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Title of the paper

Measuring Financial Protection through Public Funding of Insurance Programmes in Indian Context: Evidence from 71st Round of India's National Sample Surveys

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Abstract

In recent times Insurance has been projected as major path towards Universal Health Coverage (UHC). In past decade India and its different states have witnessed the roll-out of various government sponsored health insurances schemes. Present study is based on India's 71st Round National Sample Survey (NSS), which explores progress towards UHC in dimension of access and financial protection for India and its two most populous states, Uttar Pradesh (population: 199 million) and Maharashtra (population: 112 million). Results shows insurance did not increase the access of hospitalization or prevent household from getting impoverished due to healthcare cost in all the three contexts.

Introduction

As the world moves from Millennium Development Goals (MDGs) to Sustainable Development Goals (SDGs), Universal Health Coverage (UHC) takes the center stage of the policy discourse on health sector reforms in the global arena (WHO 2015). In 2005, the 58th World Health Assembly passed a resolution on UHC which urges countries to ensure that everyone has access to required health services without facing financial hardships (WHO 2005). It has also been proclaimed as the third major transition in health after the demographic and epidemiological transitions (Rodin and de Ferranti 2012). On the otherhand, some even calling it "old wine in new bottle" (Wagstaff 2013).

In the first global monitoring report on UHC prepared by World Health Organization (WHO) and World Bank (WB), UHC has been defined as: 'all people receiving the health services they need, including health initiatives designed to promote better health (such as anti-tobacco policies), prevent illness (such as vaccinations), and to provide treatment, rehabilitation, and palliative care (such as end-of-life care) of sufficient quality to be effective while at the same time ensuring that the use of these services does not expose the user to financial hardship' (WHO 2015).

UHC has been conceptualized as three dimensions of a cube which include: 1) who is covered? 2) what services are covered? and 3) the proportion of costs that are covered by pre-payment mechanisms? (Chisholm and Evans 2010; Klazienga 2010) Every country can be perceived as somewhere on the path to UHC. A few countries are just starting on this journey, some are halfway through and few others are very close to achieving it (Reich et al. 2016a). UHC is an important policy decision based on inevitable tradeoff (WHO 2016) which every country has to take .i.e. deciding whom to include and which all services to provide. It is essentially a choice based on the financial, organizational and political context of a nation(Poole 2011; Reich et al. 2016b; Balabanova et al. 2013; Norton et al. 2008).

According to Margaret Chan, UHC is ‘ the most powerful single unifying concept that public health has to offer because you can realize the dreams and aspirations of health for every person irrespective of what class you belong to, whether you are a woman, or whether you are poor.’ (Holmes 2012).

Equity is the heart of UHC discourse. It is mentioned as the central epithet of UHC in many policy documents of both National and International Agencies. Question on who should get the services first, roll out of insurance coverage in different population groups and deciding the component of essential service packages and its beneficiaries, requires an equity perspective at every step. In other words, does UHC mean the prioritization of the health of the poor, is the major concern which UHC has to address. In a broader sense the quest for UHC has always been seen as improving the health equity, but UHC is much more difficult to achieve than it is to advocate for (Gwatkin and Ergo 2011). Many of the policy documents proposed UHC as universal health rather than poor people’s health. It has also been believed that once UHC has been achieved it will

alleviate the health issues of the poor by “trickle-down” effect, however rising inequality till reaching the aspired universal coverage is a major question to address (Gwatkin and Ergo 2011).

Achieving UHC requires a multi-sectoral approach. The conference on Sustainable Development Goals in Rio+20 emphasized UHC as a key component (Evans, Marten, and Etienne 2012). Rio+20 conference also urged nations to plan for health systems strengthening and equity when charting a road map to achieve UHC (UN General Assembly 2012). Overcoming financial hardship has been recognized as one of the most important determinants in the achievement of universal access to health care and health equity. (WHO 2010). Out of pocket expenditure at the time of seeking health care has been recognized as one of the most regressive in terms of both health equity and even health outcomes. Every year around 150 million people all around the world face catastrophic health expenditure whereas 100 million people suffer from impoverishment due to healthcare costs (Xu et al. 2007). Many households sell their assets to meet their health expenditure forming a vicious cycle.

How to spend the government money for providing financial protection is matter of intense debate in current context. This could be in the form of strengthening public health infrastructure (supply side) or taking the route of public health insurance (demand side). Public health provisioning has been blamed for poor quality services along with lesser benefit of subsidized care to poor (Mahal et al. 2000). On the other hand public insurance is claimed as accountable way of financial protection with greater outcome. It is also said that public insurance is based on bottom-up approach where poor is covered first, which is in line with equity(La Forgia and Nagpal 2012). Taking this discourse further many studies have equated UHC with insurance coverage rather than outcome, and in India UHC has also been equated with coverage of limited publicly financed health insurance schemes (Giedion, Andrés Alfonso, and Díaz 2013).

In this context UHC has emerged as major policy discourse at national and global stage. Access and financial protection are its two major dimensions. Unlike Alma Ata, where publicly funded comprehensive primary health was the central strategy, in UHC insurance is being propagated as the main way forward or at least as one of the main strategies. It also proposes a purchaser-provider split as one of the central ways of health sector reform(Sengupta 2013). History shows nations who have achieved UHC or even reached near it, have done through public provisioning. It is also proven that public provisioning has been more pro-poor and equitable in nature. At the same time there is no conclusive evidence about the effectiveness of private provisioning and insurance as a way towards better public health. In spite of all these evidence, still insurance and purchaser-provider split have been promoted vigorously in recent times. Also, in present discourse, the stand towards equity is not clear.

Present study aims to measure financial protective effect of publicly funded insurance in India and its two most populous states: Uttar Pradesh and Maharashtra. This is based on latest NSS-71st round data on health which is highly robust. This study explores the impact of publically funded insurance on access and financial protection dimension of UHC. This become even more relevant since it looks these aspects in three different contexts: India, Uttar Pradesh and Maharashtra, which are different on epidemiological and demographic transition. Since equity is heart of UHC, this study examines not just in terms of population average, but also in terms of its various equity dimensions- across states, across the urban-rural divide and across social groups, gender and economic classes. It also explores if insurance is equitable way towards UHC in given three contexts.

Methodology

This study is based on National Sample Survey-71st Round data which is available in public domain. Data was analyzed for the all India (population: 1221 million, census 2011) and also for the two states – one from one of the EAG states and the other from the non-EAG states. EAG refers to Empowered Action Group states refer to the states of UP, Bihar, Rajasthan, Chhattisgarh, Jharkhand, Madhya Pradesh, Orissa and Uttaranchal. Which have a high fertility, high infant mortality, high levels of poverty and low GDP per capita. Within each of these two categories we take the states with the highest population and therefore the largest number of samples in each; Uttar Pradesh (population: 199 million, census 2011) and Maharashtra (population: 112 million, census 2011). In terms of geographical area wise Maharashtra is 3rd largest and Uttar Pradesh is 5th largest in India. The aim is to look at what is the level of progress in terms of access and financial protection in each of these two contexts- both in aggregate terms and disaggregated for the measurement of equity in progress.

However against this flow, on Human Development Index (HDI), Maharashtra (0.66, HDI 2015) had better performance compared to UP (0.54). Literacy level in Maharashtra is 82.19% which is significantly higher than 69.72% of UP. Maharashtra is also one of the most developed and the wealthiest state of India whereas UP does not fare as well as Maharashtra in terms of development and wealth. Maharashtra contributed 23.2% of India's GDP (2010-11) against 7.8% by UP. On the whole, on the socio-economic front Maharashtra does far better than Uttar Pradesh. Apart from the apparent contrast that the choice of these states provide, they also help to create better scientific rigor for the present study as both states provide large sample size which makes for more reliable statistical analysis.

The NSS 71st round data is based on a nation-wide survey carried out by National Sample Survey Office (NSSO), between the months of June and December, in the year 2014, with the focus on health in India. Prior to this, similar surveys have been carried out, about once every ten years: the 28th Round (October 1973-June 1974); the 42nd Round (July 1986- June 1987), the 52nd Round (June 1995- June 1996) and the 60th Round (January –June 2004).

Current 71st round contains information in the areas of education and health. There were a total 65932 households (36480: Rural, 29452: Urban) and 3, 33,104 individuals (189573: Rural, 143531: Urban; Male: 168697 Female: 164407) covered in this survey from the Indian Union. From Maharashtra, 5403 households and 27,124 individuals (14072: Rural, 13052: Urban) participated in this survey. In Uttar Pradesh 7,921 households and 47,083 individuals (29924: Rural, 17159: Urban) participated in the survey. Robust sampling design and large sample size provide relevant information at both, state and national level. The survey used a stratified sampling design with two stages. In the first stage, census villages and urban blocks were sampled for rural and urban areas respectively. Whereas households were selected in second stage. Division of First-Stage Units (FSU's) was done equally for both the segments of data collection considering equal spread of work. In first stage unit most of the Indian states and union territories participated in the survey. State NSSO team did data collection simultaneously with central sample unit, though in this survey only central sample was taken. Total 4577 villages and 3720 urban blocks were surveyed. Second –stage stratification was done on the following basis: first, there should have been at least one child of age less than 1 year and second, households with at least one member (including deceased and/or former member) hospitalized during last 365 days.

NSS-71st Round covers information related with morbidity pattern in last 15 days (out-patient care) and hospitalization in last 365 days (in-patient care). This survey also collected information related

to elderly health (above 60 years) and pre-natal and post-natal care for women between age group 15 to 49 years during the last 365 days.

Descriptive statistics, logistic regression and propensity score matching were the main statistical tools which were used for analysis of the NSS-71 data-set. Descriptive statistics was used to present following financial protection variables during hospitalization in last 365 days: insurance coverage, choice of provider, average medical expenditure, out of pocket expenditure (OOPE), source of financing, extent of cashless care and reimbursement, catastrophic health expenditure at 10% (CHE-10) and 25% (CHE-25) threshold, and extent of impoverishment before and after hospitalization. All these variables were analyzed for All India, Maharashtra and Uttar Pradesh (UP). Also, they were calculated across various equity dimensions which included geographical location, caste, gender and economic quintile.

Binary logistic regression was used for determining different factors affecting hospitalization in last 365 days, chances of getting CHE-10 and CHE-25, and impoverishment in All India, Maharashtra and Uttar Pradesh.

The various social factors considered were social groups, economic class, place of living (rural-urban) as well education level of head of the household. Age and gender were the two demographic factors considered. The health systems related factors were insurance coverage, choice of provider, and diseases category. All of these factors were assumed to be affecting household's expenditure on health. A dichotomous logistic model was developed to predict the probability of catastrophic health expenditure by households at 10% (CHE-10) and 25% (CHE-25) threshold.

Independent variables for logit model. To meet the objective of the study many new variables were generated and recoded. Age was categorized into 0-5 years, 6-15 years, 16-30 years, 31-45

years, 46-60 years and 60+ years age group. State variable was computed from NSS-Region variables. Usual Monthly per Capita Expenditure (UMPCE) was used for calculating economic quintiles: poorest, poor, middle, rich and richest. For India, Maharashtra and Uttar Pradesh separate UMPCE was calculated based on state. .

Dependent variable in logit model. CHE-10 and CHE-25, and impoverishment were dependent variable while looking at financial protection. On the other hand “incidence of hospitalization in last 365 days” was dependent variable in the access model.

Catastrophic health expenditure (CHE) was defined if households’ OOPE was more than a certain threshold (in this case 10% and 25% have been taken) of their usual annual expenditure. Where out-of-pocket expenditure (OOPE) was calculated by adding “Total Medical Expenditure” with “Transportation Cost” and followed it by subtracting amount of money reimbursed by insurance company or government.

Impoverishment due to expenditure on healthcare cost was calculated on the basis of Planning Commission 2016 report. For India (rural: Rs. 972 and urban: Rs. 1407), Maharashtra (rural: Rs. 1078.34 and urban: Rs. 1560.38) and UP (rural: Rs. 889.82 and urban: Rs. 1329.55) different poverty line were taken

Incidence of hospitalization in last 365 days was categorized in “Yes” or “No”.

Propensity score matching was used to assess the impact of government funded insurance schemes in preventing households from facing CHE-10 and CHE-25 in India. The outcome of interest in the PSM was defined as the catastrophe expenditure (CHE), which was categorized as the proportion of households with catastrophic health expenditure based on the share of health

expenditure in the household's total consumption expenditure with two *cut-offs*. Use of different *cut-offs* gives us a chance to measure the severity of the problem.

Finally the analysis has been carried out in two separate models, in the first model we have computed the outcome variable 'more than 10% share of health expenditure in the household's total consumption expenditure' coded as '1' and '0', otherwise. In the second model outcome variable 'more than 25% share of health expenditure in the household's total consumption expenditure' coded as '1' and '0', otherwise.

In both the models, we compare 'Public insurance' with 'no insurance'. Of the total 43,761 households, 16.10% (6604) of individuals had public insurance and 83.90% percent (37157) of individuals had no insurance. We have excluded private insurance from the PSM analysis since it was very small proportion (1.5%). On the basis of literature, certain background variables were controlled for: place of residence (rural/urban), education of head of the household (illiterate/ up to primary level educated/ above primary and below secondary/ above secondary), region of residence (east/west/north/ south/ northeast/central), caste (SC & ST/ OBC/ GEN), religion (Hindu/ Muslim/ others), disease group (Infection/ Cancers/ Blood Diseases & Endocrine Metabolic & Nutritional/Psychiatric & Neurological/Eye/ Cardio-Vascular/ Respiratory/ Gastro-Intestinal/ Musculo-Skeletal & Genito-Urinary/ Obstetric & Childbirth/ Injuries/Others & Skin & Ear), UMPCE (poorest/ poor/ middle/ rich/ richest), sex (male/ female), occupation of head of the household (organized/unorganized), choice of provider (public/private).

However, place of residence, region of residence, religion, occupation of head of the household could not be taken into consideration, as balancing could not be achieved during matching.

The nearest neighbor matching method with replacement method was used in conjunction with a logit model. To satisfy the balancing property on all the background characteristics, a “hit or miss” approach was used. Analysis was conducted using STATA 13.

Results

Findings of the study for India, Maharashtra and Uttar Pradesh has been broadly presented in “Access” and “Financial Protection” section. Under “Access” section results have been presented for hospitalization rate and various factor affecting it. “Financial Protection” section presents Out-of-pocket expenditure (OOPE), catastrophic health expenditure at 10% (CHE-10) and 25% (CHE-25) threshold, impoverishment due to OOPE, reimbursement rate under insurance coverage and cashless care. It also explores factors affecting CHE-10 and CHE-15, and impoverishment.

I. Access: The hospitalization rate at the all India level was 4.4 per 100 population (see Table 2). Hospitalization rate (per 100) was higher than the national average in Maharashtra (4.9) and lower in UP (3.4). In All India and UP, hospitalization rate was higher in urban areas, whereas in Maharashtra it was higher in rural areas. Hospitalization, excluding child-birth, was marginally higher in females compare to males in India and UP. On the other hand it was higher for males in Maharashtra. Considering hospitalization as one of the important indicator of access, it was relatively more equitable across social groups in Maharashtra and India and Uttar Pradesh- but with rates in ST in the Maharashtra being significantly lower and in SC in Uttar Pradesh. Hospitalization rate in *rural* areas of all three contexts was minimum in poorest quintile and maximum in richest quintile of the population. Hospitalization rate appears equitable in urban Maharashtra (urban -poorest quintile: 4.7, richest quintile: 4.4) compared to the inequitous rates

that we see for All India (urban -poorest quintile: 4, richest quintile: 5.5) and UP (urban -poorest quintile: 3.1, richest quintile: 5.9). However this apparent equity is likely to be due the lesser hospitalization rate in the richest quintile- where it is much less in Maharashtra compared to the other two contexts- whereas for the lower quintile Maharashtra has a higher hospitalization rate.

Factors affecting hospitalization: Insurance did not facilitate chance of hospitalization in all three contexts (see Table 3). Higher education levels of the head of the household, higher social group, higher economic class, female gender, higher age group and urban residence were all associated with better access/utilization of hospitalization in All India. In Maharashtra, higher social group, higher economic class, higher age group and urban residence were facilitating factors for hospitalization- gender and education of the head of the household were not associated with better access. In UP, of all these factors only higher education of the head of the household and higher economic class were found as a facilitating factor for hospitalization. So conclusively, higher economic class was an enabling factor for hospitalization in all three contexts. A person in the 5th economic quintile was 2.15 times as likely to get hospitalized compared to poorest person in Maharashtra, and 2.44 as likely to get hospitalized in Uttar Pradesh and 2.24 times as likely in all India. Or if we take the hospitalization rate in the fifth quintile for all India as the benchmark- the need for hospitalization; then the proportion of those who need hospitalization who got it would only be 50% (rural) and 62% (urban) in the poorest quintile in India, 57% (rural) and 73% (urban) in Maharashtra, and 40% (rural) and 48% (urban) in Uttar Pradesh.

The link between the indicator proportion of persons per 1000 population (PAP) and access is tenuous. To some extent this link is made in retrospect. Given the lower PAP reported in the poorer state and the poorer quintile it is likely that ease of access to services itself influences of perception and reporting of oneself as being ill. In our analysis we find that PAP was significantly higher in

India (98) as compared to Maharashtra (76) and UP (73) (see Table 2), whereas if our hypothesis of PAP reflecting access was correct, it should have been higher than the national average in Maharashtra with its higher level of development and wealth. However PAP variations were similar to hospitalization- was higher in urban areas of India (118) and UP (91) but higher in rural areas of Maharashtra (81); higher for female compare to male and relatively more equitable across social groups, but with a significantly higher PAP in higher economic quintiles.

II. Financial Protection

Insurance Coverage According to NSS-71st Round, 15.25% of India's population had some kind of insurance coverage. Government was major insurance provider which covered 12.8% of India's population (see Table 4). In Maharashtra and UP, insurance coverage was 7.2% and 4.1% respectively. Maharashtra reported surprisingly low (2.8%) coverage of government insurance compare to UP (3.3%), though the state had RGJAY insurance scheme. The process of enrollment in RGJAY schemes in Maharashtra and RSBY in UP could be the reason behind this. In RGJAY state entitle poor people under insurance schemes whereas in RSBY people had to claim for insurance by paying nominal fee and collecting health smart card. So, awareness about the insurance was expected to be higher in UP compare to Maharashtra. Also, Insurance coverage was higher in urban areas of Maharashtra and UP, whereas it was higher in rural areas (13.1%) in All India. Across social categories insurance coverage was equitable in all three contexts. On the other hand across economic class insurance coverage was higher in richer quintile compare to poorer quintiles in all three contexts, but rural UP. Across rural UP poorest population (4.2%) had higher insurance coverage compare to richest (2.4%) quintile.

Effectiveness of Insurance in Terms of Financial Risk Protection

One of the major proposition behind insurance push in UHC discourse is that, it will provide financial risk protection to family against out-of-pocket expenditure (OOPE). To check this hypothesis analysis was done to find out OOPE under different insurance schemes in India, Maharashtra and Uttar Pradesh. Idea of providing insurance was to provide cashless services. Considering this, extent of cashless services and reimbursement was calculated under insurance coverage versus no insurance (even in public provisioning). Extent of catastrophic health expenditure (CHE) and impoverishment are other two important indicators which also speaks about financial risk protection. Logistic model was built to find out what are the factors which affect CHE-10/CHE-25, and impoverishment in all three contexts. Additionally to measure the contribution of government insurance in preventing household from facing CHE, propensity score analysis was done for All India.

Out-of- Pocket Expenditure (OOPE) Under Different Insurance Schemes

Out of pocket expenditure (OOPE) has been considered as one of the most regressive way of financing in world. One of the major reason behind this is because of poor health spending by the government. In India three-fourth of the financing comes from private sector. Government barely spend 1% of total gross domestic product (GDP). Average OOPE per hospitalization in India was Rs. 13,936 (see Table 5). It was 55% higher in urban areas compare to rural counterpart. Under government funded insurance schemes average OOPE was Rs. 10,943, which was 24% lower compare to uninsured population. Under employee supported and private insurance average OOPE was 7% and 38% higher compare to non-insured population. Usually average OOPE in rural areas was lower compare to urban areas under all insurance schemes but this reduction was maximum

for non-insured (38%) population and minimum under private insurance (9%). It showed under private insurance OOPE is least varying in rural and urban areas in India.

In Maharashtra average OOPE per hospitalization was Rs.18, 567 which was 33% higher compare to All India (see Table 5). OOPE in urban areas of Maharashtra was 29% higher compare to rural counterparts. Surprisingly, opposite to All India, OOPE in rural Maharashtra was twice than urban areas for hospitalization. Also under private insurance OOPE was same for rural and urban areas of Maharashtra. Non-insured population who lived in rural areas spent 2.35 times higher compare to urban areas.

In UP average OOPE was Rs. 16,037. It was 77% higher in urban areas of UP compare to rural counterparts. Average OOPE under government funded insurance schemes was 32% lower compare to non-insured population. Also average OOPE under employee supported insurance schemes and private insurance was 11% and 6% higher compare to non-insured population respectively. Surprisingly under government funded insurance schemes OOPE was 32% higher in rural areas compare to urban (see Table 5).

Average OOPE across different social groups showed consistent increase from ST population (India -Rs. 7991) to GEN population (India: Rs.18359). Lower OOPE under lower socio economic group shows lack of spending capacity among them. Most of the time population belonging to ST, SC or OBC population forgo the treatment just because they could not afford it. Capturing that need of hospitalization could not be calculated by this survey.

Usually OOPE was higher for richer section of society since they had higher spending capacity. In India rural population belonging to poorest section (Rs. 7028) spent almost one third of the richest section (Rs. 20189) (see Table 5). Generally across all insurance category and non-insured

population OOPE suddenly increased for upper two quintile of the population. Also, gap between OOPE among lower three quintile was lesser. In urban areas this increase was even higher where urban richest population spent 3.1 times higher compare to poorest population. Overall in all situations average OOPE was significantly higher for richer population and especially in upper two quintile. This could be because of many reasons: first richest population had higher purchasing power to buy health services, second they had greater access of healthcare facilities, third they had higher perception towards healthcare need or we can say higher health seeking behavior and fourth service provider, mainly private provider, charged richer section of the population differently considering their ability to pay.

Myth of Cashless Services -OOPE under government funded insurance coverage was relatively lesser compare to no insurance. Still OOPE under various insurance schemes was significant amount against the promise of being cashless. This study categorized population in following four categories: 1. Population which had no OOPE (absolute cashless), 2. Population which had some amount of OOPE but less or equal to Rs.500 (near cashless), 3. Population which had OOPE greater than Rs.500 but lesser than Rs. 1000 and, 4. Population which had OOPE more than Rs.1000. Idea behind this categorization was practical in nature. In everyday life Rs. 500 and Rs. 1000 is something with which general population can associate themselves and make meaning. Since government funded insurance schemes were major insurance provider, OOPE was looked for population under government funded insurance schemes and non- insured population. OOPE was looked under public and private providers.

Effectiveness of insurance coverage was observed through incidence of “cashless care (OOPE=Rs.0)” or “near cashless care (OOPE<Rs. 500)” under insurance coverage by different service provider. In India under government funded insurance and private provisioning 1.7% of

the hospitalization episodes had cashless care, whereas for Maharashtra and India it was 0.9% and 3.6% respectively (see Table 6). It is important to note that promise of insurance was 100% cashless care. Also it was public provisioning which provided cashless care irrespective of insurance or not in all three contexts

Reimbursement Recently many of the National and State daily in India have reported that insurance companies are showing irregularity in reimbursing the money related with hospitalization. Many times consumer had to go to court. But overall studies show insurance companies' shows lack of integrity in reimbursement. NSS 71st round asked following questions to individuals who had hospitalization in last 365 days: total amount reimbursed by medical insurance company or employer. In India out of total hospitalization episodes 19.5% had insurance coverage but only 2.5% of the episodes had some kind of reimbursement, remember not total reimbursement. In Maharashtra (0.2%) and UP (0.3%) reimbursement was almost nil though 8.1% and 5.2% of their hospitalization episodes had some kind of insurance (see Table 7). There is possibility of not capturing those reimbursement which was directly paid to provider from the government.

Catastrophic Health Expenditure

OOPE was considered to be catastrophic for the household if it crossed a certain threshold (in this study 10% and 25%) of total usual annual per capita consumption expenditure (UAMPCE) of the household. In this study catastrophic health expenditure (CHE) was calculated at 10% (CHE-10) and 25% (CHE-25) threshold in given the three contexts.

In India 39.6% and 18.2% household, who had hospitalization in last one year, reported CHE-10 and CHE-25, respectively (see Table 8). In Maharashtra one in two households (49.2%), which

had hospitalization in last 365 days, faced CHE-10, whereas one in five person (19.6%) faced CHE-25. More than half (51.2%) of the households in rural Maharashtra faced CHE-10 due to hospitalization, whereas in urban Maharashtra 46.5% households faced the same. In UP 43.7% and 22.7% of population faced CHE-10 and CHE-25 respectively. Like All India, but opposite to Maharashtra, CHE-10 and CHE-25 was higher in urban areas of Uttar Pradesh. Incidence of CHE to be higher for lower income categories and more marginalized and it should be less in those who are richer and less vulnerable. But to our surprise we find that CHE is either the same across population sub-groups be urban-rural residence in all contexts and higher in rural Maharashtra. In all three contexts of rural areas, CHE-10 /CHE-25 incidence was higher for richest income quintile group and in urban areas it was higher for middle-income quintile.

Factors Affecting Catastrophic Health Expenditure

NSS-71st round data collected various dimensions of household information. Based on the published literature and available data a logistic model (logistic regression) was built to see the impact of various factors which determining the CHE-10 and CHE-25 for the family. Following factors were taken as independent variables: education, social groups, economic class, insurance, gender, age, rural-urban disparity and diseases category. Dependent variable was CHE-10 or CHE-25.

Population was categorized into poorest, poor, middle, rich and richest category. Insurance was categorized into two category: insured and non-insured. Non-insured population was taken as reference category. Gender had natural category of male and female. Male population had been taken as reference population. It is important to note that, gender of the household was taken as the gender of the hospitalization episode. In this assumption there were less than 10% of

households where gender of the first hospitalization episode was taken as the gender of the household.

In India households, where head of the households had education above secondary level, had 1.66 times higher chance of facing CHE-10 compare to illiterate population (see Table 9). In Maharashtra education did not play any role in deciding CHE-10, whereas population having up to primary level and above secondary level education had 1.72 (95% CI: 1.24-2.40) and 1.69 (95% CI: 1.06-2.69) times higher chance of facing CHE-25 compare to illiterate population, respectively (see Table 10). In UP population having above secondary level education had 1.95 (95% CI: 1.35-2.81) times higher chance of facing CHE-10 compare to illiterate population (see Table 9).

In India population belonging to SC, OBC or GEN category had higher chance of facing CHE-10 or CHE 25 compare to ST population. Similarly in Maharashtra as we move from ST to GEN population chances of facing CHE-10 and CHE-25 increased consistently like India. However in UP, social group had no role in deciding the CHE-10 or CHE-25.

Poorest population in India had highest chance of facing CHE-10. Similarly chances of facing CHE-25 was higher in poorer quintile. Richest economic class of India had 24% lesser CHE-25 compare to poorest population. In Maharashtra and UP economic quintile did not play any role in deciding CHE at 10% or 25% threshold.

In India population having insurance had 16% (95% CI: 26%-5%) lesser chance of facing CHE-10 . Whereas at CHE-25, insurance did not have any role in preventing CHE. Also, in Maharashtra and UP insured population had 79% and 47% lesser chance of facing CHE-10 compare to non-insured population, respectively. Whereas insurance had no protecting impact for CHE-25.

Chances of facing CHE-10 or CHE-25 was manyfold higher (five to fifteen times) under private provisioning compare to public provisioning. In case of Maharashtra chances of facing CHE-10 was thirteen times higher if household went to private provider compare to public provider.

CHE and Propensity Score Matching

Propensity score matching was done to find out the impact of insurance on CHE-10 and CHE-25. In this scenario households having government funded insurance coverage were taken as cases where as non-insured population was taken as control. The unmatched sample estimate shows that those household who had government funded insurance were 5% less likely to experience CHE-10 compared to household who had no insurance coverage in India (see Table 11). Our calculated Average-Treatment on Treated (ATT) value in treated and controlled group were 0.36 and 0.49 respectively, which means that after matching, government funded health insurance households had 13% (95% CI: 10-16) chance of experiencing CHE-10. Estimates based on a second model where outcome is CHE-25 shows with government funded insurance that there was a 6% (95% CI: 4-9) less chance of experiencing CHE (see Table 11).

Impoverishment due to OOPE

Impoverishment was another indicator which used in context of financial risk protection. It measures proportion of population which got pushed below poverty line after OOPE on health. At all India poverty line was defined as follow: Rural: 972 Rs/person/month, Urban: 1407Rs/person/month). Depending on the different level of progress in different states poverty line also differed . For Maharashtra (Rural: 1078.34 Rs/person/month, Urban: 1560.38/person/month) and UP (Rural: 889.82 Rs/person/month, Urban: 1329.55/person/month) different poverty line was taken for calculating impoverishment.

NSS 71st round gives opportunity to calculate impoverishment for those households which had hospitalization in last one year (365 days). Household poverty line was calculated by multiplying household size with the fixed per capita expenditure, which was taken by planning commission report. Since hospitalization expenditure was calculated over the last 365 days (one years), so annual poverty line was calculated for the households. Proportion of household below poverty line was calculated, pre and post OOPE by the household (HH).

In India and Maharashtra, 27.1% of households were below poverty line before OOPE expenditure on hospitalization, which increased to 39.9% in India and 41.9% in Maharashtra after incurring OOPE on hospitalization, respectively (see Table 12). In UP it increased 33.7% before hospitalization expenses to 48.0% after hospitalization expenses. In other words in state of UP half of the hospitalized slipped below poverty line after OOPE on health in last one year. In all three contexts, proportion of households below poverty line (pre and post OOPE payment) was almost same for rural and urban areas. Proportion of households which were below poverty line was highest in ST category households whereas it was lowest in GEN category population in all three contexts.

In all three contexts, both rural and urban areas, poorest two quintiles of the households were already below poverty line before hospitalization. But in upper three quintiles of the population, there was no impoverishment pre-hospitalization in India, Maharashtra and UP. After hospitalization, in richest quintile less than one (India- 5.4%, Maharashtra-9.2% and UP-7.8%) out of ten people faced impoverishment (see Table 12). As we go to poorer quintile this proportion increased.

This clearly section bring attention towards the higher rate of impoverishment in marginalized section of society. There was higher rate of impoverishment if households belonged to a ST/SC

category population compare to GEN category population. Unfortunately, household belonging to poorest quintile were already below poverty line and they go deeper into poverty with OOPe on hospitalization. Clearly need for financial protection is much larger for lower socio-economic category population in the society.

Factors Determining Impoverishment

In India education of the head of the household did not show any protective effect in occurrence of impoverishment. In Maharashtra population having primary education to the head of the household had 1.58 (95% CI: 1.09-2.29) times higher chance of getting impoverished compare to illiterate population. In opposed to that in UP, same like India, education did not show protective effect against impoverishment (see Table 13). In All India and Maharashtra social group did not show any effect on occurrence of impoverishment. Whereas in UP occurrence of impoverishment in GEN population was 72% lesser compare to ST population. In all three contexts insurance did not show any protective effect against impoverishment. In India and UP female population faced 21% and 30% lesser impoverishment compare to male population. This figure need to be taken with caution since most of the time female population forgo the treatment compare to male population. In Maharashtra gender did not show any impact on impoverishment.

In India population who lived in urban areas had 20% lesser impoverishment compare to rural areas. Similarly in Maharashtra urban areas households had 37% lesser impoverishment compare rural Maharashtra. Also in UP, rural-urban disparity had no impact on impoverishment (see Table 13).

In India chances of getting impoverished was higher under NCDs (1.63 times), injuries (1.68 times), RCH and nutrition (2.11 times) and unknown/idiopathic (1.73) compare to infectious

diseases. Whereas in Maharashtra and UP there was no effect of diseases category on impoverishment (see Table 5.20).

In India chances of getting impoverished was 3.13 (95% CI: 2.77-3.58) times higher if person went to private providers compare to public provider. Similarly chances of impoverishment was 3.88 times and 2.60 times higher if patient went to private provider in Maharashtra and UP, respectively.

In conclusion there is a need for financial protection in given three contexts. OOPE, CHE-10 and CHE-25, and impoverishment show, need for financial protection is even higher for lower socio-economic population in the country. It was the poorest population quintile which had higher chance of facing CHE and impoverishment due to OOPE. As insurance as a way towards financial protection did not show any impact in protecting the household from getting impoverished. Insurance decreased the chance of facing CHE by 13% (CHE-10) to 6% (CHE-25), though promise was given for 100% population. In opposed to that public provisioning showed financial protection in all the contexts. More importantly public provisioning is more equitable in nature. Summarily speaking this chapter shows public provisioning provides financial protection to a great extent and it should be the path chosen for financial protection on path towards UHC.

Discussion

The present study examined three different contexts: the aggregated All India picture, and the situation in the states of Maharashtra and Uttar Pradesh. All India sample was taken to understand as a nation how far India had come with respect to access and financial risk protection dimension currently. Maharashtra was selected since it is 2nd most populous state of the country. It is also one of the wealthiest and highly developed states of the country. It had better public health facilities along with better socio-economic indicators. This is also a state which is at the cusp of

epidemiological and demographic transition. In contrast to Maharashtra, the second state chosen, UP, is an “EAG states” and further is one of the poorest even amongst EAG states with one of the lowest life expectancies in the country. Aim was to examine the levels of coverage (access and financial protection) in given three contexts.

Poorest population in all three contexts were already below poverty line before meeting the expense of hospitalization. Certainly a large proportion of these people would be forgoing their healthcare needs which is difficult to capture and to the extent that they paid for healthcare they would be going deeper into poverty. This certainly indicates the need of financial protection for health care in the country.

Subsidized public provisioning had financial protective effect in all three contexts and it was equitable. There are ample amount of evidence in history which shows, if any nation has ever reached near path towards UHC, is because of public investment. This study is in another empirical addition in the recent context. In all financial measures which include OOPE, CHE-10/CHE-25 and impoverishment, financial protection was many-fold higher in public provisioning as compared to private provisioning

Even in the current context where subsidized public provisioning continues to show effective financial protection, insurance has been promoted as a financial protective mechanism both nationally and internationally. At first glance insurance as is available in India, shows inefficiency and is exclusionary in nature as it does not cover ambulatory care which is major cause (2/3rd) of OOPE in India. Also, it is exclusionary in choosing its beneficiaries (exclude older and risk prone population), at least to a certain extent.

One of the argument which was behind promotion of insurance as a strategy for UHC was that, in public subsidies are utilized more by higher socio economic categories as compared to the poorest (Mahal et al. 2000). But the current study shows insurance coverage was higher in richer quintile of the population, while for equity the reverse should have been the case- at least in government financed health insurances.

In many policy discourses insurance coverage have been equated with financial protection. But this equation does not hold, in all three of our given contexts. Propensity score matching analysis shows only 13% of government insured households experiencing hospitalization was prevented against CHE-10, whereas the promise was for 100% cashless care. In case of impoverishment, insurance did not have any protective role in preventing household from slipping below poverty line due to OOPE expenditure. Also, insurance did not increase access to hospitalization, one of the access indicators, in all three contexts.

Conclusion Achieving UHC has emerged as one of the major health goals under sustainable development goals (SDGs). Access and financial protection are two major dimensions of UHC. There have been different strategies that have been proposed in the current discourse on achieving UHC. Major question lies in selection of a path that is more equitable and efficient. There will be resource constraint in achieve all the goals, and nations have to prioritize their goals which will come with trade-offs. In this context publicly funded insurance did not show financial protective role as it was promised during the roll-out of the schemes in India. Also, insurance did not facilitate in hospitalization which an access indicator. Also in all three context Maharashtra and India were more equitable as system in providing financial protection compare to UP In this regard policy maker need to be cautious while priority setting and allocation of fund for path towards UHC.

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Tables

Table 1 Different indicators in All India, Maharashtra and Uttar Pradesh

Health indicators	India	Maharashtra	Uttar Pradesh
Infant mortality rate	40	24	50
Maternal mortality ratio	167	68	246
Total fertility rate	2.3	1.8	3.1
Under-five mortality rates	49	26	64
Life expectancy	67.5	71.3	63.8
Death rate	7.0	6.2	7.7

Source: SRS 2013

Table 2 Hospitalization Rate (Per 100 Population) and Proportion of Ailing Person (PAP) Per 1000 under Various Socio- Economic Stratifiers in India, Maharashtra and Uttar Pradesh

Strata	Hospitalization Rate (per 100)			PAP (per 1000)		
	India	Maharashtra	Uttar Pradesh	India	Maharashtra	Uttar Pradesh
Total	4.4	4.9	3.4	98	76	73
Rural-urban divide						
Rural	4.3	5.1	3.2	89	81	68
Urban	4.7	4.6	3.9	118	70	91
Gender						
Male	2.9	3.6	1.8	87	70	66
Female	6.0	6.3	5.1	110	82	80
Female (Excluding childbirth)	3.1	3.5	2.1	-	-	-
Social Group						
ST	3.6	4.1	3.8	69	89	69
SC	4.6	5.1	3.4	92	71	65
OBC	4.4	5.1	3.2	98	70	67
GEN	4.6	4.9	3.9	111	80	97
Economic Class						
Rural						
Poorest	3.2	3.7	2.6	65	62	55
Poor	3.7	4.0	3.1	79	98	70
Middle	4.1	4.5	3.4	83	91	71
Rich	4.8	5.7	4.1	102	66	79
Richest	6.4	7.2	4.8	136	86	87
Total	4.3	5.1	3.2	89	80	68
Urban						
Poorest	4.0	4.7	3.1	83	52	75
Poor	4.8	5.3	4.0	110	80	80
Middle	5.2	5.3	4.6	130	71	111
Rich	4.6	3.8	4.5	134	81	98
Richest	5.5	4.4	5.9	161	63	164
Total	4.7	4.6	3.9	118	70	91

Table 3 Factors Affecting Hospitalization in India, Maharashtra and Uttar Pradesh

Independent variable	India			Maharashtra			Uttar Pradesh		
	Odds Ratio	p> z	95% CI	Odds Ratio	p> z	95% CI	Odds Ratio	p> z	95% CI
Education (Ref: Illiterate)									
Up to primary	1.15	0.00	1.08-1.22	1.12	0.19	0.94-1.34	1.27	0.02	1.04-1.54
Up to secondary	1.10	0.00	1.03-1.18	1.05	0.56	0.87-1.28	1.40	0.00	1.17-1.68
Above secondary	0.83	0.00	0.76-0.91	0.84	0.12	0.67-1.05	0.85	0.16	0.68-1.06
Social Groups (Ref: ST)									
SC	1.31	0.00	1.18-1.45	1.39	0.01	1.06-1.82	0.72	0.36	0.35-1.46
OBC	1.15	0.00	1.04-1.27	1.31	0.03	1.02-1.68	0.67	0.26	0.33-1.35
GEN	1.14	0.00	1.03-1.26	1.12	0.36	0.87-1.45	0.68	0.29	0.33-1.39
Economic class (Ref: Poorest)									
Poor	1.29	0.00	1.19-1.39	1.40	0.00	1.12-1.74	1.19	0.07	0.98-1.43
Middle	1.53	0.00	1.40-1.66	1.75	0.00	1.40-2.19	1.55	0.00	1.27-1.90
Rich	1.74	0.00	1.60-1.90	2.12	0.00	1.67-2.68	1.70	0.00	1.35-2.14
Richest	2.24	0.00	2.03-2.49	2.15	0.00	1.64-2.82	2.44	0.00	1.83-3.24
Insurance (ref: No insurance)									
Insurance	1.06	0.12	0.98-1.14	1.04	0.85	0.65-1.66	1.01	0.91	0.72-1.42
Gender (ref: Male)									
Female	1.08	0.00	1.03-1.13	0.93	0.31	0.81-1.06	1.39	0.00	1.21-1.60
Age (ref: 0-5 years)									
6-15 years	0.48	0.00	0.43-0.53	0.48	0.00	0.36-0.62	0.60	0.001	0.45-0.80
16-30 years	0.79	0.00	0.73-0.86	0.52	0.00	0.42-0.65	1.49	0.00	1.20-1.85
31-45 years	1.08	0.07	0.99-1.17	0.65	0.00	0.52-0.81	1.77	0.00	1.35-2.31
46-60 years	1.61	0.00	1.47-1.75	1.10	0.38	0.87-1.40	2.02	0.00	1.60-2.54
60+ years	2.84	0.00	2.59-3.11	2.37	0.00	1.84-3.06	3.96	0.00	2.95-5.33
Rural-urban divide(ref: Rural)									
Urban	0.90	0.00	0.85-0.95	0.79	0.005	0.67-0.93	1.13	0.14	0.95-1.34

Table 4 Coverage of Different Insurance Schemes in India, Maharashtra and Uttar Pradesh

Types of insurance schemes	Govt. Insurance			Employee Supp.			Private Insurance			Any Insurance			No insurance at all		
	MH	U.P	India	MH	U.P	Indi	MH	U.	Indi	MH	U.P	India	MH	U.P	Indi
Total	2.8	3.3	12.8	1.3	0.7	1.2	3.1	0.1	1.2	7.2	4.1	15.2	92.8	95.9	84.8
Rural-Urban Divide															
Rural	1.2	3.0	13.1	0.3	0.6	0.6	0.3	0.1	0.3	1.8	3.7	14.1	98.2	96.3	85.9
Urban	4.8	4.3	12.0	2.7	1.1	2.4	6.9	0.3	3.5	14.5	5.8	8.0	85.5	94.2	82.0
Sex															
Male	2.6	3.3	12.5	1.6	0.7	1.2	3.4	0.1	1.3	7.6	4.1	15.0	92.4	95.9	85.0
Female	2.9	3.2	13.1	1.0	0.8	1.1	2.8	0.1	1.2	6.8	4.1	15.5	93.2	95.9	84.5
Social Groups															
ST	1.4	1.1	18.3	0.0	0.0	0.5	0.1	0.0	0.2	1.5	1.2	19.1	98.5	98.8	80.9
SC	5.6	4.9	13.1	0.6	0.4	0.6	0.3	0.1	0.2	6.5	5.4	13.9	93.5	94.6	86.1
OBC	1.1	2.7	13.6	0.9	1.0	1.2	1.2	0.1	0.7	3.2	3.7	15.5	96.8	96.3	84.5
GEN	3.5	3.1	9.5	2.2	0.5	1.8	6.5	0.3	3.0	12.3	4.0	14.4	87.7	96.0	85.6
Economic Class (Rural)															
Poorest	0.4	4.2	10.8	0.0	0.8	0.7	0.0	0.0	0.0	0.4	5.0	11.5	99.6	95.0	88.5
Poor	0.1	2.9	10.8	0.6	0.1	0.4	0.2	0.0	0.1	0.8	3.1	11.4	99.2	96.9	88.6
Middle	0.5	3.4	11.6	0.3	0.2	0.5	0.0	0.2	0.2	0.8	3.8	12.3	99.2	96.2	87.7
Rich	2.1	1.2	16.6	0.2	1.0	0.6	0.3	0.1	0.1	2.6	2.3	17.4	97.4	97.7	82.6
Richest	4.3	2.4	17.7	0.3	1.1	0.9	1.4	0.0	1.1	6.0	3.5	19.8	94.0	96.5	80.2
Total	1.2	3.0	13.1	0.3	0.6	0.6	0.3	0.1	0.3	1.8	3.7	14.1	98.2	96.3	85.9
Economic Class (Urban)															
Poorest	0.8	1.5	8.6	0.5	0.6	0.7	0.1	0.0	0.1	1.4	2.1	9.6	98.6	97.9	90.4
Poor	1.5	2.5	10.6	0.9	1.0	1.2	2.0	0.0	0.5	4.4	3.6	12.5	95.6	96.4	87.5
Middle	6.3	1.8	13.9	2.8	0.6	2.7	6.4	0.1	1.8	15.4	2.5	18.6	84.6	97.5	81.4
Rich	13.7	7.4	14.1	4.3	1.2	3.0	10.8	0.6	5.7	29.2	9.3	23.1	70.8	90.7	76.9
Richest	7.9	14.8	15.1	8.3	3.7	6.8	25.1	1.5	14.3	41.4	20.0	36.4	58.6	80.0	63.6
Total	4.8	4.3	12.0	2.7	1.1	2.4	6.9	0.3	3.5	14.5	5.8	18.0	85.5	94.2	82.0

Table 5 Out of Pocket Expenditure in Ambulatory Care and Hospitalization in All India, Maharashtra and Uttar Pradesh

	Hospitalization cost (per episode)		
	India	MH	UP
Total	13936	18567	16037
Rural-Urban Divide			
Rural	11802	17014	13364
Urban	18329	22027	23533
Sex			
Male	18843	21116	24785
Female	11250	16920	12428
Social group			
ST	7991	8338	
SC	9350	13088	10521
OBC	14037	16440	14350
GEN	18359	24514	21545
Eco. Class			
Rural			
Poorest	7028	11799	6873
Poor	8407	11254	10280
Middle	9075	14040	11305
Rich	11522	16158	12847
Richest	20189	29829	24789
Urban			
Poorest	9707	12242	9834
Poor	13176	14241	12242
Middle	16448	23002	18950
Rich	26864	42254	40359
Richest	30540	26677	44033

Table 6 Proportion of Hospitalization with “Cashless Care” By Provider Type with GFHI Coverage and With No Insurance Coverage

Type of insurance coverage	Type of Service provider	OOPE (in Rs.)				N (Episodes)
		0	1-500	501-1000	>1000	
Maharashtra						
Government funded	Public	4.0	43.7	13.1	38.5	63
	Private	0.9	8.4	7.6	75.6	113
	Total	2.0	20.8	9.6	62.6	176
Not covered by any insurance	Public	4.1	32.6	13.9	49.4	1195
	Private	0.1	0.5	1.3	98.1	3218
	Total	1.1	8.9	4.7	85.3	4413
Uttar Pradesh						
Government funded	Public	14.6	25.0	13.7	45.4	110
	Private	3.6	9.1	20.1	66.0	171
	Total	7.2	14.4	17.9	59.1	281
Not covered by any insurance	Public	3.3	26.0	15.9	54.6	2,078
	Private	0.2	0.5	0.9	98.4	3,626
	Total	1.5	11.2	7.2	80.1	5,704
India						
Government funded	Public	5.3	29.3	14.1	48.9	4030
	Private	1.7	6.4	3.1	87.6	4235
	Total	3.4	17.6	8.4	68.7	8265
Not covered by any insurance	Public	2.9	24.1	14.0	59.0	21833
	Private	0.4	1.3	1.4	96.9	23025
	Total	1.5	11.8	7.2	79.4	44858

Table 7: Proportion of Reimbursement in Total Hospitalization Episodes

Type of insurance coverage	Proportion (in percentage) of all hospitalized episodes in each category of insurance scheme	Proportion of hospitalized by category of insurance coverage who got direct Reimbursement		Total
		Yes	No	
Maharashtra				
Government funded	3.1	20.0	80.0	100.0
Employer supported	1.9	67.2	32.8	100.0
Private insurance	3.0	77.4	22.6	100.0
NO insurance cover	0.1	39.3	60.7	100.0
Total	91.9	0.2	99.9	100.0
Uttar Pradesh				
Government funded	4.2	7.2	92.8	100.0
Employer supported	0.7	4.0	96.0	100.0
Private insurance	0.2	43.3	56.7	100.0
NO insurance cover	0.1	37.7	62.4	100.0
Total	94.8	0.3	99.7	100.0
India				
Government funded	16.3	5.6	94.4	100.0
Employer supported	1.5	35.7	64.3	100.0
Private insurance	1.4	56.5	43.5	100.0
NO insurance cover	80.5	0.2	99.8	100.0
Total	100.0	2.5	97.5	100.0

Table 8: Proportion of Total Hospitalized Households Which had Catastrophic Health Expenditure at 10% and 25% of threshold in All India, Maharashtra and Uttar Pradesh

	>10 % threshold as percentage of UMPC (CHE-10)			>25 % threshold as percentage of UMPC (CHE-25)		
	MH	UP	India	MH	UP	India
Total	49.2	43.7	39.7	19.6	22.7	18.2
Rural-Urban Divide						
Rural	51.2	43.09	39.0	22.0	22.3	18.0
Urban	46.5	45.51	40.9	16.1	23.8	18.6
Social groups						
ST	31.6		25.8	11.4		10.2
SC	47.8	42.1	35.7	20.8	21.1	16.0
OBC	50.9	42.1	41.2	19.2	21.2	19.3
GEN	52.2	47.5	43.6	21.2	25.7	20.3
Economic Class						
Rural						
Poorest	44.2	41.0	36.2	21.9	20.4	17.0
Poor	46.7	37.9	34.4	20.2	23.2	17.0
Middle	55.7	41.8	37.3	23.7	18.8	15.6
Rich	50.6	41.0	38.4	19.7	19.0	17.7
Richest	57.0	52.7	47.1	24.1	31.2	22.6
All	51.2	43.1	39.0	22.0	22.3	18.0
Urban						
Poorest	48.2	38.3	37.9	21.0	15.2	17.0
Poor	45.6	45.1	39.3	12.7	18.9	17.0
Middle	61.3	49.3	43.6	14.3	30.4	15.6
Rich	37.6	51.5	45.9	16.6	30.2	17.7
Richest	32.2	43.6	38.0	15.1	24.4	22.6
All	46.5	45.6	40.9	16.2	23.8	18.0

Table 9: Factors affecting catastrophic health expenditure at 10 % threshold in India

Independent variable	Maharashtra			Uttar Pradesh			India		
	Odds Ratio	95% CI	p> z	Odds Ratio	95% CI	p> z	Odds Ratio	95% CI	p> z
Education (Ref: Illiterate)									
Up to primary	1.11	0.80-1.54	0.51	0.80	0.58-1.11	0.20	0.98	0.88-1.10	0.77
Up to secondary	0.78	0.54-1.11	0.173	0.94	0.68-1.29	0.70	1.12	0.99-1.27	0.06
Above secondary	1.38	0.88-2.19	0.16	1.95	1.35-2.81	0.00	1.66	1.41-1.94	0.00
Social Groups (Ref: ST)									
SC	1.96	1.31-2.91	0.001	0.68	0.20-2.29	0.53	1.39	1.16-1.68	0.00
OBC	2.16	1.50-3.12	0.00	0.58	0.17-1.91	0.37	1.67	1.40-1.97	0.00
GEN	2.46	1.70-3.56	0.00	0.65	0.19-2.20	0.50	1.83	1.53-2.18	0.00
Economic class (Ref: Poorest)									
Poor	1.02	0.73-1.42	0.90	1.02	0.76-1.37	0.85	0.82	0.73-0.93	0.00
Middle	1.07	0.76-1.53	0.66	0.85	0.61-1.19	0.36	0.81	0.71-0.94	0.00
Rich	0.97	0.67-1.39	0.87	0.85	0.60-1.21	0.38	0.88	0.77-1.01	0.07
Richest	1.05	0.68-1.60	0.81	0.78	0.50-1.20	0.26	0.88	0.74-1.05	0.16
Insurance (ref: No insurance)	0.21	0.09-0.47	0.00	0.53	0.32-0.87	0.01	0.84	0.74-0.95	0.01
Age (ref: 0-5 years)									
6-15 years	0.61	0.33-1.13	0.12	1.45	0.79-2.69	0.23	0.97	0.75-1.24	0.81
16-30 years	1.14	0.65-1.96	0.64	1.76	1.08-2.87	0.02	1.15	0.92-1.43	0.20
31-45 years	1.06	0.64-1.77	0.80	2.08	1.27-3.42	0.00	1.30	1.06-1.61	0.00
46-60 years	1.25	0.74-2.13	0.41	2.53	1.50-4.29	0.00	1.41	1.14-1.74	0.00
60+ years	1.19	0.69-2.04	0.52	2.04	1.21-3.43	0.00	1.44	1.16-1.79	0.00
R-U Divide (ref R)									
Urban	0.83	0.65-1.05	0.13	0.86	0.68-1.09	0.21	0.84	0.77-0.92	0.00
Service Provider (ref: public)	13.44	10.0-18.0	0.00	11.7	8.87-15.6	0.0	9.35	8.48-10.3	0.00
Disease category (ref: Infectious)									
NCDs	1.56	1.14-2.13	0.00	2.44	1.77-3.35	0.00	2.20	1.95-2.49	0.00
Eye/Ear	1.20	0.47-3.01	0.70	0.56	0.33-0.94	0.03	1.12	0.81-1.52	0.48
Injuries	1.50	0.90-2.50	0.11	1.03	0.71-1.50	0.86	1.67	2.63-4.19	0.00
RCH & Nutrition	1.87	1.03-3.37	0.03	2.91	1.32-6.40	0.01	3.32	2.63-4.19	0.00
Child Birth	0.74	0.50-1.10	0.14	0.30	0.20-0.43	0.00	0.78	0.67-0.89	0.00

Table 10: Factors Affecting Catastrophic Health Expenditure At 25 % Threshold in India

Independent variable	Maharashtra			Uttar Pradesh			India		
	Odds Ratio	95% CI	p> z 	Odds Ratio	95% CI	p> z 	Odds Ratio	95% CI	p> z
Education (Ref: Illiterate)									
Up to primary	1.72	1.24-2.40	0.00	0.74	0.51-1.08	0.12	1.06	0.91-1.23	0.44
Up to secondary	1.39	0.97-2.00	0.07	0.92	0.62-1.38	0.70	1.24	1.06-1.44	0.00
Above secondary	1.69	1.06-2.69	0.03	1.52	0.98-2.36	0.06	1.58	1.30-1.92	0.00
Social Groups (Ref: ST)									
SC	1.99	1.17-3.37	0.01	0.36	0.09-1.43	0.15	1.34	1.01-1.78	0.04
OBC	1.74	1.07-2.83	0.03	0.33	0.09-1.27	0.11	1.62	1.24-2.11	0.00
GEN	2.27	1.39-3.71	0.00	0.38	0.10-1.49	0.17	1.76	1.34-2.32	0.00
Economic class (Ref: Poorest)									
Poor	0.88	0.60-1.29	0.52	0.76	0.54-1.09	0.14	0.80	0.68-0.93	0.00
Middle	0.73	0.50-1.08	0.12	0.82	0.56-1.20	0.30	0.73	0.61-0.87	0.00
Rich	0.54	0.36-0.81	0.00	0.95	0.61-1.48	0.83	0.75	0.63-0.91	0.00
Richest	0.69	0.45-1.05	0.08	0.87	0.51-1.47	0.60	0.76	0.58-0.98	0.04
Insurance (ref: No insurance)									
Insurance	0.58	0.23-1.47	0.25	0.65	0.37-1.14	0.13	0.88	0.74-1.05	0.15
Age (ref: 0-5 years)									
6-15 years	0.55	0.26-1.16	0.12	1.46	0.74-2.92	0.28	0.96	0.69-1.33	0.82
16-30 years	1.32	0.71-2.46	0.38	1.75	0.93-3.29	0.08	1.24	0.92-1.67	0.15
31-45 years	1.71	0.95-3.06	0.07	2.38	1.27-4.45	0.01	1.80	1.34-2.41	0.00
46-60 years	2.27	1.27-4.06	0.01	2.16	1.17-3.99	0.01	1.90	1.42-2.55	0.00
60+ years	1.72	0.97-3.06	0.06	2.95	1.52-5.73	0.00	2.06	1.52-2.78	0.00
R-U Div.(ref: Rural)	0.71	0.55-0.92	0.01	0.80	0.60-1.07	0.14	0.85	0.75-0.97	0.02
Service provider (ref: Public)	6.75	4.69-9.71	0.00	5.5	3.71-8.24	0.00	6.6	5.72-7.61	0.00
Disease category (ref : Infectious)									
NCDs	2.36	1.63-3.42	0.00	2.43	1.66-3.56	0.00	2.29	1.93-2.72	0.00
Eye/Ear	0.67	0.33-1.37	0.28	0.48	0.25-0.95	0.04	1.04	0.64-1.70	0.86
Injuries	2.76	1.72-4.44	0.00	1.12	0.73-1.73	0.60	1.98	1.62-2.42	0.00
RCH & Nutrition	1.87	0.97-3.60	0.06	3.08	1.33-7.11	0.01	2.60	1.96-3.46	0.00
Child Birth	0.82	0.51-1.32	0.42	0.31	0.19-0.51	0.00	0.71	0.58-0.85	0.00

Table 11: Impact Assessment of GFHI on CHE at 10 % and 25% threshold using Propensity Score Matching (PSM)

	Public insurance Vs. No Insurance	Treated	Controls	Difference	S.E	T-test	P>z	95 % confidence interval
Model A (10% CHE)	Unmatched	0.36	0.41	-0.05	0.01	-7.13		
	ATT	0.36	0.49	-0.13	0.02*	-5.15	0.00*	-0.16, -0.10*
	ATU	0.41	0.41	0.01				
	ATE			-0.01				
Model B (25% CHE)	Unmatched	0.16	0.19	-0.02	0.01	-4.71		
	ATT	0.16	0.23	-0.06	0.01*	-3.21	0.00*	-0.09,-0.04*
	ATU	0.19	0.20	0.01				
	ATE			-0.00				

Note: * based on Bootstrap Standard Error

Table 12: Impoverishment effect of OOP for household in India, Maharashtra and Uttar Pradesh

	Percentage of household below poverty line pre-payment (OOP)			Percentage of household below poverty line post-payment (OOP)		
	MH	UP	India	MH	UP	India
Total	27.1	33.7	27.1	41.9	48.0	39.9
Rural-Urban Divide						
Rural	26.2	33.6	27.4	43.7	46.1	40.4
Urban	28.2	34.0	26.6	39.2	53.8	38.8
Social groups						
ST	48.4	25.1	42.8	58.8	60.4	52.3
SC	36.3	51.5	35.8	49.3	62.9	47.7
OBC	28.2	34.7	26.3	43.6	48.7	39.4
GEN	18.0	16.0	18.2	33.8	31.9	31.9
Economic Class						
Rural						
Poorest	100.0	100.0	100.0	100.0	99.9	100.0
Poor	96.2	24.5	43.5	99.42	55.3	76.1
Middle	0.0	0.0	0.0	49.3	17.5	20.3
Rich	0.0	0.0	0.0	19.9	9.7	10.4
Richest	0.0	0.0	0.0	9.2	7.8	5.4
Urban						
Poorest	100.0	100.0	100.0	100.0	100.0	99.9
Poor	49.1	1.1	20.2	80.30	50.7	53.4
Middle	0.0	0.0	0.0	10.4	12.6	10.8
Rich	0.0	0.0	0.0	10.4	32.9	9.4
Richest	0.0	0.0	0.0	2.2	4.5	4.0

Table 13: Factors Affecting Impoverishment in Maharashtra, Uttar Pradesh and India

Independent variable	Maharashtra			Uttar Pradesh			India		
	Odds Ratio	95% CI	p> z	Odds Ratio	95% CI	p> z	Odds Ratio	95% CI	p> z
Education (Ref: Illiterate)									
Up to primary	1.58	1.09-2.29	0.02	0.55	0.37-0.81	0.00	0.89	0.77-1.04	0.14
Up to secondary	1.33	0.88-2.00	0.18	0.99	0.65-1.51	0.97	1.05	0.89-1.23	0.55
Above secondary	1.12	0.63-1.96	0.71	1.01	0.63-1.61	0.96	0.86	0.70-1.05	0.14
Social Groups (Ref: ST)									
SC	1.02	0.55-1.88	0.95	0.23	0.07-0.82	0.02	1.08	0.77-1.52	0.65
OBC	1.11	0.66-1.85	0.70	0.27	0.08-0.93	0.04	1.04	0.74-1.44	0.84
GEN	1.22	0.72-2.07	0.46	0.28	0.08-0.95	0.04	1.12	0.79-1.58	0.53
Insurance (ref: No insurance)									
Insurance	0.87	0.36-2.11	0.75	1.25	0.68-2.28	0.43	0.86	0.74-1.10	0.06
Gender (ref: Male)									
Female	0.84	0.59-1.19	0.32	0.70	0.50-0.98	0.04	0.79	0.70-0.90	0.00
Age (ref: 0-5 years)									
6-15 years	0.56	0.25-1.04	0.12	1.71	0.77-3.79	0.19	0.96	0.67-1.38	0.83
16-30 years	1.13	0.47-1.71	0.73	1.94	0.91-4.16	0.09	1.19	0.86-1.64	0.29
31-45 years	0.83	0.39-1.29	0.54	2.09	1.00-4.37	0.05	1.28	0.93-1.76	0.13
46-60 years	1.19	0.59-1.93	0.57	2.49	1.20-5.16	0.01	1.28	0.94-1.73	0.12
60+ years	0.87	0.43-1.44	0.67	2.57	1.15-5.71	0.02	1.31	0.95-1.80	0.10
Rural-Urban Divide (ref: Rural)									
Urban	0.63	0.47-0.82	0.00	1.37	0.99-1.91	0.06	0.80	0.70-0.91	0.00
Disease category (ref: Infectious)									
NCDs	1.63	1.08-2.36	0.01	1.29	0.81-2.05	0.28	1.63	1.39-1.91	0.00
Eye/Ear	1.29	0.54-2.54	0.55	0.53	0.25-1.13	0.10	0.92	0.65-1.31	0.65
Injuries	0.98	0.60-1.61	0.94	1.17	0.70-1.96	0.55	1.68	1.34-2.11	0.00
RCH & Nutrition	1.23	0.63-2.62	0.58	2.04	0.67-6.17	0.21	2.11	1.54-2.89	0.00
Child Birth	0.89	0.42-1.14	0.66	0.63	0.35-1.11	0.11	1.01	0.82-1.25	0.89
Service Provider									
Private	3.88	2.61-5.76	0.00	2.60	1.69-4.00	0.00	3.13	2.77-3.58	0.00