000	68.5	31.5
Received Infant feeding counselling**		
Yes	54.8	45.2
No	34.6	65.4
Received ARV/Sd NVP**		
Yes	45.4	54.6
No	34.1	65.9
Test report disclosure to the husbands or in-laws***		
Yes	52.1	47.9
No	29.6	70.4
Total	**40.9**	**59.0**

*N=55, Chi-square level of significance. *10%, ** 5% and ***1%.*

Intention of formula/replacement feeding is illustrated in Table 2. HIV positive mothers with more education, higher family income and staying in urban areas were more intended for formula/replacement feeding than their counterparts and these associations were statistically significant. The HIV positive mothers who stayed with joint family were less likely to opt for formula feeding than those stayed in nuclear family. This might be due to the fear of disclosure of their HIV positive status to in-laws and relatives. Likewise, the HIV positive women who received infant feeding counselling, received ARV prophylaxis and disclosed their HIV positive status were more likely to opt for formula/replacement feeding.

The responses indicated that HIV positive women were confused about the best way to feed their newborns because of the possible social repercussions of formula feeding and they wanted to consult doctors, counsellors, husbands or family members before making any decision. This suggests that positive or prolonged interaction with the counsellors and satisfaction derived from the care of the hospital had an impact on minimizing women's desire of mixed feeding and made them prefer replacement feeding as and when the AFASS conditions were met or exclusive breast-feeding done. That may also be understood as a positive effect of counselling in the PPTCT programme.

Association between demographic characteristics and intention of feeding practices

National PPTCT guidelines suggest that exclusive replacement feeding should be done only when AFASS criteria are fulfilled (NACO, 2011). Concurrently, mixed feeding is not to be done during the first six months of life, i.e., (not to give it along with any other milk (tinned formula food, cow milk or diary milk), liquids, juices, or even water (NACO, 2011). Exclusive Replacement Feeding (ERF) can reduce HIV-transmission but is also associated with morbidity related to diarrhoea and respiratory infections. ERF (formula feeding) is the most widely used and effective method to prevent MTCT of HIV through breast feeding in resource-rich settings. (Nduati et al., 1994; Embree, et al., 2000; Anthena et al., 2007). In view of the above, those HIV positive mothers who practised exclusive breastfeeding or exclusive replacement feeding are the recommended feeding practice and mixed feeding practices are not recommended as a feeding practice.

The influence of socio-demographic characteristics on recommended EBF (exclusive breast feeding) and ERF (exclusive replacement feeding) and non-recommended (breast feeding with solid other food and replacement food with breast milk) infant feeding practices is illustrated in Table 3. Odds ratio with 95 per cent confidence interval was computed to assess the presence and degree of association between variables. Logistics regression model was applied to identify the important determinants for recommended (=1) and non-recommended (=0) feeding options. A p-value of below 0.05 denoted significance in differences. The study found that higher proportion of HIV positive women who were living in the urban areas practiced either exclusive breast-feeding or exclusive replacement feeding. The significant relationship was reflected in the logistic regression with COR = 3.98 (95% CI=1.56-14.01). Higher proportion of educated HIV positive women preferred to practice recommended feeding practices in comparison to illiterate HIV positive women (COR= 2.45 (95% CI = .53-11.3). Disclosure of HIV status with their spouses and family members (COR= 2.14; 95% CI= 1.09-6.91) were found to have significant association (p-value < 0.05) for those who intended the recommended way of infant feeding practices (EBF and ERF). Mothers who disclosed their HIV status to their spouses were 5.5 times more likely to have recommended ways of infant feeding practices. Disclosure of HIV status influenced infant feeding options of HIV positive women when their partners were aware of their HIV status and involved in the decision (Mohammad A et. al, 2010). Having disclosed their status might have brought psychological benefits as they did not have to hide doing formula feeding.

Table 3 Association between demographic characteristics and intention of feeding practices

Background characteristics	Recommended (EBF & ERF)	Not recommended (Mixed Feeding)	Crude Odd Ratio (95% CI)	Adjusted Odd Ratio (95% CI)
Age				
24 years & below(R)	82.4	17.6	1	1
25 to 35 years	93.2	6.8	.32 (.10-1.17)	.24 (0.2-1.1)
Place of residence				
Rural(R)	69.6	30.4	1	1
Urban	89.9	8.1	3.98 (1.56-14.01)*	2.26 (.47-10.88)
Religion				
Hindu(R)	85.0	15.0	1	1
Others	89.9	10.1	1.38 (.35-3.88)	2.22 (.35-11.49)
Education				
Illiterate(R)	88.7	11.3	1	1
Primary & UP	89.0	11.0	2.45 (.53-11.3)	14.63 (1.36-156.4)*
Secondary and above	91.1	8.9	1.30 (.373-4.55)	2.80 (.483-16.23)
Family income				
Below Rs. 2000(R)	82.1	7.9	1	1
Rs. 2000 to 5000	92.7	7.3	1.15 (.24-5.47)	1.60 (.23-10.95)*
Above Rs. 5000	91.2	4.3	1.47 (.32-7.14)	3.73 (.52-26.32)*
Type of family				
Nuclear(R)	79.2	20.8	38 (.12-1.16)	.14 (.03-.65)*
Joint	90.8	9.2	1	1
Disclosure of HIV status to spouses and in-laws				
No(R)	76.9	23.1	1	1
Yes	91.2	8.8	2.14 (1.09-6.91) *	5.74 (1.11-3.97) *
On ART				
No(R)	90.1	9.9	1	1
Yes	89.1	10.9	.66 (.34-4.31)	.77 (.28-3.07)

Note: N (total number of HIV positive women) = 152; ® reference category.
*Significant at: *p<0.01, **p<0.05; ***p<0.001.*

Conclusion

As per the national pediatric guidelines, exclusive breast-feeding is recommended for all infants for first six months of their life. After that complementary foods should be introduced for infants. Mixed feeding should never be done within the first six months. This study presents self-reported infant feeding intentions of HIV positive women. Study observed that 87 per cent of HIV positive mothers intended either exclusive breast feeding or exclusive replacement feeding as feeding options and 9 per cent intended mixed feeding (an undesirable feeding practice in the first 6 months of age reported). HIV positive mothers living in urban areas and disclosure of HIV status with their in-laws and spouse are major determinants of recommended feeding practices in the study settings.

Further research is needed to assess related factors in order to aid policy formulation and foster promotion of exclusive breast-feeding among HIV positive women. In order to promote EBF there is a need to further explore the characteristics of HIV positive women who have succeeded in maintaining it and their surroundings that may provide an opportunity to promote it. At the same time, experience of maintaining the ERF/EBF of HIV positive women may be required. It will help health care providers to furnish adequate examples to the HIV positive women in order to promote particular feeding practices.

There is also a need to explore more ways of involving men and family members of HIV positive women in PPTCT who are the providers of care and support as well as decision-makers on infant feeding. To achieve success in recommended feeding practice, mother's decision should be respected. Further, women's empowerment through education, improvement of ANC follow-up, HIV counseling and male involvement in PPTCT may increase the recommended feeding practices.

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An Overview of Maternal Health Care Utilization among Adolescent Mothers in Empowered Action Group (EAG) States of India

Hanvitha Khambampati[1], Hemangini Solanki[2], Arindam Das[3]

ABSTRACT : Background: *Childbirth in adolescence is often risky. Young adolescents face a higher risk of complications and death as a result of pregnancy than other women. One of the key determinants in improving maternal health and reducing maternal morbidity, mortality and fetal deaths is access to quality health services for antenatal and natal care.*

Objectives:

- *To study the differences in utilization of Full Ante Natal Care (FANC) and Safe Delivery in Empowered Action Group (EAG) states in adolescent age group.*
- *To identify the major determinants of the utilization of maternal healthcare services in adolescent age group.*

Methodology: *For this purpose, the study used the data from DLHS-3 (District Level Household and Facility Survey, 2007-08). Using Statistical Package for Social Sciences (SPSS), Univariate analysis was performed to show the socio-economic and demographic characteristics of the respondents. Bivariate (chi-square) analysis was done to know the significant association between socio-economic, demographic characteristics and utilization of FANC and Safe Delivery. Besides, multivariate logistic regression was finally carried out to know the determinants of utilization of FANC and Safe Delivery.*

Key Findings: *The percentage of adolescent girls who received full ANC is below five percent in almost all cases with few exceptions like women belonging to other castes, women and their husbands with higher level of education, high Standard of Living Index (SLI), and women residing in urban areas. A majority of the women who opted for safe delivery were the women who received FANC and women with pregnancy related problems. SLI, education of the women and their husbands, presence of any problems during pregnancy and place of residence are major determinants of FANC. In addition to above mentioned determinants, FANC and complications during delivery were found to determine the practice of Safe Delivery among adolescent women of EAG states.*

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INTRODUCTION

In terms of health related issues, women of the reproductive age group, especially pregnant and lactating mothers are the most vulnerable sections of the population. Maternal health refers to *the health of women during pregnancy, childbirth and post partum period*. While motherhood is often a positive and fulfilling experience, for many women, it is associated with suffering, ill-health and even death (H.Solanki et al, 2017). Considering the fifth Millennium Development Goal, maternal mortality dropped by about 44 percent between 1990 and 2015 (WHO,2016). However, maternal healthcare remains a major challenge to the global public health system, especially in developing countries. In India, considerable attention has been paid to estimates of maternal mortality, but mere has been

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reserved to the issue of adolescent pregnancies (P.K.Singh et al, 2012).

According to an estimate, about 16 million girls aged 15-19 and some one million girls under 15 give birth every year – most in low- and middle-income countries (WHO,2016). Childbirth in adolescence is often risky. Young adolescents face a higher risk of complications and death as a result of pregnancy than other women (WHO,2016). It is associated with a host of life threatening adverse health outcomes such as high risk of premature delivery, delivery and post natal complications, unsafe abortion complications, obstetric fistula etc. Hence it is not surprising that despite accounting for only 11 percent births worldwide, adolescent women carry 23 percent of overall burden of disease (in terms of Disability Adjusted Life Years) due to pregnancy and childbirth among women of all ages (A. Singh et al, 2014).

Most of the maternal deaths can be saved by strengthening the healthcare facilities (R.K.Singh & S. Patra, 2013). One of the key 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. A Full Ante Natal Care (FANC) comprises of three components: at least three antenatal check-ups; one Tetanus Toxoid (TT) injection received; and 100 Iron Folic Acid (IFA) tablets or three bottles of IFA syrup consumed during pregnancy. Safe Delivery is an important criterion of natal care. It refers to either institutional delivery or home delivery attended by skilled health personnel (Doctor/Auxiliary Nurse Midwife (ANM)/Nurse/Midwife/Lady Health Visitor (LHV)/other health personnel) (DLHS3 Factsheet).

Over past decades, the Government of India has implemented several policies and programs such as Child Survival and Safe Motherhood Programme, 1992; Reproductive and Child Health Program, 1997; National Population Policy, 2000; and National Urban Health Mission, 2013–2017 to reduce the burden of maternal mortality and improve maternal health. As a result, the overall utilization of maternal health care services in India has improved over time, however, the level of uptake is still considered low among adolescent mothers. It is not only true for rural adolescent mothers but also for urban adolescent mothers (A. Singh et al, 2014). Adolescent girls, most of whom are out of school, are particularly vulnerable and neglected, coming under the purview of government programmes only once they are pregnant

(A. Das, 2015).

The Government of India enlisted eight socio-economically backward states as Empowered Action Group (EAG) states, namely Bihar, Chattisgarh, Madhya Pradesh, Jharkhand, Orissa, Uttar Pradesh, Uttarakhand and Rajasthan. The progress in these states pertaining to various social, economic and health indicators was below the national average

(K. J. Singh et al, 2015). Table 1 shows the socio-demographic profiles of the eight EAG states. In spite of the fact that the minimum legal age at marriage for girls is 18 years, is not being implemented uniformly in the country. As per data from the third wave of District Level Household Survey (DLHS-

3, 2007-08), 63 percent of women get married before age of 18 years in EAG sates.

The reasons for slow progress in improving maternal healthcare are multi-factorial. In realm of socio-economic and demographic influences, factors like religion, caste, education, residence, age, standard of living etc. have significant impact on the reproductive healthcare of women in general and on antenatal care and safe delivery in particular (A. Das & H.C. Srivastav,2006). Hence, an elaborate and factor specific assessment of maternal healthcare utilization would have better policy implications. In this context, the present article is an effort to determine the level and pattern of maternal healthcare service utilization among diverse subgroups of adolescent women in EAG states, with focus on Full Ante Natal Care and Safe Delivery.

Table 1: Social and Demographic Characteristics of Empowered Action Group (EAG) States in India

Parameters	Bihar	UP	Orissa	Jharkhand	Chattisgarh	Uttaranchal	MP	Rajasthan
Total Population (million)[1]	104.11	199.81	41.97	32.99	25.55	10.11	72.62	68.54
Population Density[1]	1102	828	269	414	189	189	236	201
Rural Percentage[1]	88.7	77.7	83.3	76.0	76.8	69.4	72.4	75.1
Female Literacy Rate(%)[1]	53.33	59.26	64.36	56.21	60.59	70.70	60.02	52.66
Sex Ratio (females per 1000 males)[1]	918	912	979	948	991	963	931	928
Birth Rate[2]	25.9	27.0	19.4	23.8	23.4	18.2	25.7	25.0
Death Rate[2]	6.2	7.4	7.9	5.9	7.7	6.1	7.8	6.4
Natural Growth Rate[2]	19.7	19.6	11.5	17.9	15.7	12.1	17.9	18.6
IMR[2]	42	48	49	34	43	32	52	46

(Source: 1-Census of India 2011; 2-Sample Registration System 2014)

METHODOLOGY

a) **Data, sampling design and study size**: The data for the present article was derived from the District Level Household and Facility Survey (DLHS-3) conducted during 2007–08. DLHS is nationally representative and one of largest ever demographic surveys conducted in India to obtain reproductive and child health outcome indicators. DLHS-3 adopted a multi-stage stratified systematic sampling design. The survey interviewed 643,944 ever -married women aged 15–44 years from 720,320 sampled household (about 78 percent from rural and 22 percent from urban areas) covering 601 districts of India. The overall response rate for ever married women at the national level was 89 percent. Out of these 643,944 ever-married women, a total of 215,048 have

had a still or live birth during three years preceding the survey. For the analysis, a total of 27664 currently married women aged 15-19 years residing in EAG states and delivered a child during the three years preceding the survey were extracted from the DLHS-3 data set. Thus, 27664 currently married women from 13250 clusters (PSUs) in 265 districts were included in the analysis. In addition, census data published by the Registrar General of India were also collected and included in the analysis. (IIPS,2010)

b) **Outcome variables**: Two outcome variables were considered for the analysis:

1. Full Ante Natal Care- has been defined as at least three antenatal care visits, consumption of either100 or more Iron and Folic Acid tablets or three or more bottles of Iron and Folic Acid syrup and one or more Tetanus Toxoid injections taken during pregnancy.
2. Safe Delivery- is defined as either institutional delivery or home delivery assisted by doctor, auxiliary nurse midwife, nurse or lady health visitor.

c) **Independent variables:** For logistic regression analysis with Full Ante Natal Care, FANC was taken as dependent variable, where FANC = 1 and no FANC = 0. the following were independent variables were considered:

Place of residence of the respondent was divided into two categories: rural and urban. Religion was categorized into Hindu and others. Social status of the respondent was broken down into four categories: Scheduled Caste (SC), Scheduled Tribe (ST), Other Backward Class (OBC) and others. Education of the respondent and her husband was categorised into six sections: illiterate, primary education (one to five years of schooling), middle (six to eight years of schooling), secondary (nine and ten years of schooling), higher secondary (11 to 12 years of schooling) and graduation and above (13 and above years of schooling). Standard of Living Index (SLI) was divided in three categories namely low, medium and high. Total number of live births to the respondent was divided into three categories: no or zero live births, one to two live births and three and more live births. Presence or absence of any problem during pregnancy was also considered.

For logistic regression analysis with Safe Delivery, safe delivery was considered as dependent variable, where safe delivery = 1 and no safe delivery = 0. Additional independent variables like utilization of FANC and presence or absence of delivery complications were also considered.

***d)* Analytical approach:** The primary data from DLHS-3 was used for analysis. The analysis was carried out using Statistical Package for Social Sciences (SPSS). Univariate analysis was performed to show the socio-economic and demographic characteristics of the respondents. Bivariate (chi-square) analysis was done to know the significant association between socio-economic, demographic characteristics and utilization of FANC and Safe Delivery. Besides, multivariate logistic regression was finally carried out to know the determinants of utilization of FANC and Safe Delivery. The first category in all the independent variables was taken as reference category in logistic regression analysis.

RESULTS AND DISCUSSION

Table 2 represents the socio-economic and demographic characteristics of the respondents. The analysis suggests that more than four fifth (82 percent) of the respondents were from the rural areas of EAG states. It was also observed that a majority of the respondents were Hindu (89 percent). Besides nearly half (49 percent) of the respondents were from other backward caste. Nearly thirty percent of respondent's husbands were illiterate. On the contrary nearly 60 per cent of the respondents were illiterate. About two fifth of the respondents (38 percent) had total live births of one or two. Also it was found that 64 percent of the respondents were from low standard of living.

Table-2: Socio-Economic and Demographic Characteristics of the Respondents in EAG States (N=27664)

Socio-economic and demographic characteristics	Percent
Place of Residence	
• Rural	82.0
• Urban	18.0
Religion	
• Hindu	88.9
• Others	11.1
Caste	
• SC	22.7
• ST	11.8
• OBC	49.2
• Others	16.3
Education of the Respondent	
• Illiterate	59.9
• Primary	14.7
• Middle	14.8
• Secondary	8.0
• Higher Secondary	2.0
• Graduation & above	0.6
Education of the Husband	
• Illiterate	28.7
• Primary	13.5
• Middle	20.9
• Secondary	22.7
• Higher Secondary	7.8
• Graduation & above	6.3
Total Live Births	
• 0	61.5
• 1 to 2	37.7
• 3 & above	0.8
Standard of Living Index (SLI)	
• Low	64.8
• Medium	26.2
• High	9.0

As mentioned earlier, Chi square test was performed to find the significant association (P<0.05) between respondents' socio-economic, demographic characteristics and utilization of FANC. Results of the same have been presented in Table 3. It is observed from the analysis that characteristics such as place of residence and caste had a significant association (P<0.05) with the utilization of FANC. Around five percent rural and eight percent urban women had utilized FANC. Approximately five percent of Hindu women and women from other religions had taken FANC during their pregnancy. In terms of caste, below five percent (four) each of women belonging to Scheduled Caste and Other Backward Classes, six percent women belonging to Scheduled Tribe and seven percent women from other castes had received FANC. A significant association (P<0.05) is noticed between respondents' education and the utilization of FANC. Similar result was found for respondent's husband's education. Utilization also varied according to the Standard of Living Index (SLI) (P<0.05). While only four percent of women belonging to low SLI and seven percent of women belonging to medium SLI had utilized FANC, a relatively higher percentage of women belonging to high SLI had received FANC. Nearly four percent respondents with no live birth, five percent women with one-two live births and four percent of women with three or more live births had had FANC. Additionally the analysis suggests that in the absence of any pregnancy related problems, almost five percent of women had accepted FANC. However, the figure increased to six percent amongst women who faced any problem during pregnancy (P<0.05).

Table 3: Association between Socio-economic, Demographic and Health Characteristics of Respondents and Utilization of Full Ante Natal Care (FANC), N =516

Characteristics	% of Women who utilized FANC (Number)	Total
Place of Residence *		
• Rural	4.5(379)	8479
• Urban	8.0(137)	1722
Religion		
• Hindu	5.1(460)	8873
• Others	4.6(56)	1228
Caste *		
• Scheduled Caste	4.0(97)	2445
• Scheduled Tribe	6.0(86)	1434
• Other Backward Caste	4.6(223)	4871
• Others	7.6(110)	1451
Education of the Respondent *		
• Illiterate	3.1(213)	6911
• Primary	6.7(85)	1270
• Middle	9.2(110)	1191
• Secondary	12.4(72)	582
• Higher Secondary	17.3(19)	110
• Graduation and above	29.7(11)	37
Education of Respondent's Husband *		
• Illiterate	2.8(96)	3442
• Primary	3.2(49)	1538
• Middle	4.9(96)	1946
• Secondary	8.2(167)	2048
• Higher Secondary	8.5(54)	635
• Graduation and above	10.3(53)	514

Characteristics	% of Women who utilized FANC (Number)	Total
Total Live Births		
• 0	3.5(28)	794
• 1-2	5.2(479)	9195
• 3 and above	4.2(9)	212
Standard of Living Index (SLI) *		
• Low	3.7(265)	7190
• Medium	7.0(166)	2356
• High	13.0(85)	655
Any Problem during Pregnancy *		
• Yes	6.1(226)	3707
• No	4.5(290)	6494

***P<0.05**

Like Table 3, Table 4 shows the association between socio-economic, demographic, health characteristics of the respondents and their safe delivery practice. It is observed from the analysis that characteristics such as place of residence, religion and caste had a significant association with practice of safe delivery (P<0.05). Around 15 percent of rural and 23 percent of urban women had experienced safe delivery. Roughly 16 percent of Hindu women and 18 percent of women from other religions were found having safe deliveries. Approximately 15 percent of women belonging to Scheduled Caste and 16 percent of women each belonging to Scheduled Tribe and Other Backward Classes and 19 percent of women from other class had experienced safe delivery. Further, analysis suggested that Education of the respondents, Standard of Living Index and husband's education were found to have a positive association (P<0.05) with safe delivery. Thirty percent women with one to two live births had safe delivery. About 46 percent women each with any problem during pregnancy and women with delivery complications had undergone safe delivery (P<0.05). The analysis also suggests that above three fifth (65 percent) of women who had utilized Full Ante Natal Care (FANC) had safe delivery (P<0.05).

Table 4: Association between Socio-economic, Demographic and Health Characteristics of Respondents and their Safe Delivery Practice, N = 4520

Characteristics	% of Women who performed Safe Delivery practice (No.)	Total
Place of Residence *		
• Rural	14.8(3356)	22694
• Urban	23.4(1162)	14970
Religion *		
• Hindu	16.1(3967)	24583
• Others	17.9(553)	3081
Caste *		
• Scheduled Caste	14.8(926)	6267
• Scheduled Tribe	16.4(537)	3272
• Other Backward Caste	16.3(2212)	13607
• Others	18.7(845)	4518

Characteristics	% of Women who performed Safe Delivery practice (No.)	Total
Education of the Respondent *		
• Illiterate	15(2456)	16412
• Primary	17.8(715)	4028
• Middle	18.5(750)	4044
• Secondary	19.1(2194)	2194
• Higher Secondary	19.6(108)	552
• Graduation and above	17.6(30)	170
Education of Respondent's Husband *		
• Illiterate	13.7(1079)	7898
• Primary	17.9(662)	3708
• Middle	16.6(953)	5756
• Secondary	17.5(1091)	6233
• Higher Secondary	17.6(379)	2151
• Graduation and above	18.5(321)	1737
Total Live Births *		
• 0	2.1(362)	17002
• 1-2	29.3(4099)	10438
• 3 and above	26.3(59)	224
Standard of Living Index (SLI) *		
• Low	14.0(2516)	17930
• Medium	19.1(1389)	7254
• High	24.8(615)	2480
Any Problem during Pregnancy*		
• Yes	45.7(1910)	4176
• No	37.0(2606)	7047
Full Ante Natal Care (FANC) *		
• Yes	64.5(333)	596
• No	36.9(3579)	9685
Delivery Complications *		
• Yes	46.2(2299)	4981
• No	35.5(2221)	6253

***P<0.05**

Further, a logistic regression was carried out to find the determinants of Full Ante Natal Care (FANC). The results of the same are presented in Table 5. The variables namely place of residence, religion, caste, education of the respondent, education of the husband, total live birth, Standard of Living Index (SLI) and any problem during pregnancy were considered as predictor variables.

It was observed from the analysis that all the predictor variables were found statistically more or less significant except religion for the utilization of FANC among women of the EAG states. Education of respondent, education of husband of respondent, caste, SLI and any problem during pregnancy are most significant predictors.

Table-5: Determinants of FANC in EAG States

Determinants	Exp (B)	Confidence Interval Lower	Upper
Place of Residence			
• Rural@			
• Urban	1.266**	1.005 -	1.595
Religion			
• Hindu@			
• Others	0.891	.656 -	1.211
Caste			
• SC@			
• ST	1.848***	1.360 -	2.511
• OBC	.966	.750 -	1.246
• Others	1.273	.941 -	1.723
Education of the Respondent			
• Illiterate @			
• Primary	1.809***	1.379 -	2.373
• Middle	2.150***	1.650 -	2.801
• Secondary	2.576***	1.865 -	3.557
• Higher secondary	3.290***	1.889 -	5.727
• Graduation & above	7.795***	3.630 -	16.739
Education of Respondent's Husband			
• Illiterate @			
• Primary	.991	.692 -	1.419
• Middle	1.392**	1.015 -	1.080
• Secondary	1.988***	1.486 -	2.659
• Higher secondary	1.620**	1.093 -	2.400
• Graduation & above	1.847***	1.236 -	2.760
Total Live Births			
• 0@			
• 1 to 2	1.436*	.966 -	2.135
• 3 and more	1.364***	.568 -	2.845
Standard of Living Index (SLI)			
• Low@			
• Medium	1.326**	1.058 -	1.663
• High	1.758***	1.275 -	2.424
Any Problem during Pregnancy			
• No @			
• Yes	1.373***	1.141 -	1.651

@= Reference category, *= P< 0.1, **=P<0.05, ***=P<0.01

Again regression analysis was also carried out to find the determinants of the safe delivery practices. The results of the same are presented in Table 6.

Like FANC, Safe Delivery was also determined by place of residence of respondents, caste, religion, education of the respondents, education of the husband, total live births, Standard of Living Index, pregnancy related problems and delivery complications. Also these variables were found statistically significant for the utilization of safe delivery practices among women of the EAG states.

Table-6: Determinants of Safe Delivery

Determinants	Exp (B)	Confidence Interval Lower	Upper
Place of Residence			
• Rural@			
• Urban	1.633***	1.449 -	1.841
Religion			
• Hindu@			
• Others	.719***	0.623 -	0.830
Caste			
• SC@			
• ST	1.153*	0.997 -	1.334
• OBC	1.123**	1.006 -	1.254
• Others	1.471***	1.267 -	1.707
Education of the Respondent			
• Illiterate @			
• Primary	1.359***	1.193 -	1.548
• Middle	1.568***	1.363 -	1.803
• Secondary	1.671***	1.371 -	2.637
• Higher secondary	4.064***	2.465 -	6.702
• Graduation & above	3.384***	1.486 -	7.704
Education of Respondent's Husband			
• Illiterate @			
• Primary	1.391***	1.217 -	1.588
• Middle	1.350***	1.188 -	1.533
• Secondary	1.345***	1.180 -	1.532
• Higher secondary	1.241***	1.016 -	1.516
• Graduation & above	1.465***	1.178 -	1.822
Total Live Births			
• 0@			
• 1 to 2	0.978	.835 -	1.147
• 3 and more	0.523***	.363 -	.752
Standard of Living Index (SLI)			
• Low@			
• Medium	1.703***	1.529 -	1.897
• High	3.290***	2.681 -	4.038
Any Problem during Pregnancy			
• No @			
• Yes	1.305***	1.192 -	1.427
Full Ante Natal Care (FANC)			
• No@			
• Yes	2.219***	1.814 -	2.713
Delivery Complications			
• Yes@			
• No	1.551***	1.420 -	1.694

@= Reference category, *= P< 0.1, **=P<0.05, ***=P<0.01

CONCLUSION

It is worth mentioning from the study that in EAG states, the percentage of adolescent girls who received full ANC is below five percent in almost all cases with few exceptions like women belonging to other castes, highest level educated women and husbands of the respondents, high SLI, and women residing in urban areas. A majority of the women who opted for safe delivery were the women who received FANC and women with pregnancy related problems. By and large, from the analysis we can conclude that SLI, education of the women and their husbands, presence of any problems during pregnancy and place of residence are major determinants of FANC. In addition to above mentioned determinants, FANC and complications during delivery were found to determine the practice of safe delivery among adolescent women of EAG states.

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Socio-Economic, Demographic Profile of Women in Madhya Pradesh: A Gender Perspective

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Key words: gender, empowerment, education, income, female headed household

Abstract: *Over the past two decades gender equality and women's empowerment have been explicitly recognized as key not only to the health of nations, but also to social and economic development. Gender-based differences in power and resource-access have consequences for the quality of life of the population, including its health. The primary objective of this paper is to analyze the extent of gender equality and women's empowerment in Madhya Pradesh using data from the NFHS, Census, and SRS. An examination of indicators for which trend data are available shows that the progress toward gender equality and women's empowerment remains very slow. Age at marriage continues to be low in MP and with high fertility and low work participation, SC and ST women lag behind in a number of socio-demographic indicators especially in rural areas.*

Introduction:

Over the past 2 decades, gender equality and women's empowerment have been explicitly recognized as key health of nations, but also to social and economic development. The promotion of gender equality and empowering of women is one of the eight Millennium Development Goals (MDG) to which India is a signatory. Indicators of gender equality/inequality are typically designed to compare the status of women and men on particular characteristics of interest; whereas, by definition, indicators of empowerment/ disempowerment tend not to be relative.

Defining Gender:

The terms gender and sex are often used interchangeably; however, they are distinct concepts.hey are distinct concepts. Whereas, sex of individuals is largely determined by biology, their gender is socially constructed and comprises the roles, rights, and obligations that attach to them on the basis of their sex. Kishor (2006) identifies three important aspects of gender namely: a) Gender tends not be value neutral. The roles, rights, and obligations assigned to each sex are not just different, but also unequal with male roles and rights generally being more highly valued than female roles and rights. b) Gender involves differences in power, Gender involves differences in power i.e., it is both power to

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and power over**.** The concept of power encompasses legal and informal rights, access to resources, and pursuit of knowledge and personal goals, and cuts across most domains of human functioning, including familial, cultural, and institutional domains. Power over refers to control over societal and household resources and decisions, cultural and religious ideology, and one's own and others' bodies. Importantly, men tend to have greater power than women and, in some domains, even have power over women. c) Gender is not static or immutable. Being socially constructed, gender roles, rights, and expectations can change over time and across geographical space as societal needs, opportunities and customs change.

Objectives:

The broad objectives of this paper is to highlight the status of women in Madhya Pradesh based on socio-economic and demographic indicators of female literacy, work participation, age at marriage and teenage fertility.

Method:

Data has been drawn from various sources such as Annual Health Survey (AHS), National Family Health Survey (NFHS), District Level Health Survey (DLHS), Annual Health Survey Census, National Sample Survey (NSSO). Data is analyzed using descriptive statistics and are presented graphically. Report is based on qualitative and quantitative analyses of results.

Literacy Profile of Women of MP:

Literacy is an important demographic element of human process. Optimizing provision of education is the most fundamental prerequisite for empowering women in all areas of society.

Literacy and education are important indicators in a society and play a central role in human development that impacts overall social-economic development milieu.

Higher levels of literacy and education lead to better attainment of health and nutritional status, economic growth, population control, empowerment of women and weaker sections and community as a whole.

Table 1: Trends in Female Literacy Rate, MP

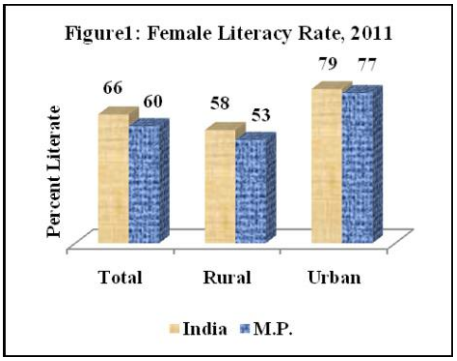
Data Source	Year	Total	Rural	Urban	Gap (U- R)
Census	2001	50.3	42.8	70.5	27.7
DLHS-2	2002-04	48.9	37.9	70.9	33.0
NFHS-3	2005-06	52.0	45.6	69.7	24.1
DLHS-3	2007-08	51.3	44.9	72.7	27.8
Census	2011	60.0	53.2	77.4	24.2
AHS	2012-13	67.7	59.7	84.2	24.5

Table 1 and Figure 1 highlight the fact that women in MP are lagging behind in literacy especially in rural areas. Whereas the female literacy rates of urban areas of MP and India are comparable (India: 79 percent; MP: 77) the rural-urban gap in female literacy persists in MP temporally.

Literacy by social Groups: From Table 2 it is evident that female literacy rates for Scheduled Caste (SC) and Scheduled Tribe (ST) women is lower than the state average for all women (SC: 46 percent; ST: 42; All: 60). Moreover, the literacy rates are further low among SC and ST women as compared to all women (SC: 42 percent; ST: 39; All: 53) in rural areas. Further improvement and interventions are necessary for these groups in the view of the fact that SC and ST constitute 37 percent of the population in the state.

Table 2: Female Literacy Rate by Social Groups in MP (Census, 2011)

Residence/ Social Group	Rural	Urban	Total
SC	42	57	46
ST	39	62	42
All	53	77	60



Gender Difference in Literacy: From Figure 2 it is evident that although women have made progress in overall literacy a gender gap of 18 percent still prevails between males and females in the state. In spite of Right to Education and Sarva Siksha Abhiyan female literacy still lags behind.

An important measure which predicts the parity or gap between males and females in literacy status is the ratio of female to male literacy.

Table 3 indicates that in the 15-24 year age group there is an overall gender gap of 23 points between female to male literacy ratio and this gap is higher for SC women belonging to rural areas (31 percent). This gap in female-male literacy ratio in 15-24 years age group implies higher dropout after primary and middle education among women especially in ST groups.

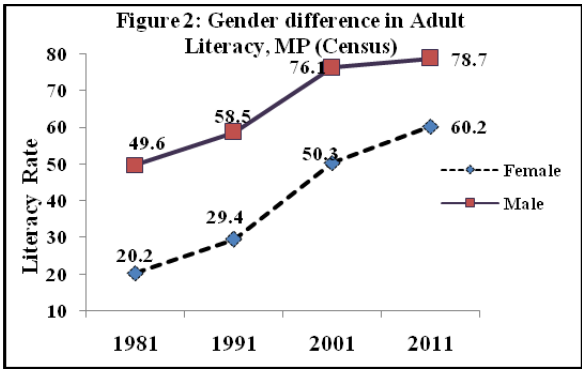
Table 3: Female-Male Literacy Ratio in 15-24 year Age in MP Census, 2011

Residence	SC	ST	All
Total	73.0	73.4	76.8
Rural	68.7	71.8	72.8
Urban	83.2	84.7	78.0

Low levels of female literacy are often associated with poor access to health and family planning facilities as well as inadequate awareness of proper child care and other hygienic practices adversely affecting the welfare of the whole family. Education empowers, creating opportunities and invests

individuals with the ability to make choices. No poverty alleviation measure can be sustainable without addressing this factor. Female literacy rates are connected with population stabilisation, declining infant mortality, increased enrolment of children in schools and better access to health care.

Economic Profile of Women in MP:



Women's quantitative participation in the workforce is important not only in addressing the disproportionate levels of poverty among women, but also as a key step towards raising household income and encouraging economic development. Although most women in MP work and contribute to the economy in one form or another, much of their work goes unrecognized. Women plough fields and harvest crops while working on farms; while working in household industries; working in the informal sector. Additionally, women are responsible for the daily housework (e.g. cooking, fetching water, and looking after children).

Women's Work Participation: Table 4 provides information on female work participation rate in comparison to males. It is observed that female work participation rates are lower than that of the males in the state (female: 33 percent, male: 54). In urban areas where women do not work in the agricultural sector their participation is even lower (female: 15 percent, male: 52). In fact female work participation in 2011 has slightly declined than the previous Census 2001(33.2).

Table 4: Work Participation Rate, MP (Census 2011)

Residence	All	Males	Females
Total	43.5	53.6	32.6
Rural	47.0	54.3	39.3
Urban	34.2	51.7	15.1

Women's participation in the non-agricultural sector among women in MP is lower as compared to India as a whole indicating that only one-fifth women in MP work in the non-agricultural sector and their representation in the formal sector is low as compared to national average (Table 5).

Table 5: Proportion of Female Workers in Non-Agricultural Sector (Census)

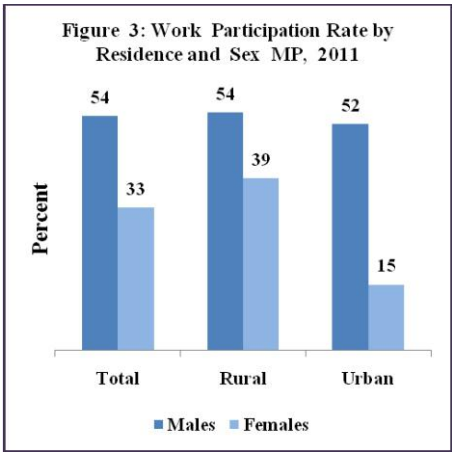
India/MP	2001	2011
India	29.2	50.1
MP	16.3	20.1

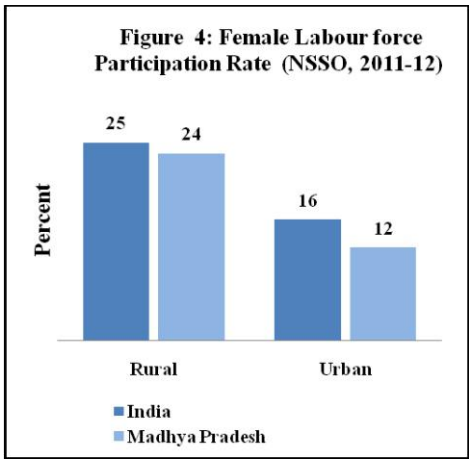
Although women represent one third of MP's workforce, they account for less than one-fifth of employees in the organised sector. Further, women are often engaged in repetitive activities characterized as drudgery. More women are involved in undocumented or "disguised" wage work than in the formal labour force. Examples of jobs in the informal sector include domestic servant, small trader, artisan, or field labourer on a family farm. Female labour force participation as shown in Figure 3 and 4 is especially low in urban areas of MP highlighting poor economic participation of women in the formal sector.

Household Assets of Female Headed Households: The assets possessed by households headed by women also indicate women's status and empowerment. Table 6 highlights the proportion of female headed households having household assets indicating that only half of the women in these households have assets. It is observed that in ST households headed by females less than one-third (32 percent) have access to household assets in comparison to SC (47 percent) and all female headed households (51 percent).

Table 6: Proportion of Female Headed Households having Household Assets, MP (Census 2011)

Residence	All	SC	ST
Total	51.3	47.2	32.1
Rural	31.7	34.0	27.7
Urban	79.7	73.5	64.3





Economic Decisions by Women: Some of the indicators like women's control over resources, participation in household decision making, women's economic freedom enjoyed by them in making decisions which involve expenditure on self or family. Freedom in economic decision making highlights empowerment of women in these areas. Table 7 shows that women belonging to the highest wealth quintile enjoy more freedom in decision making about expenses for self and family than those

women representing the lowest quintile. Decision making varies between educated and non educated women and among other women and ST. Economic empowerment is relatively better among other, educated and women from highest wealth quintile.

The findings of Annual Health Survey (AHS, 2010-11) of eight Empowered Action Group (EAG) states, of which MP is one, indicate that at least 23-28 percent of the surveyed households in rural areas belong to lowest wealth index and women representing these households are vulnerable to poverty and ill health.

Table 7: Economic Decisions by Background Characteristics of Women MP, NFHS-3

Back ground Characteristics	Own health care (%)	Major household purchases (%)	Making purchases for daily household needs (%)	Women who have Money that they can Decide how to Use (%)
Wealth Index				
Lowest Wealth Quintile	49.0	45.9	53.8	28.7
Highest Wealth Quintile	64.1	59.7	64.7	56.1
Education				
No education	49.6	47.2	55.3	31.9
10 or more years complete	61.7	57.2	60.8	56.9
Social Category				
SC	52.5	50.0	56.4	33.5
ST	48.6	47.5	56.4	33.1
Others	55.8	50.7	57.0	44.1

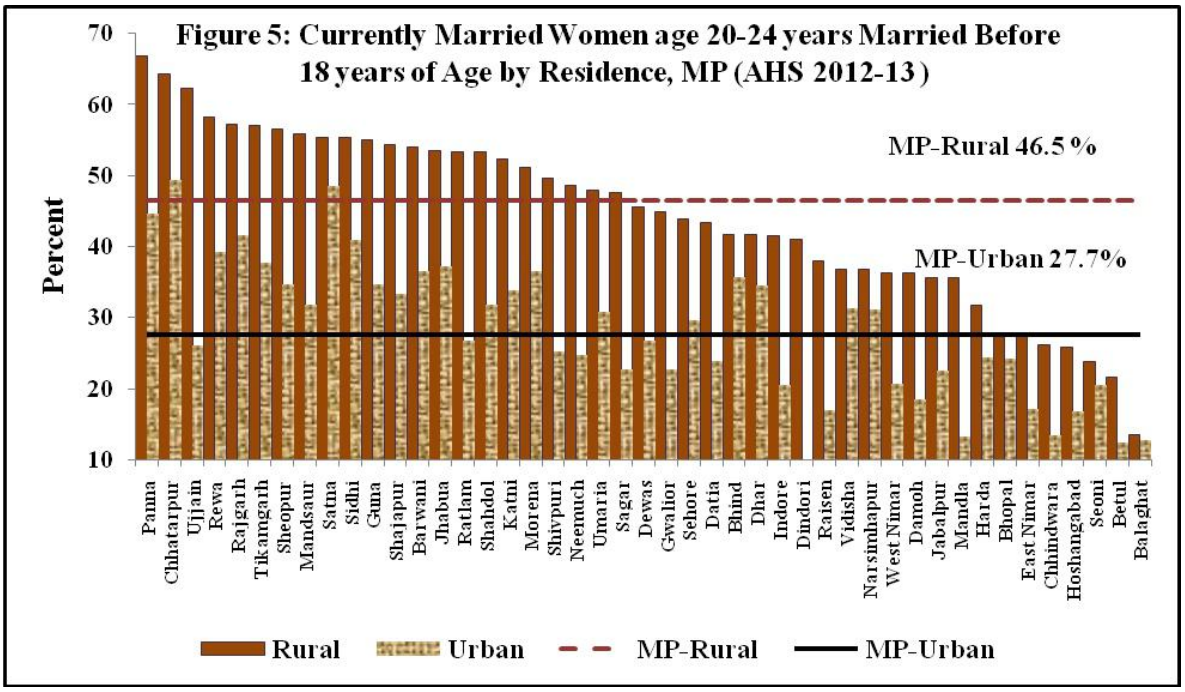
Demographic Profile of Women in MP:

Among demographic indicators age at marriage and teenage fertility are important variables which highlight women's status in society.

Age at Marriage: The Child Marriage Restraint Act of 1978 has set the minimum age for marriage for girls at 18 years in India. NFHS-3 (2005-06) provided data that 53 per cent of the women of age group 20-24 were married by the age of 18 years in MP. An early age at marriage typically curtails women's access to education and radically restricts time available to develop and mature personally unhampered by responsibilities of marriage and children. Young brides are also unlikely to be accorded much power or independence. An early age at marriage also has many negative health consequences for women. For

example, an early age at marriage typically results in early childbearing, which in turn increases the risk of maternal and child mortality.

In addition, young women married early may be subject to a higher risk of infection due to prior sexual experience of their older partners combined with their inability to negotiate safe sex as a result of their own young age and immaturity and, often, large spousal age difference. Women in rural areas of MP are still marrying early as seen in Figure 5.



Teenage Fertility: Teenage fertility is represented by married adolescents in the age group 15-19 years who are mothers. Although there is a decline in fertility, teenage fertility is still high both in India as a whole as well as MP. Table 8 shows that as far as teenage fertility is concerned 46 percent of all women, 45 percent SC and 54 percent ST married adolescents in the age group 15-19 (Census 2011) are mothers in MP. The corresponding figures for India are 47, 49 and 50 percent respectively (Table 8).

Table 8: Percentage of Teenage Mothers by Social Groups and Residence, Census 2011

India/State	Residence	All	SC	ST
India	Total	46.6	48.6	49.9
	Rural	46.9	48.5	50.0
	Urban	45.7	48.8	48.7
MP	Total	46.0	44.8	53.6
	Rural	46.2	44.1	53.6
	Urban	46.9	47.5	52.8

Another fact that is evident from Table 9 is that 10 percent each of all and SC women and 11 percent of ST women are teenage mothers with parity 2 and above in MP. The corresponding figures for India are 10 percent each for all the groups. In rural areas of MP the proportion of teenage mothers with parity 2 and above increases to 12 percent for SC and ST women but this proportion is slightly less than the proportion of all mothers from rural areas of India as a whole (13 percent). Teenage fertility is a precursor to poor maternal health and contributes to maternal mortality.

Table 9 : Percentage of Teenage Mothers with parity 2 and above by Social Groups and Residence, Census 2011

India/State	Residence	All	SC	ST
India	Total	9.8	10.2	10.2
	Rural	12.8	12.7	11.1
	Urban	10.2	10.7	10.5
MP	Total	9.9	10.0	11.3
	Rural	9.7	12.0	11.9
	Urban	10.8	11.0	11.8

Conclusion:

An examination of indicators for which trend data are available shows that the progress towards gender equality and women's empowerment remains very slow in Madhya Pradesh. Female disadvantage in education during youth (15-24 years age group) is marked in comparison to males, because youth literacy is an indicator of better access to opportunities. Women's representation in the formal sector is extremely low, which is a pointer to poor economic empowerment and economic decision making. Lack of amenities in female headed households is more evident in rural areas, most among ST women highlighting deprivation for them. Age at first marriage continues to be very low in MP with nearly half the girls marrying below the legal age at marriage in rural areas. These are areas of concern and the state must adopted a multi- pronged approach to ameliorate the condition of rural women belonging to ST groups. Ultimately from capability deprivation to capability enhancement would be a precursor to women's empowerment In Madhya Pradesh.

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A Study on Establishment of NRCs and its Utilization in the Northern Karnataka

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Abstract : ***Background****: Severe acute malnutrition (SAM) is the most serious form of malnutrition affecting children under-five, especially in developing countries. In India, nutritional rehabilitation centres (NRCs) have been recently established for the management of SAM to control and decrease the prevalence of severe malnourishment among children under-five. We aimed this study is twofold, firstly to understand the functioning of NRCs, and second to examine the effect of interventional measures on select anthropometric indicators.*

Methods and materials: *A cross-sectional study involving review of records of all SAM children admitted during 1st January-31st December, 2014 in four districts with NRCs of Northern Karnataka, India and the data was collected during January, 2015.*

Results: *Sufficient infrastructure, equipments and supplies are available at each visited NRC. Availability of exclusive and trained health personnel is very poor. Further study observed that, the absence of involvement of frontline worker is affecting the program. Of 722 admitted SAM children, 313 (43.4%) were boys and 409 (56.6%) were girls. the highest proportion of the children (around 78 percent) belongs to the age between 7 to 36 months and mean age 27 months. A statistically significant difference was obtained between the weight of children at admission and discharge (t=29.180, P<0.000). The children who stayed for a stipulated period of 14 days were fully recovered and discharged from the centre compared to those stayed for lesser period. Poor follow up visits of discharged children are observed for 19 percent in first follow up visit and none in fourth visit. The average bed occupancy rate was 40%.*

Conclusion: *This study observed that, as such there is no major issue on fund flow and establishment. However, exclusive and trained health personnel are required to effective implementation of the programme. Further, it is showed that, NRCs were effective in improving the condition of admitted children, but the utilization of these NRCs was sub-optimal in Karnataka. Some children did not reach the NRC, while many of those who did were either not got admitted or discharged against medical advice. This study pointed to a number of operational issues that need to be addressed if these NRCs are being used effectively to its potential capacity.*

Keywords: Nutritional interventions, NRC, SAM, Therapeutic feeds, Karnataka, India.

Acknowledgment: We thank MoHFW, GoI for its financial support for undertaking this study.

Introduction and Background

Severe Acute Malnutrition (SAM) is a major public health problem, especially among under- five children in developing countries. Malnutrition is more common in India than in Sub-Saharan Africa which made India ranked 2nd in the world on the number of children suffering from malnutrition after Bangladesh. The prevalence of underweight children in India is among the highest in the world, and is nearly double than that of Sub-Saharan Africa. Every third malnourished child lives in India and approximately 43% of the under-five population in the country are moderate to severely underweight (thin for age), 48% are moderately to severely stunted (short for age) and 20% moderately to severely wasted (thin for heig.

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Karnataka as a state has achieved improved health indicators over the past decade and performing well in these health and nutritional indicators as compared to some northern states. However, uneven access to quality public health facilities across the state, particularly in the northern districts, along with suboptimal utilization of the primary health care system especially for emergency care of women, newborns and children, effective integration of health concerns with other determinants of health like sanitation, hygiene, nutrition, safe water pose a big challenge. Hence, some districts of Karnataka, especially in northern part, are considered backward and prone to the health of children and women.

SAM remains a major killer of children as mortality rates in children with severe wasting - a widespread form of SAM - are nine times higher than those in well nourished children. India's third National Family Health Survey (NFHS-3) indicates that the prevalence of severe wasting is 6.4 percent as per WHO Child Growth Standards. Therefore, at any point in time an average eight million Indian children under age five years are severely wasted and are dangerously undernourished to survive, grow and develop to their full potential. In the state of Karnataka, NFHS-3 indicates that 5.9 percent of children 0-59 months old are severely wasted, which is second highest after Tamil Nadu (8.9 percent) in southern states of India [4] and recent round of District Level Household Survey (DLHS-4) reported around 14 percent severely wasted children in the state. The response to the SAM is led by NRHM and presently relies on a network of Nutrition Rehabilitation Centres (NRCs), where children with SAM receive therapeutic care following protocols based on the guidelines for the management of SAM by the World Health Organization (WHO) [10] and the Indian Academy of Paediatrics (IAP).

NRC: The facility-based management of children with Severe Acute Malnutrition (SAM) through the establishment of Nutrition Rehabilitation Centres (NRC) is an integral part of the state annual plans under National Rural Health Mission (NRHM). Nutrition Rehabilitation Centre (NRC) is a unit in a health facility where children with Severe Acute Malnutrition (SAM) are admitted and managed. In addition to curative care, special focus is given on timely, adequate and appropriate feeding for children; and on improving the skills of mothers/caregivers on complete age appropriate caring and feeding practices. Besides, providing medical treatment and nutritious food to malnourished children, the centre also creates awareness among parents on the need to ensure that their child follows a healthy diet. Even after the child is discharged from the centre, Medical officer from the primary health centres, ANM of SCs in their localities and ASHAs/AWWs monitor the health of the child.

As of September, 2013 there are 761 NRCs with 8,039 dedicated beds were functioning in India. Over 86 per cent of tribal districts had at least one functional NRC. The first of such centres in Karnataka was set up in 2011 and in a short span of 2 years the number of such centres has increased to 28 (18 under NRHM and another 10 were opened in hospitals under the Directorate of Medical Education).

Objectives

The specific objectives of the present study are:

1. To analyze the establishment, set-up and functioning of nutritional rehabilitation centres in selected districts of northern Karnataka.
2. To assess the utilization of nutritional rehabilitation centres in improving the nutritional status of children admitted.

Methods and materials:

Study Area:

Total four NRCs namely Dharwad, Belgavi, Gadag and Haveri located at District Hospital (DH)/Medical college premises in each district and one MNRC located at SDH, Kalaghatagi of Dharwad district have been covered in the present study. Fourth round of District Level Household Survey (DLHS-4) [8] recorded the lowest prevalence (15 percent) of anemic children in the age between 6-59 months for Dharwad district of Karnataka; hence Dharwad had been selected purposively. Further, to increase the numbers of NRCs covered and to add more numbers to the cases for service delivery data, another three adjoining districts to Dharwad have been purposively selected.

Data Collection and tools:

Three strategies have been adopted to achieve the study objectives. First, discussion has been held with the district level officials (RCH officer) on organization structure of NRC in the district, process, problems in implementation, trainings to the staff, equipment and supply etc. In addition to that, in-charge Pediatrician and Medical Officers (wherever available) of the selected NRCs were also interviewed to obtain their views on NRC using pre designed guideline.

Second, information have been collected regarding the establishment of NRC which includes the details on infrastructure, human resources, training, kitchen equipments and supplies, supply of pharmacy and consumables, ward equipments, etc. using a check list prepared on the basis of operational guideline for management of NRC provided by MoHFW.

Third, in order to understand the effect of nutritional intervention, service delivery data have been collected about the admitted children during 1st January, 2014 to 31st December, 2014 in the selected

NRCs. Appropriate formats have been prepared and used to collect data. The details such as in-patient (IP) number, name and address of the child, place of residence, date of admission and discharge, age, sex, religion, weight at admission and discharge, MUAC at admission and discharge, referred by, SD grade, complications, duration of stay, outcome, weight gained, and follow-up visits.

The data were collected from service registers for 163 children from Dharwad NRC centre, 31 children from Modified Nutritional Rehabilitation Centre (MNRC) Kalghatagi, 128 children from Belgavi NRC, 169 children from NRC Gadag and 231 children from Haveri NRC. Hence, in total information has been collected for 722 children from four NRCs and a MNRC.

Analysis Plan: Retrospective service delivery data collected from these centre have been entered in the excel spread sheet and then converted into SPSS file. Variables such as ***duration of stay***, ***weight gain*** (kg and grams (g/kg/day)), and ***percent weight gain***, etc. have been computed using information on dates, weight at admission and discharge. Paired-sampled T test has been applied to observe statistical significant wherever necessary in addition to univariate and bivariate techniques. Results have been presented in absolute numbers, percentages, mean and standard deviation, etc. All analysis has been carried out in SPSS 17.

Results and discussions:

Establishment of NRCs:

Two types of NRCs have been established in all the visited districts, the first one Nutritional Rehabilitation Centre (NRC) and second one is Modified Nutritional Rehabilitation Centre (MNRC). To establish these centers as such no specific criteria had been followed in these districts, but one NRC at each district hospital or medical college hospital and one or two MNRCs have been established at SDH based on the availability of resource/infrastructure. Of the four visited districts, two NRCs are functioning in the medical college (Belgavi and Gadag) and two are functioning in the district hospitals (Dharwad and Gadag), Further there are 6 MNRCs functioning in the visited districts. In addition to this Dharwad district has additional NRC in the Karnataka Institute of Medical Sciences (KIMS). Dharwad and Belgavi districts have two MNRCs, whereas Haveri and Gadag districts have one MNRC in each district. As such there are no specific criteria for establishment of MNRCs; however Belgavi district has two MNRCs as it is having highest number of talukas in the state. All NRCs have been established in the year 2012.

Monitoring of NRC:

As mentioned in the guidelines district Reproductive and Child Health (RCH) officer and District Coordinator should be oriented on the implementation plan, operational guidelines, training material and Information Education and Communication (IEC) on SAM.

At the district level Reproductive and Child Health (RCH) Officer is in-charge for the NRC. But, none of the visited districts have designated officials to set-up/monitor the NRC activities in the district. However, District Nursing Supervisor (DNS) is responsible to collect monthly performance reports, compile and submit it to the Deputy Director (Nutrition) at state level. All visited districts have been received operational guidelines and fund for establishment. As such Belgavi Medical College has not received any fund since establishment as it is functioning under the Directorate of Medical Education, Karnataka.

Infrastructure, equipments and supplies of NRC:

Sufficient infrastructure, equipments and supplies are available at each visited NRC. All districts have separate ward/building which is closer to the pediatric wards; it is observed that NRC Belgavi is functioning in old building. Further Dharwad, Gadag and Haveri districts have separate new building/ward. Of the five visited NRCs/MNRCs, all have Nursing Station, Separate Kitchen area, enough space for patient and playing area, proper storage place, attached clean toilet and regular water supply. However MNRC Kalaghatagi doesn't have the separate Kitchen and Nursing station. Of the visited NRCs only Kalghatagi MNRC is having audio visual equipment like TV. In case of IEC materials, all of the NRCs having wall charts and displayed in NRC area only.

Human Resource:

The staff requirement for smooth and effective functioning of NRC (10 bedded) in the district, there shall be a medical officer, four staff nurses, one nutritional counselor, one cook cum care taker, two attendants/cleaner and one medical social worker. Table-A present the required and available human resources at the visited NRCs.

i) ***Medical Officer*****:** An exclusive medical officer trained in the management of SAM should be made in-charge for NRC to manage medical complications of admitted children. It has been observed that, none of the NRC has dedicated medical officers except Gadag. Thus majority of the NRCs are supervising and providing clinical management to the SAM children by the pediatric surgeons/medical officer of Paediatric department.

(ii) ***Staff Nurse:*** All together 17 staff nurses have been recruited and in positioned in visited NRCs, however health staff expressed that trained staff nurses have been deputing to other departments due to shortage of regular staff nurses. Hence staff nurses are having more work load due to severe shortage of all required human resource at NRC. It is major obstacle to provide quality services and care in the NRCs. This problem is observed in Belgavi and Haveri district.

(iii) ***Nutrition Counselor:*** Nutritional Counselor will play key role in the NRC especially to assess the feeding problem, individual counseling to mothers and give demonstration on making low cost

nutritious energy dense culturally acceptable and locally available child foods; and also provide group counseling on various topics like nutrition and malnutrition, hygiene and sanitation, infant and young child feeding practices, immunization, family planning etc. None of the visited NRCs have recruited nutritional counselor to deliver the above listed responsibilities, however these responsibilities are being managed by the staff nurse only, thus majority of the supportive care and effective counseling services are not being providing in the NRCs.

(iv) ***Cook cum Care Taker:*** The cook cum care taker will prepare special diet for children as prescribed by the medical officer under the supervision of the Nutrition counselor. Of the visited NRCs, cook cum care taker post is vacant in Belgavi district since establishment. Though staff nurses are being prepared F-75 and F-100 but food is being providing by the NRC which is prepared in common kitchen for general IPD cases. Further, in Kalaghatgi MNRC cook is available on call basis. In Haveri, Gadag and Dharwad NRCs having cook cum care taker and preparing locally available low cost nutritious energy dense food in the NRC only.

(v) ***Attendant/Cleaner:*** As such there is no designated attendant/cleaner in the visited NRCs; however cleaning activities are carried out by the hospital's D group staff.

(vi) ***Medical Social worker:*** The medical social worker should make a social assessment of the family and the community in which the child lives. He/She can facilitate linkages with local anganwadi, public distribution system and public welfare schemes as may be relevant to the child and the family. These are the main responsibility of the medical social worker but this post is vacant in all the NRCs. Hence these facilitating activities had not been found in any visited NRCs.

Table-A: Human resource status at NRCs in visited districts, Karnataka

Category (Required for 10 bedded NRC)	Dharwad	Belgavi	Gadag	Haveri	Kalaghatagi[a]	Total
Medical Officer (1)	1*	1*	1+1*	1*	1*	**1+5***
Staff Nurse (4)	3	3	4	4	3	**17**
Nutritional Counselor (1)	0	0	0	0	0	**0**
Cook cum Care Taker (1)	1	0	1	1	1	**4**
Attendant/Cleaner (2)	0	0	0	0	0	**0**
Medical Social worker (1)	0	0	0	0	0	**0**

*=Paediatric in-charge. [a]Kalghatgi is MNRC with 5 beds.

Training for the existing staff:

The training needs of different levels of staff would vary. The three categories of staff with different

training needs are as follows: Medical Officer, Staff Nurse, Nutrition Counselor, Cook cum Care Taker and AWW/ASHA. The existing staff of Paediatric wards of the District Hospitals/NRCs and Medical Colleges should be provided 'in-service' training in a phased manner. The objective of the training effort would be to ensure that all medical officers and nurses attending to children, including those posted in NRC are trained in 'Facility Based Care of Severely Malnourished Children'.

As per the guidelines, trainings have been conducted in medical colleges namely Karnataka Institute of Medical Sciences Hubli (KIMS) and Belgavi Institute of Medical Sciences (BIMS). Training was provided by the senior pediatricians of the medical colleges, who were attended trainers of training (TOT). Further details on components covered in the training, data on number of stakeholders and duration of the training was not available in the visited districts. However, required information has been collected by the NRC staff during the visit. Table-B gives emphasis on number of NRC staff received training. Of the visited NRCs only two in-charge medical officers have been received training in the Belgavi and Gadag district. Of the recruited 17 staff nurses, 13 staff nurses have attended training program for three days. The discussion with staff nurses revealed that, trained staff nurses are not exclusively working for NRC, their duty has been shifting to other departments. This circumstance is exists in all the visited NRCs except Gadag district. Thus quality of services and awareness is not up to the mark, especially record maintenance and reporting is very poor. Of the four cook cum care taker, none of them have received training in the visited NRCs. One can infer that, the lack of dedicated staff and their poor training status will lead to the under utilization of NRC and also for poor quality of services.

Table-B: Number of NRC staff received training in the visited districts, Karnataka.

Category	Dharwad	Belgavi	Gadag	Haveri	Kalaghatagi[a]	Total
Medical Officer	0	1*	1*	0	0	**2***
Staff Nurse	2	3	3	2	3	**13**
Nutritional Counselor	NA	NA	NA	NA	NA	**NA**
Cook cum Care Taker	0	NA	0	0	0	**0**
Attendant/Cleaner	NA	NA	0	NA	NA	**0**
Medical Social worker	NA	NA	NA	NA	NA	**NA**

NA= Not appointed, *=Pediatric in-charge, [a]Kalghatgi is MNRC with 5 beds.

Funds to the NRC:

For establishment of NRCs one time fund has been given to all the visited NRCs except Belgavi district. The funds have been providing directly by the district program management unit (DPMU) to the district hospitals to manage and maintain the NRCs which are functioning in district hospitals. The

mode of money transfer is online to the district surgeon/chief medical officer's account. Belgavi NRC did not receive any fund from the Directorate of Medical Education, Karnataka since the establishment. Thus, Belgavi NRC is not providing wage compensation to the mothers and also facing difficulty to provide therapeutic diet to the admitted SAM children. However, NRC is providing diet for mothers and therapeutic food for children by preparing in the general kitchen of the hospital. Of the visited NRCs Gadag district has not faced shortage of funds, however Haveri district has faced the shortage of funds since last 8 months. Hence, staff opined that, the number of SAM children admissions had been drastically decreased in the Haveri NRC because mother's compensation has not been paid since last 8 months due to non availability of funds. Similarly Dharwad NRC was also not providing compensation since last 4 months due to lack of fund. There is no any shortage of fund for other dietary and medical supply except compensation.

Services available in the NRCs:

Children are admitted as per the defined admission criteria and provided with medical and nutritional therapeutic care. In addition to curative care, special focus is given on timely, adequate and appropriate feeding for children; and on improving the skills of mothers and caregivers on complete age appropriate caring and feeding practices.

Services for child: The visited facilities are providing medical and nutritional therapeutic care to the admitted SAM children. As such quality of service is good with respect to medical care in all the visited NRCs. Admitting SAM children after proper investigations of all necessary medical tests such as Blood test, Chest X-ray, Mantoux test, Urine and HIV test. Once these tests have been done, based on the diagnostic results child will get admission in the pediatric ward or NRC. If the child has been suffering from the associated/multiple medical causes then immediate medication will be initiated to child. Further, after complete cure of the persisting illness, the child will shift to the NRC for nutritional therapeutic care. The following procedures are followed at NRC, height, weight and mid upper arm circumference (MUAC) is being measured at the time of admission and discharge; however majority of children's MUAC was not recorded at the time of discharge. None of the NRCs have reported shortage of drug supplies. As far the nutritional therapeutic care is considered, it is observed that during the visit all NRCs have been providing F-75 and F-100. In addition to that, low cost nutritious energy dense food such as Ganji, Kichadi, Kardent and Halwa is being prepared as per the guideline and provided in

all the visited NRCs except Belgavi. It has been noticed that, few NRCs have been admitting Tuberculosis (TB) infected children in the same ward at NRC which can be adversely affect to other children.

Services for mother: Mothers and care givers should be involved in all aspects of management of her child. Mothers can be taught to: prepare food; feed children; bathe and change; play with children, supervise play sessions and make toys. Mothers must be educated about the importance of play and expression of her love as part of the emotional, physical and mental stimulation that the children need. In addition to these services, NRC has to be provided compensation to mothers.

As such none of the visited NRCs are providing effective ***counseling*** services to mother/care taker due to non availability of nutritional counselor. Hence counseling is done by the existing staff nurse. Further among the visited districts Dharwad, Gadag and Haveri NRCs have been ***demonstrated*** on food preparation by the cook cum care taker, whereas it is not found in Belgavi NRC. As per the recommended guideline ***wage compensation (Rs.100/day)*** is being provided in Dharwad, Gadag, Haveri and Kalghatagi NRCs to the mothers but Belgavi NRC is not at all made a provision as it is not received fund since establishment. None of the visited NRCs have providing free pick-up and drop back ***transportation*** facility for the mother and the child with SAM through JSSK. As mentioned in the guidelines ***incentives*** of Rs. 50 can be provided to ASHA for accompanying the child to the NRC and motivating the mother to stay for at least 7 days till the child is stabilized and has started to eat. Additional incentive of Rs. 50 may be given for each follow up visit by the child, up to a maximum of three visits. As such none of the visited districts have made such provision to provide incentives to ASHAs.

Background characteristics of admitted children:

Table 1 depicts the percent distribution of the children admitted to the centres during 1st January to 31st December 2014 in the selected NRCs included in the study. Results show that, the highest proportion of the children (around 78 percent) belongs to the age group between 7 to 36 months, 42.4 percent of the children were in the age group 13-24 months, followed by 25-36 months (18 percent), 7-12 months (17.9) and so on. The mean age for overall study population was 27.03 ± 15.19 months; for boys 26.32 ± 14.45 months and for girls 27.57 ± 15.66 months. The proportion of female child (56.5 percent) is more than the male child (43.4 percent) and rural category has a substantially larger proportion of the children admitted than the urban areas. Around 85 percent of the study population belonged to Hindu religion compared to 15 percent to the Muslim.

Table 1: Percent distribution of children admitted to the NRCs by background characteristics, 2014.

Background characteristics	Percent	N
NRCs		
Dharwad	22.6	163
Kalaghatagi[a]	4.3	31
Belagavi	17.7	128
Gadag	23.4	169
Haveri	32.0	231
Age (months)		
0-6	*	14
7-12	17.9	129
13-24	42.4	306
25-36	18.0	130
37-48	10.8	78
49-60	8.3	60
61 and above	*	5
Mean age ± SD		**27.03 ± 15.19**
Sex of the child		
Male	43.4	313
Female	56.6	409
Place of residence		
Rural	72.2	521
Urban	27.8	201
Religion		
Hindu	84.6	611
Muslim	15.4	111
SD grades		
I	9.1	62
II	32.7	222
III	39.1	265
IV	19.0	129
Mode of admission		
Frontline workers	16.2	117
OPD/Paediatric	22.9	165
NR	60.9	440
Complicated child		
YES	32.5	235
NO	16.1	116
NR	51.4	371
Outcome		
Discharge AMA	7.8	56
Discharge recovered	13.0	94
Others	79.2	572
Total	**100**	**722**

Note: N= number of cases, *= the cases are very low (less than 25) so percentages are not shown, [a]=Mini Nutritional Rehabilitation Centre (MNRC) with 5 beds.

Nutritional status, mode of admission, complications and outcome:

Approximately, 90 percent of the admitted children were recorded moderate to severely malnourished at the time of admission. Hence, around 58 percent children were severely malnourished (Grades III and IV), while 33 percent children were identified as moderately malnourished (Grades II) and 9

percent children suffered from mild malnutrition (Grades I). Information on mode of admission, complications and outcomes has not been recorded for the substantial proportion of the study population i.e. 61 %, 51% and 79% respectively. It may be due to the lack of training of staff and poor supervision from the district officials. One more observation extracted from the discussion with the staff nurses is that, the SNs who have trained for NRC are being deputed in other departments; hence it leads to the poor maintenance of records.

Result of analysis among the children to whom these response had been recorded indicates that, 41 percent of the children had brought by frontline workers and remaining were referred by the OPD/Pediatric ward; two third of the children were suffering from any one of medical complication; and 63 percent had recovered and discharge from the centre, while remaining 37 percent had discharge against medical advice (these percentages for mode of admission and discharge were calculated after excluding the cases to whom the responses were not recorded) **(Table 1)**. It has been expressed by the staff that, the reasons for the discharge against medical advice (DAMA) are; the compensation given to mothers is less than their earnings, there may be no other family members to look after other siblings at the home, and more specifically, among the general population the SAM is not considered as the cause to admit the child to hospital.

Mean weight at admission and discharge by sex:

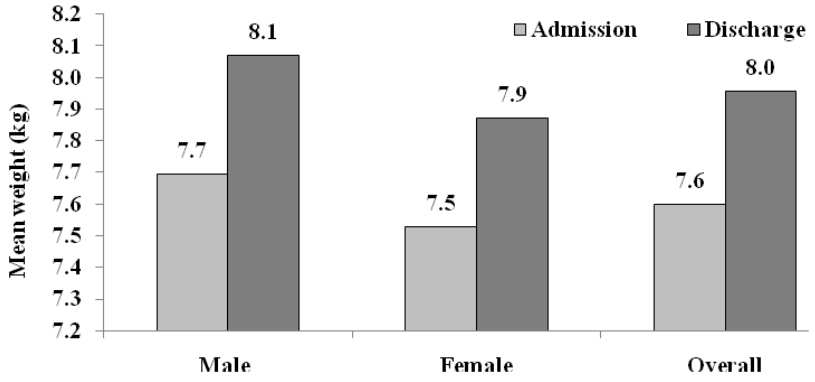

Figure 1: Mean weight at admission and discharge

The overall mean weight at admission for overall children was 7.60 ± 2.01 kg; for boys 7.69 ± 1.96 kg and for girls 7.53 ± 2.04 kg. Similarly, the mean weight at discharge for the study group was 7.96 ± 1.97 kg; for boys 8.07 ± 1.89 kg and for girls 7.87 ± 2.02 kg **(Figure 1)**. A statistically significant difference was observed between the mean weight at discharge and the mean weight at admission for the study group (t=29.180, P<0.000) and for boys (t=17.496, P<0.000) and girls (t=24.051, P<0.000) separately using Paired-sampled T test.

Percent distribution of mean weight gain by sex:

The discharge criteria recommended in the guideline suggest, at least 15 percent weight gain during the stay at the centre [2]. Results presented as percent gain reveals that, though, around 90 percent of the children have gain some weight during the stay at NRC, major chunk have gained weight less than 8 percent, while only 4 percent children had achieved 15 percent gain in weights **(Table 2 and Figure 2**).

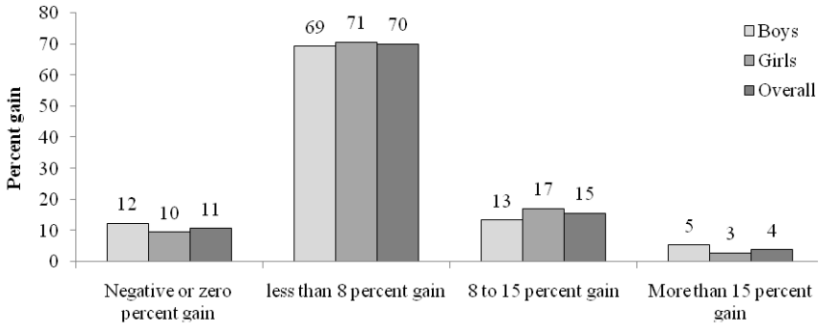

Figure 2: Percent distribution of children weight gain against weight at

Table 2: Distribution of percent gain in weight by sex (n=626).

Percent gain in weight	Boys	Girls	Overall
Negative or zero percent gain % (*n*)	12.27 (33)	9.52 (34)	10.7 (67)
Less than 8 percent gain % (*n*)	69.14 (186)	70.59 (252)	69.97 (438)
8 to less than 15 percent gain % (*n*)	13.38 (36)	17.09 (61)	15.5 (97)
More than 15 percent gain % (*n*)	5.2 (14)	2.8 (10)	3.83 (24)
Total	**100 (269)**	**100 (357)**	**100 (626)**

Mean days stayed at NRC by outcome:

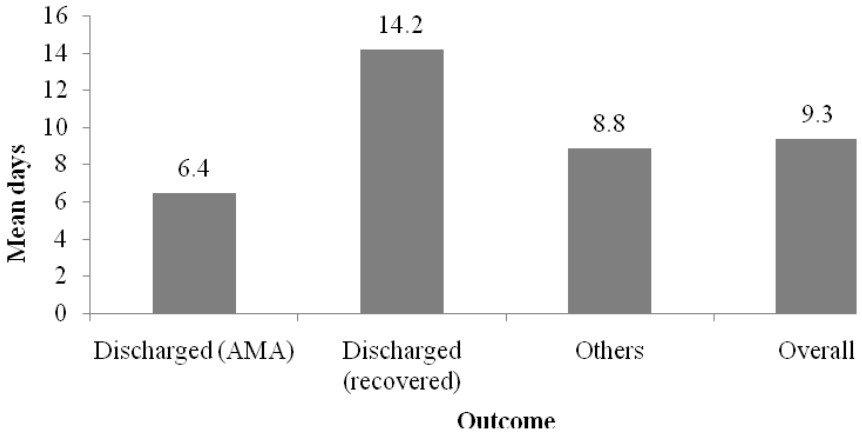

Figure 3: Mean day stayed at NRC by outcome. AMA=Against Medical Advice

Figure 3 presents the information on the duration of stay at the centre by outcome. The data collected in these selected centre reveals that, for around little less than four-fifth of the total admitted children records did not maintained on outcome whether they discharged from the centre or referred, etc. **(Table 1)**. The duration of stay at the centre calculated as mean days, and the overall mean duration of stay was 9 days.

Table 3: Distribution of mean day stayed at the centre by outcome, nutritional status.

Outcome/SD grades	Number (%) of children	Duration of stay	
		Range (days)	Mean ± SD (days)
Outcome			
Discharged (AMA)	56 (7.87)	0-27	6.45 ± 6.16
Discharged (recovered)	94 (13.20)	2-28	14.16 ± 3.65
Others	562 (78.93)	0-24	8.82 ± 4.35
Total	**712 (100)**	**0-28**	**9.34 ± 4.85**

The distribution of duration of days stayed by outcome reveals that, the children recovered and discharged from the centre was stayed around 14 days and it is 6 days for the children discharge against medical advice (DAMA) **(Table 3 and Figure 3)**.

Bed occupancy rate by NRC:

Bed occupancy rate is one of the important indicators to assess the utilization of nutritional rehabilitation centre to it potential capacity. The effective utilization of NRCs in terms of admission has been analyzed using the data on the numbers of NRC beds and total days of stay of children admitted. The expected bed days available in each NRC (10 bedded) and MNRC (5 bedded) were 3650 and 1825 respectively.

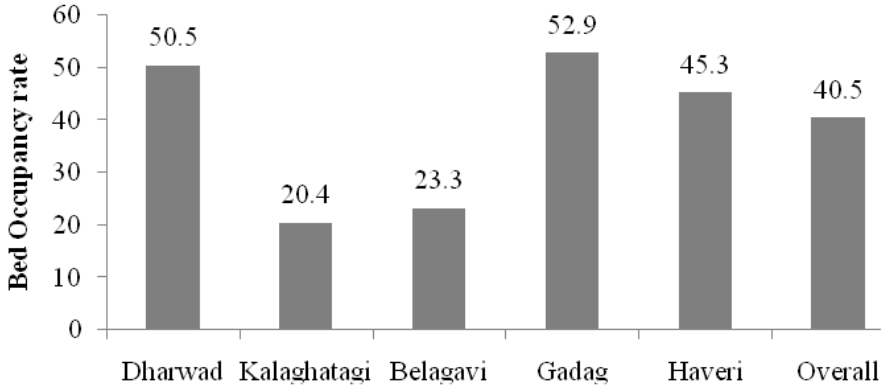

Figure 4: Bed occupancy rate in percent at visited NRCs.

Table 4: Distribution of NRCs by availability of expected bed days, actual bed days occupied and bed occupancy rate, 2014.

NRCs	Actual bed days occupied (*n*)	Expected bed days available (*n*)	Bed occupancy rate (%)
Dharwad	1842	3650	50.47
Kalaghatagi[a]	373	1825	20.44
Belagavi	849	3650	23.26
Gadag	1932	3650	52.93
Haveri	1655	3650	45.34
Total	**6651**	**16425**	**40.49**

Note: [a]MNRC with 5 beds.

The actual bed days occupied has been calculated on the basis of the duration of each child stayed at the centre which summed up to 6651 days. Further, bed occupancy rate had calculated, the Overall average bed occupancy rate for the selected centre was 40 percent; hence, results indicates that, all the visited NRCs had been underutilized its potential capacity that to less than half of its capacity, only Dharwad and Gadag NRCs are better where bed occupancy rate is more than 50 percent, i.e. 51 and 53 percent respectively (**Table 4 and Figure 4**).

During the discussion with the official, it had been revealed that, poor referral and DAMA are the main reasons for under utilization of NRCs. The front line workers were not effectively referring the SAM cases to the NRCs, they opined that, it may be because of many reasons; firstly, they were not being provided incentives and transportation for accompanying the children, there is lack of effective cooperation between stake holders, and lack of publicity regarding the programme among the general population, etc.

Follow-up visits:

Table 5 present the age and sex wise distribution of the children at each follow up visits. From the 722 children for which initial anthropometric data were analyzed, 10 children were excluded because the time between discharge and data collection is less than 15 days for these cases for the first follow-up visit; thus, a total of 712 children were included for the follow-up analysis. Since there was no uniformity amongst the different study centres regarding the recording format for anthropometric indicators during follow-ups, only weight of the children at the various follow-ups was included in the final analysis.

Of the total 712 children available for analysis for the follow-up visits, only 125 children were reported for the first follow-up and 14 for the second visit. Similarly, hardly 5 children were available for the third follow-up visit, and not a single child attended the fourth visit. Among the children who had attended the follow up visits, majority is in the age group between 7 to 24 months and more girl child

was reported for visits. Dropout rates of 81.19%, 96.54%, 97.79%, and 100% were obtained at each follow up visit respectively for the four follow-up visits conducted at 15 days each for the first month, and once in a month for latter visits, from the day of discharge as per recommended guidelines (**Table 5**).

Table 5: Distribution of children by age and sex at different follow-ups (n=712).

Age group (months)	1st follow-up (n=125)			2nd follow-up (n=14)			3rd follow-up (n=5)			4th follow-up (n=0)		
	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total
0-6	01	01	02	00	00	00	00	00	00	00	00	00
7-12	15	16	31	03	04	07	01	03	04	00	00	00
13-24	27	34	61	02	04	06	01	00	01	00	00	00
25-36	09	09	18	00	01	01	00	00	00	00	00	00
37-48	06	03	09	00	00	00	00	00	00	00	00	00
49-60	01	03	04	00	00	00	00	00	00	00	00	00
61 and above	00	00	00	00	00	00	00	00	00	00	00	00
Total	**59**	**66**	**125**	**05**	**09**	**14**	**02**	**03**	**05**	**00**	**00**	**00**
Dropout rates at each follow-up visit	**81.19%**			**96.54%**			**97.79%**			**100.00%**		

The reasons for the poor follow up are being discussed with the official at the time of visit to the NRC. They expressed that, the majority of the cases are coming directly to the Paediatric OPD and not being captured under NRC data, there is no proper mechanism for the tracking of the children discharged from the centre at community level and there is no incentive provision for AWW to bring the child for follow up in addition to the lack of technical human resources like medical social worker etc.

Conclusion:

Some of the important issues have been identified based on the quantitative inputs and observations. As such none of the NRCs have scarcity of funds except medical college, Belgavi. MNRCs are not up to the mark as compared to the NRCs. This study pointed to a number of operational issues that need to be addressed i.e. Exclusive staff and adequate training is required for smooth functioning of NRC; strengthen the programmatic/key health personnel and active participation of frontline worker is very much essential. However in this study the quantitative analysis proved that, NRCs were effective in improving the condition of admitted children, but the utilization of these NRCs was sub-optimal in Karnataka. Some children did not reach the NRC, while many of those who did were either not got admitted or discharged against medical advice. The effective monitoring is required to proper implementation of the programme, and also awareness has to create among the community through frontline workers.

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Tobacco Related Diseases, So Far So Bad: An Empirical Evidence

V. B. Annigeri

Introduction

Tobacco is probably the single greatest cause of non-communicable diseases, (Bau K. 1989). It is likely to produce a world pandemic which has necessitated an early preventive action. The origins of tobacco has attracted great deal of controversy, and in recent times some of the researchers have tried to sort out the historical aspects of tobacco. In the year 1492 Columbus was offered some dried leaves by the inhabitants of Arawaks. Though there is a point of view that Chinese were growing and using tobacco much before Columbus invented America, but it has not been convincingly evidenced. The cultivation of tobacco dates back to more than 3000 years in the American continent. The expansion of its cultivation is ascribed to the Spanish and Portuguese in the continents of Europe, Africa and Asia. By the end of World War I, the mass production of cigarettes had begun and the mass consumption of tobacco products began in the late 1930s.

There are about sixty four species of tobacco originating from the botanical genus Nicotine. Out of these varieties only, two major types are grown widely all over the globe, namely, Nicotine tabacum and, Nicotine rustica. Tobacco is considered to be one of the widely grown commercial non food plant in the world. The major portion of the plant which gets consumed is the leaf. The leaf of the plant contains about 85-90 per cent of water. For storage and use the leaf need to be dried. After the stage of drying the process of curing would be taken up to make it fit for various consumption purposes. The curing is done to enhance the desirable qualities of the leaf and diminish the bad ones. The flue curing is more quicker and quite regulated while the process of air curing depends on natural weather conditions. Though curing makes the tobacco fit for consumption, the leaf would be tastier due to fermentation over the period of years. It has been established that nearly for five years the leaf would be intact without losing its characteristics.

There is a distinction between dark and light tobacco which is based on the color of the respective tobacco. Light one which is generally a milder variety is used for producing cigarettes. The dark tobacco has greater strength and its use is for various purposes. The following explains various types of tobacco, method of curing and the purpose of their use.

Chart 1

Method of curing	Type	Use
Air	Virginia, Barley Amarelo Cigar Local	pipe, chewing Cigarettes & snuff Cigars All uses
Sun	Oriental	Cigarettes, pipe
Fire	Local, Virginia	All, Pipe, cigarette & chewing
Flue	Virginia, Amarelo	Cigarette, pipe

1. Professor and Director CMDR Dharwad.

Air curing refers to the exposure of the picked leaves to the natural atmosphere by suspending in a shaded structure. This may be in the form of a roof or a carefully constructed barn. Sun curing consists of exposing the picked leaf to the full rays of the sun for the majority of the curing period. Majority of the oriental tobacco is of the sun cured type. In case of flue-curing as soon as the leaves are picked from the plant the moisture is completely removed using the charcoal instead of wet wood. As soon as the curing is complete the tobacco does not become useful for consumption, the manufacturer blends various types of tobacco to make the finished product for the consumer.

Given a brief introduction of different category of tobacco and mode of their use, current study has planned to see type of tobacco product consumed and health status of consumers. The cross sectional survey made in Nippani region of Karnataka. Attempt is made to analyze the results across different social groups. In order to understand different facets of tobacco consumption and the factors which would influence addiction to tobacco consumption, a total of 500 respondents consuming tobacco were surveyed. Out of this total sample 50% of the respondents were selected randomly from the rural areas and rest of the 50% from taluka headquarters representing urban areas. This selection of consumers of tobacco in the chosen regions was done randomly by planting the investigators near the 'distribution centers' of tobacco products that is pan shop, cigarette/bidi shops etc. We followed this method because there does not seem to be any alternative method of identifying who is a tobacco consumer and where he/ she stays. Consumers of tobacco so selected were followed to his / her respective residence to collect the necessary socio-economic data about the person and the family members.

Tobacco Consumption and Related Diseases: An Overview Pattern of Tobacco Consumption in India

In the Indian context smoking is practiced in the form of cigarettes, bide, chutta, dhumti, hookhi, chillum and hookah. Cigarette smoking is a habit which has come from the west. There are about 100 brands of Cigarettes which are produced out of 30 per cent of the tobacco produced in India. (Lee 1975). Smoking of cigarettes in India is concentrated in urban areas with very few people opting for it in rural areas. Bides are the most popular form of tobacco use in rural areas. Bides are made by rolling a dried tendu leaf 0.15 to 0.20 grams of sun-dried tobacco into a conical shape which tied with a thread. The flat end of the bide which hardly contains any tobacco is kept in the mouth during smoking. Bides are smoked throughout India and some of the studies have shown that about 67 per cent of men and about 13 percent of women smoke bides in rural areas (Bhonsale et. Al. 1992). Cigars are made of air cured fermented tobacco which are expensive and hence found only in urban areas.

Cheroots are small cigars made up of heavy bodied tobacco without any wrapper. Very few people

consume tobacco in this form. Chuttas are the raw form of cheroots which are made by rolling a tobacco leaf into a cylindrical shape. The consumption of this is mainly found in coastal areas of Andhra, Tamil Nadu and Orissa. In some specific regions of these states people smoke chutta in the reverse manner, i.e. the burning part of the chutta would be inside the mouth atleast for the initial puffs. In the Konkan belt we find smoking of Dhumti which is made by rolling tobacco in the leaf of a jack-fruit leaf, banana leaf. Yet another form of smoking is found in the form of Hookhi, which is a clay pipe with wooden tip towards the mouth. Such type of smoking is found in the state of Gujarat. In the northern part of India we find Hookah in which tobacco is passed through water before inhaling because of the belief that it is safe to use tobacco after passing it through the water. At the top of the hookah we find a clay bowl to hold tobacco and this is joined to a wooden stem which brings in tobacco to the water container at the bottom. A wooden smoking pipe is attached to the water container from which people inhale tobacco.

Apart from these various smoking habits tobacco is also used orally and such smokeless use of tobacco is widely prevalent all over India. In the ancient times the consumption of such tobacco was in the form of 'PAN' or the betel-quid. The pan consists of betel leaf, areca nut, slaked lime and catechu. As the time lapsed tobacco became an important element of pan. In recent times we find large scale of consumption of tobacco in the form of Pan Masala which contains tobacco nick-named as Zarda. Apart from these various forms tobacco is also consumed in the form of Mawa, a raw preparation of tobacco quid along with lime, areaca nut and other ingredients.

Though many diseased associated with tobacco have been for more than thirty years, only in recent years the association has been confirmed. Some of the studies which have dealt with this relationship have concluded that tobacco use is a significant cause of disability and premature death (WHO 1986, USDHHS 1989). World wide about 3 million premature deaths are resulted from the use tobacco. In case of mortality, diseases like lung cancer and ischemic heart diseases are considered to be causing greater damage. The toxic elements present in tobacco are considered to be the sources for the diseases that result from its consumption.

Evidence from the Literature

Some of the epidemiological studies have established the relationship between the sue of smokeless tobacco and oral cancer (Winn et.al. 1981). Other attempts in the United States have also brought the fact that there is a strong association between drinking and cigarette smoking (Bolt et.al 1988). The laboratory experiments have shown that there is a good deal of carcinogens in the tobacco which cause cancer to the consumer. The International Agency for Research on Cancer, National Institutes of Health Consensus Conference Panel of the U.S. and the Advisory Committee to the U.S. Surgeon General have brought out number of studies establishing a link between smokeless tobacco and the

occurrence of cancer. Cigarette smoking causes variety of medical complications in the form of coronary heart disease, chronic obstructive pulmonary disease, cancers of the lung, larynx, esophagus, oral cavity and pharynx (Paffenbarger and others & Gortmaker and others 1992). In India, the tobacco associated risk ranged from 70 per cent to 84 per cent for or pharyngeal cancers (Jayant and Yeole 1998).

The debate about the occurrence of oral cancer from smokeless tobacco is still inconclusive. However some studies have documented the a causal relationship between oral soft-tissue lesions and the use of smokeless tobacco (Green and Poulson 1983). It was found in the U.S. that school going children who were using smokeless tobacco were detected to be having Oral lesions which was found by the trained oral examiners. As the smokeless tobacco contains high percentage of nicotine it may lead to other health hazards also. Increased blood pressure and heart rate can be considered as an aftermath of smokeless tobacco consumption. An epidemiological study has reported that smokeless tobacco can led to hypercholesterolaemia (Tucker 1999).

A study on smokeless tobacco (Winn D.M. 1992) revealed that in recent times there has been a revival in the use of smokeless tobacco in USA. This habit usually preludes smoking and alcohol drinking. Smokeless tobacco contains carcinogens of which tobacco specific nitrosomines are quite significant. The study quotes many clinical evidences showing tobacco as a high risk factor for oral cancer, for example the following table gives the details about prevalence of oral soft tissue lesions among non-smoking tobacco users.

A study by Sasco A.J. (1992) tried to estimate the tobacco related cancer burden, and in so doing it felt the need to have a data base on mortality or preferably morbidity, prevalence of tobacco use in various forms, the precise relationship between tobacco use and diseases. Depending on the availability of the data the study made use of various approaches and estimated that there were about 6.35 million incident cases of the most frequent cancers in 1980. Of these 49% occurred in the developed and 51% in developing countries. It was also estimated that 1 to 1.5 min cancers per year are due to tobacco use. The study also found that substantial reductions in the incidence of cancer can be achieved by the elimination of tobacco. The following table gives possible reduction in the incidence of the cancer due to elimination of tobacco.

Table 1 : Possible reduction of Cancer by quitting tobbacco

Site of cancer	Possible reduction (%)
Oral cavity	60-80
Oesophagus	75
Pancreas	30
Lung	80-80 (males) 60-80 (females)
Larynx	85
Cervix	20-25
Bladder	30-70
Kidney	30-40

The large scale cohort study carried out in Japan from 1966-1981 revealed that 9106 deaths occurred among 91405 non-smoking wives who had smoking husbands. Lung cancer, ischancemic heart disease and other selected cases of death were measured according to the extent of the husband's smoking habit. In addition to lung cancer the study revealed significatantly elevated risks for nasal sinus cancer, brain tumor, in non-smoking woman with heavily smoking husbands as compared to those with non-smoking husbands.

A study by Jayant & Yeole examined the site specific rates of cancers of the upper alimentary and respiratory tracts over two decades among males in Bombay and it was found out that the incidence of the cancer of the tongue oraphrynx and larynx have decreased significantly. Whereas that of oral cancer excluding the tongue has remained more or less stable. The study also worked out the risk factors arising out of the tobacco consumption which is shown in the following table.

Table 2 : Risk Factors in smokers and chewers for tobacco Related cancer

Site of cancer	Type of Tobacco usage			
	S	C	SC	Cgs
Oral cavity Excluding base base of tongue	2.8	6	10.1	1.5-3.0
Pharynx Oraphrynx including the base of tongue	11.8	3.3	31.7	
Hypo pharynx	3.6	6.2	16.9	
Esophagus	2.2	2.5	6.2	
Larynx	7.7	4.6	20.1	
Lung (Bidis)	3.4			
(Cigarettes)	2.4			

S= smokers C=chewers SC = smokers & chewers Cgs=cigarettes

Source: Jayant K. and B.B.yeole Challenges in Tobacco Control in India: A Historical Perspective, in Gupta P.C. and others (eds) Control of Tobacco Related Cancers and Other Diseases, Oxford University Press, Bombay.

A study by Gortmaker S.L. & others (1992) carried out by the Harvard School of Public Health and Harvard School of Medicine, found out that smoking during pregnancy leads to higher infant mortality by increasing several risks including that of low birth weight. It estimated that about 10 per cent of infant deaths and 19 per cent of low birth weights of babies could be prevented in the USA if smoking by mothers during pregnancy could be eliminated. The study also documented the fact that about 22-31% of very low birth weight births, 17% of childhood asthma and 38% of childhood asthama

requiring medication could also be prevented if maternal smoking were eliminated.

A study by Krishamurthy S.1992 in which clinical evidence has been established, which shows that smoking by mothers can affect the feotus during pregnancy via an intrauterine pathway or after childbirth through passive smoking via airborne pathway or breast feeding. It was found out that maternal smoking has a risk of 98% for coronary heart diseases, 77% for total cardiovascular diseases. The risk keep on increasing steadily as the doses of smoking increase.

The epidemiological studies reviewed by Notani P.N. (1989) have established beyond doubt that cigarettes smoking is the major cause of cold and among non-smokers clinically significant cold is a rare event. Clinical examination of the smokers has revealed that irritants in the smoke are found to cause airway resistance which ultimately leads to pathologic changes in the airways. The studies which have probed the bidi smokers have shown that the immediate effect of smoking is seen more on central airways and the effect on peripheral airways is equal to both bidi and cigarette smokers. The conclusions reached form the studies indicate that the risk of cold in bidi and cigarette smokers is likely to be similar and that there is also a like likelihood that the disease may get initiated early in bidi smokers.

Based on the limited data it has also been estimated that (Jayant K and A.A Mahashur 1989) the morbidity due to cold ranges between 15 to 29 million and mortality between 0.25 min to 0.4 min. Based on the secondary data Krishnamurthy S.(1989) estimates that 10-60% of 15 to 44 year old women chew tobacco. The impact of such tobacco use and the resulting preventable reproductive outcome is estimated to be approximately 17% of the perinatal mortality. Besides such direct effects the study also highlighted indirect effects of such tobacco use like, Infantile and childhood morbidity and mortality, Low birth weight and maturity, Malnutrition due to diversion of scanty purchasing power from nutrition to tobacco.

Other associations with maternal or parental smoking are, Infant death syndrome,Nicotine transfer via breast feeding and excretion by the neonate in saliva and urine. Infantile bronchitis and pneumonia. Impaired physical, mental and emotional development.

The above discussion tries to highlight the effects of tobacco consumption, which are quite damaging to the health status of the community. Some of the studies which have probed the issue further have attempted to establish the linkage between various diseases arising out of the consumption of tobacco as well as passive consumption of tobacco. Many studies have shown that tobacco leads to cardiovascular diseases, cancer and accidents. It has also been concluded that use of tobacco causes disability are also quite significant, which only means that cessation of tobacco would be beneficial not only individuals in particular but also to the society as a whole. In this context it may be useful to take note of the findings of the study by USDHHS (1985),

Smokers take 50 percent more sick leave; The risk of death is double for smokers than non-smokers; 2 to 6 percent working hours are lost due to smoking; suffering to the non-smoking workers. Such dark effects of tobacco make a strong case for not only reduction of its consumption at the earliest, but also its production in a phased manner from our society.

Tobacco Chewing and Related Health Issues; Evidence from Primary Data

A closer look at the data reveals that the habit of tobacco consumption gets started at the average age of 21 for males and 22 females. The overall mean age of initiation of tobacco habit takes place at 21 years. The following table shows us the social category wise consumption of tobacco.

Table 3: Consumption of tobacco by social group

Social Category	Cigarette	Biddi	Gutkha	Raw Tobacco	Snuff	Total
Sc/ ST	14.12	22.35	23.53	38.82	1.18	100
OBC	8.47	26.27	22.88	41.53	0.85	100
Others	9.58	20.66	26.05	42.81	0.9	100

From the above table we can note that people belonging to socially backward groups (SC/ ST and OBC) are consuming large doses of tobacco as compared to the socially forward groups. Within different varieties of tobacco consumption greater concentration is found in the consumption of Bidi and Gutkha. This may be due to the fact that these are cheaper varieties of tobacco suitable to the income levels of socially backward people. The age sex consumption of consumers reveals the following pictures as depicted below.

Table -4 : Age Sex Composition of Tobacco Consumers

Age	Cigarette			Bidi			Gutkha			Raw Tobacco		
Group	M	F	Total	M	F	Total	M	F	Total	M	F	Total
<15	0	0	0	0	0	0	3	0	3	0	0	0
16-34	32	0	32	27	0	27	115	1	116	89	1	90
35-54	18	0	18	62	0	62	9	0	9	72	12	84
55+	4	0	4	30	0	30	6	0	6	47	4	51

From the table we can note that females are very few in number as far as tobacco consumption is concerned, and they absolutely do not consume smoking tobacco in this particular region. The mean age of initiation of tobacco habit which is 21 coupled with greater concentration of consumers in the age group of 16 to 34 and 35 to 54 indicates that the working population is more addicted to the

consumption of tobacco, of any variety. The table also shows that younger population of 16 to 34 is inclined towards consumption of Gutkha while the older age group of 35 to 54 is likely consumption of raw tobacco or betel quid. People above the age of 55 either smoke bidi or take up consumption of raw tobacco.

Table -5 :
Educational Status and Tobacco Consumption
(Percentage)

Educational Status	Smoking	Chewing
Illiterate		
1-4	16	19
5-10	23	12
11-12	38	23
Graduate	9	9
and above	9	2

From the table we can see that about 16% of smokers are illiterate and majority of smokers are found in primary and higher secondary educational levels. Some pattern is also found for chewers of tobacco. From the table we can also note that as the education level increases the percentage number of tobacco consumers is declining. From this we may infer that as the educational level increases there is a likelihood that the habit of tobacco consumption will decline.

The following table shows that break-up of domestic consumption expenditure on different items including expenditure on tobacco consumption.

Table-6 : Percentage share of consumption expenditure

Items of Expenditure	% of Expenditure
Food	52.04
Clothing	23.04
Education	5.99
Festivals	11.85
Tobacco	7.07
Any other	0.01
Total	100.00

It can be noted from the above table that food and clothing are the major items of expenditure of the family of tobacco consumers. The expenditure on tobacco consumption constitutes about 7% of the domestic expenditure. This indicates that quite a significant amount is spent on tobacco which otherwise would have been used for other family expenditure in support of the family members. With regard to episodes of sickness experienced by the consumers, it should be noted that we were not able to

directly link the sickness experience with tobacco consumption. But we wanted to know whether the consumers of tobacco have experienced sickness episodes during the reference period (that is one months) which probably might be related to the consumption of tobacco. The following table gives us the percentage number of consumers who experienced and also duration of sickness.

Table-7

(Percentage)

Nature of Consumption	Number of Sick	Duration of Sickness
Smoking	32.03	46.42
Chewing	43.26	46.42

The table shows that greater percentage of consumers experienced sickness episodes who chewing tobacco as against smokers. As against this the quantum of duration of sickness was more in case of smoking than chewing, which probably indicates that sickness would be more prolonged for smokers. As a corollary to this we tried to understand the subjective opinion of tobacco consumers about the self evaluation of their own health status before and after the initiation of tobacco consumption habit. The responses were quite interesting which are produced in following table.

Table-8 : Option About Health Status

(Percentage)

Status	Good	Average	Bad
Before Consumption of Tobacco	72	21	26
After Consumption of tobacco	46	45	46

The table shows that 72% of the consumers opined that their health status was good before taking up tobacco consumption and only 46% felt that their health status is good after they have started consuming tobacco. About 26% of the consumers felt that their health status was bad before addiction to tobacco consumption and their number increased to 46% after the habit got initiated. Thus the overall message is that people considered themselves to be in good status of health prior to the habit of tobacco consumption and as they started addicted to tobacco there was an increase in the number of consumers who felt that they are experiencing a bad state of health. This gives us an indirect measure of tobacco consumption and health status and also the awareness among the people that tobacco consumption is injurious to health.

Finally, we also tried to capture why individuals take up consumption of tobacco, or what factors motivate them to start taking tobacco products. The responses have revealed that influence of the friends and parental consumption are the major factors influencing the non-consumers of tobacco to take up the consumption of tobacco. This is illustrated in the below mentioned table.

Table-9 Reasons for Consuming Tobacco	Percentage of Responses
1. Produced at home	2.8
2. Habit by Parents / other family members	25.6
3. Influence of friends	53.7
4. Experiencing Psychological Tensions	7.2
5. Advertisemenst	0.6
6. Any other	9.9

In sum we can say that the behaviour of the tobacco consumers reveals that on an average the consumption of tobacco as a habit gets initiated at the age of 21 years. People belonging to socially backward groups are consuming more than the socially forward groups. As far as smoking is concerned females have abstained from consumption of tobacco. Large number of consumers are found in the age group of 16 to 34 and 35 to 54. The education status of the consumers broadly reveals that there is a likelihood of reduction in the consumption of tobacco as the consumers education status improves. On an average about 7% of domestic expenditure is spent on tobacco related products. The episodes of sickness though may not be directly related to the consumption of tobacco gave some interesting clues in knowing an indirect effect of tobacco consumption on the health status of the people. Those who smoked tobacco have reported greater duration of episodes of sickness as against those who were chewing tobacco. The self evaluation of health status by the consumers indicated the fact that after people take up consumption of tobacco they have started feeling that heir health status has been deteriorating. This subjective expression is hinting at the awareness of the people about health hazards of tobacco consumption. Finally, the influence of friends' and parental consumption emerged as the major factors which induce non-consumers of tobacco to get started with tobacco consumption .

The US Surgeon General's reports on smoking and health has generated a good deal of debate on health hazards of tobacco consumption. As a result of this there were many efforts which aimed at understanding why people become addicted to the consumption of tobacco and how best we can concentrate our efforts to reduce its consumption.

Some of the studies related to this issue have tried to estimate the effects of cigarette prices and taxes on smoking participation and cigarette consumption. The general message which has emerged from these studies is that as the prices of cigarettes increases there is a significant reduction in smoking. The overall price elasticity of cigarette smoking was in the range from –0.3 to –0.5 (National cancer Institute 1993) other studies which have supported this argument are Lewis et. All (1981) and

Grossman et all (1983). However some of the other studies could not confirm the hypotheses of price sensitivity to smoking. Wasserman et-al (1991) and Chaloupka (1991) concluded the smokers behave more myopically and they were less responsive to cigarette prices. The literature which is developing on this issue is still not clearly indicating the effect of cigarette prices on smoking or the effect of any other government measure (banning of smoking in public places) on the smoking habits. In this background we have attempted to understand the factors which determine the habit of tobacco consumption, and we have taken past years of tobacco consumption as the surrogate for addiction to tobacco consumption.

To know more about the addiction behaviour of the consumers of tobacco, an attempt was made to understand the factors which would influence the addiction behaviour of the consumers. A multiple regression model was used to examine the addiction of different kinds of tobacco consumption. The model is described below

Y = +1X1+2X2+3X3+4X4+5X5+6X6+7X7+8X8+u

Where,

Y = number of past years of tobacco consumption
(Considered as proxy for addition to tobacco consumption)

X1 = Sex of the consumer
(dummy variable, if Male=1, O=otherwise)

X2 = Age of the consumer in actual years.

X3 = Caste of the consumer
(dummy variable, if Backward =1 O=otherwise)

X4 = Education status of the consumer
(in actual years of schooling)

X5 = Occupation status of the consumer
(dummy variable if Employed =1 O=otherwise)

X6 = Expenditure on tobacco
(percentage of tobacco expenditure out f total consumption expenditure)

X7 = Frequency of consumption of tobacco.

X8 = Perceived health status of the consumer
(dummy variable if Good=1, O=otherwise)

Separate regression equations were run for different kinds of tobacco consumption (Bidi, Cigarette,

Raw tobacco, Gutkha etc.) ad dependent variable.

These were,

Years of consumption of	Bidi
Years of Consumption of	Cigarette
Years of Consumption of	Gutkha
Years of Consumption of	Raw tobacco
Years of Consumption of	Tobacco all forms of consumption takes together)

The independent variable for all the equations were same as explained above. , 1…….8 are respectably the constant and the coefficients to be estimated and u is the error term.

Regression results

The regression results (presented at the end of the report) are as expected, and in all the equations the R2 value varies from 0.33 to 0.64 indicating that the models are good fit. Regression results for Bidi indicate that 47 per cent of the variation in addiction is explained by the independent variables. Of all the independent variables age is positive and statistically significant. Even though other variables indicate expected signs they are not statistically significant. Sex did not enter into the equation because there are no female consumers in the sample.

In case of cigarette consumption, independent variables explain 41 per cent of variation. Like the previous equation, age is having direct relation with addiction. It is remarkable here tote that if the frequency of consumption of cigarettes increases by one unit addiction also shows an increase. As regards Gutkha consumption the variation is to the extent of 33 percent and again age being the major influencing factor. The educational status is this equation indicates that with increases in education addiction to Gutkha consumption declines.

Raw tobacco has the highest R2 value i.e. 64 per cent of the variation is explained by the independent variables. Here again age has the major dominance. In this equation education status indicates that as education increases addiction to raw tobacco is likely to come down. The same is true o addiction to tobacco in general (all varieties taken together). It is to be noted that no variables have come out significantly in determining consumers addictions behaviour. Age and education do have some influence on the addiction to various kinds of tobacco consumption.

Conclusions

There is no doubt that tobacco is a deadly killer and the need is felt to spread about the ill effects of tobacco consumption among the young generation. The cause and effect of tobacco consumption and disease on account of it clearly bring out a case for advocacy for school going children. Special drive to enlighten illiterate population in rural areas need to be taken up immediately to curb this menace. Governments, Civil society and public at large have a larger role to play in this regard.

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Regression Results for Tobacco Consumers

Y= f (X1, X2, X3, X4, X5, X6, X7, X8)

EQ1= Years of Past Consumption of Bidi

EQ2= Years of Past Consumption of Cigarette

EQ3= Years of Past Consumption of Gutkha

EQ4= Years of Past Consumption of Raw Tobacco

EQ5= Years of Past Consumption of Tobacco

X1- Sex of the consumer - Male -1, female - 0

X2 - Age of the Consumer

X3 - Caste of the Consumer - Backward -1, Forward - 0

X4- Years of schooling of the consumer

X5 - Occupational Status of the consumer - Employed-1, Unemployed -0

X6 - Exp. On Tobacco (%)

X7 - Bidi, Cigarette, Gutkha, Raw Tobacco, total tobacco

X8- Health Status of the consumer - Good-1, bad-0

Variwables	R Square	Constant	Sex	Age	Caste	Education in Years	Occupational Status	Exp. On tobacco (%)	Evaluation of Health	Freq. Of Bidi Consumption	Freq. Of Cig Consumption	Freq. Of Gutkha Consumption	Freq. Of Tob Consumption	Total N
EQ 1	0.47	-9.87	-	0.73*	1.79	0.11	-0.14	-0.068	2.23	-0.05				117
		(-1.50)		-8.67	(0.85)	(0.49)	(0.05)	(-0.84)	(0.81)	(-0.59)				
EQ 2	0.41	-1.71	-	0.32*	1.17	0.01	-2.21	-0.08	-1.61		0.75*			53
		(-0.29)		-3.48	(0.63)	(0.03)	(-0.83)	(-1.04)	(-0.24)		(3.04)			
EQ 3	0.33	12.33	-7.02	0.36*	-0.58	-0.61*	-2.13	-0.06	1.51			0.30**		133
		-1.62	(-0.99)	-5.38	(-0.45)	(-2.83)	(-1.46)	(-1.27)	(0.73)			(1.98)		
EQ 4	0.64	-9.92	2.36	0.67*	0.43	-0.38*	-0.46	-0.05	1.80				0.19	224
		(-2.80)	-1.08	-16.05	(0.37)	(-2.99)	(-0.22)	(-1.42)	(0.90)				(1.75)	
EQ 5	0.58	-6.50**	1.66	0.64*	0.40	-0.29*	-1.84	-0.04	1.60					0.09** 478
		(-2.37)	(0.77)	(20.48)	(0.48)	(-2.89)	(-1.63)	(-1.34)	(1.17)					(1.98)

* - Significant at 1% and ** - Significant at 5% level

Figures in the bracket indicate t values

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