

Jyoti S. Hallad Professor & Director, attended meeting of restructuring of International Institute for Population Sciences (IIPS) organized by MoHFW under the Chairmanship of Joint Secretary (RCH), MoHFW at IIPS, Mumbai.

Dr. Rajarama K.E.T., Asst. Professor, delivered a radio talk on 'Ayushman Bharat' and was broadcasted on August 22, 2019 from the Prasar Bharati, Dharwad.

Prof. Jyoti S. Hallad, attended NHM Programme Implementation Plan (PIP) meeting and made a presentation on NHM-PIP Monitoring activities conducted by all 18 PRCs which was organized under the Chairmanship of Joint secretary, Policy at Nirman Bhawan, New Delhi on 26.09.2019.

Dr. Shriprasad H., Associate Professor and Mrs. Manjula G. Hadagalimath, Research Investigator attended one week Training Programme during 16-21 September, 2019 on Data Management, SPSS and STATA organized by ISEC Bangalore, sponsored by MoHFW, New Delhi.

The field data collection under “Study on Global AGEing and Adult Health” (SAGE), Wave 3 for Karnataka state has been completed during November, 2019.

Following papers are published in the contemporary issue of Health & Development in India – A Compendium of studies conducted by the PRCs during 2017-18 published by MoHFW, Govt. of India, New Delhi, Synergy Books India ISBN 978-93-82059-91-2

- Jyoti S. Hallad, J.A. Golandaj and B.I. Pundappanavar (2019) “Are Socially Marginalized Women Deprived of Maternal Health Care Services in Rural North Karnataka”.
- Shriprasad H., M. S. Kampli (2019) “An Assessment of Hygiene Knowledge and Practice among Students and Evaluation of Sanitation Facilities in Schools of Yadgiri District, Karnataka”

Other publications

Jyoti S. Hallad, J.A. Golandaj and B.I. Pundappanavar (2019) “Caste Differentials in Utilization of Maternal Health Care Services in Rural North Karnataka” International Journal of Home Science Vol. 5; Issue 2 pp 17-24, ISSN 2395-7476.

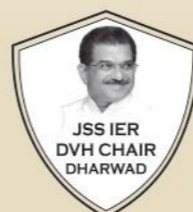
J. A. Golandaj, M. S. Kampli and J. S. Hallad (2019) “Prevalence, Care Seeking Behaviours and Treatment Cost for Neonatal Morbidities in Karnataka, India” Journal of Humanities and Applied Social Sciences, Emerald Publishing Ltd., 2632-279XDOI10.1108/JHASS-07-2019-0007.

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**Padma Vibhushana Dr. D. Veerendra Heggade
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- ◆ Incidence and determinants of Hysterectomy in Andhra Pradesh and Telengana: A district Level Analysis
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Incidence and determinants of Hysterectomy in Andhra Pradesh and Telengana: A district Level Analysis

N. Kavitha¹ T.S. Syamala² and Lekha Subaiya³

Abstract : *Hysterectomy, the surgical removal of uterus, has been a serious concern in developed countries for long time. In India, it is on the rise in the recent decades and not much attention has been paid on this issue. According to fourth round of National Family Health Survey (2015-16), almost three percent of women in the age group 15-49 have undergone hysterectomy in India and the rates vary considerably between states which range from less than one percent in Assam to about nine percent in Andhra Pradesh and Telengana states. Incidence of hysterectomy increases the risk of hypertension, obesity and coronary heart disease. Thus, rising levels of hysterectomy is a serious concern. Though there are some studies which focus on the issue, till recently there was no large scale data available to understand at a broader level. The NFHS-4 survey provides information on hysterectomy which facilitates to study hysterectomy levels for a nationally representative sample and also at district level. It is also noted that states of Andhra Pradesh and Telegana have higher levels of incidence of uterus removal compared to other states of India. Therefore, the study focuses on the levels of hysterectomy in districts of Andhra Pradesh and Telengana and background factors influencing the decision to go for hysterectomy at the state level. The objectives of the Study are: To assess the incidence of hysterectomy for all the states of India, to assess the levels of hysterectomy at the district level for Andhra Pradesh and to examine the magnitude of influence of background factors on the incidence of hysterectomy in Andhra Pradesh and Telengana. Data from the fourth round of National Family Health Survey is used for the analysis. The level of hysterectomy is assessed for states of India at the first level and the levels of incidence of hysterectomy for the districts of Andhra Pradesh and Telengana are examined. Finally, an attempt has been made to determine the factors influencing the incidence of hysterectomy. The overall incidence of hysterectomy rates across different states of India revealed that the percentage of women underwent hysterectomy varies from less than one percent in Assam to almost 9 percent in Andhra Pradesh. States of Gujarat, Bihar, Telengana and Andhra Pradesh have higher incidence of hysterectomy. Particularly, Andhra Pradesh and Telengana, which are adjoining states, stand out for higher rates of hysterectomy. Findings also show that considerable percentage of hysterectomies is done to younger women. It was found that educational status of women and wealth status of households have shown a significant influence on the incidence of hysterectomy. Body Mass Index (BMI) of women, place of residence and having undergone sterilization appeared to be significant predictors of incidence of hysterectomy.*

1.Field Investigator 2 Associate Professor 3 Assistant Professor, Institute for Social and Economic Change, Bangalore.

Introduction

Hysterectomy, the surgical removal of the uterus, is conducted most commonly among women, next to cesarean section around the world (Muller et al., 2010). Hysterectomy has invited several debates. On one hand, hysterectomy improves the health condition of women when they suffer from gynecological ailments such as abnormal bleeding and pelvic pain (Carlson, 1997; Uzun et al., 2009). On the other hand, the removal uterus can have long lasting implications on health of women. Hysterectomy can result in complications such as urinary incontinence, sexual dysfunction (Jennifer et al., 2010; Brown, 2000; Hock et al., 2015; Bachmann, 1990). Hysterectomy impacts the production of estrogen which places women at the high risk of osteoporosis, cardiovascular diseases, cognitive decline, dementia etc. (Sarrel et al., 2016; Kodaman, 2010). However, there are different views on the hysterectomy rates in India among researchers. One set of researchers argue on the lower rates of hysterectomy in India in general compared to other countries (Singh and Arora, 2008). On the other side, various news reports from different states raised the concern on unnecessary hysterectomies conducted in India (The Hindu, 2010; Dhar, 2013; Singh, 2012; McGivering, 2013; Kohli, 2018). Reports from different parts of India discussed the exploitation of poor and illiterate women by the medical professionals.

Generally, there are two types of hysterectomy i.e., sub-total and total hysterectomy. In subtotal hysterectomy, uterus is removed and the cervix is intact. This is done usually when there are complications such as uncontrollable postpartum hemorrhage and ruptured uterus whereas the total hysterectomy is done when there are complications such as fibroids, incurable endometriosis, uterine prolapse, cancer of the uterus, cervix and ovaries, persistent vaginal bleeding and chronic pelvic pain. Another type of total hysterectomy is that uterus, cervix with tubes and ovaries are removed. This is generally recommended as prevention of ovarian cancer (Kameswari and Vinjamuri, 2009). Though type of hysterectomy depends on the complication

which women face, normally the later type of total hysterectomy, i.e., the removal of the uterus, cervix, tubes and ovaries, is the commonly conducted surgery.

In recent times, social researchers started focusing on the issue of hysterectomy in India after various reports published by the researchers, media and the activists on the unwarranted hysterectomies. Health activists and civil society groups have demanded to include information on hysterectomy as one of the components in the fourth round of National Family Health Survey and the information generated can be used to formulate guidelines on hysterectomy (Dhar, 2013).

The above discussion clearly establishes the impact of medicalization on reproductive health of women. Hence, in order to understand the medicalization of reproductive health of women, an attempt is made to review studies on some of the aspects of reproductive health of women as how the modern medicine has shifted the natural process into a medical condition.

Medicalization of Reproductive Health of Women

Medicalization is defining of non-medical problems in medical terms, usually as an illness or disease, and usually with the implication that a medical intervention or treatment is appropriate (Zola, 1972). Though medicalization is common for men and women, women bodies are more medicalized in terms of reproduction from puberty to till old age. It starts from the stage of onset of puberty. Mean age at puberty of girls is decreasing around the world and reaching the biological limit (Pierce and Hardy, 2012). Healthy girls with early puberty are sometimes given gonadotropin-releasing hormone agonists to delay their pubertal development (Hayes, 2016).

Pregnancy is a physical state and not illness. Before 20th century, pregnancy and childbirth were treated as natural processes. Due to high mortality among women and children during the process of pregnancy and childbirth, interventions have been developed with the objective of making births safer. Modern technologies enabled monitoring of mother and fetus during

pregnancy (Smeenk and ten Have, 2003). Childbirth was an emotional and social event that took place at home. With the development of medicine, in order to reduce mortality childbirths have been moved to hospitals. Assisted reproduction changed the meaning of pregnancy, labour and delivery. This professionally assisted childbirth brought significant changes in health care provided to women by turning into a surgical procedure called cesarean section. In many countries, the c-section rates are rising significantly. The C-section rates have increased from 6.7 percent in 1990 to 19.1 in 2014 (Betran et al., 2016).

Forced sterilizations are yet another form of medicalizing women's bodies. There has been a long history of forced sterilization of women around the world. Forced and coerced sterilizations are documented in many countries (Open Society Foundations, 2011; Patel, 2017). In India, though the forced sterilizations were adopted for short period of time (between 1975 and 1977), soon it moved to the targeted approach and continued for nearly two decades and during 1996-97, the target free approach was implemented (Das, n.d.). Tubectomy, ie., sterilization among women is the common type of sterilization done in India. Even with the target free approach, service providers are the ones mobilize women for sterilizations most of the time and not the choice of women.

In line with puberty, childbirth and sterilizations, menopause is also being medicalized. Menopause is seen a hormone deficiency or disorder rather than a natural process and is linked to heart disease, osteoporosis and Alzheimer's disease (Meyer, 2001). Replacement of hormones is often recommended without proper assessment of the impact. In the process of menopause, women develop different kinds of problems, among which some are serious and some are manageable without a surgical procedure. However, in the medical field, most of the times, women are recommended to go for a surgical procedure for removal of uterus. Higher rates of hysterectomy has been a concern in developed countries, in recent times, it is on the rise in developing countries as well. India is also under the same threat. To study the levels of

hysterectomy at the district level or at the state level, data at a large scale was not available till recently. As already mentioned, component of hysterectomy was included in the fourth round of National Family Health Survey (NFHS) and the information collected is used for further analysis.

Data and Methods

Data for this study is taken from the fourth round of NFHS conducted during 2015-16. The survey provides information on population, health and nutrition for India, each state and union territory. The primary objective of the 2015-16 NFHS is to provide essential data on health and family welfare, as well as data on emerging issues in these areas. The clinical, anthropometric and biochemical (CAB) component of NFHS-4 is designed to provide vital estimates of the prevalence of malnutrition, anemia, hypertension, HIV and high blood glucose levels through a series of biomarker tests and measurements (IIPS and ICF, 2017).

Four types of questionnaires: household questionnaire, woman's questionnaire, man's questionnaire, and biomarker questionnaire) were used in NFHS to collect information on various aspects. In household questionnaire, basic demographic information was collected on the characteristics of each person listed, such as age, sex, marital status, schooling, and relationship to the head of the household. The information on age and sex of household members obtained in the household questionnaire was used to identify women and men who were eligible for individual interviews. Information on characteristics of the household's dwelling unit such as source of water; water treatment; type of toilet facilities; type of cooking fuel; materials used for the floor, roof, and walls of the dwelling unit; and ownership of various durable goods was collected through the household questionnaire.

The woman's questionnaire collected information from all eligible women age 15-49 on background characteristics of woman, reproduction, hysterectomy, menstrual hygiene, family planning, maternal and child health, breastfeeding, and nutrition, fertility preferences, domestic

violence etc. the man's questionnaire covered information on man's background characteristics, media exposure, marriage, employment, number of children, presence at antenatal care visits, contraceptive knowledge and use, fertility preferences, nutrition, sexual behaviour, attitudes toward gender roles, HIV/AIDS, tobacco and alcohol use, knowledge of tuberculosis, current morbidity (diabetes, asthma, goitre, heart disease, cancer), and household decision making. The biomarker questionnaire covered measurements of height, weight, and haemoglobin for children, and measurements of height, weight, haemoglobin, blood pressure, and random blood glucose for women age 15-49 and men age 15-54. In addition, eligible women and men were requested to provide a few drops of blood from a finger prick for HIV testing.

NFHS 4 provides following information on hysterectomy: whether the woman had undergone hysterectomy or not and place where the hysterectomy was conducted and is used in the analysis.

Factors influencing hysterectomy

Current Age of Women: Age is a significant predictor for hysterectomy. Increase in age increases the risk of hysterectomy (Prusty et al., 2018; Byles et al., 2000). It is also important to note that a majority of women undergo hysterectomy at younger ages which is particularly common in high prevalence states, Telengana and Andhra Pradesh (Prusty et al., 2018). Hence it is important to understand the effect of age of women on the hysterectomy. It should also be noted that age of women at the time of survey is used and is not age at the time of hysterectomy as such kind of information is not available in the survey.

Educational Level of Women : Educational status of women is an important determinant in determining the health care use. In general, the level of education and health care use are positively associated. However, in the case of hysterectomy, studies have shown that lower level of educational status is associated with higher incidence of hysterectomy (Stang et al., 2014; Wilson and Mishra, 2016).

Economic Status and hysterectomy: Economic status plays a vital role in the use of health care services. Earlier research showed that women with low income tend to go for hysterectomy more compared to women with higher income (Daugbjerg et al., 2012; Marks and Shinberg, 1997).

Some studies have found that higher economic status increased the risk of hysterectomy (Hautanemi and Sievert, 2003).

Sterilization : Women who undergo tubal sterilizations are at higher risk of hysterectomy than non-sterilized women (Santow and Bracher, 1992; Ryan and Dennerstein, 1986; Prusty et al., 2018) and the risk of hysterectomy is higher for women who had undergone sterilization at early ages (Goldhaber, 1993; Hillis et al., 1998; Health Watch Trust, 2013). India's fertility decline, particularly in southern states is attributed to the widespread acceptance of sterilization among women. There are evidences that age at sterilization is decreasing in most of the states of India and the decline observed to be higher in the case of Andhra Pradesh and Telengana (Padmadas et al., 2004; Rajaram and Sunil, 2004).

Parity: Number of children born to a woman appears to be an important determinant of hysterectomy. Desai et al. (2016) found that women who had two or more children had higher risk of hysterectomy than women with fewer children. Study by Dharmalingam et al. (2000) too supports the fact that higher parity increased the risk of hysterectomy.

Health Insurance: Studies have shown that there is a linkage between health insurance schemes and the hysterectomy (Mamidi and Pulla, 2013; Desai et al., 2017). Some of the states have health insurance schemes to enable the poor to access the health care when they have catastrophic ailments. Studies have focused on the issue and argue that poor women covered under such insurance schemes are vulnerable for high risk of hysterectomy as the health care providers view it as a permanent solution for the gynecological problems (Desai et al., 2017).

Body Mass Index (BMI): BMI of women is a significant predictor for hysterectomy. Obesity increases the risk of other gynecological problems, which may ultimately result in hysterectomy among women (Liu et al., 2016; Goodman et al., 1997).

From the above discussion, it is clear that background characteristics of women as well as the household play a major role in determining the incidence of hysterectomy and hence is used to assess the magnitude of impact of these variables on the incidence of hysterectomy.

Results

The incidence of hysterectomy for major states of India is assessed and the results are presented in table 1. Andhra Pradesh and Telengana have the highest percentage of women in the age group 15-49 in India who have undergone hysterectomy, followed by Bihar and Gujarat.

Table 1. Incidence of Hysterectomy in States of India

States	Percent of Women who had undergone Hysterectomy
Andhra Pradesh	8.9
Assam	0.9
Bihar	5.4
Chhattisgarh	1.9
Gujarat	4.2
Haryana	1.9
Jharkhand	2.3
Karnataka	3.0
Kerala	1.8
Madhya Pradesh	3.0
Maharashtra	2.6
Odisha	2.1
Punjab	2.6
Rajasthan	2.3
Tamil Nadu	3.4
Uttar Pradesh	2.2
Uttarakhand	2.0
West Bengal	2.0
Telengana	7.7
India	3.2

Place in which the hysterectomy was conducted is very important as various debates on hysterectomy point towards the cost involved in it and the role of private practitioners. Table 2 provides the percent distribution of hysterectomy among women by type of hospital in states of India. It is noted that almost 67 percent of hysterectomies are conducted in private hospitals in India. It is shocking to see that more than 80 percent of the hysterectomies in states such as

Andhra Pradesh, Bihar, Telengana and more than 70 percent of the hysterectomies in Uttar Pradesh and Jharkhand are conducted in private hospitals. In the state of Odisha, most of the hysterectomies (71 percent) are conducted in public hospitals. In states of Karnataka and Tamil Nadu, more than half of the hysterectomies in each state is conducted in public hospitals.

Table 2. Incidence of Hysterectomy by Type of Hospital for States of India

States	Percent of Hysterectomy in	
	Public Hospitals	Private Hospitals
Andhra Pradesh	16.7	82.8
Assam	66.0	33.3
Bihar	17.9	81.3
Chhattisgarh	35.0	64.3
Gujarat	30.6	66.9
Haryana	41.2	57.8
Jharkhand	27.0	71.5
Karnataka	52.8	46.9
Kerala	41.5	58.2
Madhya Pradesh	44.3	55.3
Maharashtra	30.8	68.7
Odisha	71.4	28.4
Punjab	35.3	63.3
Rajasthan	33.8	65.9
Tamil Nadu	52.6	46.7
Uttar Pradesh	23.0	76.5
Uttarakhand	38.8	60.3
West Bengal	49.3	48.5
Telengana	18.8	80.8
India	32.3	66.8

In the next step, percentage distribution of hysterectomy in districts of Andhra Pradesh and Telengana were obtained as these two states have very high levels of hysterectomy compared to other states of India. It is evident from table 2 and 3 that, some of the districts in Andhra Pradesh (East Godavari, West Godavari, Krishna and Guntur) and some in Telengana (Nizamabad,

Karimnagar, Nalgonda and Warangal) have more than 10 percent of women in the group 15-49 have undergone hysterectomies. It is also seen that except in three districts in Andhra Pradesh (Y.S.R., Kurnool and Anantapur) and two districts in Telengana (Hyderabad and Rangareddy), and all other districts more than five percent of women in the reproductive age group have had their hysterectomies.

Incidence of hysterectomy in Andhra Pradesh and Telengana by Type of hospital

It is evident from table 2 that majority of women in both Andhra Pradesh and Telengana have undergone hysterectomy at private hospitals. Therefore, an attempt is made to study the pattern of hysterectomies in public as well as private health facilities and is presented in table 5 and table 6. Results show that in all the districts of Andhra Pradesh and Telengana (except Hyderabad), most of the hysterectomy surgeries are conducted in private health facilities.

Table 3. Incidence of Hysterectomy in Districts of Andhra Pradesh

Districts	Percent of Women who had undergone Hysterectomy
Srikakulam	8.1
Vizianagaram	9.6
Visakhapatnam	8.3
East Godavari	10.7
West Godavari	12.2
Krishna	12.2
Guntur	13.2
Prakasam	8.6
Sri Potli Sriramulu	
Nellore	9.2
Y.S.R.	4.2
Kurnool	4.7
Anantapur	4.3
Chittoor	6.7
Andhra Pradesh	8.9

Table 4. Incidence of Hysterectomy in Districts of Telengana

Districts	Percent of Women who had undergone Hysterectomy
Adilabad	6.7
Nizamabad	11.2
Karimnagar	10.1
Medak	8.9
Hyderabad	3.7
Rangareddy	4.7
Mahbubnagar	7.0
Nalgonda	10.2
Warangal	13.0
Khammam	8.3
Telengana	7.7

Table 5. Incidence of Hysterectomy by Type of Hospital for Districts of Andhra Pradesh

Districts	Percent of Hysterectomy in	
	Public Hospitals	Private Hospitals
Srikakulam	19.5	80.5
Vizianagaram	13.8	86.2
Visakhapatnam	28.3	71.7
East Godavari	18.6	81.4
West Godavari	19.7	80.3
Krishna	13.9	86.1
Guntur	4.8	94
Prakasam	12.4	87.6
Sri Potli Sriramulu Nellore	24.6	74.3
Y.S.R.	8.2	91.8
Kurnool	14.5	82.9
Anantapur	21.8	75.2
Chittoor	25.0	75
Andhra Pradesh	16.7	82.8

Association between Background Characteristics and the Incidence of Hysterectomy in Andhra Pradesh and Telengana : It is clear from the percentage distribution of incidence of hysterectomy for states of India as well as for the districts of Andhra Pradesh and Telengana that incidence of hysterectomy is very high in Andhra Pradesh and Telengana and the same trend is observed in most of the districts of these states. Hence, in this section, an attempt is made to see the association of incidence of hysterectomy in these states with the background characteristics of women and is presented in table 7.

Logistic Regression Results: The previous section dealt with the gross association of background characteristics with the incidence of hysterectomy. In order to see the net effect of socioeconomic, demographic and background factors on the incidence of hysterectomy, logistic regression analysis is used. Table 8 and table 9 present the results of logistic regression analysis of hysterectomy for Andhra Pradesh and Telengana respectively.

Table 6. Incidence of Hysterectomy by Type of Hospital for Districts of Telengana

Districts	Percent of Hysterectomy in	
	Public Hospitals	Private Hospitals
Adilabad	30.5	67.6
Nizamabad	12.7	87.3
Karimnagar	12.9	87.1
Medak	19.3	80.7
Hyderabad	44.9	56.1
Rangareddy	28.8	71.2
Mahbubnagar	7.0	93
Nalgonda	10.9	89.1
Warangal	14.7	83
Khammam	16.3	83.7
Telengana	18.7	80.8

Table 7. Percentage of Hysterectomy by background Characteristics for Andhra Pradesh and Telengana

	Percentage of Hysterectomy	
	Andhra Pradesh	Telengana
Current Age of Women		
15-19	0.0	0.1
20-29	1.5	1.4
30-39	9.6	9.5
40-49	22.4	20.1
Educational Level of Women		
Illiterates	14.7	15.7
Primary Level	12.2	13.8
Secondary Level	5.0	2.7
Higher Secondary and above	1.6	1.8
Household Wealth Status		
Poorest	3.9	6.7
Poorer	8.5	9.4
Middle	9.7	8.4
Richer	9.1	8.5
Richest	8.4	4.9
Religion		
Hindu	9.2	8.2
Muslim	5	4.1
Christian	10	6.6
Others	0	0
Caste		
SC/ ST	7.8	9.1
Other Backward Caste (OBC)	9.5	7.5
None of the Above	8.9	6.1
Type of Place of Residence		
Urban	7.3	5
Rural	9.7	10.3
BMI		
Underweight	4.3	4.4
Average	7.6	7.8

Overweight	12.6	12.3
Obese	12.7	6.4
Had Sterilization		
No	3	5.6
Yes	13.3	10.3
Ever had a Terminated Pregnancy		
No	8.8	7.6
Yes	9.8	8.1
Covered by Health Insurance		
No	6	4.6
Yes	10.2	9.7

Table 8 presents that educational level of women appears to be a significant predictor of incidence of hysterectomy in Andhra Pradesh. Women with secondary level education and higher secondary and above level education are less likely to go for hysterectomy compared to illiterate women. Increase in each level of household wealth status increased the odd ratios of incidence of hysterectomy. The Muslim women were less likely and women belong to OBC (Other Backward Caste) are more likely to go for hysterectomy compared to the Hindu women and SC/ ST (Scheduled Caste/ Scheduled Tribe) women, respectively. Rural women and women who had undergone sterilization have higher risk of hysterectomy than urban women and women who had not gone for sterilization. Odds of incidence of hysterectomy observed to be higher among overweight and obese women than among thin women.

Table 8. Correlates of Hysterectomy in Andhra Pradesh

	Percentage of Hysterectomy	
	Coeff	Odds Ratios
Current Age of Women		
15-19		
20-29	16.582	1.590
30-29	18.138	7.534
40-49	19.025	1.829
Educational Level of Women		

Illiterates		
Primary Level	0.037	1.038
Secondary Level	-0.355	0.701***
Higher Secondary and above	-1.506	0.222***
Household Wealth Status		
Poorest		
Poorer	0.665	1.944*
Middle	0.890	2.436***
Richer	0.919	2.507***
Richest	1.174	3.234***
Religion		
Hindu		
Muslim	-0.642	0.526***
Christian	0.267	1.306
Others	-18.880	0.000
Caste		
SC/ ST		
Other Backward Caste (OBC)	0.311	1.365**
None of the Above	0.054	1.056
Type of Place of Residence		
Urban		
Rural	0.332	1.394***
BMI		
Underweight		
Average	0.180	1.197
Overweight	0.412	1.511***
Obese	0.564	1.758***
Had Sterilization		
No		
Yes	0.496	1.642***
Ever had a Terminated Pregnancy		
No		
Yes	0.098	1.103
Covered by Health Insurance		
No		

Yes	0.114	1.121
Constant	-22.335	0.000***
Loglikelihood		4891.247
Chi-Square Value		1145.877
Level of Significance		0.000
Number of Women		10387

Table 9 presents the correlates of hysterectomy for Telengana state. Current age of women appears to be a significant predictor for hysterectomy in Telengana. As expected, increase in age increased the risk of hysterectomy. As seen in the case of Andhra Pradesh, increase in educational level of women decreased and increase in household wealth status increased the likelihood of incidence of hysterectomy. The odds of incidence of hysterectomy observed to be higher among rural women, women who had undergone sterilization and overweight women as compared to their counterparts.

Table 9. Correlates of Hysterectomy in Telengana

	Coeff	Odds Ratios
Current Age of Women		
15-19		
20-29	2.783	16.168**
30-29	4.279	72.172***
40-49	4.873	130.715***
Educational Level of Women		
Illiterates		
Primary Level	-0.003	0.997
Secondary Level	-1.131	0.323***
Higher Secondary and above	-1.462	0.232***
Household Wealth Status		
Poorest		
Poorer	0.493	1.638*
Middle	0.654	1.923**
Richer	1.042	2.836***
Richest	1.008	2.741***

Religion		
Hindu		
Muslim	-0.349	0.705
Christian	-0.173	0.841
Others	-18.273	0.000
Caste		
SC/ ST		
Other Backward Caste (OBC)	-0.149	0.862
None of the Above	0.009	1.009
Type of Place of Residence		
Urban		
Rural	0.620	1.859***
BMI		
Underweight		
Average	0.267	1.306
Overweight	0.481	1.617**
Obese	0.073	1.076
Had Sterilization		
No		
Yes	0.285	1.752**
Ever had a Terminated Pregnancy		
No		
Yes	-0.014	0.986
Covered by Health Insurance		
No		
Yes	0.174	1.190
Constant	-7.256	0.001***
Loglikelihood		3464.28
Chi-Square Value		866.601
Level of Significance		0.000
Number of Women		7444

Discussion

The overall incidence of hysterectomy rates across different states of India revealed that the percentage of women underwent hysterectomy varies from less than one percent in Assam to

almost 9 percent in Andhra Pradesh. States of Gujarat, Bihar, Telengana and Andhra Pradesh have higher incidence of hysterectomy. Particularly, Andhra Pradesh and Telengana, which are adjoining states, stand out for higher rates of hysterectomy. These states have been on the debate for unwarranted hysterectomies among young women. Some of the reports by the media revealed that illiterate women are forced into surgical procedure to remove the uterus. It is also evident from the earlier research that most of these hysterectomies are performed in private hospitals (The Hindu, 2016; Sardeshpande, 2016).

As it is debated, money making out of hysterectomy may not be the only reason for the high rates of hysterectomy. As another study discussed the service provider's view that medical professionals recommend the surgical procedure with the view that the problem is solved permanently (Prusty et al., 2018). Health professionals' recommendations as well as patients' preferences play a vital role in determining the incidence of hysterectomy. Findings also show that considerable percentage of hysterectomies is done to younger women. Evidence from other countries shows that hysterectomy rates are higher among older women due to gynecological problems. According to Erekson and others (2009), the mean age at hysterectomy in the United States is 50.8 years. Considering the consequences of hysterectomy surgeries, hysterectomy at younger ages gives a scary picture of health of women. It was found that educational status of women and wealth status of households have shown a significant influence on the incidence of hysterectomy. Women who had higher levels of education and women belong to households with higher wealth status have lower risk of hysterectomy, which indicates women with lower educational status but have access to economic resources are more prone for hysterectomy. Body Mass Index (BMI) of women observed to be a significant predictor for the incidence of hysterectomy. Women who are overweight and obese are at higher risk of hysterectomy could be due to the reason that overweighed women are more prone for gynecological problems which in turn may lead to hysterectomy. The study also found that rural women are at higher risk of hysterectomy. It is evident that the risk of hysterectomy observed to be higher among who had undergone sterilization. Women who undergone tubal ligation are at high risk of gynecological

ailments and other related problems, which ultimately might result in hysterectomy (Shreffler et al., 2017). It is also found that the states of Andhra Pradesh and Telengana have high incidence of sterilization in their early ages (Motkuri and Hansda, 2017).

Policy Implications

This study is highly related to the health policy of women. The recently drafted National Policy for Women (NPW) 2016 focuses several issues on women's health. Findings of this study can be used as a preamble to the study further issues on hysterectomy as it is a complex phenomenon and include as one of the objectives of the NPW. The first and foremost focus should be on the increasing numbers of surgical removal of the uterus. It would help to curb the unwarranted hysterectomies conducted. Though this study does not show any significant influence of health insurance scheme on the incidence of hysterectomy and the information collected in this survey provide information on health insurance at the household level, health insurance schemes should be designed to discourage unnecessary hysterectomies. Finally, information generated on hysterectomy is very minimal in India and given the complexity of understanding the reason for high rates, information on hysterectomy should be generated through surveys. Thus, the issue can be dealt with utmost caution.

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Disease Prevalence and treatment Seeking Behaviour among elderly in

Uttar Pradesh

Jitendra Kumar¹

Abstract : Aged population has special health problems that are basically different from those of adult or young. Most diseases in aged are chronic in nature – cardiovascular, arthritis stroke, cataract, deafness, cancer, chronic infections etc. Disease processes are usually multiple Morbidity pattern among the elderly varied from country to country. Chronic conditions which produced infirmity and disability became more common in old age. To study the health status of elderly, morbidity conditions, their perceptions about their own health and their treatment seeking behaviour using the data from 71st round of National Sample Survey. Bi-variate and multi-variate techniques were used to find out the factors affecting the health and health care utilization of the elderly. Results reveal that widows/ separated/divorced are having worst relative state of health as compared to currently married elderly. Those who are fully dependent on other have significant negative impact on their state of health. Monthly per-capita Consumer Expenditure (MPCE) is positively related to state of health. Male elderly used to take more treatment as compared to female elderly. Educational level, occupation and MPCE are found to be important determinant of treatment seeking behaviour.

Keywords: Ageing, Diseases prevalence, communicable Diseases, treatment seeking of elderly, status of elderly in India

Background

One of the important indicators of development of a nation is progressive improvement in the health status of its population. Nobel laureate Angus Deaton uses the term ‘wellbeing’ to refer to all the things that are good for a person that makes for a good life. Wellbeing includes material wellbeing, such as income and wealth; physical and psychological wellbeing, represented by health and happiness; education; and the ability to participate in civil society through democracy and the rule of law. Deaton (2013) further argues, “Not the least of the health problems faced by

Research Scholar, International Institute for Population Sciences (IIPS), Mumbai, Email ID: jitu.kumar327@gmail.com



the poor countries of the world today is the lack of good information. Morbidity has been defined as “any departure, subjective or objective, from a state of physiological well being. The term is used equivalent to such terms as sickness, illness disability WHO Expert committee on Health Statistics noted on its 6th Report that morbidity could be measured in terms of 3 units. (i) Person who were ill, (ii) the illnesses (provides of spells of illness) that these persons experienced and (iii) the duration (days, weeks etc) of these illnesses. The aged population has special health problems that are basically different from those of adult or young. Most diseases in aged are chronic in nature – cardiovascular, arthritis stroke, cataract, deafness, cancer, chronic infections etc. Disease processes are usually multiple Morbidity pattern among the elderly varied from country to country. Chronic conditions which produced infirmity and disability became more common in old age. “Morbidity due to cancer, Congenital Heart Defect, Diabetes, Hypertension and Arteriosclerosis had increased while there was a decline in morbidity among the elderly from conditions like skin diseases, visual and hearing handicaps and multiple orthopaedic problems”⁴³. Epidemiologically there has been a shift in disease pattern from communicate to non-communicable diseases and is considered as the net result of the demographic transition.

Due to the predominating rural character of the Uttar Pradesh population, it would be natural to expect that most of the elderly people would also be living in rural areas. In rural areas, health of the older persons may be particularly influenced by poverty, lack of education, poor nutrition and increased risks of accidents. In the first half of the 21st century, the major socio-economic problems will be the maintenance of the health and nutrition of the elderly through social security, social assistance and other social support mechanisms. A comprehensive social security system is not functioning in our country as in western countries. In our country, the economic security, social fulfillment and personal dignity are not well assured as in western countries due to economic imbalance. The position of the elderly in the family is depended upon their economic position, support systems available, marital and health status. Though a large number of studies on various factors influencing the aged especially elderly during the process of senescence are available in western countries not much data have been a generated as applicable to the Indian situation. In this context the present study attempts to understand the perceived

health condition, current health status and treatment seeking behaviour of elderly in Uttar Pradesh.

Data and Methods

Data for the study have been used from 71st round of National Sample Survey, Schedule No. 25.0 'Social consumption relating to health', January 2014 to June 2014. The round provided detail about the socio-economic status of the elderly (age 60 and above), their perception about current state of health and relative state of health, their economic independence, including their relationship with the care providers, about ailments from which they are suffering on the day of the survey, started more than 15 days ago and continuing, started more than 15 days and has ended, started within 15 days and is continuing, started within 15 days and has ended. Nature of treatment such as Allopathy, Ayurveda, Unani, Homoeopathy, others and whether any treatment was taken for the ailment have been considered. Both bi-variate and multi-variate analysis were used to find out the factors affecting the health and health care utilization of the elderly. Persons suffered from any kind of diseases and treatment seeking behaviour has been used as dependent variables in two separate models. The selected predictor variables considered for the analysis are age of the elderly, sex, marital status, place of residence, educational level, caste, religion, MPCE and State of economic independence.

For the intended analysis we have clubbed all the cases of spells by nature of status of ailment. Using the variable "status of ailment", we have calculated the prevalence rate.

$$\text{Prevalence rate} = \frac{\text{All new and old cases during the time period } t}{\text{Population exposed to risk during the time period } t} \times K$$

Findings

Perceived health of the elderly in Uttar Pradesh

The need for the health care increases with age as people above 65 years spend on average 1.5 times more on healthcare compared to those in the 60-64 age category (Mahel et al, 2002). The largest proportion of expenditure is spent on out-patient treatment as well as the purchase of

medicines. The expenditure on health care is expected to be high for the elderly because of chronic diseases. The elderly has a little resource to insurance as insurance generally covers in-patient hospital expenditure (Sharawat and Rao, 2011). Perception of elderly regarding their own health status portrays a situation about their current as well as relative state of health. It is found that about one fourth of elderly rated their current state of health is poor compared to only 4 percent who feel their health condition is excellent their perception also varies substantially according to background characteristics (Table 1) portrait that in the age group of (60-69) 75 percent elderly people current health condition is good than the other age groups of elderly, in the age Group of (80 and above) 47 percent elderly reported that their health condition is worse in comparison to previous year. Elderly male have good health condition than the elderly female, by place of residence urban elderly have better health condition than the elderly rural areas, those elderly who have higher education level are also have highest percentage of good health condition. In the religion category Hindu elderly people have good health condition than the Muslim and other religious elderly people, in the social group ST/SC have highest percentage of good health condition of elderly in the current health status than the others social group compare to previous year. As MPCE goes up, there is somewhat improvement in the relative as well as current state of health, in the state of economic independence the highest good health condition was found in those elderly who are not dependent on others, region wise the highest percentage of elderly with good health condition was found in eastern region 74 percent followed by central region 71 percent.

Table 2 to know the perception of elderly about their state of health compared to previous year in Uttar Pradesh a multinomial logistic regression model has been applied considering the dependent variable as categorical having more than two categories. The dependent variable has been categorized into three categories, namely, (i) Better, (ii) the same and (iii) worse. These socioeconomic and demographic predictors includes- age of the respondents, sex, education, marital status, social group, MPCE, State of economic independence, regions etc. The results of multinomial logistic regression represented in relative risk ratio shows that in the age group (70-

79) 1.383 times or in the (80 or above) 1.743 time more worse their state of health compared to previous year than the reference category in the age group (60-69), those elderlies have primary education 1.542 times, or have secondary education 1.718 and have higher secondary 1.818 times better state of health compared to previous year than the reference, no education category of elderlies, In the religion category Muslim/Other religion group have 1.357 times better state of health compared to previous year than the Hindu. Elderlies who are partially dependents on other state of health compared to previous year is 1.453 times more worse and those who are fully dependent on others are 1.396times worse than the reference category not dependent on others, similarly in the region wise the results shows that the elderly in the region of central 0.495 times and eastern 0.591 southern 0.691 time and southern upper 0.756 less worse state of health compared to previous year in Uttar Pradesh.

Table 1: Percent distribution of aged persons by own perception about their state of health Uttar Pradesh, 2014

Background Characteristics	Current State of Health			Relative state of health Compared to Previous Year		
	Excellent/ Very good	Good/ Fair	Poor	Much Better	The Same	Worse
Age Group						
60-69	3.8	75.0	21.2	14.4	66.8	18.8
70-79	4.7	64.6	30.7	10.1	57.0	32.9
80+	0.4	48.1	51.5	9.4	43.4	47.3
Sex						
Male	4.9	71.4	23.7	14.8	60.1	25.1
Female	2.6	68.9	28.5	10.8	64.8	24.4
Marital Status						
Currently Married	2.8	77.5	19.7	15.1	64.3	20.6
Widowed/ Separated/ Divorced	5.4	57.8	36.8	9.0	59.2	31.9
Place of Residence						
Rural	3.5	69.2	27.3	12.8	62.6	24.7
urban	4.9	74.1	21.1	13.0	61.7	25.3
Education						
No Education	2.7	67.6	29.7	11.2	60.8	27.9
Primary	5.1	72.8	22.0	13.7	64.5	21.8
Secondary	6.6	77.0	16.5	15.7	64.1	20.2
Higher Secondary	5.8	76.2	18.0	18.6	67.5	14.0
Religion						

Hindu	3.7	71.0	25.3	12.4	63.6	24.0
Muslim	4.4	64.9	30.7	15.3	55.0	29.7
Caste						
ST/SC	2.4	73.7	23.9	10.3	66.3	23.4
Other Backward Class	4.3	69.6	26.0	13.1	60.0	27.0
Others	4.0	68.2	27.8	14.5	63.1	22.4
Whether Hospitalised						
Yes	2.0	45.3	52.7	16.7	33.0	50.4
No	3.9	71.6	24.5	12.6	64.1	23.3
MPCE						
Poor	3.5	72.0	24.5	12.5	64.8	22.7
Middle	4.0	65.6	30.4	13.0	61.7	25.3
Rich	4.0	73.5	22.6	13.2	58.6	28.2
State of Economic Independence						
Not dependent on others	6.7	78.9	14.4	16.1	65.7	18.2
Partially Dependent on others	3.5	76.7	19.9	13.5	62.2	24.4
Fully dependent on others	2.3	63.8	33.9	10.9	60.7	28.5
Region						
Northern	0.5	67.39	32.11	12.1	57.25	30.65
Central	3.68	71.64	24.68	10.01	67.74	22.25
Eastern	5.22	74.23	20.55	16.97	61.47	21.56
Southern	2.85	51.24	45.91	3.31	59.48	37.21
Southern Upper	3.16	68.38	28.45	12.5	60.33	27.17
Total	3.8	70.2	26.1	12.8	62.4	24.8

Table 2: Background variables affecting the perceptions of elderly about relative state of health compared to previous year in Uttar Pradesh: Results from Multinomial Logistic Regression Analysis

Background Characteristics	Better			Worse		
	RR	Lower Limit	Upper limit	RR	Lower Limit	Upper limit
Age Group						
60-69 ®						
70-79	1.002	0.783	1.284	1.383***	1.139	1.679
80+	0.804	0.513	1.261	1.743***	1.302	2.332
Sex						
Male ®						
Female	1.141	0.888	1.466	0.995	0.818	1.210
Marital Status						
Currently Married ®						
Widowed/ Separated/ Divorced	1.095	0.859	1.395	1.307***	1.085	1.573
Place of Residence						

Rural ®						
urban	0.976	0.770	1.236	1.052	0.871	1.271
Education						
No Education ®						
Primary	1.542***	1.137	2.091	1.035	0.805	1.332
Secondary	1.718***	1.220	2.419	1.089	0.815	1.456
Higher Secondary	1.818***	1.265	2.612	0.799	0.575	1.112
Religion						
Hindu ®						
Muslim	1.357**	1.022	1.801	1.362***	1.083	1.712
Caste						
ST/SC						
Other Backward class	1.235	0.913	1.670	1.007	0.799	1.268
Others	1.086	0.778	1.516	0.997	0.770	1.290
MPCE						
Poor ®						
Middle	0.859	0.667	1.106	0.923	0.756	1.126
Rich	0.980	0.750	1.280	0.893	0.718	1.112
State of Economic Independence						
Not dependent on others ®						
Partially Dependent on others	1.058	0.776	1.440	1.453***	1.112	1.900
Fully dependent on others	0.893	0.685	1.165	1.396***	1.114	1.748
Region						
Northern®						
Central	0.842	0.537	1.320	0.495***	0.356	0.688
Eastern	1.333	0.873	2.035	0.591***	0.434	0.807
Southern	0.674	0.365	1.242	0.691*	0.456	1.046
Southern Upper	0.909	0.578	1.429	0.756*	0.548	1.041
Constant	0.179***	0.107	0.300	0.483***	0.329	0.708

Note: ***P<0.01, **P<0.05, *P<0.1.

Ailment among Elderly in Uttar Pradesh

The mixed disease burden among elderly places increased burden on the care providers for the aged in Uttar Pradesh. Certain chronic problems occur more frequently among the elderly than among younger people. Cataract is the most common problem among elderly more than half the subjects had a cataract even though it can be treated by a simple procedure. The next most common problems were musculoskeletal disorders among elderly this was consistent with the findings of Prakesh *et al.* (2004) and Joshi *et al.* (2003). Table.3 shows the percentage

distribution of communicable diseases according to region wise in the diseases category we found that the highest percentage of communicable diseases found in eastern region (20 percent), followed by central and southern region (15, 14 percent). In the communicable diseases category highest percentage of elderly suffered from skin diseases (16 percent) in southern region, second highest diseases found in elderly is fever (13 percent) in southern upper region and third highest disease found in elderly is diarrhoea/ dysentery (8.7 percent) in eastern region, Non communicable diseases according to region wise in the diseases category we found that the highest percentage of non-communicable diseases found in northern region (96 percent), followed by southern and southern upper region (95, 75 percent). In the non-communicable diseases category highest percentage of elderly suffered from Bronchial asthma (23 percent) in eastern, central and northern region, second highest diseases found in elderly related to Genito/urinary (31 percent) in southern third highest non-communicable disease found in elderly is Skin diseases (16, 12 percent) in in southern and southern upper region.

The elderly have highest injuries in central region (10 percent) followed by southern upper region (5 percent) and only (0.1 percent) elderly people of eastern region facing hearing problems.

From the Table 4 when we use to compare the disease according to region wise the problem of non communicable disease found more in northern region 96 percent and less in Central region 74 percent while in communicable disease more problems found in eastern region 20 percent and less problem in northern region that is 3.4 percent. Over all morbidity condition highest percentage found in northern region 32 percent followed by Eastern region 27 percent. Table 5 shows the variation in disease among elderly in Uttar Pradesh by background characteristics results from logistic regression variation in disease among elderly in Uttar Pradesh, shows that, with the increase of age there is substantial increase in the health problems. Elderly who are residing in urban area 1.257 times having higher chances to getting diseases, elderly who has primary and secondary level of education are more likely to have problems compared to those who are illiterate or higher education. Elderly those who are fully dependent on other have 1.231

times having higher chances to getting diseases. Controlling the effect of other variables, the reporting of any kind of diseases is likely to be less among elderly belonging to central, eastern southern and southern upper regions.

Table 3: Percent distribution of Different diseases among elderly during last 15 days by regions of Uttar Pradesh, 2014

Diseases	Northern	Central	Eastern	Southern	Southern Upper	U.P
Communicable Diseases	3.4	15.1	20.1	4.6	14.8	15.3
Fever	2.2	4.3	9.2	1.0	13.1	7.7
Tuberculosis	1.2	1.0	1.4	0.3	1.2	1.2
Filarisis	0.0	0.1	0.7	0.0	0.0	0.3
Hiv/ Std	0.0	0.1	0.0	0.0	0.0	0.0
Jaundice	0.0	0.6	0.0	0.0	0.5	0.2
Diarrhoea/ dysentery	0.0	4.2	8.7	3.2	0.1	4.8
Worm infestation	0.0	4.7	0.1	0.0	0.0	1.0
Skin diseases	0.0	4.3	0.1	16.6	12.9	3.8
Non- Communicable	96.6	74.8	77.0	95.4	75.7	79.7
Cancers	0.0	0.9	0.2	0.0	0.3	0.3
Anemia / blood disorder	3.6	0.2	0.3	0.0	0.0	0.7
Diabetes	3.6	2.3	3.7	12.1	4.7	3.9
Thyroid	0.0	0.1	0.0	0.0	0.1	0.0
Obesity	0.0	0.0	0.1	0.0	0.0	0.0
Psychiatric disorders	0.1	0.1	1.4	0.0	0.2	0.7
Neurological disorder	8.0	1.9	2.7	0.3	5.5	3.7
Cataract	1.2	1.0	0.4	0.0	5.5	1.5
Glaucoma	0.0	0.8	0.3	0.0	1.4	0.6
Hypertension	1.6	9.1	5.6	0.9	2.9	5.1
Heart disease	6.7	3.0	1.0	0.5	2.4	2.4
Bronchial asthma	22.6	23.3	23.9	5.0	15.3	21.4
Gastric/ peptic ulcer	19.4	9.3	6.6	8.6	5.4	8.8
Skin diseases	0.0	4.3	0.1	16.6	12.9	3.8
Genito/ urinary	9.9	0.2	2.6	31.4	0.1	3.7
Disabilities and Injuries	0	10.1	2.9	0	9.5	5.1
Hearing problems	0.0	0.0	0.1	0.0	0.0	0.0
Injuries	0.0	10.1	2.9	0.0	9.5	5.0
Total	100	100	100	100	100	100

Sources: NSSO Data, 71st round

Table 4: Prevalence of ailments by Regions wise of Uttar Pradesh, 2014

Regions	Any Morbidity	During last 15 days		
		CDs	NCDs	D&I
Northern	32.3	3.4	96.6	0.0
Central	17.1	15.1	74.8	10.1
Eastern	27.5	20.1	77.0	2.9
Southern	11.1	4.6	95.4	0.0
Southern Upper	21.7	14.8	75.7	9.5
Uttar Pradesh	22.9	15.3	79.7	5.1

Sources: NSSO Data, 71st round

Table 5: Variation in Disease among elderly in Uttar Pradesh by background characteristics: Results from Logistic Regression Analysis

Background Variable	Exp β	95% CI	
		Lower Limit	Upper Limit
Age Group			
60-69 ®			
70-79	1.151	0.053	0.333
80+	1.567	0.161	0.737
Sex			
Male ®			
Female	0.964	0.232	0.159
Marital Status			
Currently Married ®			
Widowed/ Separated/ Divorced	1.120	0.073	0.300
Place of Residence			
Rural ®			
Urban	1.257**	0.044	0.413
Education			
No Education ®			
Primary	1.508***	0.172	0.650
Secondary	1.302*	0.014	0.542
Higher Secondary	1.041	0.268	0.347
Religion			
Hindu ®			
Muslim	1.084	0.145	0.305
Caste			
ST/SC			
Other Backward Class	1.008	0.228	0.244

Others	1.174	0.098	0.418
MPCE			
Poor ®			
Middle	1.012	0.187	0.212
Rich	1.018	0.197	0.233
State of Economic Independence			
Not dependent on others ®			
Partially Dependent on others	0.859	0.422	0.117
Fully dependent on others	1.231*	0.009	0.424
Region			
Northern®			
Central	0.588***	0.847	-0.215
Eastern	0.748***	0.586	0.006
Southern	0.358***	1.483	-0.573
Southern Upper	0.583***	0.855	-0.224

Note: ®: Reference Category; ***P<0.01, **P<0.05, *P<0.1.

Treatment seeking behaviour among Elderly in Uttar Pradesh

Table 6. Shows People in the age group of 80 and above were likely to choose Allopathy treatment. 85.6 percent of elderly male prefer to take Allopathy treatment, similarly the percentage of getting Allopathy treatment found high in widow and separated elderly and those elderly who belongs to rural areas. Also who had some education as well as who have good wealth quintile were likely to take treatment from qualified allopathic practitioner. However, those who have poor wealth were likely to take treatment from Indian system/ Homeopathy. According to region wise 94 percent of northern elderly people taken treatment from Allopathic and 9 percent from Indian system /Homeopathy overall out of 95 percent elderly people 85 percent from Allopathic, 10 percent were taken treatment from Indian system/ Homeopathy.

Table 7 shows the variation in treatment seeking behaviour among elderly in Uttar Pradesh by background characteristics results from logistic regression variation in treatment among elderly in Uttar Pradesh, shows that female have 2.246 times higher chances to getting treatment comparison to elderly male, Elderly who are belonging to other social groups have 0.334 times less chances to getting treatment. In the MPCE Elderly who belongs to middle 2.926 times and in the rich 5.137 times having higher chances to getting treatment, those who are partially

dependent on other have 0.340 times having less chances to getting treatment in comparison to those who are independent. Controlling the effect of other variables, the reporting of any kind of diseases is likely to be less among elderly belonging to central, eastern southern and southern upper regions.

Table 6: Percent distribution of aged persons by treatment Seeking behaviour

Background Characteristics	Any Treatment	Nature of Treatment		No treatment
		Allopathy	Indian System/Homeopathy	
Age Group				
60-69	97.9	86.6	11.3	2.1
70-79	90.1	79.3	10.8	9.9
80+	96.3	93.7	2.6	3.7
Sex				
Male	93.3	85.6	7.7	6.7
Female	98.1	85.2	13.0	1.9
Marital Status				
Currently Married ®	98.3	84.0	10.5	5.6
Widowed/ Separated/ Divorced	90.8	89.8	9.0	1.2
Place of residence				
Rural	94.4	87.7	10.6	1.7
Urban	98.8	81.5	9.3	9.2
Education				
No Education	95.5	82.6	13.0	4.5
Primary	91.5	86.9	4.6	8.5
Secondary	98.0	87.0	11.0	2.0
Higher Secondary	100.0	97.5	2.6	0.0
Religion				
Hindu	95.0	87.3	7.7	5.0
Muslim	98.1	75.6	22.5	1.9
Caste				
ST/SC	90.4	73.8	16.6	9.6
Other Backward Class	98.0	89.7	8.3	2.0
Others	95.4	87.0	8.4	4.7
Whether Hospitalised				
Yes	98.0	95.5	2.6	2.0
No	95.2	84.1	11.1	4.8
MPCE				
Poor	92.7	76.3	16.4	7.3
Middle	97.2	90.5	6.7	2.8
Rich	98.4	95.6	2.9	1.6
State of Economic Independence				

Not dependent on others	98.8	93.2	5.6	1.2
Partially Dependent on others	86.4	70.2	16.2	13.6
Fully dependent on others	95.8	84.8	11.0	4.2
Region				
Northern	99.0	94.8	4.2	1.0
Central	95.0	85.6	9.4	5.0
Eastern	96.6	85.7	10.9	3.4
Southern	100.0	75.1	24.9	0.0
Southern Upper	89.9	79.2	10.7	10.1
Total	95.5	85.4	10.1	4.5

Sources: NSSO Data, 71st round

Table 7: Variation in Treatment seeking behaviour among elderly in Uttar Pradesh by background characteristics: Results from Logistic Regression Analysis

Background Variables	Exp(β)	95% CI	
		Lower Limit	Upper Limit
Age Group			
60-69 ®			
70-79	1.233	0.532	2.862
80+	1.909	0.495	7.362
Sex			
Male ®			
Female	2.246*	0.946	5.330
Marital Status			
Currently Married ®			
Widowed/ Separated/ Divorced	0.742	0.327	1.683
Place of Residence			
Rural ®			
Urban	1.014	0.427	2.411
Education			
No Education ®			
Primary	1.357	0.517	3.561
Secondary	3.016	0.757	12.011
Higher Secondary	1.000		
Religion			
Hindu ®			
Muslim	1.709	0.597	4.890
Caste			
ST/SC			
Other Backward Class	0.777	0.274	2.201
Others	0.334**	0.113	0.989
MPCE			
Poor ®			
Middle	2.926**	1.235	6.937

Rich	5.137***	1.644	16.046
State of Economic Independence			
Not dependent on others ®			
Partially Dependent on others	0.340*	0.106	1.093
Fully dependent on others	0.576	0.190	1.748
Region			
Northern®			
Central	0.288	0.034	2.479
Eastern	0.245	0.031	1.945
Southern Upper	0.289	0.034	2.435

Note: ®: Reference Category; ***P<0.01, **P<0.05, *P<0.1.

Conclusion

The disease patterns among elderly and their treatment seeking behaviour in Uttar Pradesh. At the same time, very limited information on the health conditions of older and their treatment seeking behaviour is available. In this study congregated critical evidences that older suffered with greater rates of self- reported morbidities and a very lower proportion of the elderly, were able to access health care services. Disease patterns showed that non-communicable disease were more widely prevalent among elderly. On the other hand, contribution of communicable diseases to disease burden was comparatively lower. These patterns in disease prevalence were in expected direction as Uttar Pradesh is swiftly entering in the advanced phases of health transition and demographic ageing. Here, the most striking concern was emerged that a greater proportion of elderly reported life-style, behavioural and environmental related morbidities compared to their counterparts, elderly. Substantial disparities in disease prevalence patterns and treatment seeking behaviour were noticed by age, residence, education and other socio-economic conditions. Oldest-old reported greater prevalence of morbidities due to weakening resistance power in old ages. Better socioeconomic status is strongly associated with better self-reporting of health status and greater utilization of health care services. However, in the process of health-epidemiological transition, higher socio-economic status is also associated with the greater reporting of sedentary life style related morbidities.

We found that about half the elderly people preferred allopathic treatment, while one-fifth chose self-medication. Waweru *et al.* (2003) have also reported that 14% of elderly individuals either

took self-medication or from a family member. The health seeking behaviour of the elderly was influenced by age, level of Education and wealth quintile. About 2.1 percent elderly people did not seek any treatment for their illness. Their reasons for this behaviour included the impression that the illness was minor, there was no one to escort them to the hospital, or they felt that the illness was not going to be cured even after taking treatment.

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Performance on ANC and PNC Services in Assam (Evidence from HMIS data (2013-14 to 2017-18))

Dilip Kr. Kalita¹, Nabanita Saikia² and Arpita Basak³

Abstract : *Maternal mortality is a crucial public health problem in Assam. Among the various factor associated with the maternal mortality, the maternal health services such as antenatal (ANC) and postnatal care (PNC) services are the main. To analyse the performances of antenatal and post-natal care services in Assam at district level during the period 2013-14 to 2017-18, HMIS data for the said periods have been used for this study. In order to compare the findings in relevant aspects of the present study, data from NFHS-3 (2005-06) and NFHS -4 (2015-16) are also taken into consideration .The analysis reveals that In Assam, the percentage of first trimester registration has gradually increased from 2013-14 (71.8%) to 2017-18 (84.8%). In Assam the percentage of pregnant women received TT2 has increased gradually during the reference period, 85.3 percent in 2013-14 to 91.8 percent in 2017-18. The highest percentage in this regards is found in Kamrup (M) district (96.9%) whereas the lowest observed in Dima Hasao (78.9%) for the period 2017-18. Still birth in Assam has reduced to 21 percent in 2017-18 from 23.4 percent in 2013-14. However, the improvements were not equally distributed across the all districts of Assam. Thus, there is a need to increase utilization of the maternal health services, improve the quality of health services with the skilled professionals, increase the health facilities with proper equipment's, and provide essential maternal health education to all women of Assam. The study will help the policy makers to pay their attentions towards the raise in the utilization of ANC and PNC services in Assam covering all districts.*

Introduction

Maternal mortality is a critical public health concern in India as well as in Assam also. According to the data released by Registrar General of India, the MMR of India was 167 per 1,00,000 live births for the period 2011-13. Among the North Eastern States, Assam recorded the MMR as 300 per 1,00,000 live births for the same period which is much higher than the national

¹ Associate Professor,

² Research Fellow-2,

³ Research Fellow-1 (Ex.), Population research Centre, Guwahati, Assam.

average. The major direct obstetric causes of maternal mortality in India are haemorrhage, puerperal sepsis, hypertensive disorders of pregnancy, obstructed labour and unsafe abortions.

Prenatal and postnatal care services are imperative strategy to decrease maternal morbidity and mortality. Antenatal care is the optimistic approach to overcome the prospective obstacle before and after delivery. It is an important determinant of high maternal mortality rate and one of the basic components of maternal care on which life of mothers and babies depends (Nisar and White, 2003). The World Health Organization (WHO, 1991) defines antenatal care as a dichotomous variable, having had one or more visits to a trained person during pregnancy. It includes routine follow up provided to all pregnant women at primary care level from screening to intensive life support during pregnancy and up to delivery (Nisar and White, 2003). Antenatal care is the systemic supervision of women during pregnancy to monitor the progress of foetal growth and to ascertain the well-being of the mother and the foetus. It is a pivotal factor for child survival and safe motherhood. The health of mother and her newborn child depends on ANC services. All pregnant women should have at least four antenatal care (ANC) services under the supervision of skilled attendants. A proper antenatal check-up provides necessary care to the mother and helps to identify any complications of pregnancy such as anaemia, pre-eclampsia and hypertension etc.

The postnatal period is defined by the WHO as the period beginning after the delivery of the placenta and continuing until six weeks (42 days) after the birth of an infant. Care during this period is critical for the health and survival of both the mother and the newborn. More than two-thirds of newborn deaths occur within the first week after birth and of these, most deaths occur in the first 24 hours of birth.

Objective

The objective of the study is to analyse the performance of ante-natal and post-natal care services in Assam at district level during the period 2013-14 to 2017-18.

Data and Methodology

The database for the study is taken from the HMIS web portal of the Ministry of Health and Family Welfare, Govt. of India. HMIS data for the years 2013-14 to 2017-18 have been used for this study. In this paper we have analysed some indicators of ANC and PNC services viz. ANC registration within 1st trimester, IFA tablets, TT2 distribution, Home delivery, Institutional deliveries (public), Discharge less than 48 hours, number of ANC checkups, C-section delivery, Sex ratio at birth and Still birth ratio. Data from NFHS-3 (2005-06) and NFHS -4 (2015-16) are also taken into consideration to compare the findings of these studies in relevant aspects.

Table 1: District wise percentage of first trimester registration to total ANC registration during 2013-14 to 2017-18.

State/Districts	2013-14	2014-15	2015-16	2016-17	2017-18
Assam	71.8	77.2	80.6	83.2	84.8
Baksa	83.4	82.3	83.6	85.7	87.9
Barpeta	74.4	78.4	83.1	84.6	85.5
Bongaigaon	66.9	74.5	80.2	90.2	86.7
Cachar	77.2	80.9	82.1	87.8	87.7
Chirang	49.2	71.8	78	78.9	78.6
Darrang	67.3	65.9	72.8	83	88.4
Dhemaji	79.3	81.3	83.4	89.6	91.2
Dhubri	59	66.8	71.3	77	79.1
Dibrugarh	75.1	80.6	84.9	83.2	87.1
Dima Hasao	44.2	51.6	58.4	61.9	67.6
Goalpara	59.8	69.8	82.4	87.1	89.8
Golaghat	79.4	82.9	85.1	85.5	85.9
Hailakandi	60.6	69.9	77.1	79.3	80.6
Jorhat	84.8	89.6	87.8	88.6	93.1
Kamrup M	71.8	78.8	83.1	87.2	88.1
Kamrup R	82.4	88.2	89.6	90	92.7
Karbi Anglong	62.8	65.6	64.9	67.2	75.3
Karimganj	74.4	79.2	81.5	81.9	83.2
Kokrajhar	55.8	62.2	67.2	74.3	73.2
Lakhimpur	84.7	83.5	85.6	89.2	89
Marigaon	67.1	74.7	88.8	83.8	80.2

Nagaon	74.9	80.2	81	79.3	78.4
Nalbari	75.9	86.7	91.7	94	93.1
Sibsagar	80	83.1	85.1	86.4	89.8
Sonitpur	74.4	79.8	80.3	86.8	90.2
Tinsukia	68.8	74.5	74	77.8	80.2
Udalguri	81.5	84.4	83.6	83.6	84.7

From Table 1 it is observed that in Assam, the percentage of first trimester registration has gradually increased from 2013-14 (71.8%) to 2017-18 (84.8%). All the districts of Assam have also shown the increasing trend. In 2017-18 the highest percentage of first trimester registration is found in Jorhat and Nalbari districts (93.1%). Dima Hasao district shows the lowest coverage for the same (67.6%).

Table 2: District wise percentage of 3 and above ANC checkups to total ANC registration during 2013-14 to 2017-18.

State/District	2013-14	2014-15	2015-16	2016-17	2017-18
Assam	79.1	84	86.9	88	78.1
Baksa	83.3	84.9	88	85.5	80.4
Barpeta	82.9	88.8	92.1	91.8	86
Bongaigaon	73.2	82.1	83.9	85.5	76.3
Cachar	77.2	81	88.9	97.4	85
Chirang	71.6	79.5	80	78.9	69.4
Darrang	73	92.4	88.7	90.4	86.9
Dhemaji	95.6	89.5	90.9	89.9	82.3
Dhubri	82.7	85.4	86.6	86.3	77.9
Dibrugarh	81	85.1	90.9	88	76.8
Dima Hasao	62.4	68.3	66.8	67	45.2
Goalpara	82.9	85.7	88	88	79
Golaghat	82.5	87.6	88	85	69.3
Hailakandi	79.5	83	82.3	84.1	59.5
Jorhat	75.4	77.6	80.7	82.2	78.4
Kamrup M	72.5	82.9	84.1	86.5	84.4
Kamrup R	86.6	87.8	89.7	91.2	85.3
Karbi Anglong	65	68.8	68	70.6	62
Karimganj	73.1	79.3	85.2	86.8	77.3
Kokrajhar	76.5	79.2	81.2	80.1	63.6
Lakhimpur	83	84.6	84.3	87.7	80.3
Marigaon	83.2	84.8	90.5	89.3	72.4
Nagaon	84.5	88.5	95.2	98	81.6

Nalbari	78	86.6	91.5	89.2	76.3
Sibsagar	81.4	84.8	88.6	78.1	78.7
Sonitpur	78.2	82.8	82.7	94.6	81.5
Tinsukia	71.4	81.8	89.7	86.2	78.2
Udalguri	73.7	82.8	84.1	81.2	68.9

The number of antenatal check-ups and the timing of the first check-up are important for the health of the mother and the outcome of the pregnancy. The conventional recommendation for normal pregnancies is that once pregnancy is confirmed, antenatal check-ups should be scheduled at four-week intervals during the first seven months, then every two weeks until the last month and weekly thereafter. Four antenatal check-ups—one each during the third, sixth, eighth, and ninth months of pregnancy have been recommended as the minimum necessary. From HMIS web portal data, we have found that up to 2016-17, only 3 ANC check-ups had been proposed as the minimum necessary but from 2017-18, 4 ANC checkups have been recommended. Table 2 represents the district wise percentage of 3 or 4 ANC checkups to total ANC registration. In Assam, the percentage of 3 ANC checkups has increased gradually, 79.1 percent in 2013-14 to 88 percent in 2016-17. In 2017-18, only 78.1 percent women received 4 ANC checkups. For the same period, the highest percentage (86.9%) of women received 4 ANC checkups are observed in Darrang district whereas the lowest (45.2%) recorded in Dima Hasao district.

Table 3: District wise percentage of women given 100 IFA tablets during 2013-14 to 2017-18.

State/Districts	2013-14	2014-15	2015-16	2016-17	2017-18
Assam	73.9	90.7	90.3	101.2	94.1
Baksa	86.7	90.2	91.8	104.8	106
Barpeta	71.8	83.8	88.5	97.8	77.5
Bongaigaon	82.4	93.3	82.2	84.1	99.1
Cachar	79.9	109.9	93.4	99.8	97.3
Chirang	77.1	90.5	98.3	99.9	73.4
Darrang	61.2	77.3	89.9	104.6	99.7
Dhemaji	86.6	86.2	88.9	102	98.4
Dhubri	75.7	93.8	86.3	91.8	93.5
Dibrugarh	81.8	88.6	95.7	107.1	99.6

Dima Hasao	56.4	62.7	68.2	74.5	58.3
Goalpara	64.2	88.6	89.7	107.7	100
Golaghat	80.2	94.2	85.9	104.1	89.7
Hailakandi	83.7	88.2	83.1	99.9	91.4
Jorhat	70.7	73.2	122.1	91	90.8
Kamrup M	33.6	85.9	90	106.2	90.3
Kamrup R	87.3	94.5	90.3	95.3	91.1
Karbi Anglong	67.2	75.1	73.5	93.1	97.7
Karimganj	78.2	93.1	85.9	101.9	97.5
Kokrajhar	71.3	87.9	94.7	97.4	99.6
Lakhimpur	73.2	78.3	72.1	94.3	84.1
Marigaon	71.4	89.2	98.5	99.9	99.4
Nagaon	80.3	100	97.6	108.8	99.1
Nalbari	72.5	93.7	96.6	98.1	90.7
Sibsagar	66.1	85.8	91.4	101.2	100.4
Sonitpur	85.8	101.7	83.6	114.7	95.6
Tinsukia	82.6	91.3	97.9	116.7	98.3
Udalguri	75.6	86.4	80.8	96.2	83.4

Proper maternal nutrition is important for healthy growth of the baby. It is a major threat to safe motherhood and to the health and survival of infants because it contributes to low birth weight, lower resistance to infection, impaired cognitive development and decreased work capacity. According to NFHS-4 factsheet, the percentage of women given 100 IFA tablets in Assam is only 32 percent. Table 3 depicts that in Assam the percentage has increased from 73.9% in 2013-14 to 94.1% in 2017-18. It is also observed from the table that in some cases the number of women given 100 IFA tablets is higher than the ANC registered women which might be due to data error.

Table 4: District wise percentage of women given TT2 during 2013-14 to 2017-18.

State/Districts	2013-14	2014-15	2015-16	2016-17	2017-18
Assam	85.3	88.5	90.8	91.7	91.8
Baksa	85.5	85.5	88.1	90	89.9
Barpeta	87.1	88.8	88.1	91.3	90.4
Bongaigaon	84.4	91.3	89.9	92.1	93.8
Cachar	91.5	90.8	91.7	98.1	95.4
Chirang	76.8	86.4	91.4	90.8	92.3
Darrang	78	88.5	92.4	96.1	94.9
Dhemaji	88.9	89.3	90.1	92.6	87.7

Dhubri	89.4	88.3	89.7	88.8	91.9
Dibrugarh	76.6	81.7	91.1	89.1	92
Dima Hasao	82.8	83	83.8	77.7	78.9
Goalpara	84.6	86.6	92.3	92.5	91.9
Golaghat	88.2	90.2	91.5	90.7	91
Hailakandi	88.6	88.8	89.2	90.7	89.3
Jorhat	83	85.1	85	86.1	92.1
Kamrup M	73.3	86.1	91.6	88.8	96.9
Kamrup R	83.9	86.4	89.8	88.9	89.1
Karbi Anglong	88.6	89.1	88.9	88.8	92.7
Karimganj	84.8	88.2	96.2	97.8	97.5
Kokrajhar	83.9	85.8	90.2	88.6	91.5
Lakhimpur	90.8	90.9	89	88.8	86.3
Marigaon	90.5	96.2	94.3	93.3	93.8
Nagaon	86.5	90.3	93.6	94.3	91.7
Nalbari	84.6	89.1	95.7	95.7	92.7
Sibsagar	82.2	84.3	86.1	82.2	83.5
Sonitpur	91.5	92.9	91.1	101.3	93.2
Tinsukia	84.7	86.7	89.3	88.1	89.4
Udalguri	87.2	89.2	89	90.5	88.2

Maternal and neonatal tetanus are important preventable causes of maternal and neonatal mortality. Two doses of tetanus are given to women during pregnancy to prevent these mortalities. If a woman has been vaccinated during previous pregnancy, however, she may require only one dose for the current pregnancy if the previous pregnancy occurred within 3 years of the last birth. Table 4 represents percent distribution of pregnant women who have received TT2 to total ANC registration. In Assam the percentage of pregnant women received TT2 has increased gradually during the reference period, 85.3 percent in 2013-14 to 91.8 percent in 2017-18. The highest percentage is found in Kamrup (M) district (96.9%) whereas the lowest observed in Dima Hasao (78.9%) for the period 2017-18.

From the standpoint of child survival and health of the mother, it is advantageous for babies to be born under hygienic conditions with the assistance of a trained medical practitioner. One of the important objectives of National Health Mission (NHM) is to reduce child and maternal mortality through institutional delivery and 100 percent deliveries should be attended by the Skilled Birth Attendant (SBA). Assam shows the decreasing trend in percentage of home

deliveries 16 percent in 2013-14 to 12.5 percent in 2017-18. Among the districts of Assam, in Karbi Anglong, Marigaon, Nagaon and Udalguri the percentage of home deliveries has increased during the reference periods. The highest percentage of home delivery is found in Dhubri district (43.5%) in 2017-18 which is higher than the state level.

Table 5: District wise percentage of home deliveries to total deliveries during 2013-14 to 2017-18.

State/Districts	2013-14	2014-15	2015-16	2016-17	2017-18
Assam	16	15.3	14.1	13.5	12.5
Baksa	9.2	9.4	9.3	9.6	8.6
Barpeta	34.5	30.7	26.9	24.9	22
Bongaigaon	21.4	23.2	21.7	13.7	11.2
Cachar	14.2	12.3	9.5	6.4	4.4
Chirang	24.4	27	23.7	23.1	21.2
Darrang	20.3	16.6	17.1	16.3	16.3
Dhemaji	2.2	0.8	0.6	0.6	0.7
Dhubri	47.1	46.7	46.9	46.9	43.5
Dibrugarh	0.9	0.7	0.5	0.3	0.4
Dima Hasao	40.5	41.1	41.6	35.2	32.3
Goalpara	14.3	12.6	10.3	8.5	7.1
Golaghat	5.6	3.8	3.9	4.1	3
Hailakandi	35.5	32.9	30.7	27.4	20.9
Jorhat	1.8	1.1	0.8	0.9	0.7
Kamrup M	2.4	1.9	1.1	0.8	0.9
Kamrup R	7	5.9	4.6	3.6	2.3
Karbi Anglong	14.2	13.2	13.4	13.9	16.1
Karimganj	39.7	38.9	37.6	35.5	33.7
Kokrajhar	13.1	10.4	9.4	8.3	9
Lakhimpur	1.7	1.4	1.8	1.7	1.4
Marigaon	12.7	13.6	12.6	13.8	15.9
Nagaon	9	8.6	8.3	9.1	9.2
Nalbari	13.2	10.7	4.7	4.3	4
Sibsagar	3	2.3	2.1	2	1.6
Sonitpur	14.4	15.2	13.7	10.9	10.7
Tinsukia	7.5	6.7	6.5	5.3	4.5
Udalguri	9.3	9.2	8	9.4	9.6

Delivery by skilled birth attendants (SBAs) and receiving institutional care at birth can significantly reduce the risk of maternal and neonatal deaths attributable to prematurity,

intrapartum or postpartum complications. NFHS-3 (2005-06) data reveals that at national level, the percentage of institutional birth is 38.7 percent; the percentage is increased to 78.9 percent in NFHS-4. For Assam the percentage has increased from 22.4 percent in NFHS-3 to 70.6 percent in NFHS-4. Table 6 represents the district wise percent distribution of institutional delivery to total ANC registration.

Table 6: District wise percentage of institutional deliveries to total ANC registration during 2013-14 to 2017-18.

State/Districts	2013-14	2014-15	2015-16	2016-17	2017-18
Assam	65.3	70.6	72.7	74.4	76.4
Baksa	56.5	56.6	54.8	51.2	49.7
Barpeta	55.2	62.1	63.7	67.2	72.8
Bongaigaon	74.1	74.3	72.7	82.1	88.1
Cachar	87.2	89.4	84.8	97.5	103
Chirang	45.1	50.2	55.9	52.5	58.5
Darrang	57.9	70.8	63.8	61.9	68.3
Dhemaji	96.3	103.5	111.2	106.4	101.3
Dhubri	39.8	43.3	43	45.9	51.7
Dibrugarh	91.9	89.9	106.4	92.8	94
Dima Hasao	45.9	47.6	44.6	49.7	52.8
Goalpara	65.6	71.6	74.6	80.9	89.2
Golaghat	71.4	81.1	80.7	79.1	81.4
Hailakandi	47.9	51.2	50.5	56.5	54.6
Jorhat	85.3	78.1	76.4	78.2	72.7
Kamrup M	59.9	75.2	87.4	101.6	117.7
Kamrup R	57.1	61.4	62.1	62.2	62.5
Karbi Anglong	66.4	69.2	66.5	63.8	63.3
Karimganj	43.8	48.4	52.6	55.5	56
Kokrajhar	63.6	74.9	77.3	77.4	80.8
Lakhimpur	86.9	87.1	83.4	82.9	80.3
Marigaon	66.7	65.5	68.7	66.9	65.2
Nagaon	62.7	81	83.9	83.1	80.9
Nalbari	80	83.8	87.9	89.3	94.2
Sibsagar	70.7	71.7	73.7	70.1	69.5
Sonitpur	73.4	73	80.3	87.6	84.8
Tinsukia	83.2	84.1	86.8	85	85.1
Udalguri	63.9	63.9	64.7	59.8	58.6

In Assam, the percentage of institutional delivery to total ANC registration has risen from 65.3 percent in 2013-14 to 76.4 percent in 2017-18. In 2017-18, the highest percentage of institutional delivery is observed in Kamrup (M) district (117.7%), which might be due to the fact that the beneficiaries are availing the delivery facility in Kamrup (M) from outside areas who have taken ANC services in their own localities. There are so many Govt. and private health facilities including Medical college and hospitals located in Kamrup (M) district.

Table 7: District wise percentage of C-section deliveries to total public deliveries during 2013-14 to 2017-18.

State/Districts	2013-14	2014-15	2015-16	2016-17	2017-18
Assam	11.7	10.7	11.9	13	14.2
Baksa	0	0	0	0.3	0.6
Barpeta	12.9	13.9	18.5	17.3	16.8
Bongaigaon	8.8	2.3	7.4	9.6	12.2
Cachar	17	13	12.7	15	17.1
Chirang	0	0	0	1.6	5.8
Darrang	2.8	2.9	4.6	3.3	4.4
Dhemaji	12.5	14.4	15.2	16.6	19.2
Dhubri	6.3	4.4	3.7	3.5	3.7
Dibrugarh	26.5	20.5	19.8	22.7	24.5
Dima Hasao	17.4	18	19	19.2	22.5
Goalpara	12.4	6.4	7.8	7.6	8.9
Golaghat	8.3	7.5	10.9	11.5	13.3
Hailakandi	0.5	0.3	0.1	0.5	0.5
Jorhat	30	29	37.4	35.2	33.6
Kamrup M	47.8	48.5	45.5	49.8	46.5
Kamrup R	8.6	7.3	9.1	10.5	11.4
Karbi Anglong	4.4	4.3	5.1	5.8	6.1
Karimganj	2.1	1.8	1.7	3.2	4
Kokrajhar	4.7	6.6	7.1	7.2	10.1
Lakhimpur	12.4	12.2	16.1	16.9	19.7
Marigaon	6.2	5.4	4.5	4.7	6
Nagaon	2.4	1.8	2.7	3.6	5.7
Nalbari	9.8	8.6	11	11.1	13.1
Sibsagar	8	7.8	12.3	13.7	14.1
Sonitpur	8.4	13.3	16	19.9	21.2
Tinsukia	18.5	18.3	18.2	19.8	21.5
Udalguri	0	0	0	0.9	1.1

Caesarean Section (CS) is an operation, mainly evolved to save a maternal life during difficult child birth. The rate of caesarean section have shown significant rise in most of the developed countries and in many developing countries including India over the last few decades. The alarming rise in the rate of caesarean has been a matter of concern to the social scientist. Caesarean sections conducted without clinical need can have adverse consequences for mothers and children. The unnecessary caesareans were associated with an increased risk of maternal mortality and serious outcomes for mothers and newborn infants. Table 7 depicts the percentage of C-section delivery to total public delivery. In Assam, the percentage of C-section delivery has gradually increased from 11.7 percent in 2013-14 to 14.2 percent in 2017-18. At district level, it is found that all the districts except Dhubri, Goalpara and Marigaon show increasing trend in percentage of c-section delivery. The highest percentage has found in Kamrup (M) (46.5%) in 2017-18.

Table 8: District wise still birth rate of Assam during 2013-14 to 2017-18.

State/Districts	2013-14	2014-15	2015-16	2016-17	2017-18
Assam	23.4	22.6	21.1	21.2	21
Baksa	20.8	18.5	17.7	19.5	19.3
Barpeta	23.5	28.9	26.2	27.5	24.8
Bongaigaon	23	22.5	19	19.3	17.9
Cachar	30.8	33.1	27.6	27.8	26.7
Chirang	14.2	10.4	9.2	15.1	16.5
Darrang	20.2	21.2	17.9	16.9	15.6
Dhemaji	21.2	20.6	19.6	18.6	18.7
Dhubri	23.3	22.9	22.2	18.3	20.3
Dibrugarh	22.1	25.3	20.9	25.6	24.7
Dima Hasao	22	24.3	16.1	23.9	18.7
Goalpara	21.4	16.6	18.4	19.9	19.7
Golaghat	24.2	25.2	18.9	21	20.3
Hailakandi	36.1	34.2	30.5	28.6	27.8
Jorhat	16.5	17.7	16	18.2	18.6

Kamrup M	30.4	30.1	28.6	26.5	29.3
Kamrup R	11.8	11	10.4	12	10.2
Karbi Anglong	22.5	22.8	21.9	21.8	20.2
Karimganj	29.9	28.3	27.6	31.2	30.9
Kokrajhar	15.8	15.7	14.7	18.3	25
Lakhimpur	20.9	22.7	17	17.8	16.6
Marigaon	22.9	12.1	11.8	10.7	8.7
Nagaon	27.6	25.7	24.9	23.3	24
Nalbari	12.3	14.3	10.9	10.7	8.9
Sibsagar	22.2	17.4	19.4	18	17.5
Sonitpur	25.7	20.7	22.9	21.5	17.8
Tinsukia	19.5	14.4	14.5	11.7	13.5
Udalguri	18.2	16.1	19.6	18.6	16.9

World Health Organization (WHO) defines still birth as “the death of a baby before or during birth after 28 weeks of gestation”. The burden of stillbirths in India remains unacceptably high with about 590,000 stillbirths in 2015, the largest numbers of stillbirths globally (Dandona et. al, 2017). However, the sample registration system (SRS) of India has estimated stillbirth rate to be only 5 per 1000 births in 2013. Whereas Blencowe et al. (2016) have estimated it to be 23 per 1000 live births. In Assam the rate of still birth has reduced to 21 percent in 2017-18, 23.4 percent in 2013-14. The highest still birth rate is recorded in Karimganj district, 31 per 1000 live births and lowest observed in Marigaon and Nalbari districts, 9 per 1000 live births.

According to NFHS-3 (2005-06) report, the sex ratio at birth of India is 914 girls per 1000 males; the ratio is increased by 5 in NFHS-4 (2015-16). However, the sex ratio at birth of Assam has declined to 929 in NFHS-4 against 1033 in NFHS-3. Table 9 represents district wise sex ratio at birth of Assam. From the table it is found that the sex ratio of Assam has risen 928 (per 1000 males) in 2013-14 to 938 in 2017-18. Barpeta, Chirang, Goalpara, Golaghat, Kokrajhar, Lakhimpur, Nalbari, Sibsaagar and Sonitpur districts indicate decreasing trend in sex ratio at birth. From the table it is also observed that in some districts viz. Bongaigaon, Chirang

and Darrang, there are sharp decline of sex ratio at birth during 2016-17 to 2017-18. For example in Bongaigaon district, the ratio has decreased from 994 in 2016-17 to 947 in 2017-18.

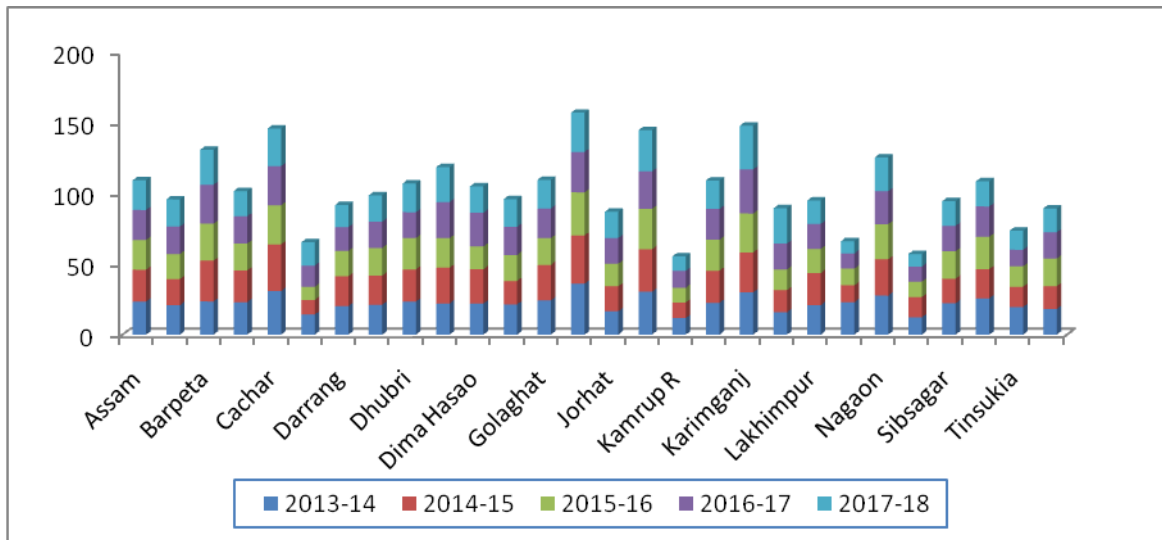


Figure 1: District wise still birth rate of Assam and its district during 2013-14 to 2017-18.

The postnatal period is defined by the WHO as the period beginning after the delivery of the placenta and continuing until six weeks (42 days) after the birth of an infant. Care during this period is critical for the health and survival of both the mother and the newborn. From Table 10, it is found that in Assam, the percentage of mother discharge less than 48 hours after delivery has decreased from 41.9 percent in 2013-14 to 33.3 percent in 2017-18. In Dibrugarh district only 5.5 percent mothers discharge within 48 hours whereas in Dhubri district 68.9 percent women stay in hospital less than 48 hours in 2018 which is higher (double) than the state level.

Table 9: District wise sex ratio at birth of Assam during 2013-14 to 2017-18.

State/Districts	2013-14	2014-15	2015-16	2016-17	2017-18
Assam	928	920	922	936	938
Baksa	941	945	948	970	981
Barpeta	952	909	917	930	948
Bongaigaon	935	937	940	994	947
Cachar	922	936	936	917	942
Chirang	932	908	912	953	911

Darrang	856	905	929	971	918
Dhemaji	896	879	844	897	947
Dhubri	919	921	914	934	941
Dibrugarh	943	926	922	918	951
Dima Hasao	982	968	977	955	989
Goalpara	934	877	871	937	909
Golaghat	943	928	966	946	939
Hailakandi	975	955	933	937	978
Jorhat	930	929	857	894	969
Kamrup M	934	942	969	950	946
Kamrup R	974	917	945	968	983
Karbi Anglong	881	867	898	918	918
Karimganj	917	905	904	925	930
Kokrajhar	933	841	859	889	905
Lakhimpur	1,017	952	954	939	935
Marigaon	926	980	964	948	982
Nagaon	897	905	918	944	930
Nalbari	965	935	922	948	938
Sibsagar	928	934	984	968	918
Sonitpur	950	954	946	940	911
Tinsukia	876	907	899	904	888
Udalguri	914	942	918	944	961

In Dibrugarh district only 5.5 percent mothers discharge within 48 hours whereas in Dhubri district 68.9 percent women stay in hospital less than 48 hours in 2018 which is higher (double) than the state level (33.3%).

Table 10: District wise percentage of women discharge less than 48 hours after delivery during 2013-14 to 2017-18.

State/Districts	2013-14	2014-15	2015-16	2016-17	2017-18
Assam	41.9	36.5	34.3	31.7	33.3
Baksa	27.8	42.3	31.8	38.8	29.2
Barpeta	35.9	30	19.5	19.5	30
Bongaigaon	66	72.4	52.4	68.7	66.3
Cachar	35.6	35.1	35	18.4	16.9
Chirang	90	45.7	6.9	12.9	11.8
Darrang	36.1	27.7	21.8	17.6	25.7
Dhemaji	57.8	52.7	50.4	47.4	32.9
Dhubri	62.9	45.7	54.8	50.3	68.9

Dibrugarh	23.7	28.5	20.1	13.2	5.5
Dima Hasao	51.3	20.2	22.9	20.5	24.9
Goalpara	48.2	39.8	50.8	63.1	48
Golaghat	58.5	43	40.5	15.7	20.3
Hailakandi	29.9	35.8	36.4	43.7	39.6
Jorhat	31.1	14.5	21.6	17.7	9.6
Kamrup M	2.3	0.7	0.5	6.5	12.4
Kamrup R	54.9	33.1	22.1	4.7	3.2
Karbi Anglong	72.7	71.4	71.6	69.5	64.2
Karimganj	39.8	40.8	41.6	39.8	54.6
Kokrajhar	76.1	73	70.4	47	43
Lakhimpur	42.1	41.9	51.3	48.8	64.6
Marigaon	34.1	25.4	14.7	19.2	30.7
Nagaon	34.1	42.3	46.7	48.2	52.9
Nalbari	29.5	11	8.2	8	8.3
Sibsagar	12.7	13	7.1	11.6	12.5
Sonitpur	52.8	37.7	18.9	16.4	20.9
Tinsukia	31.1	13.5	18.3	18	8.1
Udalguri	58.1	57.2	53.8	51.4	48.7

Thus the improvements were not equally distributed across the all districts of Assam. Therefore, there is a need to increase utilization of the maternal health services, improve the quality of health services with the skilled professionals, increase the health facilities with proper equipment's, and provide essential maternal health education to all women of Assam. The study will help policy makers and health sector managers to pay attention to the issue, while also enabling women and their family's to adopt and utilize modern contraceptive methods in the extended postpartum period.

Conclusions

Access to antenatal care (ANC) and postnatal care (PNC) services has a great deal of impacts on major causes of infant death and significantly affects trends of mortality in a population. The present study discuss about the performance of ANC and PNC services of Assam. From the study it is observed that all districts of Assam exhibit a significant development in respect of first trimester registration. In Assam, the percentage of first trimester registration has gradually increased from 2013-14 (71.8%) to 2017-18 (84.8%). It can also be found that, in Assam the

percentage of C-section delivery in public hospital has gradually increased. The rate of still birth in Assam has reduced to 21 percent in 2017-18 from 23.4 percent in 2013-14. The highest still birth rate is recorded in Karimganj district, 31 per 1000 live births and lowest observed in Morigaon and Nalbari districts, 9 per 1000 live births. It is also observed from the study that in Karbi Anglong, Morigaon, Nagaon and Udalguri districts, the percentage of home deliveries has increased during the reference periods. In Bongaigaon, Chirang and Darrang districts, there are Sharp decline of sex ratio at birth during 2016-17 to 2017-18.

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Consumption Smoothing in the face of Catastrophic Health Expenditure due to Non Communicable Disease

Mayanka Ambade¹ and Balram Paswan²

Abstract

Non Communicable Diseases are the leading cause of mortality in this period of global health transition. At Present, Cardio-Vascular Diseases, Diabetes, COPD and Cancers account for maximum deaths and loss of productive life (DALYs). The nature of these diseases is chronic, which makes them difficult to finance among poor families. With growing prevalence of these diseases among lower income quintiles, the government has a new public health issue to tackle. The following study makes an attempt to calculate the amount of economic burden of health expenditure incurred by households with at least one patient of NCD (CVDs, Diabetes, COPD), and compare it with other households using the Propensity Score Matching Technique. This technique is further utilized to fill an important gap in health literature in terms of absence of studies on consumption smoothing using cross sectional data. Consumption Smoothing is the process of maintaining the level of consumption expenditure of certain items irrespective of income shocks like excessive health burden. When a household is able to maintain its consumption levels, it is called as consumption insured. The ability of a household to smooth their consumption depends on their income, income shock and source of finance for the shock. Thus, the paper tries to find the consumption insurance of households in face of catastrophic health expenditure (income shock) due to NCDs). Lastly, the impact of sources of finance on consumption insurance is studied.

Background to the study

Non-communicable diseases are reaching epic proportions worldwide. These diseases which include cardiovascular conditions (mainly heart disease and stroke), some cancers, and chronic respiratory conditions and type 2 diabetes, affect people of all ages, nationalities and classes. These conditions cause the greatest global share of death and disability, accounting for around 60% of all deaths worldwide. Some 80% of chronic-disease deaths occur in low- and middle-income countries. They account for 44% of premature deaths worldwide. The number of deaths from these diseases is double the number of deaths that result from a combination of infectious diseases (including HIV/AIDS, tuberculosis and malaria), maternal and perinatal conditions, and nutritional deficiencies (Ministry of Health and Family Welfare- MoHFW). Several factors are

¹Ph.D Scholar,

²Professor and Head, Department of Population Policies and Programs, International Institute for Population Sciences (IIPS)

implicated in this increasing burden, including longer average lifespan, tobacco use, decreasing physical activity, and increasing consumption of unhealthy foods. Fortunately, these diseases are largely preventable. Up to 80% of premature deaths from heart disease, stroke and diabetes can be averted with known behavioral and pharmaceutical interventions. NCDs are replacing communicable diseases, maternal and child health as well as malnutrition as the leading cause of death. Non-communicable diseases are the leading cause of death in the world, responsible for 63% deaths worldwide and 53 % deaths in India (MoHFW). Based on available evidence, cardiovascular diseases (24 percent), chronic respiratory diseases (11 percent), cancer (6 percent) and diabetes (2 percent) are the leading cause of mortality in India (GBD study). The prevalence of these diseases and death attributable to them have seen an increasing trend in India since the last two decades. Figures 1 to 4 show the prevalence and death (percentages) due to COPD, Stroke, Hypertension and Type 2 Diabetes in India between 1990-2017. We can notice from figure 1 that death rate of COPD has increased significantly between 1990-2017 from 0.065 % to 0.095%. But the rise in prevalence is not as much as in death rate. Figure 2, 3 and 4 show that death rates and prevalence of Stroke, Hypertension and Diabetes have increased steadily in the past two decades.

Treatment costs are almost double for NCDs as compared to other conditions and illnesses. Burden of non-communicable diseases and resultant mortality is expected to increase unless massive efforts are made to prevent and control NCDs and their risk factors. NCDs stem from the combination of modifiable as well as non-modifiable risk factors. Thus study of risk factors is equally important. Moreover, intervention at risk factors will be more effective than later, but treating the intermediary factors would be more difficult. Chronic diseases like the NCDs pose a lot of economic burden to the society. The economic burden of diseases is experienced in the form of health expenditures, preventive expenditures, loss of income due to disability and premature death, the opportunity cost of relatives for care taking etc. WHO defines total health expenditure as including expenditure for public health programs, water supply, hygiene activities, nutritional support activities, education, training and research. It excludes the unpaid care given by relatives and their opportunity cost. There are many studies which have been conducted for estimating the economic burden of diseases and various approaches have been

developed to do the same. Many studies have also been conducted specifically on India and its neighboring countries. The most prominent studies have been conducted by David Bloom and his team of Harvard demographers, who have calculated effects of diseases on economy across globe and specifically for India and China

Figure 1: COPD Death and Prevalence (percentages) 1990-2017 (GBD Data)

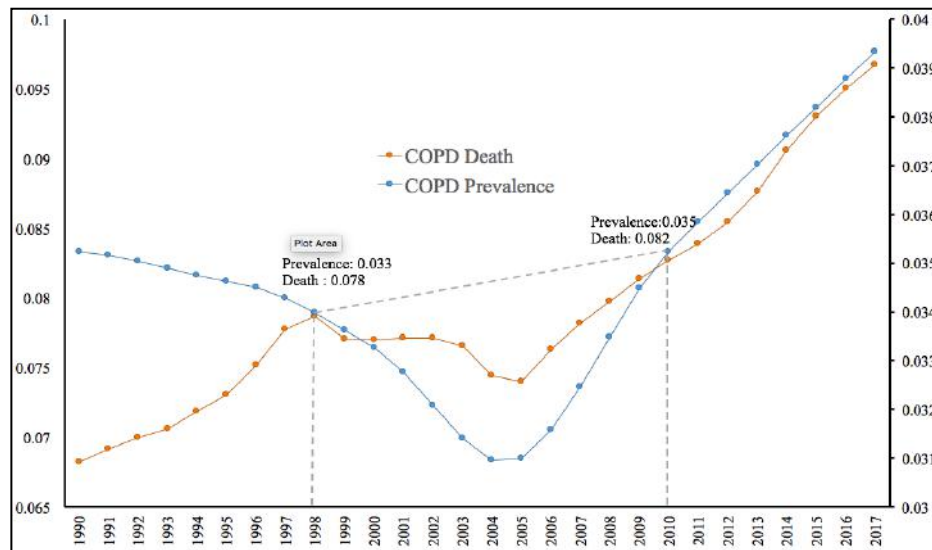


Figure 2: Stroke Prevalence and Deaths (percentages) 1990-2017 (GBD Data)

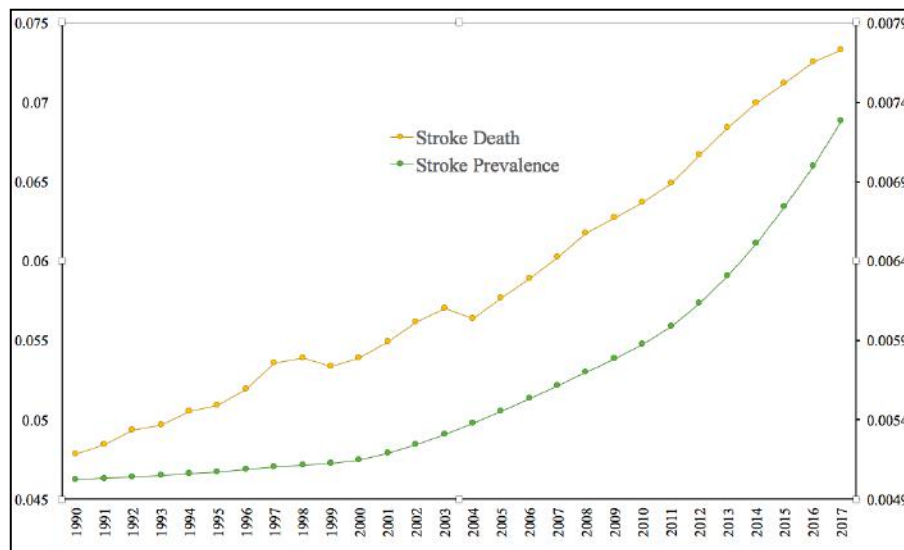


Figure 3: Hypertension Prevalence and Death (percentages) 1990-2017 (GBD Data)

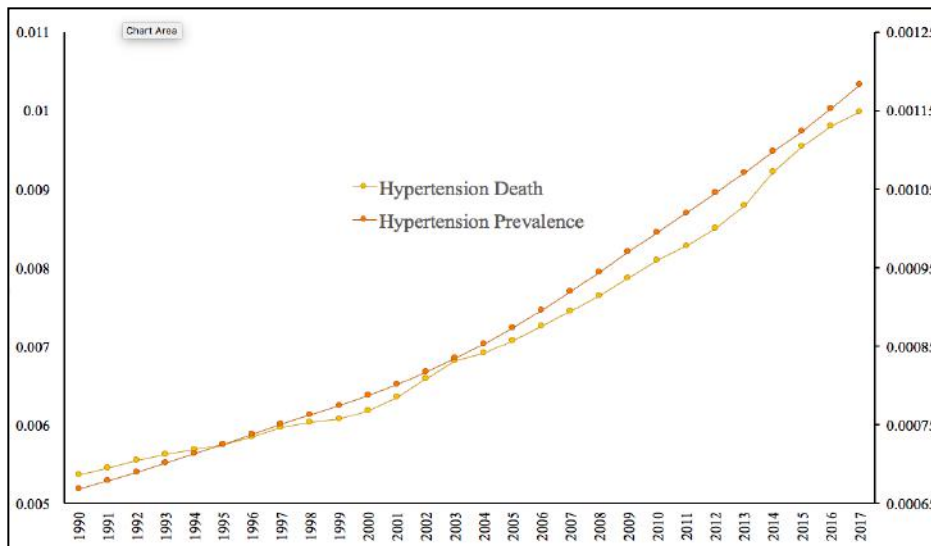
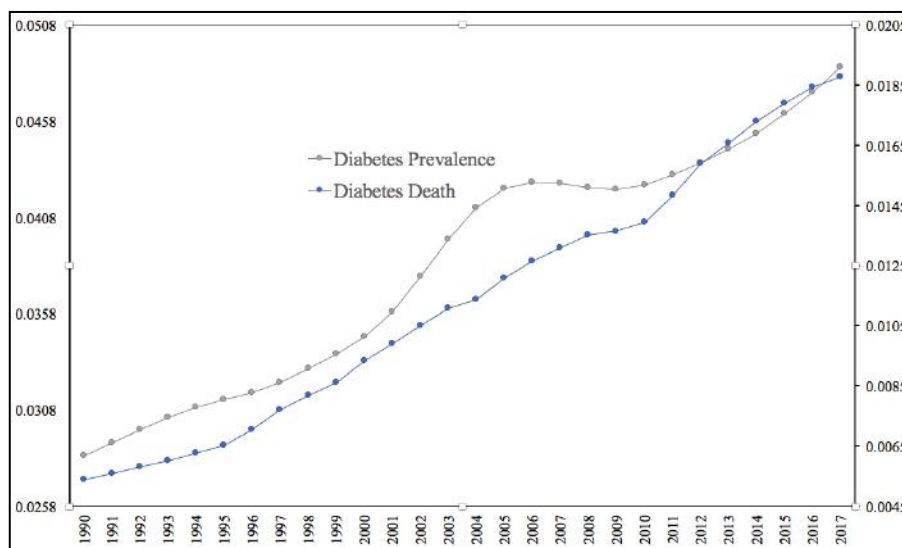


Figure 4: Type 2 Diabetes Prevalence and Deaths (percentages) 1990-2017 (GBD Data)



Other major researches are by A. Mahal and Gupta (2013) who have estimated economic burden in India. Mahal who has calculated economic burden based on NSSO data has proposed that chronic diseases impose a huge welfare loss for households as well as economy in India. Most studies classify the economic burden into direct and indirect costs which are incurred. Information on direct costs is always based on self-reported data or hospital based data. On the other hand, there are three principal methods of finding out indirect costs namely the human capital method that measures the cost production in terms of lost earnings, friction cost method that measures only the production losses during the time it takes to replace a worker and the willingness to pay approach that measures the amount that an individual is willing to pay to reduce the probability of illness or mortality. The methods to find individual's willingness to pay include surveys or an examination of demands for products that lead to greater health or safety.

Some large scale surveys conducted by WHO also present a good picture of health and economic burden of these diseases e.g. the Global Burden of Disease study which gives estimates of health burden in form of Disability Adjusted Life Years for various countries and many diseases. Another survey, 'The World Health Survey' collects data in 70 countries on levels of health of population and risks to health, responsiveness of health systems to people's expectations and the expenditures that people incur in health. In addition to studies that measure direct and indirect costs incurred due to disease, some studies measure the micro and macro-economic consequences of these diseases. Many have made an effort to estimate the effect of chronic diseases on consumption and savings. Also, some studies like the 'Global Economic Burden of Non Communicable diseases' collaborated by Harvard School of Public Health and the World Economic Forum (WEF) gives excellent estimates of the loss of GDP due to the non-communicable diseases. This study is largely dependent on the study conducted by Abegunden and Stanciole (2006) and the EPIC model (developed by WHO) of macroeconomic simulation which shows the impact of health in terms of life expectancy on the GDP. This study has proposed the use of three approaches to calculating the macroeconomic burden of diseases: the cost of illness approach, which adds the total direct and indirect costs, the macroeconomic

simulation approach that fits in a health variable (generally life expectancy) into a macroeconomic growth equation like the Solow's or Cobb-Douglas equation and measure the change in output (which represents GDP) with unit change in health and lastly the value of statistical life approach which is based on the concept of trade-off between risks and money e.g. the minimum wage for doing a risky job or the money spent on healthy diet to avoid disease. This method quantifies the relationship between money and the risk of disability or death for e.g. the rate of compensation for risk between two situations say the occurrence of disease or no disease could be equated to extra money to be spent divided by difference in risk. Another facet of economic burden of diseases is the concept of 'catastrophic expenditures' or 'impoverishing medical expenditures' (Van Doorslear *et al.* 2006). It is generally defined as the threshold level of expenditure that becomes financially catastrophic for poor households with no insurance cover. It is calculated in terms of a household's capacity to pay (Xu *et al.* 2006).

The following study is an attempt to find out the effect of NCD on a household by analyzing the catastrophic health expenditure faced by them and the consequent effect on Consumption Smoothing. A household will have to face a number of economic consequences due to economic burden of a disease. The costs incurred by the households in treatment of the disease and the income lost in relation to the disease may impact the current disposable income of the household. This may affect their non-health consumption and savings in the short run. In the long run it may impact the wealth accumulated by the household through reduced investment and disposal of assets to fund the economic burden. A household may choose between any of the different means of funding to meet the economic burden. They may resort to using savings, selling assets, borrowing money or reducing their non-health consumption. Mostly, a sample survey collecting information about the methods of funding is sufficient to understand this phenomenon.

There is ample literature that shows the impact of health expenditure on saving and non-health expenditure of households. A study by Anup Karan *et al.* (2014) has used propensity score matching techniques to understand the differences in health expenditures, non-health expenditures and savings between households with NCDs and without NCDs. Many more

studies have applied the same process like the one by Ajay Mahal *et al.* (2013) on CVDs, another by Khurshid Alam and Ajay Mahal (2014) wherein they study the effect of angina on households. Other than these, there is a study by Adriana Murphy *et al.* (2014) which applies the Coarsened Exact Matching Approach to find impact of NCDs on household's expenditure and savings. Most of these studies have found that the disease burden causes a reduction in savings and increase in health expenditure. But no significant change has been seen in the non-health consumption of the household. This shows that the households are consumption insured. But in reality cross sectional studies like the above are insufficient to understand the phenomenon of consumption insurance. A household is said to be consumption insured when it can smooth its consumption in the face of income shock. An income shock is any burden on the on income which was unexpected but is unavoidable.

The study of concept of consumption smoothing needs the understanding of the concept of Catastrophic Health Expenditure (CHE) in the first place. CHE is caused not only by high cost medical intervention, but even a small health expenditure may become catastrophic to a poor household which may force it to reduce its consumption in the long run. Thus CHE is a concept relative to the income (Himmelstein, D.U. 2005). The most commonly used concept of CHE is the one based on the 'Capacity to Pay' as applied by Xu *et al.* (2003). This study proposes health expenditure as 'catastrophic', when the same exceeds a threshold of 40% of a household's 'Capacity to Pay'. The concept of capacity to pay is discussed in detail by Adam Wagstaff in a WHO policy research working Paper (Wagstaff, 2008). A study by William Joe (2014) finds the headcount of households facing CHE using the concept proposed by Xu *et al.* (2003) as mentioned above. He calculated the extent of CHE faced by households using concentration index and concentration curves. There are more studies which highlight the catastrophic effects of 'Out of Pocket Health Expenditures (OOPE)' in India. High level of OOPE is indicative of a regressive health care system (William Joe, 2014). Bonu *et al* (2009) shows the levels of CHE in maternity health care and its consequences. Van Doorslaer *et al.* (2007) discuss about CHE in

different countries of Asia. Other studies by Ghosh (2011) and Gupta and Joe (2013) talk about CHE in different contexts.

Once the concept of CHE is defined and the headcount of households facing it is estimated, one can move on to understanding the coping mechanisms of the household depending upon the background characteristics of the households. The most essential coping mechanism which needs to be studied especially in relation to poor households is that of “consumption smoothing”. Consumption smoothing is a concept used to express the desire of a household to keep consumption constant in long run. So the study of consumption smoothing consists of testing whether a household is consumption insured or not (Bonu *et al.* 2009) and the next test is to find out the level of consumption smoothing achieved by the household.

Objective

To study the effect of NCDs on household’s consumption insurance.

Data Source

The data used in this study is the WHO-Study on Global Ageing and Adult Health (wave 1) in India conducted by WHO in 2008. This is a longitudinal survey which collects data on adults aged 50 and over and a small comparison sample of 18-49. This data is collected in China, Ghana, India, Mexico, Russian Federation and South Africa. Standardized SAGE survey instruments were used in all countries consisting of five main parts: 1) household questionnaire; 2) individual questionnaire; 3) proxy questionnaire; 4) verbal autopsy questionnaire (VAQ); and, 5) appendices including show cards. A VAQ was completed for deaths in the household over the last 24 months.

Though latest data on health expenditure like NSSO round 71 and IHDS round 2 are available, they have shortcomings. NSSO round 71 does not collect information about income of households. It also does not collect information about food or other non-medical expenditures, which limit the calculation of capacity to pay. Similarly, IHDS round 2 does not collect

information on source of funding for medical expenditure. Hence, this study uses 2008 WHO-SAGE wave 1 data.

Methodology

1. Calculating Capacity to Pay and Catastrophic Health Expenditure

At first a household's 'Capacity to Pay' was calculated by subtracting the subsistence level of expenditure from the household's monthly income. The subsistence level of expenditure was calculated as the median food expenditure of each tenth percentile of income group. This was then applied to calculate the capacity to pay for each household. Later, health expenditure was calculated as the percentage of the household's capacity to pay. The changes in this percentage by income were studied. Later, this variable was used to define the household's facing "Catastrophic Health Expenditure (CHE)", as those households for whom this percentage is greater or equal to 40%. Then logistic regression was applied to calculate the odds of facing CHE by given that it faces NCD controlling for background characteristics of the household.

2. Propensity Score Matching

After this, propensity score matching was applied to see the differences in monthly health expenditures, non-health expenditures and food expenditures between households facing NCD and those not facing NCD. This consist of two stages. In the first stage, the probability that a household will have an NCD patient is calculated based on socio-economic indicators (called propensity score). This is done using logit or probit model. In this paper, probit model was used. In the second stage, affected households were matched with control households on the basis of propensity scores, by the method of nearest neighbor matching process.

Propensity scorer matching is a common technique used to duplicate the results of case control study in cross sectional setting. It consists of two stages. In the first stage, the probability that a household has a member suffering from Diabetes or CVD ("propensity Score") is predicted based on household socio-economic and demographic characteristics. This stage involves the estimation of a logit or probit model.

$$P(C_i = 1/X_i) = \frac{e^{\beta X_i}}{1 + e^{\beta X_i}}$$

Here C_i indicates whether household contains a member with Diabetes or CVD. The vector X_i indicates household demographic and socio-economic characteristics, and β is a vector of the parameters to be estimated. In the second stage, Diabetes or CVD affected households with similar propensity scores are matched with control households. For balance checking it is advised to compare the means of each covariate used in the regression model generated across affected and control households. The matching variables used in this study are educational status of head of household, type of household, occupation, number of children, aged, women, sex of household head), caste, religion, place of residence.

3. Variables used to construct propensity score:

Propensity score was computed using Individual characteristics like age in completed years, sex of respondent, marital status (0 if no and 1 is yes), education of respondent, religious group (1 if Hindu and 0 otherwise), ethnicity (1 if SC/ST and 0 otherwise); information about household members like number of females, number of old persons, age of household head, education of household head, sex of household head; other household characteristics like household size, weights, place of residence, socio-economic status, state and social capital (constructed based on questions about social networks)

4. Definition of NCD affected households

In this study, a household is defined to be affected by NCD is at least one person in the household has faced any of these diseases in the duration as asked in the study: Angina, Stroke, Hypertension, COPD and Diabetes.

5. Defining consumption insurance of household in cross section

Lastly, a household was defined as consumption insured if the treatment effect calculated using propensity scores was positive or zero and as uninsured if the treatment effect was negative. Here the matched control households were assumed to be post health shock conditions of affected households. Thus, two households which have same propensity scores were assumed to be one a household with different expenditures in two time periods (one before occurrence of NCD and

thus no NCD related costs, and one after). Then odds of being consumption insured as against being uninsured were seen by the mode of financing health expenditure after controlling for other background characteristics.

Results

Households face varying degrees of health expenditures. Diseases like Diabetes are chronic and difficult to cure. Thus, it requires long term curative and preventive measures such as consumption of medicines even after control of blood sugar. In this respect, such disease present low but long term burden on the patient. On the other hand, diseases such as Stroke or Angina, pose high costs (economic shocks associated with hospitalization) along with low long term costs of medication. Some of these situations may become catastrophic for the family. The percentage of households facing Catastrophic Health Expenditure (CHE) is shown in Table 1.

Table 1: Percentage of Households facing Catastrophic Health Expenditure due to Diabetes or CVD

Variables		CHE
NCD	Yes	18
	No	12
Religion	Hindu	14.7
	Muslim	13
	Others	17.1
Caste	SC/ST	11
	Non SC/ST	15
Income	Very poor	16.7
	Poor	13.9
	Middle income	8.6
	Rich	-
	Very rich	-

Source of Data: WHO SAGE wave 1, 2008

It can be seen from this table that percentage of households facing CHE is higher by 6 points among NCD affected households (18%) as compared to non-affected households (12%). We also see that, the percentage of households facing CHE, falls as the income rises with 16.7% of very households facing CHE but only 8.6% of moderate income households facing it. Further, households belonging to. Also, the non-SC/ST households plus households belonging to religious groups other than Hindu or Muslim have higher prevalence of CHE.

Table 2 shows us the health expenditure patterns of households on basis of whether they face CHE or not. It can be seen from the Table, that the monthly health expenditure can be as high as 5000 and above when a household faces COPD, Diabetes or Angina burden (for those facing CHE). The monthly expenditure in case of stroke is 1400 and that of hypertension is about 3000. For all these diseases, the monthly health expenditure is higher when the household faces CHE. The annual outpatient expenditure is nearly double for stroke affected households when they face CHE. This amount is nearly 8 times more in case of Angina and 24 times for COPD. Similarly, a huge difference can be noted in inpatient care costs. While a stroke affected household without CHE faces 6733 monthly inpatient expenditures on an average, this amount rises to 15731 in case of Catastrophic health expenditure. For Angina, the inpatient care cost without CHE is 12920 but with CHE is as high as 56658. Similar differences are noted for COPD, Diabetes and Hypertension.

Table 2: Expenditure Patterns of Households with at least one patient of NCD

Disease	CHE	Monthly Capacity to Pay	Monthly Health Expenditure	Annual Outpatient Expenditure	Annual Inpatient Expenditure
Stroke	No	21246	630	825	6733
	Yes	1006	1446	1618	15731
Angina	No	4148	1130	634	12920

	Yes	3303	5102	4570	56658
Diabetes	No	7306	892	443	10256
	Yes	3009	5203	6861	55572
COPD	No	3098	314	384	3390
	Yes	2583	5047	9415	51153
Hypertension	No	7447	571	467	6390
	Yes	2246	3925	3696	43398

Source of Data: WHO SAGE wave 1, 2008

Table 3 shows the odds of facing CHE. It can be seen from the table that the odds of facing CHE are higher when household has NCD burden. Given that a household has NCD burden, a poor household has higher odds of facing CHE as compared to rich. These odds rise with increase in monthly health expenditure. The non-SC/ST households have higher odds of facing CHE as compared to SC/ST households. Also, the odds are higher for male headed households. The pattern of odds ratio closely follows the one shown in Table 1. One important thing to note here is the fact that female headed households have lower probability of facing CHE. A likely reason for the same could be the fact that the patient would be head of the household. Female headed households in India are more likely to be rural household drawing their income from remittances. In such a case ill health of head of the household poses no issue on income of the household. Thus, even with similar health expenditures, the cost does not become catastrophic. But, if the head of the household falls sick, then it directly impacts the income of the household, thus reducing its capacity to pay and increasing the likelihood of CHE.

Table 3: Odds of Facing Catastrophic Health Expenditure by a household having a at least one patient of NCD

Variable	Exp (B)
No NCD®	
NCD	1.19**
Monthly Health Expenditure	1.06***
Poor®	
Middle	0.018***
Rich	0.84***
Hindu®	
Muslim	-
Others	0.89*
SC/ST®	
Non SC/ST	1.54*
Female Household Head®	
Male Household Head	1.05*
No. of Dependents	0.96*

*Level of Significance: ***<0.001%, **<0.01%, *<0.05%*

Source of Data: WHO SAGE wave 1, 2008

After analyzing the extent of CHE faced by Households with NCD burden, this study analyzed how consumption insurance of a family was affected by the NCD burden. This was done by propensity score matching. Households were matched according to their background characteristics and then the differences in their health and non-health expenditures were studied to get an idea of how it changes due to NCD burden. The results of PSM are given in Table 4. From the Table it can be see that the households facing NCD burden have health expenditure which is higher than medical of expenditure of matched control households by 103.77 INR. Also, the food expenditure among affected households is higher than control households by 253.31

INR. But, the non-health non-food expenditure is lower by 270 INR. This means that households are not consumption insured against NCD burden i.e. they reduce their consumption of non-health items to some extent in order to finance health expenditure associated with the disease. Also, these households have 2.7% higher chance of using distress financing to fund health expenditure (Distress financing means the use of medical loan or sale of asset to fund health care costs). Furthermore, the mean positive overshoot (average amount of health expenditure exceeding the limit of 40% of capacity to pay) is higher among households with NCD patient than control households by 191 INR

Table 4: Propensity Score Matching Results for Households having At least on patient NCD

Variable	ATT NCD (1 vs 0)
Food Expenditure	253.31***
Health Expenditure	103.77***
Non-Health Non-Food Expenditure	-269.94***
Debts	-0.009
Distress Financing	0.027*
Positive Overshoot	190.894*

*Level of Significance: ***<0.001%, **<0.05%, *<0.01%*

Source of Data: WHO SAGE wave 1, 2008

Plus, it can also be seen that the increase in Health expenditure and food expenditure is not equivalent to the decrease in non-health consumption expenditure. This means that houses have some degree of consumption insurance. They smooth their consumption (i.e. maintain their current level of consumption) by using income, reducing consumption to some extent, using savings, selling items, borrowing etc.

Table 5 shows the use of various funding mechanisms for financing health expenditures. It can be seen from the table that use of distress financing is higher among families without NCD patient in case of low income households. The percentage of household using Sale of asset is 11.1 % among Low income non affected households, which is more than 9.1% for affected households. But this number comes down to 3.6% for both, in case of middle income households. Similarly, the percentage of households resorting to borrowing from external sources is 9.8% and from friends and family is 20.3% in case of non-affected households, which is higher as compared to 5.4% and 20.8% among affected households.

Though these results seem uncanny, they are far from it. It is expected that poor households will resort to distress financing like sale of asset or borrowing money to fund health expenditures. But, they have limited assets to sell with low sale value. At the same time, their borrowing capacities are limited because of their repayment capacities. Nevertheless, the percentages show a higher use of these in case of poor households as compared to households of mediocre income. But, when the poor households have an NCD patient, the health care costs are much higher, making their funding from sale of asset or borrowing difficult. Since the costs incurred due to NCDs are also long term the households have to resort to consumption restructuring instead of immediate solutions like borrowing or sale of asset. Hence, the percentages of families using distress finance among affected households is low as compared to non-affected households among poor families

Table 5: Percentage of Households using different modes of finance by status of Disease

Income	Savings	Insurance	Selling Items	Friends/Family	Borrowing	Others
Low						
NCD	24.2	1.8	9.1	20.8	5.4	11.3
No NCD	25.2	3.9	11.1	20.3	9.8	13.4
Middle						

NCD	33.1	3.4	3.6	6.8	4.5	5.3
No NCD	40	5.5	3.6	8.2	5.5	0.9
High						
NCD	27.4	9.6	-	13.7	-	4.1
No NCD	40	10	-	20	-	20

Source of Data: WHO SAGE wave 1, 2008

It is clear from the above discussion that type of funding mechanism used has a great impact on the consumption insurance of a household. If a family has adequate income or savings or capacity to borrow and repay, it may not resort to consumption restructuring (the mechanism of changing consumption patterns i.e. reducing consumption of one item to increase consumption of other). But, if the family has limited source of funding health care expenditure, then it will reduce its non-health consumption to fund health care costs. The effect of funding mechanisms on consumption smoothing can be seen from the results given in Table 6. It gives the odds of being consumption insured given the funding mechanism used. Though not all results are significant, nevertheless one can see the pattern to understand the effect. The table shows that the when funding is done through insurance or borrowing, then the odds of a household being consumption insured are higher. But when the household uses savings or sells asset, then the odds of being consumption insured are low.

Table 6: Odds of Facing Consumption Insurance for given mode of finance

Mode of Finance	Odds Ratio
Savings not used®	
Savings used	0.629663*
Income not used®	
Income used	0.864122

No Insurance®	
Insurance used	1.125332.8
No Assets sold®	
Assets sold	0.646149
No Borrowing®	
Borrowing	1.07312*

*Level of Significance: ***<0.001%, **<0.05%, *<0.01%*

Source of Data: WHO SAGE wave 1, 2008

Discussion

Household's coping strategies are linked with the existing economic conditions of the family. With long drawn out high costs of health care associated with NCDs, households have to make decisions between short term instability or long term instability. In the short run, households may choose between borrowing money or sale of asset to fund health care expenditure, foregoing capacity to pay in the long run due to repayment commitments; or maintain capacity by foregoing treatment or using up savings. In both these situations, households try to smooth their consumption either in short run or in long run. Whether households decide to maintain consumption in short run or long run depends on the coping strategies and risk sharing mechanism available. The result of log odds of consumption smoothing (Table 6) shows that when households use savings, the odds of remaining consumption insured are less than 1. This means that the households which use savings, are less likely to be able to cover the entire health care expenditure through it. This propels the family to reduce non health consumption and use that money to fund health care costs, thus making it consumption uninsured. At the same time, when a household borrows money, the odds of consumption insurance are 7% higher than alternate situation. This shows that distress financing is a short term coping strategy, which may lead to avoidance of consumption restructuring. So the households remain consumption insured

in the short run, but will have reduced probability of consumption insurance in long run. Thus, when a household uses savings, it will most likely reduce its non-health consumption too. The same household could use borrowing or sale of assets. In case of middle income households, the use of savings over distress financing is assumed to be done due to availability of higher capacity to pay than incapability to borrow. But, in case of poor households, the use of income/savings coupled with consumption restructuring could imply a worse financial strain due to incapability to borrow or low value of saleable assets. Yet, no inference about the coping behavior of any income group can be drawn from this proposition.

The result of propensity score shows lower non-health non-food but higher food expenditure among affected households than matched control households. Thus, by considering two matched households as temporal observations of one household in pre NCD and post NCD health expenditure conditions, one can observe effect of health expenditure on consumption insurance in a cross section data. The analysis showed a statistically significant negative impact on non-health non-food consumption. The hypothesis of consumption insurance is not rejected in case of food expenditure, but rejected for non-health non-food consumption. So, the movement of a household from healthy to affected status reduced its non-food consumption and negates the implication of risk sharing. This demonstrates the loss of welfare which could have been avoided with proper risk sharing channels.

Low and volatile incomes, lack of well-developed financial markets, absence of public health insurance schemes and local risk sharing mechanisms in developing countries such as India, makes households which are vulnerable to health shocks, susceptible to Catastrophic Health Expenditures that cannot be smoothed over successfully. This will require intervention at community levels for improving risk sharing capacity. Risk sharing capacity of a community means the availability of arrangements for easy borrowing (Self Help Groups, community credit groups) and insurance (mostly provided by government with low rates or premiums). Policy like that of Ayushman Bharat was long due, which will provide financial protection in an environment characterized by high out of pocket expenditure.

Conclusion

Households facing NCD burden have higher chances of facing CHE. Their health and food expenditures are higher than those not facing NCDs. Then the households facing NCDs have lower non health consumption which shows that they are not consumption insured. The odds of being consumption insured rises with insurance. Though insurance coverage like Ayushman Bharat, is a positive step towards reducing health burden, it is important to note that the scheme does not cover outpatient costs. Outpatient costs are one of the biggest contributors to consumption un-insurance among household. Outpatient expenditures are quite high, with high fee of specialized doctors, high cost of medicines and medical tests. In case of NCDs like Hypertension, Angina, Diabetes, medical outpatient costs are long drawn out, as they require preventive medication through the remaining life of the patient. Also, regular medical checkups are necessary to monitor the health status of these patients to adjust medicine doses. Such costs are high for poor households, which leads to compromise in health care utilization. Regular outpatient cost pose just as much burden as one time health shocks due to hospitalization. Thus, a disease specific policy is necessary, which will outline the methods for identification of patient, process for free and regular medical camps for diagnosis and distribution chain of generic medication for the common NCDs.

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Burden of Chronic Diseases among Return Migrants in South Kerala

Dr. Nanzy P.S.,¹ Dr. Suresh Kumar S.² & Mr. Mathew M.C.³

Abstract : Kerala has a long history of migration, and return has always a part of migration process. Return migration and health has received little attention in policy and research. In a state like Kerala this aspect assumes utmost importance. Data for the study were collected from three districts in South Kerala, namely Thiruvananthapuram, Kollam and Pathanamthitta. Areas for data collection in the districts were selected by identifying the areas having concentration of return migrants. Data from non-migrant control population was also collected from the same areas. Information was collected from the respondents using the pre-tested interview schedule through personal interview.

Disease burden is more among the return migrants. One out of two return-migrants reported any chronic illness while only two in five non migrants bear the burden. Three fourths of the return migrants and non migrants aged 60+ years report any chronic illness and prevalence decreases with decreasing age. But it can no way be ignored that one in five return migrants in the 30-40 age group report chronic illness as against 10.8 percent among non migrants. Prevalence of any chronic illness is higher among return migrants who had been doing blue collar jobs compared to white collar jobs. Prevalence of any chronic illness among return migrants is higher among smokers compared to non smokers. Hypertension, diabetes and heart problems are the most reported chronic illness. Nearly 31 percent of the return migrants against 21.5 percent of the non migrants report hypertension. Diabetes is prevalent among 28.8 percent of the return migrant compared to 20.6 percent of the non migrants. Heart problems have been reported by 7.2 percent of the return migrants and the percentage is halved among non migrants. For 34 percent of the return migrants, onset of hypertension was in the age group 30-39 years. Most of the respondents sought treatment for their chronic illness. Age and education of the return migrants were found to be having significant influence in the chronic disease prevalence among the return migrants.

Introduction

Migration is a complex global phenomenon that has been essential to human histories, cultures and civilizations. It has occupied one of the most crucial positions in the economic and social development discourse in various countries of the world. The specific health needs of migrants

1 Research Fellow, 2 Documentalist and 3 Filed Investigator, Population Research Centre, Kerala

are not clearly understood and communication between health care practitioners and migrant people remains poor. Migrants return home with a wide range of health needs. Some returnees arrive healthy, as in the case of migrants who have been able to get good jobs in destination countries and have had access to appropriate health and social services. This is often the case with healthy retired professionals who return with money and contribute to development in their countries of origin. Migrants who receive low wages and live in poor housing, eat unhealthy food, and have difficulty accessing health services may have been exposed to other risk factors that promote poor health. These migrants often return home less healthy than when they left.

In India, the southern state of Kerala received much attention in the 1970s in view of the large number of emigrants to the Gulf countries, and it has started receiving attention again in recent years because of the large number of returnees from the same countries. In India, the southern state of Kerala received much attention in the 1970s in view of the large number of emigrants to the Gulf countries, and it has started receiving attention again in recent years because of the large number of returnees from the same countries. Corresponding to every 100 households in Kerala, there are 16 return emigrants; 12 of them have at least one return emigrant. About 1.3 percent households have more than one return emigrant. At present, there are roughly over 1.3 million return emigrants in Kerala. (Zachariah and Rajan, 2012). Even though, there are some studies on Gulf emigration from India, they have mainly dealt with the economic impact of remittances at the household level as well as in the state as a whole. Health status of return migrants has received little attention in policy and research. Therefore, this study was taken up with the objective of exploring the pattern of chronic illness of the return migrants and to compare it with that of non migrants in the same area.

Objectives

1. To analyse the Chronic Disease among the Return Migrants in South Kerala
2. To study the health seeking behavior of the Return Migrants.

Data and Methodology

The three southern districts of Kerala namely Thiruvananthapuram, Kollam and Pathanamthitta were selected for the study. A total 450 persons above the age of 30 years with equal proportions from each districts were interviewed for the study. Data were collected from two areas each in the selected districts. Areas for data collection in the districts were selected by identifying the areas having concentration of return migrants as revealed in information from the Kerala Migration Survey done by Centre for Development Studies, Thiruvananthapuram. The data were collected during the period from November 2018 to February 2019. Data analysis was done using SPSS package. Information was collected from the respondents using the pre-tested interview schedule through personal interview. The interview schedule has two parts, one for the household details and the other part for the individual details. The relevant socio economic, demographic, occupational and health details were collected from the respondents. The variables taken are age, marital status, educational status, occupation, sources of income, occupational status, details of migration etc. The details of chronic illness and treatment seeking behavior were collected from the selected persons.

Sample size calculation

Formula used for the sample size is

$$SS = \frac{Z^2 \times (p) \times (1 - p)}{C^2}$$

$$SS = \frac{(1.96)^2 \times (0.5) \times (1 - 0.5)}{(0.05)^2}$$

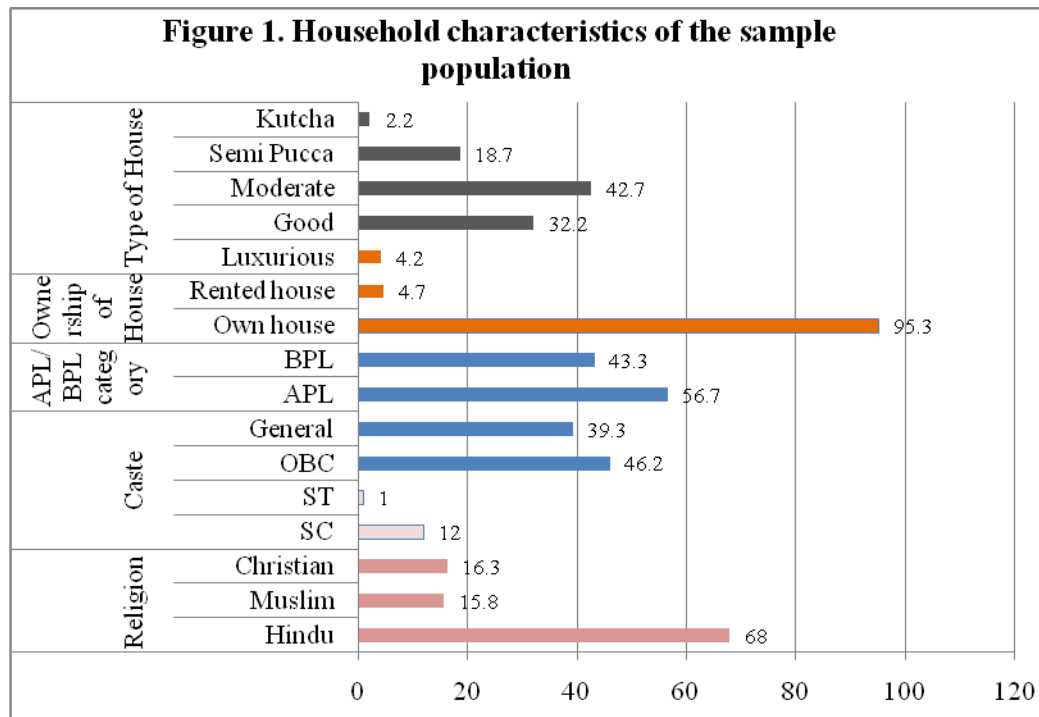
$$= 384.16$$

Sample size was fixed as 450 to cater to the non response rate also.

Findings and Discussion

Characteristics of sample population

Highest percent of the sample population are Hindus (68.0 percent) followed by Christians (16.3 percent) and Muslims (15.8 percent). Caste wise distribution shows that highest proportion of the respondents belongs to OBC category (46.2 percent) followed by general category (39.3 percent). Percentage of Respondents in the SC category is 12 percent and that in the ST category is 1.0 percent. The economic category of the respondents to which they belong shows that 56.7 percent belongs to APL category and the remaining 43.3 percent belong to BPL category.

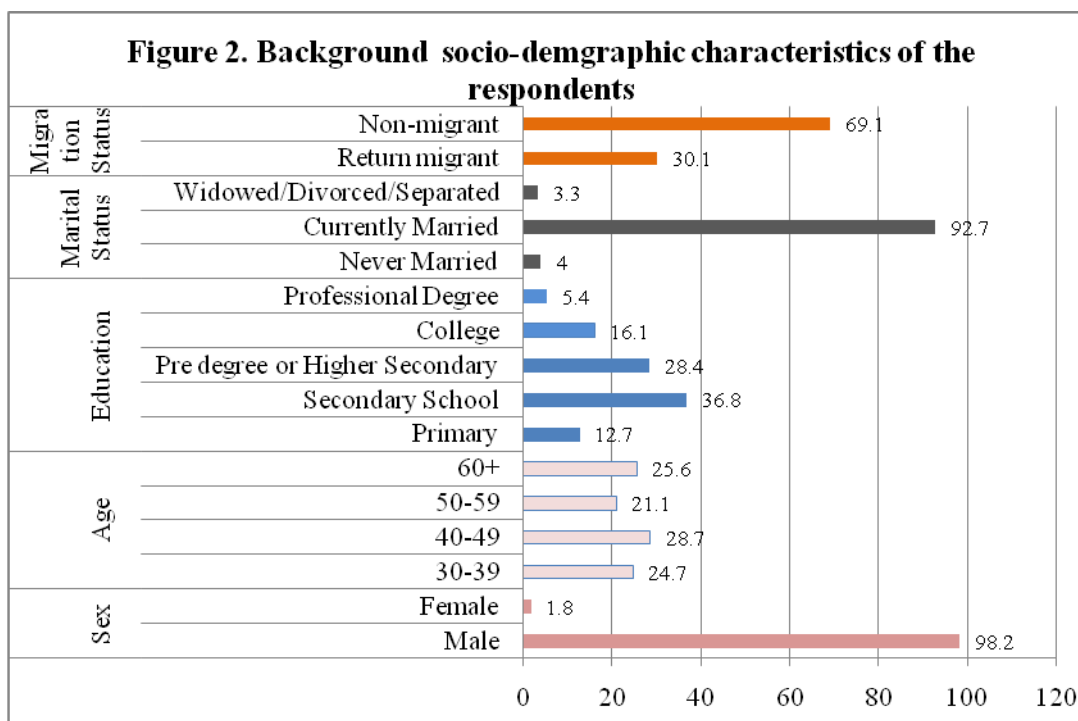


Among the respondents 95.3 percent have their own house and 4.7 percent of the respondents live in rented houses. Types of house of the respondents were classified into five categories based on the number of rooms and materials used for the construction. Two fifths of the respondents (42.7 percent) live in moderate type houses (2 bed room house with brick/cement plastered walls, concrete/tiled roof and tile/cement floor). About 36 percent of the respondents

live in good /luxurious houses (3 or more bed rooms with attached bathrooms, concrete roof, Tile /granite floor). About 19 percent live in Semi Pucca houses (house with brick / mud walls, cement/mud floor, tin or asbestos roof) and 2.2 percent of the respondents live in Kutcha houses (house with mud/temporary walls, mud floor & thatched roof).

Socio-demographic profile of respondents

Majority of the return migrants in the selected area were males and we selected almost similar number of male and female non-migrants from the same area as control population for interview. About 98 percent of the respondents are males and 1.8 percent of the respondents are females.



About one-fourth of the respondents belonged to the age group 30-39 years. Proportion of respondents in the age group 40-49 is 28.7 and that in the age group 50-59 is 21.1. Among the respondents about one-fourth are senior citizens. About 13 percent have primary school education and about 37 percent have completed secondary school. About 22 percent of the respondents have College/ Professional education. Among the respondents about 93 percent are

currently married and living with their spouse. Current working status of the respondents shows that more than three-fourth of the respondents are currently working and main source of income of 63 percent of the respondents is salary or wage. About 7 percent of the respondents have pension for employment as their source of income. About 17 percent of the respondents depend on others financially for their day to day needs. Of those who depend on others financially 83.3 percent depend on son or daughter and 12.5 percent depend on spouse.

Table1. Percentage distribution of return migrants by migration characteristics

Characteristics	Percent
<i>Age at the time of first migration</i>	
<20	11.2
21-25	38.1
26-30	25.4
31-35	11.9
36+	13.4
Total	100.0
<i>Duration of stay</i>	
<2years	19.4
2-5 years	18.1
5-10 years	23.7
10-20 years	26.6
21+years	12.2
Total	100.0

The unemployment especially educated unemployment is a cause of concern. This is reflected in the age at which the people migrate. Nearly two thirds of the migrants have migrated when they were in the age group 21 to 30 years. It is also surprising that one out of ten respondents

migrated before 20 years of age. With regard to duration of stay in the place of destination we see that one fourth of the return migrants had spent 10-20 years and a similar proportion had spent 5-10 years in the place of destination. Return migrants who stayed back for more than 20 years forms 12.2 percent.

Table 2. Percentage distribution of return migrants by age of return migration

Age at the time of return migration	Percent
<39	20.1
40-49	30.2
50-59	21.6
60+	28.1

A larger share of the respondents returned in their forties although it is the prime working age. Migrants returning when they were in their 50s form 21.6 percent and the respondents returned after 60 years form almost 28 percent.

The reasons for return migration is reported to be low wages (31.7 percent), expiry of contract (21.6 percent), ill-health (14.4 percent), aged over at job place (8.6 percent), problems at work place and poor working conditions. Out of those who reported health problems, kidney problems, accident, disc problems, ulcers etc formed the chief reasons.

Living and working conditions at the place of destination

The living and working conditions of the return migrants at their place of work is assessed in this section.

Table 3. Percentage distribution of return migrants by their conditions of work and stay in the Place of Destination

Characteristics		Percent
Nature of occupation	Blue collar	89.2
	White collar	10.8
Job affected health	Yes	48.9
	No	51.1
Needed Continuous	Yes	77.0

sit/stand	No	23.0
Hours Worked	≤ 8	49.6
	9-10	28.8
	11-13	21.6
Interval for lunch	Nil	2.9
	1 hour	95.7
	2 hour	1.4
Weekly holidays	Nil	9.4
	1 day	86.3
	2 days	4.3
Had to do Over time job	Yes	43.9
	No	56.1
Had Night shift	Yes	21.6
	No	78.4
Faced Problems in working place	Yes	8.6
	No	91.4
working condition was Favourable	Yes	72.7
	No	27.3
Nature of accommodation	Single	20.1
	Shared	79.9
Number of persons shared accommodation	2-5	75.2
	6-9	16.0
	10+	8.8
Neatness of Room	Neat	86.6
	Not neat	13.4
Cooking place inside room	Yes	31.3
	No	68.7
Have Toilet	Yes	94.0
	No	6.0
Share Toilet	Yes	76.2
	No	23.8

About 89 percent of the return migrants under study were doing blue collar jobs during the period of their migration and the remaining 10.8 percent were having white collar jobs.

About 49 percent of the return migrants opined that their job involved conditions like chemicals, heat, sound etc which affected their health. About 50 percent of the return migrants worked for

less than or equal to 8 hours daily. About 22 percent worked for 9-10 hours and 21.6 percent worked for 11-13 hours daily. About 91 percent of the respondents had at least one holiday per week. About 9 percent had no weekly holidays during their work abroad. About 44 percent had to do overtime work and for 21.6 percent of the respondents night shift was a part of their job. About 9 percent mentioned that they had to face problems in their work place. About 80 percent of the respondents had shared accommodation during their period of migration. About three fourth of them shared accommodation with 2-5 persons and 8.8 percent shared their accommodation with 10 or more persons. About 31 percent cooked their food inside their room. Residence of 94 percent of the respondents had a toilet and 76.2 percent of them had to share the toilet with others.

Chronic illness

Table 4. Percentage distribution of the Respondents by Chronic Illness

	Return Migrants	Non migrants
Chronic Illness	53.2	39.2

Information on the prevalence of Chronic illness among the migrants in comparison to the non migrants is given in Table 4. Evidently the return migrants appear to report more chronic illness. One in two return migrants have reported any chronic illness when only two in five non migrants bear the burden.

Table 5. Distribution of Respondents with chronic disease by background characteristics of respondents

Back ground characteristics		Percentage of Respondents with chronic disease	
		Return Migrants	Non migrants
Age	30-39	21.4	10.8
	40-49	57.1	32.2
	50-59	46.7	47.7
	60+	76.9	71.1
Education	Primary	66.7	62.8

	Secondary School	58.3	47.6
	Pre degree	46.3	31.0
	Graduate and above	44.4	22.2
Occupation	Blue collar jobs	54.0	40.7
	White collar jobs	46.7	17.3
Religion	Hindu	58.4	37.8
	Muslim	43.3	53.7
	Christian	45.0	34.0
Caste	SC/ ST	37.5	30.0
	OBC	54.7	48.1
	General	53.6	33.9
Social Category	APL	56.1	35.3
	BPL	49.1	44.2
Smoking	Yes	66.7	34.5
	No	50.0	39.8
Chewing Tobacco	Yes	71.4	39.1
	No	51.2	39.3
Drinking Alcohol	Yes	66.7	27.7
	No	49.1	41.1

Analysis of the distribution of respondents by background characteristics yields interesting findings. Age of respondent is an important aspect in any study on chronic illness. Obviously it is often the older cohorts who suffer more chronic illnesses than the younger ones. True to this generalization, we find almost three fourths of the return migrants and non migrants aged 60+ years report any chronic illness and prevalence decreases with decreasing age. But it can no way be ignored that one in five return migrants in the 30-40 age group report chronic illness as against 10.8 percent among non migrants.

Educational background of the respondents also shows significant variation in prevalence of chronic illness among both return migrants and non migrants. Prevalence of any chronic illness decreases with increasing educational levels. When more than sixty percent of the return migrants and non migrants with primary level education report any chronic illness only 44.4 percent of the return migrants and 22.2 percent of the non migrants with education levels 'graduate and above' report any chronic illness.

Health of an individual has a strong association with the type of occupation as working conditions and nature of job is most likely to influence chronic diseases in particular. Prevalence of any chronic illness is higher among return migrants who had been doing blue collar jobs (54 percent) compared to white collar jobs (46.7 percent). The differential is quite wider among non migrants in this respect at 40.7 percent among blue collar workers and 17.3 percent among white collar workers.

Religion wise break up shows reporting of any chronic illness among return migrants to be greater among Hindus (57.4 percent) compared to Christians (45 percent) and Muslims (43.3 percent). But among non-migrants it is higher among Muslims (53.7 percent). Both among return migrants and non migrants, OBC report any chronic disease more followed by the general and SC/ST group. OBC and the General group show only slight differentials in prevalence of chronic illness (54.7 percent as against 53.6 percent respectively) whereas it is only 37.5 percent among SC/ST group among the return migrants. The corresponding proportion among non-migrants is 48.1 percent among OBC, 33.9 percent among General and 30 percent among SC/ST. One notable finding pursuant to other research findings on prevalence of chronic illness is that the affluent group (APL here) show higher prevalence of chronic illness among return migrant (56 percent) compared to BPL group (49 percent) whereas prevalence is higher among BPL group (44.2 percent) than APL (35.3 percent).

Behavioural aspects are strongly linked to chronic diseases. Smoking, tobacco chewing and alcohol consumption habits were included in the present study. Apparently, prevalence of any chronic illness among return migrants is higher among smokers (66.7 percent) compared to non smokers (50 percent) whereas 40 percent of the non smokers and 34.5 percent of the smokers among non migrants report any chronic illness. Similarly, among the return migrants, 71.4 percent of the tobacco chewers have reported any chronic illness as against 51.2 percent who do not chew tobacco. Differentials in prevalence of any chronic illness by tobacco consumption is absent among non migrants is absent. Alcohol consumption too elevates the risk of prevalence of chronic illness as we see that 66.7 percent of the alcoholic return migrants report any chronic illness when prevalence is lesser among non alcoholics (49 percent).

Table 6. Percentage distribution of the Respondents by Type of Chronic Illness

Type of Chronic Illness	Return Migrants	Non migrants
Hypertension	30.9	21.5
Diabetes	28.8	20.6
Heart Problem	7.2	3.5

Hypertension, diabetes and heart problems are the most reported chronic illness. Nearly 31 percent of the return migrants and 21.5 percent of the non migrants report hypertension. Diabetes is prevalent among 28.8 percent of the return migrant and 20.6 percent of the non migrants. Heart problems have been reported by 7.2 percent of the return migrants and this percentage is halved (3.5 percent) among non migrants.

Table 7. Percentage distribution of the Respondents by Age of onset of Chronic Illness

Age of Onset of Chronic Illness	Return Migrants	Non migrants
Hypertension		
30-39	34.0	22.5
40-49	25.5	18.3
50+	40.5	59.2
<i>Mean age of onset</i>	<i>51.0</i>	<i>49.3</i>
Diabetes		
30-39	25.0	25.8
40-49	22.5	19.7
50+	52.5	54.5
<i>Mean age of onset</i>	<i>50.0</i>	<i>49.4</i>
Heart Problem		
30-39	10.0	15.4
40-49	10.0	15.4
50+	80.0	69.2
<i>Mean age of onset</i>	<i>51.8</i>	<i>52.1</i>

The age of onset of chronic disease is captured in the Table. The onset of hypertension was 30-39 percent among 34 percent of the return migrants, it was between 40-49 years among one in four return migrants and 40.5 percent of them reported that the onset of hypertension was after age 50 years. Three fifths of the non migrants reported that their age of onset of hypertension was after 50 years. The mean age at onset of hypertension is more or less the same among return migrants and non migrants. The age of onset of diabetes too exhibits a similar pattern with more than half of the return migrants and non migrants reporting the onset of diabetes to be after 50 years the mean age of onset being 50 years. But its quite a noteworthy observation that one in four respondents among return migrants and non migrants reported they were diabetic between ages 30-34 years which reflects the early onset of life style diseases becoming a problem in Kerala. Four fifths of the return migrants and 70 percent of the non migrants had their age at onset of heart problems after 50 years of age. The mean age at onset is however 52 years among both the return migrants and non migrants.

Table 8. Treatment seeking for Chronic Illness of respondents

Chronic Illness	Percentage of respondents treated	
	Return Migrants	Non migrants
Hypertension	87.2	91.5
Diabetes	90.0	76.9
Heart Problem	100.0	90.9

Health care seeking behavior is depicted in Table 10. Majority of the respondents irrespective of the fact that whether it is a return migrant or a non migrant have sought treatment for their chronic illness. About 90 percent of the respondents with hypertension and diabetes have availed treatment and all the return migrants with Heart problems sought health care.

Table 9. Percentage distribution of the Return migrants by Years worked abroad and history of Illness

Number of Years worked Abroad	Whether has Chronic Illness
<=10 years	30.8
10-20 years	54.2
21+ years	68.2

It can be seen that the percentage of respondents having chronic illness increase with increase in the duration of work abroad. Among the return migrants with a duration of stay <=10 years, 30.8 percent have chronic illness. At the same time about 54 percent of those with a duration of 10-20 years and about 68 percent of those with a duration above 20 years have chronic illness.

Table 10. Percentage distribution of the Return migrants by Duration of stay abroad and Chronic Illness

Number of Years worked Abroad	Hypertension	Diabetes	Heart problems
<=10 years	15.0	11.2	3.7
10-20 years	31.2	29.2	6.2
21+ years	45.5	40.9	13.6

Table gives the percentage distribution of return migrants by their duration of stay abroad and prevalence of major chronic illnesses namely Hypertension, Diabetes and Heart problems. It can be seen that the percentage of respondents having Hypertension, Diabetes and Heart problems increase with increase in the duration of work abroad. Prevalence of Hypertension among return migrants with a duration of stay <=10 years is 15.0 percent and that of return migrants with a duration of 10-20 years is 31.2 percent and that of return migrants with a duration of more than 20 years is 45.5 percent. Percentage of return migrants with Diabetes is 11.2 percent among those with a duration of stay <=10 years, 29.2 among those with a duration of stay of 10-20 years and 40.9 percent among those with a duration of stay of more than 20 years. Similarly percentage of return migrants with Heart problems is 3.7 percent among those with a duration of stay <=10

years, 6.2 percent among those with a duration of stay of 10-20 years and 13.6 percent among those with a duration of stay of more than 20 years.

Table 11. Result of Logistic Regression analysis for Chronic Illness among Return Migrants.

Variables	B	Exp(B)	Sig.
Caste			
SC/ST/OBC@			
General	0.012	1.012	0.976
Category			
BPL@			
APL	0.262	1.3000	0.512
Age			
<=40@			
41+	1.766	5.848	0.000**
Education			
School educated@			
College Educated	-8.20	0.440	0.036*
Years worked Abroad			
<=15years@			
>15years	0.54	1.716	.160
Constant	-1.697	0.183	0.014

@ - Reference category, * - significant at 5% level, ** - significant at 1% level

Logistic Regression analysis for the factors affecting chances of chronic illness among the return migrants shows that age and education status have significant influence in the chronic illness of the return migrants. Return migrants having age above 40 years have 5.8 times higher chance to have chronic illness, compared to return migrants having an age of 40 years or below. Similarly college educated return migrants have 56 percent lesser chance for chronic illness, compared to school educated return migrants.

Table 12. Treatment seeking for Chronic Illness by Place of Treatment

Chronic Illness	Place of Treatment	Return Migrants	Non migrants
Hypertension	Govt. Hospital	56.8	48.6
	Pvt. Hospital	40.9	45.7
	Others	2.3	5.7

Diabetes	Govt. Hospital	42.5	58.5
	Pvt. Hospital	50.0	35.4
	Others	7.5	6.1
Heart Problem	Govt. Hospital	50.0	30.8
	Pvt. Hospital	50.0	61.5
	Others	0	7.7

Return migrants who sought treatment at Government hospitals is slightly more for hypertension (56.8 percent), that for diabetes is 42.5 percent and for heart problems is 50 percent. For treatment of diabetes slightly shifts to Private hospitals among return migrants. Non migrants utilize Government hospitals more for hypertension and diabetes but they turn more to private hospitals for curing heart problems.

Table 13. Percentage distribution of Respondents doing regular checkup for Chronic Illness by status of migration

Chronic Illness	Return Migrants	Non migrants
BP	92.7	94.0
Diabetes	89.5	95.4
Heart Problem	90.0	76.9

With regard to continuity of treatment as reflected in regular checkups, around 90 percent of both return migrants and non migrants are regular in availing review checkups or follow-up treatments.

Summary and Conclusions

The health status of return migrants reflects the accumulation of health consequences related to conditions of migration process including return phase. Migrants return home with a wide range of health needs. Therefore, this study was taken up with the objective of exploring the pattern of morbidity of the return migrants and to compare it with that of non migrants in the same area. Information was collected from the respondents using the pre-tested interview schedule through personal interview. The relevant socio economic, demographic, occupational and health details were collected from the respondents. The variables taken are age, marital status, educational status, occupation, sources of income, occupational status, details of migration etc. The details

of chronic illness and their treatment seeking behavior were collected from the selected persons above the age of 30 years.

About one-fourth of the respondents belonged to the age group 30-39 years. Proportion of respondents in the age group 40-49 is 28.7 and that in the age group 50-59 is 21.1. Among the respondents about one-fourth are senior citizens. About 13 percent have primary school education and about 37 percent have completed secondary school. About 22 percent of the respondents have College/ Professional education. Among the respondents about 93 percent are currently married and living with their spouse. Current working status of the respondents shows that more than three-fourth of the respondents are currently working and main source of income of 63 percent of the respondents is salary or wage. About 7 percent of the respondents have pension for employment as their source of income. About 17 percent of the respondents depend on others financially for their day to day needs. Of those who depend on others financially 83.3 percent depend on son or daughter and 12.5 percent depend on spouse.

Nearly two thirds of the migrants have migrated when they were 21-30 years old. It is also surprising that one in ten migrate before 20 years of age. With regard to duration of stay at the destination, one fourth of the return migrants had spent 10 to 20 years and a similar proportion had spent 5 to 10 years. Return migrants who stayed back for more than 20 years forms 12.2 percent. The longer duration is understandable as one requires first to settled down, later save income, probably invest a part of their savings in their home state etc. One noteworthy finding is that 17 percent of the return migrants are still dependent on others.

The reasons for return migration is reported to be low wages (31.7 percent), expiry of contract (21.6 percent), ill-health (14.4 percent), aged over at job place (8.6 percent), problems at work place and poor working conditions. Out of those who reported health problems, kidney problems, accident, disc problems, ulcers etc formed the chief reasons. About 89 percent of the return migrants under study were doing blue collar jobs during the period of their migration and the remaining 10.8 percent were having white collar jobs.

About 49 percent of the return migrants opined that their job involved conditions like chemicals, heat, sound etc which affected their health. About 50 percent of the return migrants worked for

less than or equal to 8 hours daily. About 22 percent worked for 9-10 hours and 21.6 percent worked for 11-13 hours daily. About 91 percent of the respondents had at least one holiday per week. About 9 percent had no weekly holidays during their work abroad. About 44 percent had to do overtime work and for 21.6 percent of the respondents night shift was a part of their job. About 9 percent mentioned that they had to face problems in their work place. About 80 percent of the respondents had shared accommodation during their period of migration. About three fourth of them shared accommodation with 2-5 persons and 8.8 percent shared their accommodation with 10 or more persons. About 31 percent cooked their food inside their room. Residence of 94 percent of the respondents had a toilet and 76.2 percent of them had to share the toilet with others.

Evidently the return migrants appear to report more chronic illness. One in two return migrants have reported any chronic illness when only two in five non migrants bear the burden. Age of respondent is an important aspect in any study on chronic illness. Obviously it is often the older cohorts who suffer more chronic illnesses than the younger ones. True to this generalization, we find almost three fourths of the return migrants and non migrants aged 60+ years report any chronic illness and prevalence decreases with decreasing age. But it can no way be ignored that one in five return migrants in the 30-40 age group report chronic illness as against 10.8 percent among non migrants.

Health of an individual has a strong association with the type of occupation as working conditions and nature of job is most likely to influence chronic diseases in particular. Prevalence of any chronic illness is higher among return migrants who had been doing blue collar jobs (54 percent) compared to white collar jobs (46.7 percent). The differential is quite wider among non migrants in this respect at 40.7 percent among blue collar workers and 17.3 percent among white collar workers.

Behavioural aspects are strongly linked to chronic diseases. Smoking, tobacco chewing and alcohol consumption habits were included in the present study. Apparently, prevalence of any chronic illness among return migrants is higher among smokers (66.7 percent) compared to non smokers (50 percent) whereas 40 percent of the non smokers and 34.5 percent of the smokers

among non migrants report any chronic illness. Similarly, among the return migrants, 71.4 percent of the tobacco chewers have reported any chronic illness as against 51.2 percent who do not chew tobacco. Differentials in prevalence of any chronic illness by tobacco consumption is absent among non migrants. Alcohol consumption too elevates the risk of prevalence of chronic illness as we see that 66.7 percent of the alcoholic return migrants report any chronic illness when prevalence is lesser among non alcoholics (49 percent).

Majority of the respondents irrespective of the fact that whether it is a return migrant or a non migrant have sought treatment for their chronic illness. Almost 9 out of ten respondents have availed treatment for hypertension, diabetes and all the return migrants have sought health care for heart problems. Among non migrant only three fourths of the respondents had availed treatment for diabetes.

The place of treatment do not show wide differentials between treatment at Government and Private hospitals. Return migrants who sought treatment at Government hospitals is slightly more for hypertension (56.8 percent), that for diabetes is 42.5 percent and for heart problems is 50 percent. For treatment of diabetes slightly shifts to Private hospitals among return migrants. Non migrants utilize Government hospitals more for hypertension and diabetes but they turn more to private hospitals for curing heart problems. With regard to continuity of treatment as reflected in regular checkups, around 90 percent of both return migrants and non migrants are regular in availing review checkups or follow-up treatments.

Age at return migration shows that larger share of them are returning in their forties which is the peak working age and about three fourth of return migrants started working again to support their families. It indicates that a good number of return migrants are forced to come back due to different reasons. The main reasons for return migration reported by them are low wages, expiry of contract, ill-health, age over at job place, problems at work place and poor working conditions. Job condition of about half of the return migrants involved conditions like chemicals, heat, sound etc which affected their health. It is clear that they are not in a financially sound or in a healthy condition after returning to their native place. Prevalence of any

chronic illness is higher among return migrants who had been doing blue collar jobs compared to those with white collar jobs.

Evidently the return migrants appear to report more illness both chronic and acute. One in two return migrants have reported any chronic illness when only two in five non migrants bear the burden.

The findings indicate that there should be an effective health insurance scheme for return migrants. Some of the return migrants who are not working are dependent on their relatives. So the pension scheme for the return migrants should be strengthened.

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Towards AMB: An Anaemia Mukht Bharat

What is Anaemia Mukht Bharat ?

In India, around 58% children (6-59 months), 54% adolescent girls (15-19 years), 29% adolescent boys (15-19 years), 53% women of reproductive age (WRA), 50% pregnant women and 58% lactating women are anemic. As such, anemia is the manifestation of the condition when circulating red blood cells (RBC's) are insufficient to meet physiological oxygen-carrying needs and is conventionally identified when the hemoglobin concentration falls below a defined threshold. If left untreated, anemia can potentially hamper health, cognitive development and overall economic well-being. The multifactorial etiology of anemia requires a multidimensional response for its prevention and treatment. Accordingly, the Ministry of Health and Family Welfare (MoHFW) has launched an Intensified – National Iron Plus Initiative (I-NIPI) - referred to as the Anemia Mukht Bharat (AMB) program.

Strategies under Anaemia Mukht Bharat

AMB adopts an intensive 6x6x6 strategy combining existing mechanisms with broad-based strategies for addressing the challenges associated with prevention and treatment of Anemia. Essentially, the strategy focuses on 6 beneficiary groups: children (6-59 months and 5-9 years), adolescents (10-19 years), women of reproductive age (WRA), pregnant and lactating women. These target groups are reached out through six preventive/treatment mechanisms comprising of prophylactic Iron Folic Acid (IFA) supplementation, deworming, intensified year-round behavior change communication (BCC) campaigns, diagnosis of anemia using digital methods and point of care treatment, mandatory provision of IFA fortified foods in public health programmes and redressal of non-nutritional causes of anemia in endemic pockets. Further to bolster program implementation and accountability, six institutional mechanisms, i.e., intra-ministerial coordination, national AMB unit, convergence with other ministries, strengthening of supply chain and logistics, and development of AMB dashboard and digital portal are envisaged.

The IFA supplementation programme includes IFA syrup for children (6-59 months), IFA pink for children (5-9 years), IFA blue for adolescents (10-19 years) and IFA red for pregnant and

lactating women. According to the Health Management Information System (HMIS) data from the MoHFW, the all India IFA coverage was 8.3 percent for IFA syrup, 14.9 percent for IFA pink, 28 percent for IFA blue and 84.8 percent for IFA red in the FY 2018-19. It is crucial to note here that the IFA red coverage for pregnant and lactating women is significantly higher than IFA coverage for children, (both 6-59 months and 5-9 years). Besides, there is are large inter-state disparity in coverage, particularly among children and adolescents.

Challenges of Anaemia Mukht Bharat

The AMB programme faces both supply and demand side challenges. The two primary supply-side challenges faced are, supply chain management of the IFA tablets and ineffective programme implementation. Supply chain management requires dedicated managerial tasks of demand forecasting, procurement and timely delivery by manufacturers, inventory and warehousing provisions, transportation, drugs distribution (including last mile delivery) and stock reporting. Limited workforce is another important obstacle in programme implementation, thereby reducing the coverage of supplementation. Children (< 5 years) and adolescents are being catered through anganwadicentres and government aided schools. Although the front-line workers are entrusted with various programmatic goals, target based performances and incentives, they are overburdened and lack motivation to meet these goals. The demand-side challenges involve lack of awareness among the beneficiaries and lack of adherence to consume IFA supplements.

Key for success

In order to meet AMB targets by 2022, it is important to improve both supply and demand side factors. The key recommendations for the supply side are: (a) course-correction of present procurement practices ensuring regularity in supply (b) adopting scientific practices for storage, repairs and renovations to ensure smooth distribution and avoid stock-outs (c) planning and availability of vehicles to transport and distribution of the supplements (d) regular replenishment of drug kits of ANM and ASHA's for effective last mile delivery and (e) more personnel training and sensitization on HMIS (Health Management Information System) for regular reporting of

stocks and coverage data. On the other hand, significant demand-side policies for behavioural change are also necessary to translate availability into actual consumption. To ensure amore holistic approach, the programme further needs to include community awareness programmes through extensive behaviour change communication, regular counselling on the need for dietary diversity and curbs on false information regarding side effects of IFA, for successful implementation of AMB programme.

Author: **William Joe**, Assistant Professor, william@iegindia.org, Population Research Centre
Institute of Economic Growth, Delhi.

Disc Pain- FAQs and Solution Through Ayurveda

Low backache is the most common cause for pain, disability, absence of a person in workplace. It also affects personal, social and economical status of the patient. Now a day, Disc pain is mostly misinterpreted term for low back pain. Here are some of the FAQs (frequently asked questions) about the disc pain in patients of low back ache.

- **What are Discs?:** In human spine (backbone), between 2 bones, there lies disc which is flat, soft round structure which acts as a cushion, gives mobility to the spine and it functions as a shock absorber. . There are 23 discs throughout the spine. In adults, Disc is not having direct blood supply. Hence the degeneration starts early in disc than any other body part. As the disc of low back region is more prone for bulge or rupture, and now a days, disc pain is becoming the most common cause for pain, the low back pain are often referred as disc pain.
- **Who will have disc pain? :** The person having Jobs that requires heavy and repetitive weightlifting, Cigarette smokers and tobacco consumers, Anxiety and depression, Stressful occupations, repeated travelling or travelling with sudden jerky movements, Women with greater number of pregnancies Obesity, Improper postural habits while sitting and sleeping are considered as risk factors for developing disc pain.
- **What are the causes of disc pain?** Sudden pressure over the disc like falling from height, accidents, sudden lifting heavy weight, abrupt adopting abnormal postures are the common causes for acute low back pain. The degeneration of the disc causes chronic back pains. The degenerated disc tend to rupture very easily. Hence as the age advances, the chances of disc pain increases with above abrupt actions.
- **What are its symptoms?** Based on the level and degree of disc bulge or rupture, the symptom varies. The degenerated disc may cause continuous chronic low back pains. The sudden disc ruptures can cause severe pain in low back, radiating to one or both legs, numbness, stiffness, restricted movement, Pain worsens with coughing, sneezing, straining. In very severe cases there may be loss of sensation, loss of control over the urine and stools, weakness in legs, and continuously worsening pain which needs immediate alternate management.

• **What is the solution in Ayurveda?:** The disc pain which can be medically managed can be best treated through Ayurvedic treatments. In Ayurveda, the condition is diagnosed as different diseases of vata based on the symptom of the patient. The pain, stiffness and heaviness are best managed by two treatments done locally over the low back region. The medicine and need of specific type of treatment is decided by the physician.

Nadee sweda: In this treatment, the low back area and legs are massaged with medicated oil. The medicated decoction is filled in a cooker and lid is closed. The rubber tube is fixed to the lid. The steam which comes out during the boiling of decoction is used for the treatment. The rubber tube is held in a safer distance and continuously moved over the massaged area. This relieves pain, stiffness and heaviness very quickly.

Kati basti: The ring prepared of wheat flour dough is fixed over the most painful area in low back. Then the medicated lukewarm oil is filled inside the ring and retained there. When the temperature is cooled, again hot oil is mixed. Same procedure is done for 30 minutes daily for 7 days. It is best advised in degenerated, bulged disc pains.

Medicated enema: is the main line of treatment in Ayurveda for disc pains. It manages the disease from its root.

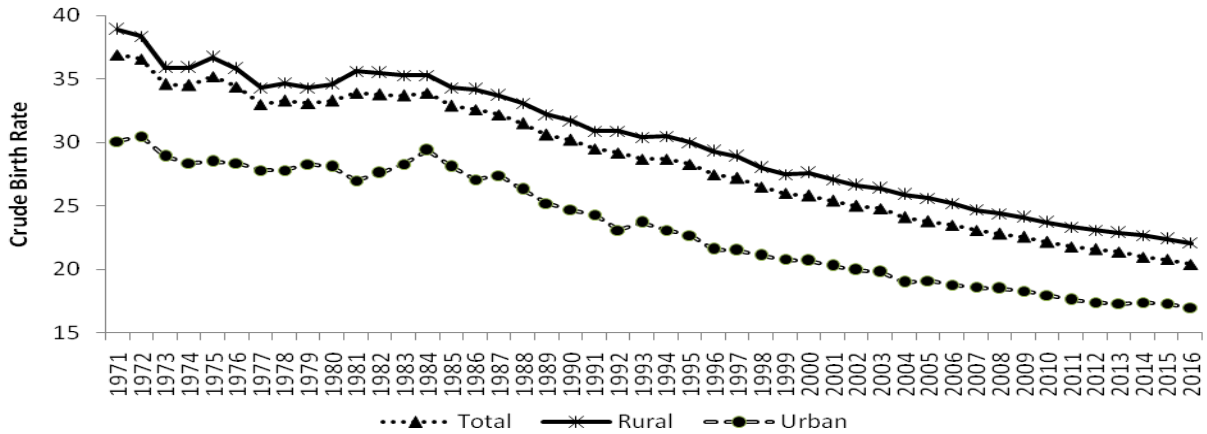
- **How to prevent disc pain and its recurrence?:** After the treatment, the recurrence may be prevented by
 - Adopting proper posture while sitting, sleeping.
 - Avoiding jerky movements
 - Back exercise learnt by the experts which will make the muscles healthy and strong
 - Avoiding sudden lifting weights

Many of the patients are panic by the name disc pain. But the fact is many of the condition can be managed medically through Ayurveda. Thus the proper diagnosis at right time, getting proper course of treatments and adopting the measures to avoid recurrence can make the person symptom free and can lead a disc pain free life.

Author: Dr Padmakiran C, Associate Professor, Department Of Panchakarma, SDM College of Ayurveda, Udupi, Udupi district, Karnataka.

Current Statistics

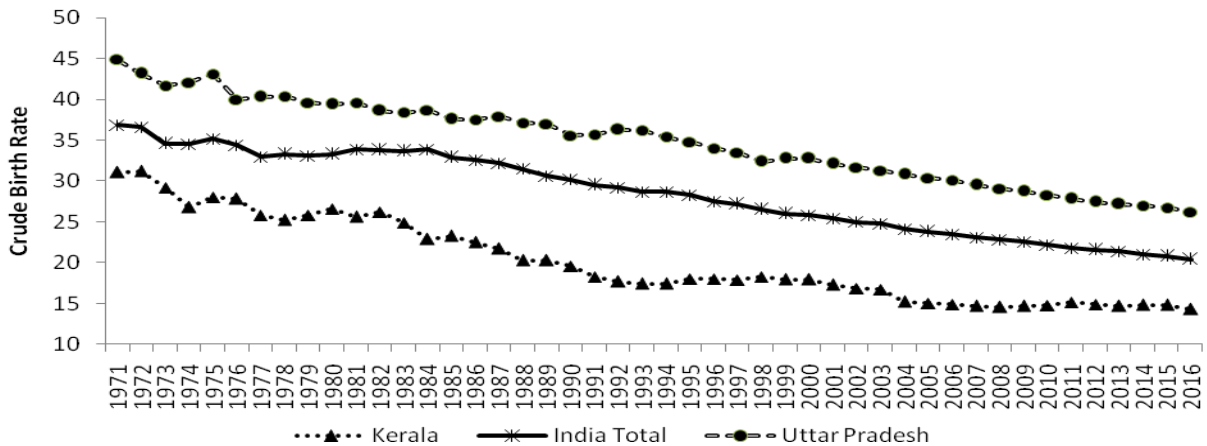
Figure 1: Crude Birth Rate (CBR) trends by place of residence and year for India, SRS, 1971-2016.



Note: The crude birth rate is the number of live births occurring among the population of a given geographical area during a given year, per 1,000 mid-year total population of the given geographical area during the same year. The rates of CBR was 36.6, 38.9 and 30.1 during 1971, which gradually decreased year by year to 20.4, 22.1 and 17.0 during 2016 for combined India total, Rural and Urban, respectively.

Source: Sample Registration System, 1971-2016.

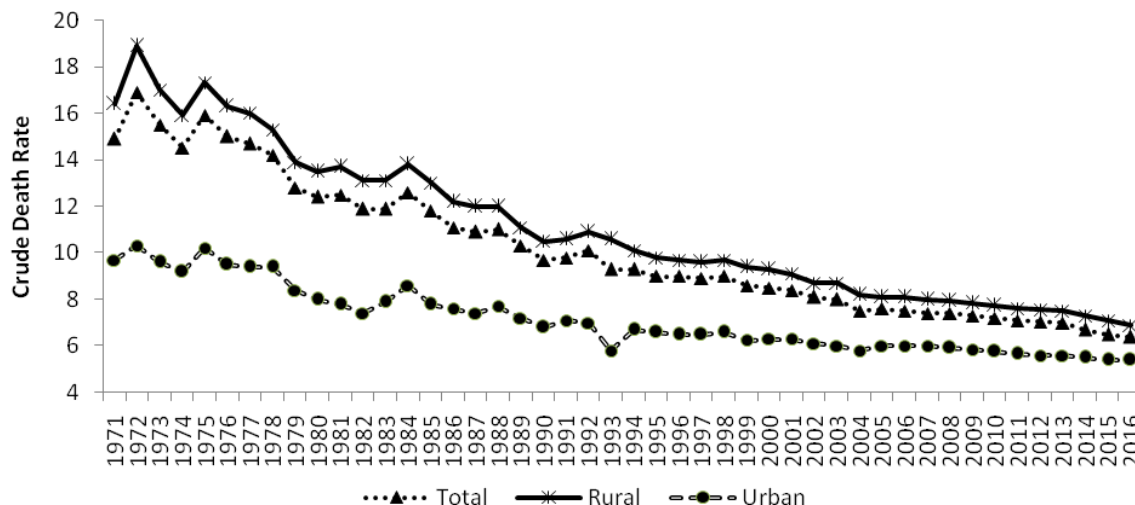
Figure 2: Crude Birth Rate (CBR): India, Uttar Pradesh, and Kerala, SRS, 1971-2016.



Note: The crude birth rate is the number of live births occurring among the population of a given geographical area during a given year, per 1,000 mid-year total population of the given geographical area during the same year. The CBR was highest (36.9) during 1971 which decreased to 20.4 during 2016. Similarly, CBR was reported highest in Uttar Pradesh (44.9) and lowest in Kerala (31.1) during 1971 and decreased to 26.2 and 14.3 during 2016, respectively.

Source: Sample Registration System, 1971-2016.

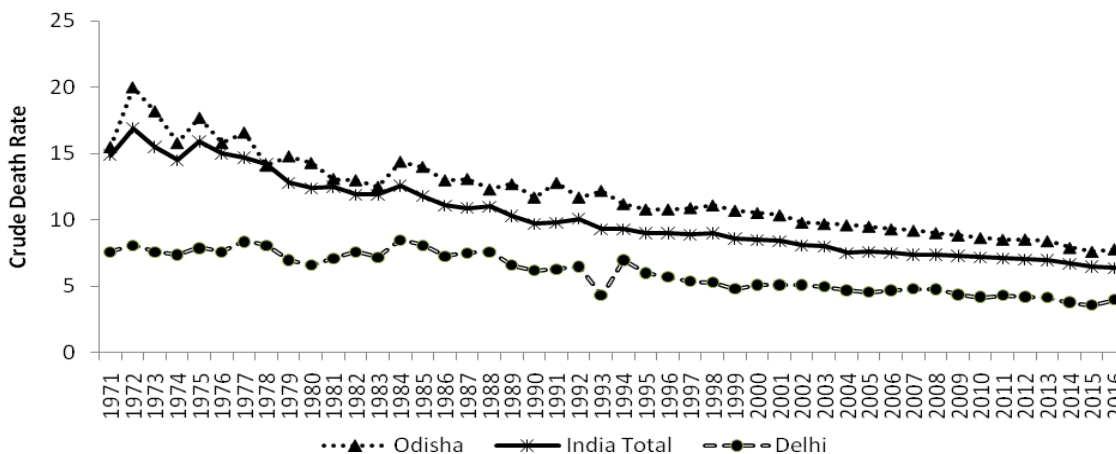
Figure 3: Crude Death Rate (CDR) trends by place of residence and year for India, SRS, 1971-2016.



Note: The crude death rate is the number of deaths occurring among the population of a given geographical area during a given year, per 1,000 mid-year total population of the given geographical area during the same year. The rates of CDR was 14.9, 16.4 and 9.7 during 1971, which gradually decreased year by year to 6.4, 6.9 and 5.4 during 2016 for combined India total, Rural and Urban, respectively.

Source: Sample Registration System, 1971-2016.

Figure 4: Crude Death Rate (CDR): India, Uttar Pradesh, and Kerala, SRS, 1971-2016.



Note: The crude death rate is the number of deaths occurring among the population of a given geographical area during a given year, per 1,000 mid-year total population of the given geographical area during the same year. The CDR was highest (14.9) during 1971 which decreased to 6.4 during 2016. Similarly, CBR was reported highest in Odisha (15.5) and lowest in Delhi (7.6) during 1971 and decreased to 7.8 and 4.0 during 2016, respectively.

Source: Sample Registration System, 1971-2016.