Achieving equitable social health insurance benefits in China: how does domestic migration pose a challenge?

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Abstract

Background: Universal coverage through social health insurance is promoted by many researchers and policymakers to improve health equity within a country or region. In China, the mass internal migration since 1980s has posed challenges for the social health insurance to ensure equitable benefits for migrant population. This study evaluated the benefit distribution of social health insurance among internal migrants in China.

Methods: Using the 2014 China National Internal Migrants Dynamic Monitoring Survey, by applying a two-part model, we conducted a benefit analysis of social health insurance among a representative sample of migrants in China.

Results: The study found that the broader the geographic scope of migration, the lower the probability of receiving reimbursements from the social health insurance and the reimbursement ratio; but among those who received reimbursements, the broader the geographic scope of migration, the larger amounts they were reimbursed for health care use. We attributed this unequal benefit distribution to the current insurance design that replies on localized administration and patients paying services up-front and requesting reimbursement later.

Conclusion: To improve the equity in social insurance benefits between migrants and non-migrants and among migrants, policies that promote the insurance portability across regions and immediate reimbursement are warranted, while at the same time efforts should be done to control inflation of health care expenditures and to prevent inverse government subsidies from the regions that have more out-migration to regions that have in-migration.
Keywords: health insurance, health service, migrant, equity, China
Background

Over the past decades, China has been experiencing the most rapid urbanization and internal migration[1]. Domestic (internal) migrants who lived outside their place of origin reached 245 million in 2016[2]. However, migrants faced huge barriers to obtain health insurance in the places where they lived[3]. Research has shown that migrants were less likely to be covered by social health insurance than permanent residents[4]. Although China established a nationwide social health insurance system, this system was quite fragmented and administrated locally, leading to large variation in insurance benefits across health insurance programs and regions. The unequal benefits in insurance might be amplified among the migrant population for the following reasons[5].

Firstly, the social health insurance system consisted of three separate insurance programs designed based on citizen’s residence registration status and employment status[4]: the New Rural Cooperative Medical Scheme (NCMS) covering the registered rural residents, the Urban Employee Basic Medical Insurance (UEBMI) covering urban employees only, and the Urban Resident Basic Medical Insurance (URBMI) covering urban non-working residents[5-7]. UEBMI was jointly financed by employers and employees, while URBMI and NCMS were financed mostly by general taxes in addition to individual’s premium. Subsidies from government accounted for up to 70% of the URBMI and NCMS funds [7]. Among the three insurance programs, UEBMI offers the most generous benefit package that provides reimbursement for both outpatient and inpatient services with high reimbursement rates, whereas URBMI and NCMS mainly reimburse for inpatient services[8]. Additionally, UEBMI and URBMI covered more
than 2100 drugs, almost twice the coverage of NCMS. To promote urbanization, the Chinese government issued policies to allow migrants to enroll in UEBMI or URBMI depending upon their employment status[9], and thus migrants may be enrolled in any of the three insurance programs. This may result in the variation in insurance benefits among migrants.

Secondly, the social health insurance programs are administrated and financed by local county or city government[10]. Each county or city designs its own benefit package which mainly covers health services delivered within the county / city, and generally does not reimburse health services delivered outside of the county / city[8]. Even if some counties / cities cover health services provided outside of the county / city, lack of insurance portability across regions could create an additional barrier for insurance enrollees to receive the benefits. Migrants may enroll in health insurance at one place, but move to another place and receive health services at this new place, which thus results in separation between the location of health care use and that of health insurance coverage. For many internal migrants, they need to go back to their place of origin to get insurance reimbursement.

Previous benefit analysis among general population showed that government subsidies for social health insurance were pro-rich for both inpatient and outpatient services from 2003 to 2013 in China, although inequity in benefit distribution had been narrowed[11-13]. Evidence from URBMI also showed that the lower-income groups benefited less than the higher-income groups between 2007 and 2011[14]. Huang’s study further pointed out that with the fragmented feature and increased benefit
disparities, social health insurance not only reinforced the existing rural-urban inequity, but also generated a new inequity between urban residents and migrants who lived in urban areas[7]. The only one study focusing on migrant workers presented that enrollment in UEBMI, URBMI or NCMS did not significantly increase health care utilization or reduce out-of-pocket health care expenditures[15]. In addition to income inequity, there is a unique contributor to health inequity among migrants – scope of migration – that where they migrated to. However, no literature has focused on the benefit distribution of social health insurance by scope of migration for the huge migrant population in China.

Using the 2014 China National Internal Migrants Dynamic Monitoring Survey, we conducted a benefit analysis of social health insurance among a representative sample of migrants in China. This study was the first to assess the benefit distribution by the geographic scope of migration and health insurance programs. We aimed to generate new evidence on the continuously changing health insurance system in China, and provide policy implications for other developing countries thriving to achieve universal health coverage under rapid urbanization.

Methods

Data and study design

Data used for this analysis were from the 2014 China National Internal Migrant Dynamic Monitoring Survey. The survey was conducted by the National Health and Family Planning Commission of China in May 2014. This was a national cross-sectional
survey representing 15-59 year-old internal migrants who have lived in a city of new residence for more than one month but do not have a “Hukou” of the city (registered resident certificate).

In this survey, a stratified multi-stage random sampling method by Probability Proportional to Size (PPS) was employed, and the annual national data on internal migrants from each province in 2013 was considered as the basic sampling frame. A total of 348 cities from 32 provincial units in China were surveyed. Within each city, townships were randomly selected and followed by neighborhoods using the PPS. And then, in each neighborhood, 20 internal migrants were randomly selected to participate in the survey, finally reaching a total sample of 200,937 respondents. Face-to-face interview was conducted by trained interviewers, using a structured questionnaire. The informed consent was sought from the study respondents.

Questionnaires included demographic information and family structures, socioeconomic status, migration characteristics, health insurance, health care services, and family planning services. In this study, we focused on internal migrants who used inpatient care in the city of new residence during the previous year of the survey, and analyzed the benefits they received from their social health insurance. Thus, our sample comprised internal migrants who used inpatient care services in the city of new residence and had social health insurance, with a sample size of 1165 in total.

**Measurements**

In this analysis, benefits of health insurance were measured using three outcomes: the probability of receiving reimbursements from social health insurance, total amounts of
reimbursement received, and the percentage of reimbursements of total health care expenditures (reimbursement ratio). In the survey, we identified the first outcome by a multiple choice question “where did you receive reimbursement for your last hospitalization in this year”, answers including: allowance from NCMS, allowance from UEBMI, the employer, the NCMS office, the local health centers, the commercial insurance, allowance from the Family planning operation, the Family planning operation, and else. We recognized those who answered only “the commercial insurance” or “else” or both “the commercial insurance” and “else” as receiving no reimbursement from social health insurance. We identified the second outcome by the question “how much reimbursement did you receive from social health insurance. We identified the last outcome by the question for the second outcome and the question “how much did you cost in total”.

Our primary predictors of interest were social health insurance programs and the geographic scope of migration. Social health insurance programs included UEBMI, URBMI and NCMS. The geographic scope of migration was categorized into three subgroups: migration across counties but within a city, migration across cities but within a province, and migration across provinces (Under China’s administrative division, a county is smaller than a city).

Controlled variables included demographic characteristics, socioeconomic status, other migration characteristics, and the facility level for hospitalization. Demographic characteristics included gender, age and marital status. Marital status was measured by a binary variable indicating whether the respondent was married or not married (e.g.
widowed, divorced or never married). Socioeconomic status was measured by educational attainment, monthly household income per capita, whether the respondent had a job, whether the respondent had rural “Hukou”, and whether the respondent lived in urban areas. Educational attainment was categorized into four subgroups: primary school and below, junior high school, senior high school, and college degree and above. “Hukou” represents the record in the residency registration system in China; people can be registered as having either a rural or urban “Hukou” at birth and cannot be easily changed throughout lifetime[16]. Other migration characteristics were measured by reasons for and duration of migration. The reasons for migration included seeking jobs, family members following them to migrate or other reasons. Migration duration was categorized into four groups: less than one year; one to five years; five to ten years; and ten years and above. Finally, the facility level for hospitalization included primary care facility, secondary hospital, tertiary hospital, and private hospital.

**Statistical analysis**

We first described the general characteristics of our study sample. Chi-square test and one-way variance analysis were used to compare the differences of the probability of receiving reimbursement, the amount and ratio of reimbursement received according to the geographic scope of migration.

Since there were many “zero observations” - patients who used inpatient care but received no reimbursement, we used the two-part model to estimate the benefits migrants received from the social health insurance, which can be expressed as follows:

$$\Pr[(\text{Reimburse amount})_i > 0 / (\text{Migration scope})_i] = \Phi[\beta *]$$
\[(\text{Migration scope})_i + \eta \ast X_i + \epsilon_i\] \hspace{1cm} (1)

\[\log[(\text{Reimburse amount})_i/ (\text{Reimburse amount})_i > 0, (\text{Migration scope})_i, X_i] = \theta * (\text{Migration scope})_i + \gamma * X_i + \psi_i\] \hspace{1cm} (2)

\[(\text{Reimburse ratio})_i/ (\text{Reimburse amount})_i > 0, (\text{Migration scope})_i, X_i = \varepsilon * (\text{Migration scope})_i + \delta * X_i + \alpha_i\] \hspace{1cm} (3)

Where \((\text{Reimburse amount})_i\) and \((\text{Reimburse ratio})_i\) are the reimbursement amount and reimbursement ratio received by individual \(i\). \((\text{Migration scope})_i\) is a set of dummies representing migration scopes of individual \(i\), and migrants who migrated across counties within a city is taken as the reference group. The parameter \(\beta\), \(\theta\) and \(\varepsilon\), the key coefficients of interest, identify the association between migration scope and the probability of receiving reimbursement, and also the amount and ratio of reimbursement conditional on reimbursement received, respectively. \(X_i\) is a vector of control variables including social health insurance coverage, demographic characteristics, socioeconomic status, other migration characteristics, and the facility level for hospitalization as mentioned above.

The above two-part model assumes that the benefit migrants received from the social health insurance is determined by two separate decision making process: equation (1), the ‘participation equation’, captures the fundamental difference between the respondents who received reimbursements from social health insurance and those who did not; as the ‘intensity equation’, equation (2) or equation (3) characterizes the determinants of the amount and the ratio of reimbursement received among those who actually received reimbursements. In equation (2) and equation (3), the amount and the
ratio of the reimbursement fits the Gamma distribution, and the logarithm transformation was taken on the amount of the reimbursement to reduce the impact of extreme values. Following the previous studies [e.g. Jan pan, Sen Tian, Qin Zhou and Wei Han (2016)], we estimated equation (1) with the Probit Model, and equation (2) and equation (3) with the Generalized Linear Model (GLM), respectively. Marginal effects with standard errors were reported.

All of the analyses were conducted for the total sample, rural social insurance sample (the NCMS subsample), and urban social insurance sample (the URBMI & UEBMI subsample), respectively. All analyses were performed using STATA 12.0 (StataCorp LP, College Station, TX, USA).

Results

Characteristics of the study sample

Table 1 presents the descriptive statistics for our study sample. Of the 1165 respondents, 66.70% enrolled in NCMS, and 23.00% and 10.30% enrolled in UEBMI and URBMI respectively. The average expenditures per inpatient stay were 10,366 Chinese Yuan (=1,567 US dollar), and there was little difference (about 500 Yuan, \( P=0.643 \)) of inpatient expenditure between the NCMS subsample and URBMI & UEBMI subsample. 66.78% of respondents who used inpatient care received reimbursement from social health insurance, with 60.49% for NCMS enrollees and 79.38% for URBMI & UEBMI enrollees. Among the respondents who received reimbursement, the average amount and ratio of the reimbursement received were 5,506
Yuan (=832 US dollar) and 46.77%. The average amount and ratio of the reimbursement received for NCMS enrollees were much smaller than those for URBMI & UEBMI enrollees.

The average age and monthly household income per capita of the respondents was 38 years old and 2,256 Yuan. Less than half of the respondents were female. Most of them were married (89.27%), had education level of high school or below (89.70%), had rural “Hukou” (87.81%) and owned a job (79.57%), and lived in urban areas (69.36%). Nearly half of the respondents migrated across provinces, while those who migrated across cities but within a province and those who migrated across counties but within a city were 28.76% and 25.41% respectively. A total of 84.21% respondents migrated for better job opportunities, and 87.38% respondents had lived in the city of new residence for more than one year. Most of respondents (80.51%) chose inpatient care at secondary and tertiary hospitals instead of primary care facilities.

Table 2 summarizes the total expenditures per inpatient stay, the probability of benefiting from the social health insurance. It also presents that among the benefit recipients, the amount and ratio of reimbursement received according to the geographic scope of migration. The univariate analysis showed that the broader the migration scope, the lower the probability that migrants would receive reimbursements; but among those who received reimbursements, those who migrated across cities or across provinces received the larger amounts of reimbursement than those who migrated within a city. There was no significant difference in total expenditure and reimbursement ratio by the
geographic scope of migration.

**Association between insurance programs, migration scope and benefit of social health insurance**

Table 3 reports the association between insurance programs, migration scope, other factors and benefit of social health insurance, estimated from a two-part model. Compared with NCMS enrollees, URBMI or UEBMI enrollees were more likely to receive reimbursement, and among the benefit recipients, urban insurance enrollees received larger reimbursement amount and ratio. The probability of receiving reimbursement for UEBMI enrollees was 37.5% (P<0.01) higher than that for the NCMS enrollees. Among insurance benefit recipients, UEBMI enrollees received 42.8% (P<0.01) more reimbursement amount and 20.1% (P<0.01) higher reimbursement ratio than NCMS enrollees.

According to the association between insurance benefit and migration scope, the geographic scope of migration significantly reduced the probability of receiving reimbursement and the reimbursement ratio, but increased the reimbursement amounts they received. Specifically, the probability of receiving reimbursement for those who migrated across cities and provinces was 14.7% and 26.0%, respectively, lower than those who migrated within a city (P<0.01). However, they received 33.4% and 27.2% higher amount of reimbursement than those who migrated within a city (P<0.01). And those who migrated across provinces had the lowest reimbursement ratio (P<0.10).

In addition, there was no significant difference in insurance benefits by age, gender, marriage status, education, Hukou status, and migration duration. Income had no
significant influence on the probability of receiving reimbursement and reimbursement ratio, but significantly increased the reimbursement amount. Having jobs significantly decreased the probability and amount of receiving reimbursement, whereas living in urban areas significantly increased the probability of receiving reimbursement by 6.3% than living in suburban areas. Compared with migration for seeking jobs, family members following migrants significantly increased the reimbursement amount and ratio. The higher the level of health care facility, the greater probability and amount of receiving reimbursement, but the lower the reimbursement ratio.

Considering the differences in reimbursement policy between NCMS and urban health insurance, we further conducted the above regressions among the subsamples of NCMS enrollees and URBMI & UEMBI enrollees (Table 4). The relationships between migration scope and the probability of receiving reimbursement and reimbursement amount did not change, while it differed in its relationship with reimbursement ratio. Those who migrated more broadly had a significantly lower reimbursement ratio among NCMS enrollees, but had a significantly higher ratio among URBMI & UEMBI enrollees.

**Reasons for not receiving reimbursement from social health insurance**

We further investigated the reasons why migrants did not receive reimbursement from their social health insurance. Figure 1 showed that the need or plan to go back to hometown to get reimbursement was the main reason for not getting reimbursement, accounting for 66.5%, followed by a lack of knowledge about the reimbursement...
process (16.7%) and the policy coverage issues (10.6%). Figure 2 further compares the proportion of not receiving reimbursement due to the need or plan to go back to hometown by migration scope. The broader the migration scope, the higher the likelihood that migrants did not receive reimbursement because that they must get reimbursement later from their hometowns.

Discussion

Using recent data from the China National Internal Migrants Dynamic Monitoring Survey, this study documented the benefit distribution of social health insurance among internal migrants. Among migrants who utilized inpatient care in the past year, only 67% received reimbursements from their social health insurance, and the reimbursement amount only accounted for 47% of the total expenditure per inpatient stay. There were large disparities by health insurance programs and migration scope. The broader the migration scope, the lower the probability of receiving reimbursement and the reimbursement ratio, but the higher the reimbursement amount they received.

Comparing this finding with other studies we found there was an inequity in insurance benefits between migrants and non-migrant population. The probability of receiving reimbursement and the reimbursement ratio for migrants were far smaller than those for the general population. Only 60% of migrants who were NCMS enrollees received reimbursement from NCMS, which was 30% lower than that for general NCMS enrollees (91.1% in 2013), whereas the reimbursement ratio among this group of migrants was 10% lower than that among general NCMS enrollees (39.4% vs. 50.1% in
For URBMI & UEBMI enrollees, the probability of receiving reimbursement among migrants was about 10% lower than that among general population (79.4% vs. 95.3% for UEBMI and 88.7% for URBMI enrollees), although small difference existed in the reimbursement ratio between the two groups (around 60%) [17]. A previous study also pointed out that migrants only partially benefited from health insurance coverage[15].

The results should be understood in the China specific context. There were several challenges for migrants to get insurance benefits under the current insurance policy design. In China, migrants faced more challenges of getting insurance reimbursement than non-migrants. There have been two common approaches to reimburse health care services (immediate reimbursement and later reimbursement)[18]. Immediate reimbursement means that the insured patient gets reimbursement immediately for the treatment and only pay out-of-pocket for the copay or coinsurance rate, whereas later reimbursement means that the insured patient pays the total expenditures out-of-pocket up-front and gets reimbursement later from their health insurance[18]. Local residents usually get reimbursement immediately, but migrants in general receive reimbursement later as they must travel back to their hometown where they enroll in social health insurance to receive reimbursement. Our study showed that up to 22% of migrants reported that did not get reimbursement because they needed to get reimbursement from their hometowns. In addition, research has shown that many services were not reimbursed and the reimbursement process was much more complex for migrants than for local residents[19]. One study showed that more migrants were treated in a hospital
that outside of the NCMS designated network than local residents, and thus their healthcare use were less likely to be covered by NCMS[19].

Our findings also showed inequity in insurance benefits among migrants by migration scope. Although the scope of migration was associated with larger reimbursement amount per inpatient stay, it was significant associated with a lower probability of receiving reimbursement and a lower reimbursement ratio. In China, all three social health insurance programs were administered, financed and operated by local county or city governments. Each county or city designed its own benefit packages and made the benefit localized[8,20], which limited individual coverage choices outside of the local region. This poses a challenge for internal migrants who typically use health care in the city of new residence, but may enroll in health insurance at their hometown according to their residence (“Hukou”) status. The separation between where health care is received and where health insurance is administrated provided an additional hurdle for the internal migrants to receive benefits from their social health insurance. It became even more difficult when they lived far away from their hometowns. The localized administration of social health insurance and the later reimbursement approach contributed jointly to the inequity in benefit coverage for migrants[21]. To resolve this inequity, policies that promote the portability of insurance across regions and link health information to ease the reimbursement approach should be encouraged[21,22].

Another important finding of this study was that migrants who got reimbursement received larger reimbursement amounts if they migrated more broadly. Compared to migration within a city, migration across cities or across provinces was significantly
associated with 30% higher reimbursement amount per inpatient stay. This mainly attributed to higher health care costs in larger cities and more affluent regions where migrants who migrated more broadly like to locate. However, these reimbursements were mainly paid by health insurance funds in smaller counties / cities which were less affluent. This may pose financial difficulties for local governments in those out-migration regions, as if the current barriers to reimbursement were to be removed, there would have been larger amounts of insurance funds flowing into the health care system in more prosperous in-migration regions, which would worsen the already skewed regional inequity in economic development and health. Therefore, the inverse subsidies of health insurance funds from the less-developed out-migration regions to the highly-developed in-migration regions became an ongoing challenge and policy dilemma for countries like China that experience a mass domestic migration. Strategies that control health expenditures inflation and allow central government to redistribute welfare funding to less-developed regions may be warranted to address the possible financial difficulties faced by out-migration regions[5].

In addition to the above inequity related with migration. There were two other types of inequity in benefits due to the fragmented social insurance system and income inequity. Although China has almost achieved universal insurance coverage through social health insurance expansion[5], migrants who enrolled in UEBMI and URBMI benefited more than those who enrolled in NCMS[8,23]. One national study found that among general population, UEBMI enrollees had a higher benefit level than those covered by URBMI or NCMS[24]. Even for the same condition - tuberculosis inpatient
care- the reimbursement rate was the highest for UEBMI enrollees, followed by URBMI, and NCMS enrollees in 2012[23]. Income inequity also explains some of the benefit inequities. Among the benefit recipients, we found that migrants with higher income received greater reimbursement amount, which was consistent with prior studies among the general population[11,14,25]. On average, the higher-income group tended to have higher inpatient expenditure, and it was not surprising that they also received greater reimbursement amount[26].

This study contained some limitations. First, the outcomes related with reimbursement were self-reported, which may lead to measurement bias. Future research will use health insurance claims data to minimize this bias. Second, health status may influence health care utilization as well as whether a person chooses to migrate. Studies have detected the healthy migrant effect for internal migrants in China, showing that healthier people were more likely to migrate and to move farther away from home[27]. Unfortunately, there was no measurement on health status of migrants in this dataset. Third, we could not accurately distinguish the administration location of social health insurance, which may affect the insurance benefit for internal migrants. To reduce this bias, we conducted the analysis separately on two subsamples of NCMS enrollees and UEBMI & URBMI enrollees.

Conclusion

This study has important policy implications for China and other developing countries that experience rapid urbanization and internal migration. The broader the migration
scope, the lower the probability of receiving reimbursements from the social insurance and the reimbursement ratio; but among those who received reimbursements, the broader the migration scope, the larger amounts they were reimbursed for health care use. We attributed this unequal benefit distribution to the current insurance design that replies on localized administration and patients paying services up-front and requesting reimbursement later. To improve the equity in social insurance benefits between migrants and non-migrants and among migrants, policies that promote the insurance portability across regions and immediate reimbursement are warranted, while at the same time efforts should be done to control inflation of health care expenditures and to prevent inverse government subsidies from the regions that have more out-migration to regions that have in-migration.

Declarations

Ethics approval and consent to participate

The dataset is publicly accessible, and Ethical approval for this research was waived by Fudan School of Public Health’s IRB.

Consent for publication

This manuscript is an original work and has been done by the authors, ZH, HW, DL and DZ who all are aware of its content and approve its submission. This manuscript has not been published, and is not under consideration by another journal.

Availability of data and materials

The data analyzed during the current study are not publicly available because they
contain information that could compromise research participant privacy and consent, but are available from the corresponding author on reasonable request.

**Competing interests**

The authors have no competing interests to declare.

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**Authors' contributions**

ZH designed the study and drafted the manuscript. HW conducted the literature review, analyzed the data, and contributed to the manuscript writing. DL and DZ revised the manuscript. All authors read and approved the final manuscript being submitted.

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