



Equity of Claims for Antiretroviral Therapy, Vaccination and Chemotherapy in Public Facilities among Migrants in Thailand

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Abstract

Despite remarkable efforts from the Ministry of Public Health (MOPH) to promote access to health services among migrants, there remains an important gap about equity in utilizing health services among migrants residing in different economic status areas. This study aims to explore the equity in health service utilizations of migrants registered with Health Insurance Card Scheme. A cross-sectional quantitative design using provincial-level data was employed. Claim data of antiretroviral therapy (ART) and high-cost outpatient services, namely, vaccination and chemotherapy, in 2015 and 2016, and Gross Provincial Product per capita were analyzed by descriptive statistics, Spearman's rank correlation and concentration index (CI). Significant negative CIs were found in the claims for ART in both years, which indicates that migrants residing in poor provinces access to ART more than migrants in rich provinces. However, the distribution of claims for children's vaccinations across provincial income was relatively equal showing that access to vaccination is quite equal across different geographical location as vaccinations were provided regardless of children's nationality. While the claims for chemotherapy had positive significant CIs in both years indicating better access to chemotherapy was observed in richer provinces because resources needed are relatively pooled in urbanized cities. This study suggests that access to health care services are not equal among migrants residing in rich and poor provinces. The most concern was on access to chemotherapy which is heavily concentrated among the economically well-off provinces. Thus, it is worth exploring whether and to what extent there are hindrances against access to care for such services, especially in the economically deprived areas. The non-reported claims for children's vaccinations in half of the provinces should also be explored. If there was a case of low coverage, a strategy to support and promote vaccinations to migrants is recommended.

Keywords: equity, migrant, antiretroviral therapy, access, health services, health insurance card scheme

Introduction

Thailand has been a hub for migration in the Greater Mekong Sub-region, particularly for labor migrants from Myanmar, Cambodia, and Lao PDR. According to data from the Foreign Worker Administration Office, the Ministry of Labour, the number of migrant workers in Thailand increased dramatically from around 1.3 million migrant workers in 2014 to 2.2 million in 2018.¹ This figure did not include undocumented or illegal migrants whose actual volume is still in question.

Undocumented migrant workers and dependents are subject to deportation according to Thai immigration law unless they are registered with the government to participate in the nationality verification process and acquire a work permit.² The registration process involves enrolling migrants in the insurance arrangement, the so-called Health Insurance Card Scheme (HICS). The HICS is managed by the Ministry of Public Health (MOPH). The scheme was established in 2004. It was funded by an annual premium paid by migrants ranging from \$12-123 USD depending on the type of coverage period.³ The scheme enables migrants to access health care services at public facilities and reduces catastrophic health expenditures. In 2018,

there were 862,870 undocumented migrants enrolled in the scheme.⁴

Undocumented migrants mainly work in dirty, dangerous, and degrading conditions which make them at exceptional risk of experiencing physical and mental health problems including diseases that may cause public health threats like HIV/AIDS or tuberculosis.⁵ Evidence shows that migrants are among the most vulnerable group to contract HIV/AIDS due to their unsafe sexual practices such as condomless sex and having multiple sex partners. A recent study in Ranong, Thailand, suggested that 63% of migrant seafarers had visited a sex worker in the past 12 months, and only 66% of those reported condom use.⁶ This coincides with another research piece in Trat, Thailand, which demonstrated that around 65-70% of migrant fishermen had ever visited a sex worker.⁷

In 2013, the MOPH expanded the HICS benefit package to cover the antiretroviral therapy (ART) and high-cost treatment including chemotherapy, prosthetic instruments, and advanced surgical procedures. The facilities can get reimbursed for the expense of ART, vaccinations, and high-cost services directly from the MOPH.

Although the HICS demonstrates Thailand's achievement in advancing the agenda for migrants' right to health, there has been limited access to HIV diagnosis and treatment from time to time. Several challenges were identified, such as inadequacy of health service availability and migrant patients' ignorance of the benefits.⁸ Even legal migrant workers still faced numerous difficulties in utilizing the HICS benefit package; for example, the employers can confiscate insurance cards from the workers, or the workers prefer private clinics over public hospitals due to shorter waiting times.

Many factors have been reported to limit migrants from accessing the scheme. For example, lack of funding limited the full implementation of HICS policy.⁹ Moreover, communication barriers and long distances from residential areas to the public facilities, could further limit access to health services.⁸ Thus, it is imperative to explore if and to what extent these factors equitable affect migrants' access to care.

In this regard, this study aims to explore the equity situation in access to health care services among the migrant population using three service items as a proxy: vaccination as a proxy for basic health care and disease prevention activities; chemotherapy for malignancy as a proxy for high-cost care; and ART.

Materials and Methods

This study applied a cross-sectional quantitative design using provincial-level data. The dataset comprised: 1) claims data of high-cost outpatient services among migrants registered with HICS in 2015 and 2016; and 2) information about Gross Provincial Product (GPP) per capita in respective years. The claim data were obtained from the database of the Division of Health Economics and Health Security (DHES), MOPH, Thailand. This database contained information about expenses and claims for outpatient treatment for migrants covered by the HICS.

The aspect of the focus of this study means the frequency of claims. The study did not include inpatient care as claims for inpatient care operate separately by the Diagnostic Related Groups (DRGs) system. The information on GPP per capita was acquired from the Office of the National Economic and Social Development Council, Thailand. Claim rates were calculated based on number of claims in one year divided by number of migrants registered with HICS in the same year.

The analysis consisted of three parts. First, a descriptive study was conducted to present an overview of the data. Second, the relationship between the reimbursement rate for each of the three items (vaccination, ART, and chemotherapy) and GPP per capita was determined by Spearman's rank correlation. The last step was to assess the equity in reimbursement rates among migrants at different provincial economic statuses by concentration index (CI). The CI can be acquired from regressing $2\sigma_r^2 \left(\frac{h_i}{\mu}\right)$ on βr_i , where the coefficient β represents point estimate of the CI, σ_r^2 is the variance of the fractional economic rank, h_i is the health variable of interest (in this case, the reimbursement rates), μ is the mean of h_i , and r_i is the rank of population unit in the economic rank.¹⁰

Statistical significance was determined by 95% confidence level (95% CI). All calculations were performed by STATA software v.15.1. The positive CI represents the reimbursement rates are concentrated among the wealthy provinces. On the contrary, negative CI value represents the concentrated reimbursement rates among the poorer provinces. The results were visualized using the concentration curve.

Ethical approval was received from the Institute for the Development of Human Research Protections in Thailand (IHRP 893/2560). The facilities' names are kept anonymous. Dissemination of data can be done only for academic interest and individual information cannot be identified.

Results

Overall, the greatest cumulative claim rates for migrant insurees were for ART, followed by children's vaccinations and chemotherapy. When comparing the claims between 2015 and 2016, a declining trend was observed for all service items. The average claim rate for ART was 308.6 claims per 100,000 persons in 2015, which further decreased to 231.6 claims in 2016.

Similarly, the average claim rate for children's vaccinations was 186.6 claims in 2015, which fell to 176.3 claims per 100,000 persons in the following year. The average claim rates for chemotherapy were 8.7 claims and 7.9 claims per 100,000 persons in corresponding years. In addition, half of the provinces did not report claims for children's vaccinations or chemotherapy in both years as shown by the zero figure for the medians (Table 1).

Table 1. Descriptive statistics on cumulative claim rates (n=77)

Parameters	Mean	Standard deviation	Median	Interquartile range	Range
Claim rate per 100,000 persons in 2015					
Antiretroviral therapy	308.6	737.0	75.8	255.6	0-5618.0
Children vaccination	186.6	600.1	0	63.3	0-3821.7
Chemotherapy	8.7	27.8	0	0	0-186.5
Claim rate per 100,000 persons in 2016					
Antiretroviral therapy	231.6	360.3	118.5	253.8	0-1932.4
Children vaccination	176.3	430.5	0	195.1	0-2832.1
Chemotherapy	7.9	21.7	0	3.4	0-126.4

Table 2. Descriptive statistics excluding no claim

Parameters	Mean	Standard deviation	Median	Interquartile range	Range
Claim rate per 100,000 persons in 2015					
Antiretroviral therapy (n=63)	377.2	799.7	138.5	251.2	2.0-5618.0
Children vaccination (n=27)	532.2	928.3	178.7	679.3	2.6-3821.7
Chemotherapy (n=18)	37.3	48.2	16.9	45.9	3.3-186.5
Claim rate per 100,000 persons in 2016					
Antiretroviral therapy (n=65)	274.3	377.2	150.9	242.4	53.9-1932.4
Children vaccination (n=35)	387.8	574.3	206.2	380.8	7.3-2832.1
Chemotherapy (n=22)	27.6	33.7	13.5	29.2	1.83-126.4

After excluding no claim data, the mean claim rates increased in all services as shown in Table 2.

The median GPP per capita was 64,427 and 68,847 Thai Baht respectively. GPP is an indicator of the provincial economic. It is calculated based on provincial-level production of agricultural, forestry and fishing sector, mining and quarrying sector, manufacturing sector, construction sector, accommodation and catering services sector, and education sector. The GPP per capita was used in policy and planning for provincial development.

Spearman's correlation coefficients (rs), which reflect the strength of the association between the number of claims and GPP, are shown in Table 3. A small degree of negative correlation between the rate of reimbursements for ART costs and provincial economic status was observed (Table 3). None of the associations were statistically significant. In contrast, moderate positive correlations were revealed between the claims

of children's vaccinations and GPP showing rs of 0.327 in 2015 and rs of 0.365 in 2016. Moderate positive correlations were also noted in the claims of chemotherapy (rs=0.486 and rs=0.527).

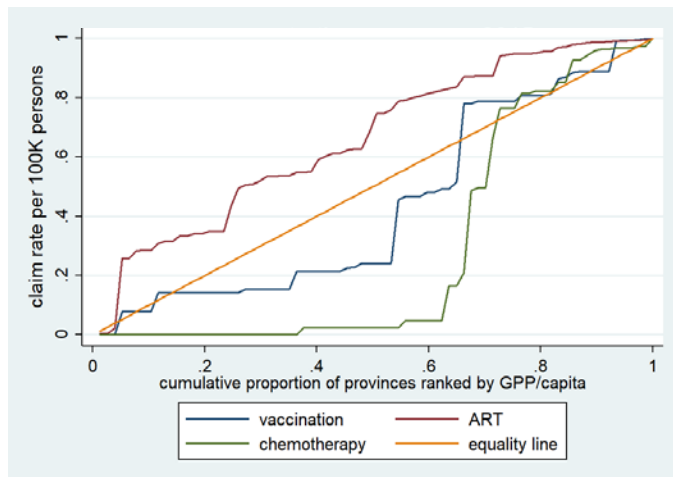
Table 3. Correlation between claim rates and Gross Provincial Product (GPP) per capita by Spearman's rank correlation (n=77)

Parameters	Spearman's rho
2015	
Claim rate of antiretroviral therapy and GPP	-0.124
Claim rate of children vaccination and GPP	0.327
Claim rate of chemotherapy and GPP	0.486
2016	
Claim rate of antiretroviral therapy and GPP	-0.122
Claim rate of children vaccination and GPP	0.365
Claim rate of chemotherapy and GPP	0.527

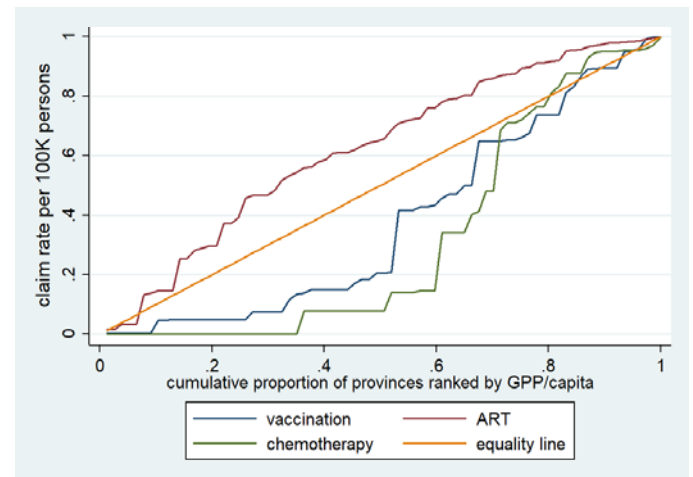
Table 4. Concentration indices of claim rates by year (n=77)

Parameters	CI	(95% Confidence interval of CI)	p-value
2015			
Claim rate of antiretroviral therapy	-0.324	(-0.634, -0.013)	0.041
Claim rate of children vaccination	0.079	(-0.179, 0.339)	0.543
Claim rate of chemotherapy	0.001	(0.00041, 0.43)	0.046
2016			
Claim rate of antiretroviral therapy	-0.244	(-0.444, -0.043)	0.018
Claim rate of children vaccination	0.251	(-0.070, 0.572)	0.124
Claim rate of chemotherapy	0.368	(0.011, 0.727)	0.043

In the CI analysis, significant CIs were found in the claims for ART in both years, showing CI=-0.324 with $p=0.041$ in 2015 and CI=-0.244 with $p=0.018$ in 2016. The negative CI implies that the distribution of claims for ART was rather concentrated in less well-off provinces. However, the distribution of claims for children vaccinations across provincial income was relatively equal in 2015 (CI=0.079, $p=0.543$) and 2016 (CI=0.251, $p=0.124$); while claims for chemotherapy

**Figure 1. Concentration curve in 2015**

had positive significant CIs in both years (CI=0.001, $p=0.046$ and CI=0.368, $p=0.043$ respectively). The positive CIs suggest that the claims for chemotherapy slightly favored the provinces with better economic prosperity and this inequitable distribution was more pronounced in the year 2016 than in 2015. The summary of the CIs is displayed in Table 4, which corresponds with the concentration curves shown in Figure 1 and Figure 2.

**Figure 2. Concentration curve in 2016**

Note: (i) The diagonal line was defined as the 'equality line', which means that the claims are equally distributed across provincial economic status; (ii) if the curve lies below the diagonal line, the claims are concentrated more heavily among the wealthy provinces and (iii) if the curve is above the diagonal line, the claims are concentrated more heavily in the poor provinces.

Discussion

This study explored claim data as a proxy of access to basic health care and disease prevention activities, cost care, and special services. This study found significant negative CIs in the claims for ART in both years as illustrated by the red curves lying above the diagonal line in figures 1 and 2. The findings indicated that migrants in low income provinces accessed ART relatively with more visits than those in high-income provinces. It demonstrates that access to ART among migrants was more concentrated among poor migrants. This discovery may be possibly explained by the fact that HIV infections are positively related to unfavorable economic status. Thus, the high reimbursement rates in poorer provinces may be

associated with the high prevalence of HIV. This finding is supported by a surveillance study for HIV infection among migrant worker in ten provinces in Thailand in 2010. The study revealed that provinces with highest prevalence of HIV infection (5%, 1.3% and 1%) had relatively low GPP (for instance, Trat, Kanchanaburi and Trang).¹¹ This notion is also supported by much literature from abroad.¹² For example, the Center for Disease Control and Prevention (CDC) in the United States of America reported that HIV prevalence was higher among those with lower socioeconomic status: 2.6% among the unemployed compared with 1.0% among the employed and 2.3% among participants whose household incomes were below the national poverty line

compared with 1.0% among those with incomes above the poverty line.¹³

Another explanation is that in many provinces, there exist non-governmental organizations and charitable agencies that play important roles to facilitate healthcare access among migrants.¹⁴ For example, the Prevention of HIV/AIDS among Migrant workers in Thailand (PHAMIT) project is run by one of the renowned non-profitable private agencies in Thailand and is implemented in 22 provinces. The project aims to improve migrants' awareness and knowledge of HIV, increase condom use, and support the uptake of proper reproductive and sexual health services as well as voluntary counseling and testing services. These initiatives try to enhance access to ART among migrants and thus promote equity of access. Although equity of access was found by this study, the decrease in reimbursement rates of ART services from 2015 to 2016 need a more thorough exploration in future studies.

This study found non-significant positive CIs for claims of children vaccinations as demonstrated by the blue curves lying below the diagonal line in figures 1 and 2. The findings indicate that the distribution of claims for children's vaccinations is more equitable across provinces in Thailand (relative to ART claims). This might be because local healthcare providers tend to provide basic vaccinations for all children regardless of their nationality and insured status. Insured migrant children can also access essential vaccines through public health facilities as suggested by Tuangratananon et al's study.¹⁵ Although there is no explicit policy to provide essential vaccinations for uninsured migrant children in Thailand, a study by Kosiyaporn et al in 2018 found that in practice, health providers delivered vaccination services free of charge for all migrant children regardless of their insurance status through spare vaccines in the facilities.¹⁶ This practice has been performed nationwide. In addition, the study found that Thai health care providers mostly perceive the value of providing vaccines for all children in Thailand regardless of their citizenship status. However, the relatively low vaccination coverage among migrant children compared with Thai children as found in Tuangratananon et al's study remained a concern; this point is consistent with the findings in Table 1 presented above. In addition, reporting of no claims for vaccinations in half of the provinces is another key concern. If migrant children in these provinces were under-vaccinated, it would mean that the herd community to protect against certain preventable diseases in the whole community (or the whole country) was compromised. Hence, strategies to

promote and support adequate vaccination for migrants should be put in place nationwide.

This study found significant positive CIs for the claims of chemotherapy in both years as demonstrated by the green curves lying below the diagonal line in figures 1 and 2. The findings show a pro-rich effect on the claims of chemotherapy in both years. One possible explanation of this is that resources needed for diagnosis and treatment of malignancy such as imaging instruments and specialized human resources are pooled at high-level tertiary hospitals, mostly located in major provinces with relatively high GPP or in urbanized cities. For example, most Magnetic Resonance Imaging (MRI) and mammography are more available in private hospitals than public hospitals and are also concentrated in Bangkok rather than in other regions.^{17,18} Therefore, this disparity may lead to unequal access to health services among migrants in different areas. The disparity in access to advanced health technologies is also observed in the Thai population. A study on the equity of healthcare utilization on mammography examination and Pap smear screening in Thailand by Chongthawonsatid also indicated that richer people undertook mammography and Pap smears screening more than poorer people.¹⁹

Many studies have explored barriers and problems of access or utilization of advanced health services among migrants. Various factors impeding the utilization of cancer services, particularly cervical and breast cancer screening, were identified and one of those was the lack of knowledge or information about the services.²⁰⁻²² Chamchan et al reveal that some migrants in Thailand covered by HICS or Social Security Scheme (SSS) lacked information or understanding about their health benefits. Most migrants were aware of the health benefits of treatment for minor illnesses, work injuries, and pregnancy, and less aware of high-cost treatments.²³ Migrants who live in provinces with high GPP may have better access to information about their health benefits and the availability of advanced health-technology, which may result in more access to malignancy treatment. However, these explanations were assumptive and require further study.

Limitations

Despite thorough analysis, some limitations remain. Firstly, the scope of the data is confined to public hospitals affiliated to the MOPH. Hospitals that do not affiliate with the MOPH such as medical schools under public universities, military hospitals, mental health hospitals, and private hospitals contribute to approximately 36% of Thailand hospital capacity were not included in the study due to data unavailability.

Secondly, the database contained information only about migrants who are insured by the HICS. Unregistered and undocumented migrants or other groups of non-Thai populations such as stateless people, tourists, and expats were not included.

Thirdly, the analysis was confined to service reimbursements presented to the MOPH. Services exercised at the facilities including general outpatient and inpatient care or emergency treatment were not included. However further studies that involve general inpatient and outpatient services are recommended.

Fourthly, this study used GPP as a proxy for socioeconomic status. It captures economic aspects at the provincial level, which may not necessarily represent a household's socioeconomic status. Provinces in industrialized areas are likely to have higher GPP than non-industrialized provinces. The best measure for a household's economic status is the asset index, which requires a thorough survey of the assets and goods of an individual. Unfortunately, the national household survey performed by the National Statistical Office is not routinely performed in migrants' households. Accordingly, these data were still lacking in the migrant research field in Thailand. Further work on this issue is required.

Fifthly, the sample size of 77 provinces is quite limited. The small number of samples might be a possible explanation for the limited strength of the relationship between the model and the dependent variables and likelihood to yield statistical significance. Thus, future studies are recommended to delve into the district- or subdistrict-level data, which will not only result in a larger number of samples, but also enable researchers to have a clearer insight on the micro-economy of the studied areas.

Finally, the interpretation and the application of the above findings to real-world practice should be made with caution. The close-to-zero, negative, and positive CIs, as observed in all health problems, do not mean that the uptake of services for these health problems is sufficient. The CI is a tool for quantifying inequality in the distribution of the variable of interest against the economic gradient of the studied areas. Therefore, future research on access to health services to solve the health problems of migrants is still needed.

Public Health Recommendations

The most important concern from the findings above is chemotherapy which is heavily concentrated among the economically well-off provinces. Thus it is worth exploring whether and to what extent there are hindrances against access to care for such services, especially in the economically deprived areas. This also

points to the reorientation of the health service system for migrants. For instance, health resources for chemotherapy should be re-allocated more to less affluent provinces and migrants in these areas should be promoted to be aware of their rights to the services. For ART and vaccination where the analysis showed pro-poor or equitable distribution, policymakers should continue the status quo practices but still be vigilant if any disparity in service access occurs.

Conclusion

The reimbursement of ART is concentrated among poor provinces. By contrast, the positive CIs found in chemotherapy suggest that the volume of reimbursements slightly favored economically well-off provinces where more advanced technologies are available. The reimbursements for children's vaccinations are relatively equitable across provincial economic status, partly due to the practice of sharing vaccines for Thai children with migrant children. Future research may need to focus more on the degree of accessibility and utilization of health care among migrants residing in different geographical areas.

Author Contributions

Conceptualization, R.S. and R.K.; methodology, R.K., D.C.; validation, T.B; formal analysis, R.K., R.S.; data curation, T.B., S.P.; writing—original draft preparation, R.K., M.S., T.B., D.C., S.P.; writing—review and editing, R.S., R.K.; supervision, R.S.; project administration, M.S., S.P., P.S.; funding acquisition, P.S.

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Conflicts of Interest

The authors declare no conflict of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, or in the decision to publish the results.

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