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PAYMENT SUBSIDY AND EQUITY IN ACCESS TO HEALTH CARE: THE CASE OF THE DEMOCRATIC REPUBLIC OF CONGO

Kasumbi Tshituka, https://orcid.org/0000-0002-6095-1110
The Saint-Louis Economic Research Laboratory (LARES), Gaston Berger University (GBU), Senegal
Official University of Mbujimayi, DR Congo.
Corresponding author: Kasumbi Tshituka, louistshituka@yahoo.fr
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Abstract: *Since the 2000s, the Democratic Republic of Congo has adopted national policies to phase out direct payment at the point of service to make health care more accessible. The objective of this study is to measure inequalities in access and financing of a subsidised health system. The measurement of inequalities in access and financing was applied to data from the Improved Monitoring for Action (N = 475 households in the Tshilenge health zone, East Kasai province, Democratic Republic of Congo), which is part of the evaluation of the performance of the health system through high-impact interventions for maternal, newborn and child health. The concentration curve and index (CI) method was used to assess the degree of inequality in the distribution of health care consumption and expenditures. A negative CI indicates a disproportionate concentration of subsidies among the poor, while a positive CI indicates that the subsidy is favourable to the rich; a CI of zero indicates perfect equity. In addition, the Kakwani Progressivity Index (KPI) was used to assess the progressivity of direct household spending on care. A positive value of the KPI indicates the progressivity of the system and a negative value its degressivity. The indices of concentration of use are respectively 0.034 for self-medication and -0.050 for use of a health facility, and the indices of standardised use are 0.00 in both cases. Comparison of the standardised and non-standardised concentration of use curves shows that standardisation reduces the differences between quintiles: there is horizontal equity of use after indirect standardisation. All Lorenz curves are below the standard of the living curve (the KPIs are significantly negative). Health expenditure is therefore all-regressive. The measurement of the degree of equity showed that there is imperfect equity in the use of care and that the system of financing care is inequitable and regressive. Direct household spending increases inequities in access. The contribution is greater for the lowest income groups. The low budget of the health sector prohibits universality and free access to services by producing a recourse to self-medication and renunciation of care.*
Keywords: equity index, health care consumption, health financing, index decomposition.
JEL Classification: D63, E26, I14.

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Introduction. Constantly confronted with security and humanitarian crises for several decades, the Democratic Republic of Congo (DRC) faces major challenges, particularly in the area of economic and financial governance, which seriously hampers efforts to reduce child mortality and improve maternal health (MDG 3), despite the existence of a 2011-2015 Health Development Plan that set the objective of accelerating the achievement of the MDGs.

The DRC is the third largest contributor to under-five mortality in the world after India and Nigeria. Infant, child and neonatal mortality ratios have been estimated at 158, 97 and 42 per thousand live births respectively (MICS, 2011; USAID, 2018; UNICEF, 2015; Ministère de la Santé Publique, 2013), corresponding to approximately 465,000 under-five deaths each year. This high mortality is attributable to conditions that are preventable (fever/malaria, acute respiratory infections, diarrhoea, malnutrition, and neonatal conditions) through simple or low-cost measures.

To increase child health care coverage, many countries in sub-Saharan Africa have implemented policies to abolish out-of-pocket payments for health care and services and to reduce the costs of child care. This is notably the case in the Democratic Republic of Congo, which has introduced child health care subsidies through the strategic purchasing mechanism. These subsidies are based on a flat rate, subsidised by technical and financial partners with a contribution from the population in the form of a co-payment.

The objective of this article is to measure inequalities in access to health care among children under 5 years of age in the event of malaria fever, diarrhoea and/or acute respiratory infections.

After explaining the equity criteria used, this article mobilises data from the Improved Monitoring for Action to measure horizontal equity in the consumption of care and vertical equity in observed health expenditures. This article contributes to the literature on health care subsidy policy as a factor of inequity and criticises the use of health care subsidies.

Literature Review. The level of equity of a system is generally measured by two criteria: an equity criterion in the consumption of care and an equity criterion in financing. Unlike the criteria of equality, in the sense of absence of difference, they take into account inequalities in means and needs (Rochaix and Tubeuf, 2009).

The first principle of horizontal equity in the consumption of care requires that everyone receive the care they need, i.e., according to their state of health, regardless of their ability to pay or where they live. It aims to equalise the consumption of care and medication by people of different social and geographic status, as long as they have the same health status (Wagstaff and van Doorslaer, 2000; Jusot et al., 2016; van Doorslaer and Masseria, 2004; van Doorslaer et al., 2006; Allin et al., 2010; Allin, 2008).

The principle of vertical equity in financing requires that the contribution of households increase with their ability to contribute (whether in the form of taxes, contributions, direct household payments, or differentiated insurance premiums).

The contribution can increase with income less than proportionally, proportionally or more than proportionally. In this paper, we consider the financing of a system to be equitable as soon as it does not increase inequalities in living standards, i.e., as soon as the financing is proportional to income or more than proportional (progressive) (Szende and Culyer, 2006; Kakwani et al., 1997; Cissé et al., 2007; Jusot et al., 2016).

The two aspects of equity in systems of care are rarely studied simultaneously. Yet, we believe it is important to link these two concepts, a fortiori in poor countries where public spending is generally low. Balabanova and McKee (2002) show that the richest, the most educated and the youngest tend to pay more, but rather because they wish to obtain better quality care than because the doctor wants to subsidise the poorest. However, this is a feeling that is reported in qualitative surveys (Falkingham, 2004) and in opinion polls. In Bulgaria, it is the poor, elderly and sick, who refuse to formalise payments to the doctor (Delcheva et al., 1997). This suggests that they have an interest in keeping the fee informal because they feel they can give less to the doctor.

Methodology and research methods. To study the impact of health care subsidies on equity of access to health care, the data from the Improved Monitoring for Action survey conducted in 2020 in the Tshilenge health zone were used. This survey was zonal in scope and selected a sample of 475 households and 85 villages. The Improved Monitoring for Action is part of the evaluation of the performance of the health system through high-impact interventions for maternal, newborn and child health. This survey was conducted using the Lot Quality Assurance Sampling (LQAS) methodology used for baseline surveys and regular monitoring for health program evaluation. LQAS is a combination of stratified and random sampling principles.

The Tshilenge health zone, located 30 km from the capital (City of Mbujimayi) of East Kasai Province, was the focus of this study. It is inhabited by an estimated population of 3,361,569 (including 6,2667 children

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under 5 years of age) over an area of 1,500 km^2, i.e., a density of 221 inhabitants per km^2 spread over 21 health areas and 124 villages. The Tshilenge health zone has 53 health facilities (1 general referral hospital, 1 hospital centre, 21 health centres and 30 health posts) with a service utilisation rate of 59% and a bed occupancy rate of 52%. The health zone is one of the health zones in the province of East Kasai that benefits from the subsidisation of health services through the purchase of services, flat rate pricing and the implementation of the Millennium Development Goals 4&5 Acceleration Framework with the support of UNICEF, PRO DS (European Union), USAID/Prosani and Save the Children (UNICEF, 2020).

Variable of interest. Since the objective of the health care subsidies is to improve access to health care for children under 5 years of age, we considered the use of first-line care and presented two alternatives: health services and self-medication. The use of health services represents all public and private health structures. And, self-medication will take into account all the care given at the household level. The choice of these two alternatives is based on the context and objectives of the study. This indicator is analysed on the whole sample and on the subgroups, defined on the basis of the socio-economic status of the households.

Concentration Curve and Index Methods. To measure the degree of inequality in the distribution of health care consumption and expenditure, the concentration curve and index method will be used (O'Donnell et al., 2008; Devaux, 2015). A concentration curve shows the cumulative share of the variable of interest, which can be care consumption or health expenditures, for each standard of living percentile (with individuals ranked by increasing standard of living).

The concentration index is defined as twice the area between the concentration curve of the variable of interest h and the line of equality, which is equivalent to the convenient covariance formula (Kakwani, 1980; Kakwani et al., 1997; O'Donnell et al., 2008), calculated as follows:

$$CI_h = \frac{2}{\mu_h}\, x\, cov\,(h,r), \qquad (1)$$

with μ_h the mean of the health variable h and r the rank variable in the income distribution. If the concentration index CI_h is positive, then the variable of interest is more heavily concentrated at the top of the income distribution. If it is negative, then the poorest accumulate a larger share of this variable (illness rate, utilisation rate, or health care expenditure). If CI_h is zero, then the variable is equally distributed across the population.

Measuring horizontal equity. The measurement of horizontal equity in access to care makes it possible to verify whether, whatever the standard of living, for equivalent needs, the use of care is equivalent. In order to do this, the variable of access to care has been corrected by means of indirect standardisation. The concentration index of this standardised variable indicates whether access is equitable or not (Wagstaff and Van Doorslaer, 2000; O'Donnell et al., 2008; Devaux, 2015).

Measuring vertical equity. To determine whether direct household spending on care increases more than proportionately with the standard of living and increases inequality, the Kakwani Progressivity Index (KPI), which measures vertical equity in financing, is calculated. The KPI originates from Tax Studies but is commonly applied to health expenditures (Abu-Zaineh et al., 2008; Abu-Zaineh et al., 2011, Cissé et al., 2007). It is defined as twice the area between the health expenditure concentration curve and the Lorenz income curve and is calculated as the difference between the health payment concentration index and the Gini index (KPI = CI - Gini). A positive value of the KPI indicates the progressivity of the system and a negative value its degressivity. Thus, to measure vertical equity this study uses different expenditure variables. Health expenditure on self-medication and expenditure on health care facilities, which includes the cost of transport and the cost of services (payment for consultations, etc.).

Measuring the standard of living. The choice of the standard of the living index used as a rank variable in equity analyses is not trivial and can influence the results, as shown by numerous research studies since the 2000s. Inequalities in recourse may be more important when measured in relation to wealth than in relation to consumption (Lindelow, 2006). Consumption aggregates are more relevant than income for studying living standards in countries where information is incomplete because a large share of income is informal (Deaton and Zaidi, 2002). The wealth index, obtained by principal component analysis, is recommended over the consumption aggregate in order to avoid some of the biases in the expenditure data, unless the study is about consumption inequality (McKenzie, 2005; Foreit and Schreiner, 2001). Consumption expenditures are therefore used as a supplement to determine the level of households. In areas where households mainly consume their own production, one could not determine the standard of living from consumption expenditures alone.

This paper uses a household level index called the welfare index, which is a composite and continuous standard of living indicator constructed from principal component analysis (Jolliffe, 2002; Vyas and Kumaranayaka, 2006).

Results. To measure the degree of equity in the use of health care among children under 5 years of age for malaria fever or diarrhea, concentration indices, the most common method for measuring social inequalities in the use of health services, are used (Regidor, 2004a, b; Van Doorslaer et al., 2006; Wagstaff et al.,1991). Concentration indices measure the degree of association between the health care utilisation variable and the socioeconomic variable by taking into account the entire distribution of the latter (Mackenbach and Kunst, 1997; Wagstaff et al., 1991). Furthermore, O'Donnell et al. (2008); Wagstaff and Van Doorslaer (2000), referring to the principle of horizontal equity, suggest that it is necessary to standardise the measurement of inequality by individual needs.

This study focuses on the measurement of equity in health care utilisation. The concentration curve is defined here for health care as the relationship between the cumulative percentages of populations ranked from lowest to highest in total monthly consumption expenditure per household member and the proportions consuming health care. For needs, the concentration curve links the cumulative proportions of populations ranked by reported monthly consumption expenditures per household member with the cumulative proportions of needs. To do this, horizontal equity and vertical equity are measured.

The use of care observed by the standard of living quintile is given in Table 1, column 1 for self-medication and column 2 for use of a health facility. Households in the lowest quintile of the standard of living used self-medication in 49.28% of cases of malaria fever or diarrhoea in children under 5 years of age during the two weeks preceding the survey, compared to 32.86% of cases in the wealthiest households. Similarly, 50.16% of the poorest households used a health facility while 32.64% of the wealthiest did.

Table 1. Health care consumption by standard of living quintile

Quintile of living standards	Use of self-medication (obs.)	Use of a health facility (obs.)	Use of self-medication (stand.)	Use of a health facility (stand.)
Q_1	0.4928	0.5016	0.5072	0.4984
Q_2	0.3913**	0.3947**	0.6087**	0.6053**
Q_3	0.4058**	0.4009**	0.5942**	0.5991**
Q_4	0.3913**	0.3861**	0.6087**	0.6139**
Q_5	0.3286**	0.3264**	0.6714**	0.6736**

*Note: For the test of the significance of differences in means, the Q1 quintile is taken as a reference (** $p < 0.05$).*
Sources: developed by the author.

Measurement of the concentration of use. In the presence of horizontal equity in access to care, the coefficient should be equal to 0 or coincide with the equality line. Table 2 shows that the concentration coefficients are equal to 0, which means that for an equivalent need for care, use is equal. The indices of concentration of use are respectively 0.034 for self-medication and -0.050 for use of a health facility, and the indices of standardised use are 0.00 in both cases.

Table 2. Inequality in access to health care (indirect standardisation)

Quintile of living standards	Use of self-medication (obs.)	Use of a health facility (obs.)	Use of self-medication (indirect stand.)	Use of a health facility (indirect stand.)
Q_1	0.4928	0.5016	0.5983	0.4017
Q_2	0.3913	0.3947	0.5983	0.4017
Q_3	0.4058	0.4009	0.5983	0.4017
Q_4	0.3913	0.3861	0.5983	0.4017
Q_5	0.3286	0.3264	0.5983	0.4017
Coefficient of concentration	0.034	-0.050	0.0000	0.0000

Sources: developed by the author.

Comparison of standardised and non-standardised utilisation concentration curves (Figure 1 and Figure 2) shows that standardisation reduces differences between quintiles: there is horizontal equity of recourse after indirect standardisation.

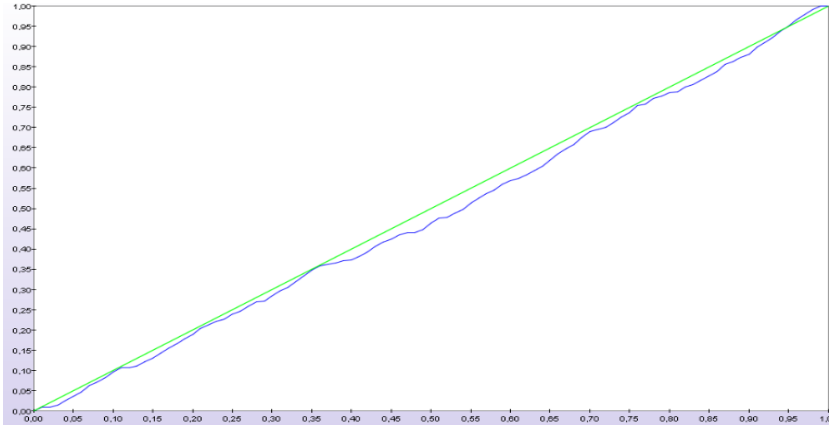

Figure 1. Concentration curve of self-medication use

Sources: developed by the author.

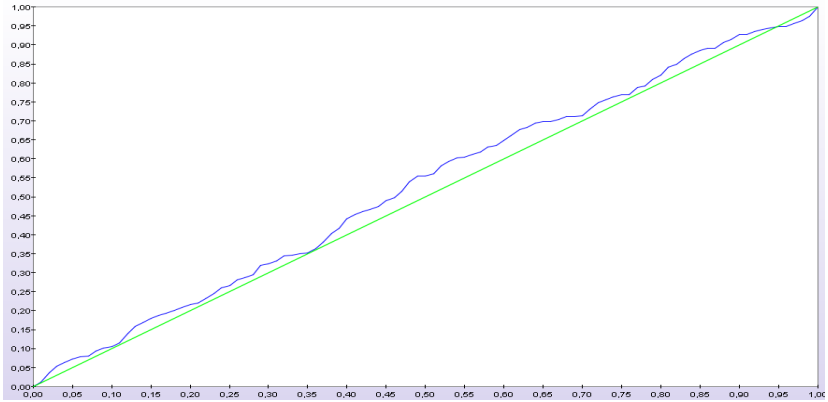

Figure 2. Concentration curve for use in a health facility

Sources: developed by the author.

Explaining the horizontal inequity: decomposition of the utilisation index. The concentration of use index is decomposed to explain health care use. The decomposition corroborates the result of the concentration curves according to which a horizontal inequality of access exists and specifies the role of each inequality factor. The standard of living is the main factor of inequality with a contribution of 19% to inequalities in the use of a health facility and 13.5% for the use of self-medication. In addition, the needs factors (child diarrhoea episode, child malaria episode and child sex) explain a significant part of the unequal distribution of use in favour of wealthy households. The strong contribution of the supply variables is noted. The presence of health facilities, pharmaceutical infrastructures and the free distribution of family kits facilitate the use of care (45.5% for self-medication and 42.6% for use of a health facility).

Vertical equity in financing. For self-medication and facility-based health care expenditures, the concentration curves are all below the equality line. The main diagonal (line of equality) assumes perfect equity in health care financing. The curves below the main diagonal indicate that there are inequities in the financing of self-care or facility-based care that disadvantage the poor.

In addition, to measure the progressivity of the system, the concentration curves of health expenditure are compared with the Lorenz curve of consumption expenditure.

It can be seen in Figure 3 and Figure 4 that all the Lorenz curves are below the standard of the living curve (the KPIs are significantly negative). Health expenditures are therefore all regressive (Table 3).

According to the vertical equity criterion, the health care financing system is inequitable and regressive (Abu-Zaineh et al., 2008), i.e., the contribution is greater for the lowest income groups.

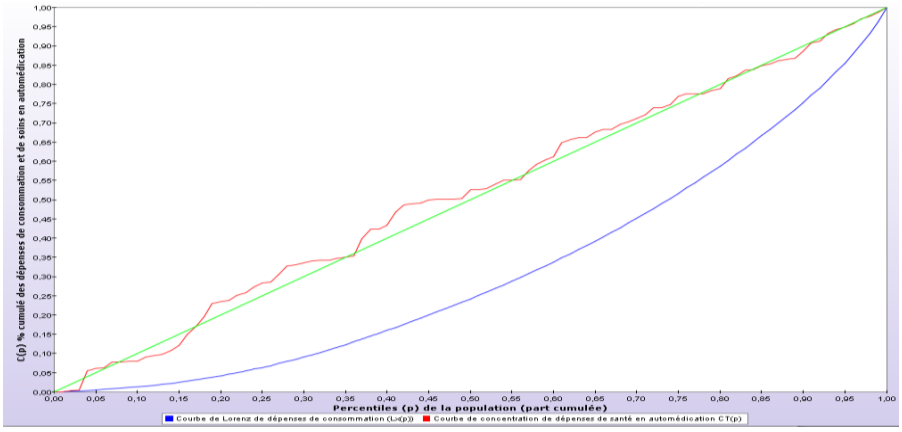

Figure 3. Concentration curve of care expenditure vs Lorenz curve of consumer expenditures

Sources: developed by the author.

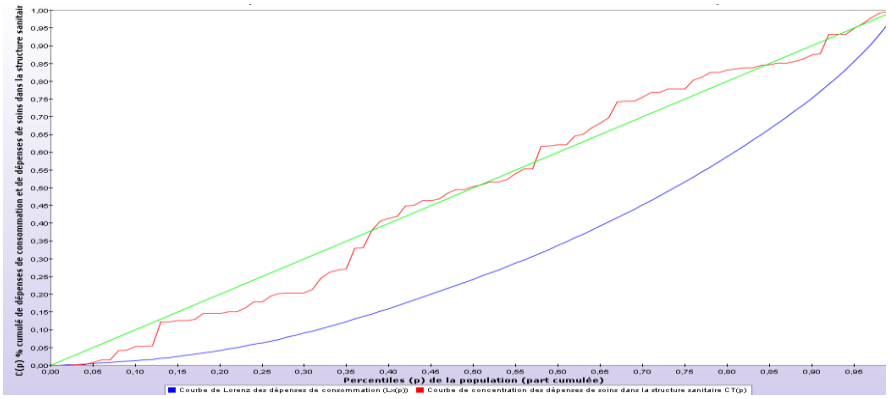

Figure 4. Concentration curve of health care expenditures vs Lorenz curve of consumer expenditures

Sources: developed by the author.

Table 3. Concentration indices and KPIs obtained from observed expenditures

Variables	CI (Standard error)	KPI (Standard error)
Use of self-medication		
Cost of use	0.515 (0.059)	-0.44 (0.051)
Use of health facility		
Cost of transport	0.508 (0.117)	-0.48(0.10)
Cost of care	0.498 (0.086)	-0.47(0.07)
Cost of use of health facility	0.499 (0.081)	-0.47(0.07)

Sources: developed by the author.

Conclusions. This study assessed the equity of access to care for malaria fever and diarrhoea in children under 5 years of age in the Democratic Republic of Congo. It thus contributes to the literature on the equity of health systems in the context of purchasing services by jointly measuring horizontal and vertical equity based on equity criteria and on the social and contextual determinants of health care utilisation among children under 5 years of age.

The joint study of equity in financing and consumption of care is an original contribution to the literature in the context of the Democratic Republic of Congo in general and in particular, in the health zones benefiting from the interventions of the Sustainable Development Goals acceleration framework supported by performance-based financing.

Several studies have analysed the effects of free health care on maternal health outcomes, while others have also examined the effects on child health outcomes. In this study, we will discuss the results of the equity measure through two criteria: the horizontal equity criterion and the vertical equity criterion. For the first criterion, households should receive identified care if they have the same needs. Access to care is said to be equitable if and only if it is influenced solely by need and not by other factors. From this perspective, there is

imperfect equality in the use of care. For the same health need, households used different types of care. The second criterion differs from the first. This criterion is based on the fact that unequally wealthy households should not be treated in the same way. With respect to health care expenditures, we have noted that these are not progressive and therefore there is vertical inequity. Health expenditures tend to decrease when income increases.

In conclusion, household health expenditures are regressive. Access to health care remains mixed, characterised by imperfect equity in the use of health care.

This study suggests the following:

– Reforms of the health financing system: the State should mobilise and contribute to the implementation of programs for the purchase of services by increasing public financing and improving public spending;

– The setting up of adapted health care structures offering quality health services, capacity building of the relays of the commentary health care sites while integrating the private health structures.

– A qualitative study of the supply of health services to identify more elements likely to influence the use of care and equity;

– The development of protection mechanisms (mutual health insurance) co-financed by the Congolese State and partners supporting health programs.

Finally, the results of this study will allow health authorities, governments and donors to make informed decisions regarding the allocation of resources needed to implement health system support programs and to sustain the achievements of the various interventions carried out in the health zone. While it is important to deliver and evaluate effective programs, it should be noted that ultimately, the capacity of recipient countries should be strengthened so that they have their own resources.

Conflicts of Interest: Authors declare no conflict of interest.

Data Availability Statement: All relevant data can be found in the document.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

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Касумбі Тшитука, Лабораторія економічних досліджень Сент-Луїса (LARES), Університет Гастона Бергера, Сенегал.

Університет Мбуджі-Майї, Конго.

Державні субсидії та рівний доступ до медичних послуг: на прикладі Демократичної Республіки Конго

Починаючи з 2000-х років, Демократична Республіка Конго запровадила національну політику, спрямовану на поступову відмову від прямої оплати в пунктах надання медичних послуг, щоб зробити систему охорони здоров'я більш доступною. Метою цього дослідження є визначення ступеню нерівності у доступі та фінансуванні субсидованої системи охорони здоров'я. За основу вимірювання нерівності в доступі та фінансуванні були взяті дані Програми з вдосконалення контролю за впровадженням заходів (N = 475 домогосподарств у межах медико-санітарної зони Тшиленге, провінція Східний Касаї, Демократична Республіка Конго), яка є складовою частиною процесу оцінювання ефективності системи охорони здоров'я за допомогою високоефективних заходів у галузі охорони здоров'я матері та дитини. Для визначення ступеня нерівності в системі розподілу між об'ємом потреб та видатків на охорону здоров'я було використано метод кривої концентрації та індексу (CI). Від'ємне значення індексу концентрації (CI) вказує на непропорційну концентрацію субсидій серед малозабезпечених верств населення, а додатне – на сприятливий розподіл субсидій серед заможних верств населення; нульове значення індексу концентрації (CI) свідчить про досягнення абсолютної рівності. Крім того, для оцінки прогресивності прямих витрат домогосподарств на догляд використовувався індекс прогресивності Kakwani (Kakwani Progressivity Index, KPI). Позитивне значення KPI свідчить про наявність тенденції до прогресивності системи, а від'ємне – про її дегресивність. Індекси концентрації користування послугами становлять відповідно 0,034 для випадків самолікування та -0,050 для випадків звернення до закладу охорони здоров'я, а індекси стандартизованого користування в обох випадках дорівнюють 0,00. Порівняння стандартизованої та нестандартизованої кривих концентрації користування показує, що стандартизація зменшує відмінності між квінтилями: після непрямої стандартизації спостерігається горизонтальна рівність користування. Всі криві Лоренца є нижчими за криву рівня життя (показники KPI є суттєво від'ємними). Отже, всі видатки на охорону здоров'я є регресивними. Результати вимірювання ступеня рівності показали, що існує недосконала рівність у користуванні медичними послугами, а система фінансування охорони здоров'я є несправедливою та регресивною. Прямі витрати домогосподарств збільшують нерівність у доступі. Цей розмір сплати є більшим для груп населення з найменшими доходами. Через недостатнє фінансування сектору охорони здоров'я не забезпечується універсальний та вільний доступ до послуг, що призводить до самолікування та відмови від медичної допомоги.

Ключові слова: індекс рівності, споживання медичних послуг, фінансування охорони здоров'я, декомпозиція індексу.