Original Article
http://mjiri.iums.ac.ir
Medical Journal of the Islamic Republic of Iran (MJIRI)

Med J Islam Repub Iran. 2022 (30 Nov);36.145. https://doi.org/10.47176/mjiri.36.145

Decomposed Trends of Iranian Private Health Expenditures: Should Inequality be Appreciated?

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Received: 5 Apr 2022 Published: 30 Nov 2022

Abstract

Background: Inequalities in health and health care have drawn considerable attention in social determinants of health literature. This study aims to calculate the inequality of out-of-pocket health payments (OPHP) for Iranian households during the period 1984 to 2019 and provide decomposed inequality for households with different socioeconomic status.

Methods: This longitudinal study utilized the Iranian Statistics Centre data on Iranian household income and expenditures survey. The analysis includes a total of 995,300 households during a 36-year period from 1984 to 2019. The Theil index and the mean logarithmic deviation were used to decompose inequality into within-group and between-group for OPHP among Iranian households.

Results: The findings indicate that the mean of the Theil index for the households covered by insurance is 1.44 (SD ± 0.34), while the index was 1.35 (SD ± 0.31) for households without insurance coverage. The mean of the Theil index for rural and urban households was 1.29 (SD ± 0.29) and 1.43 (SD ± 0.33), respectively. Regardless of the fluctuations, the trends of between- group and within group inequalities in OPHP were almost similar until 2011, but they followed a different path since then.

Conclusion: Households living in cities, households with insurance coverage, and households in high income levels have experienced more inequality in OPHP than other households. This study provides a novel interpretation of inequality in health care expenditures and provides a long-term time series data to assess the effectiveness of implemented policies in health care system.

Keywords: Inequality, Out-of-Pocket Payments, Theil Index, Decomposition, Health Care Expenditure

Conflicts of Interest: *None declared*
Funding: *None*

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Cite this article as: Aghapour E, Basakha M, Mohaqeqi Kamal SH, Pourreza A. Decomposed Trends of Iranian Private Health Expenditures: Should Inequality be Appreciated?. *Med J Islam Repub Iran.* 2022 (30 Nov);36:145. https://doi.org/10.47176/mjiri.36.145

Introduction

There are several methods to finance a health care system: private insurance, social health insurance, general taxation, community financing, out-of-pocket health payments (OPHP), and donation or foreign resources. Low-income countries often rely on OPHP (1). Currently, in Iran the health care system funding comes from several sources. Based on data from 2018, around 24% comes from government funding, social health insurance contrib-

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↑What is "already known" in this topic:
As health care needs are unequally distributed among people in society and various factors influence this inequality, it is expected that health expenditures (unlike other types of expenditures such as food or education expenditures) should be unequally distributed among individuals. In this case, it can be ensured that people have sufficiently benefited from health services.

→What this article adds:
This study provides a time-series data on inequality in out-of-pocket health care expenditures that can be used for further health inequality analysis. Results show a clear picture of higher inequality among high-income households and the ones with insurance coverage. In counties with considerable share of out-of-pocket payments in health care expenditures, inequality should be interpreted cautiously.

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[DOI: 10.47176/mjiri.36.145]

utes (31%), OPHP (35%), private health insurance (6%), and individual donations and other sources (4%) (2). According to the World Health Organization, about 40% of the global health care services are financed through OPHP. In some countries, the OPHP share in health care resources reaches 60% to 70% (3). The high OPHP may have 2 types of consequences for households. First, the direct OPHP for the health care service increases the probability of catastrophic health care expenditures (CHE). Furthermore, the OPHP for health care may be a regressive type of health care funding (1). The World Health Organization states that equity in health care includes equitable financing through fair prepayment and protection against catastrophic payments and equitable access to health care services (4). This may have an impact on the efficiency of the health care system. Therefore, the status of OPHP will not only determine households' access to health care services, but can also affect their well-being through income allocation to health care and other needs (5-8).

Different theoretical views have been developed to explain the factors leading to inequality in the distribution of household income or expenditures at both the micro and macro level. At the macro level, educational opportunity, globalisation, labour market changes, taxes, changes in political power and institutional factors, such as migration, are among the possible determinants of inequalities (9-12). In addition, the factors causing inequality, such as share of labour income in household's total income, social security coverage, education, and other household characteristics (gender, age, and race) are the micro level determinants of inequalities (13-15). The most economic theories describe inequality as the unequal distribution of individual or household income or expenditure within a certain country and across regions or countries (16). Economists often consider expenditure rather than income to study inequality in living standards (17). More recently, inequality in OPHP has become increasingly interested topic of health policymakers (18). This sensitivity has been due to the fact that access to health care services is unequally distributed among social groups (19-21).

Iran is a developing country and according to the latest census, more than 85 million people lived across the country. Iran spends almost 7% of its gross domestic product in the health care sector (22, 23). The 2 primary funding sources of public hospitals are government budget and reimbursements provided by the Social Security Organisation and the Iran Health Insurance Organisation (24). Due to the prominent role of health care in the quality of life, health disparities have received more attention. As health needs are unequally distributed among people, it is expected that health care expenditures—unlike other types of expenditures such as food or education expenditures—should be unequally distributed. In this case, it can be ensured that people have sufficiently benefited from health services. If equality in these expenditures appears, it may be an implicit sign that people cannot afford to meet their health care needs. However, when the coverage of health care services is inadequate, equal health care spending can be resulted by limited access to health care services. A few studies have been calculated and reported a considerable inequality in OPHP expenditures; however, even limited studies decompose this inequality among different subgroups. Decomposition of inequality requires categorizing the population into similar sociodemographic subgroups so that the total inequality can be expressed as the sum of the inequities within and between the subgroups (16). Waghei estimated the Gini index and showed that there is a remarkable amount of inequality in health care spending among the Iran's provinces (25). In addition, Ekholuenetale showed that about two-thirds (66%) of working age women in Ghana were covered by health insurance. In summary, women living in neighbourhoods with a high socioeconomic disadvantage status had the lowest OPHP expenditure for total health care utilisation, laboratory investigations, antenatal care visits, postnatal care visits, care for new-born's for up to 3 months and other health care services (26). The findings of this study are anticipated to provide valuable findings for policymakers in Iran to improve the efficiency of the health system, ensure equity in health care, identify the factors contributing to changes in inequality and how inequality in OPHP expenditures should be interpreted. Managers and planners can also use the results of this study to identify points of intervention in this area instead of planning in ways that have no benefit for society and families and people and can take steps to effectively solve the problems of the health system.

This study sought to explore the factors underlying inequality in OPHP among the Iranian households over 1984 to 2019. The total inequality decomposed among different social subgroups—gender of household head, insurance status, decile groups of households, and area of residence. The study also aims to determine the factors that have remarkable contribution to inequality of OPHP. The findings of this study may not only provide a set of time series information for policymakers to identify the factors contributing to changes in inequality but also introduces a novel paradigm for inequality analysis of OPHP.

Methods

Data

In this longitudinal study, secondary analysis was performed on Household Income and Expenditure Survey data (HIES) conducted by the Statistical Centre of Iran during the period 1984 to 2019. The analysis included 995,300 households over 36 years (Table 1). This study used STATA Version 14.2 to clean and analyse data. The OPHP among Iranian households is evident in 3 different forms (27): as deductibles before the reimbursements, additional payments when a stipulated threshold for insurance is reached, and as direct contributions for utilising health care services. The Theil index and the mean logarithmic deviation (MLD) was used to inequality decomposition. The STATA module INEQDECO was used for estimating the full range of the Thiel index and providing decompositions for a subset of these indices by population subgroups and breaking down the inequality to between and within-group components (28). The gender of the household's head, residence's region (rural vs urban),

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Table 1. Summary statistics for sample households

Year	Frequency	Head of household Gender (%)		Area of residence (%)		Insurance status (%)	
	N	Male	Female	Urban	Rural	No covered by insurance	covered by insurance
1984	27148	89.9	10.1	54.3	45.7	73.7	26.3
1985	27563	91.1	8.9	50.7	49.3	74.8	25.2
1986	5689	90.5	9.5	48.3	51.7	75.7	24.3
1987	5767	90.3	9.7	47.7	52.3	74.3	25.7
1988	8317	90.2	9.8	47.9	52.1	74.9	25.1
1989	11520	90	10	47.7	52.3	77	23
1990	18455	90.8	9.2	49.3	50.7	75.2	24.8
1991	18673	90.3	9.7	49.1	50.9	74.8	25.2
1992	18671	91.6	8.4	49.5	50.5	73.4	26.6
1993	12770	90.7	9.3	53.1	46.9	71	29
1994	19910	91.5	8.5	60.9	39.1	63.9	36.1
1995	36592	90.7	9.3	55.2	44.8	62.8	37.2
1996	21964	92.4	7.6	50	50	64.6	35.4
1997	21950	91.7	8.3	50	50	60.6	39.4
1998	17477	91.7	8.3	47.4	52.6	62.9	37.1
1999	27465	91.4	8.6	46.4	53.6	62.7	37.3
2000	26941	91	9	45.7	54.3	63	37
2001	26961	90.5	9.5	45.8	54.2	62.9	37.1
2002	32152	89.6	10.4	47	53	67.7	28.3
2003	23134	92	8	47.4	52.6	59.6	40.4
2004	24552	91.3	8.7	47.3	52.7	64.6	35.4
2005	26895	91.1	8.9	48.1	51.9	58.5	41.5
2006	30910	90.4	9.6	45.9	54.1	31.9	68.1
2007	31283	90.3	9.7	48	52	35.3	64.7
2008	39088	88.9	11.1	49.6	50.4	24.9	75.1
2009	36869	88.3	11.7	50.6	49.4	22.6	77.4
2010	38286	88.1	11.9	48.8	51.2	22.7	77.3
2011	38515	87.4	12.6	48.6	51.4	21.2	78.8
2012	31192	86.6	13.4	48.5	51.5	19.2	80.8
2013	38316	87.9	12.1	49.3	50.7	18.8	81.2
2014	38276	86.8	13.2	49.3	50.7	18.3	81.7
2015	38252	86.3	13.7	49.3	50.7	12.6	87.4
2016	38146	85.9	14.1	49.3	50.7	11.3	88.7
2017	37962	86	14	49.3	50.7	11.1	88.9
2018	59310	87.1	12.9	68.6	31.4	12.5	87.5
2019	38828	85.7	14.3	51.9	48.1	11.2	88.8

insurance coverage status, and income decile of the household were used to group Iranian households and to calculate their OPHP inequality separately. The selection of these variables' practices was based on the research literature and the availability of data at the national level.

Out of Pocket Health Payment

The expenses incurred for utilization of 4 major groups of health care services are calculated and reported in the form of OPHP, which includes (3) outpatient health care services, equipment, supplies and medical assistant accessories, inpatient health care services, and addiction quitting services. Among the components of OPHP, medical treatment expenditures have the highest level of expenditure (Statistical Centre of Iran, 1984-2019).

Decomposition of the Theil Index and Mean Logarithmic Deviation Index

The Theil index of inequality that originally proposed by Theil (1967), is one of the 2 most widely applied inequality measures along with the Gini coefficient. Unlike the Gini coefficient, the total amount of inequality measured by the Theil index can be cleanly decomposed into the 2 additive parts of between-group and within-group inequalities. This study uses the Theil index to measure inequality, as it satisfies several desirable properties as a measure of inequality in welfare, that is, mean independency, population-size independency, and the Pigou-Dalton principle of transferability (16). When the sum of between-group and within-group inequalities constitutes total inequality, the inequality index is said to be additively decomposable. In the context of additive decomposability, the generalized entropy class of inequality indexes are superior to other indexes. The interpretation of these measures is simple and their decomposition does not leave any residual. Assuming m groups, its decomposition assumes the following equation (16):

Equation 1.

Within-group inequality ***Between-group inequality***

$$T = \sum_{k=1}^{m} \left(\frac{n_k}{n}\frac{\bar{y}k}{\bar{y}}\right) Tk + \sum_{k=1}^{m} \frac{n_k}{n}\left(\frac{\bar{y}k}{\bar{y}}\right) ln\left(\frac{\bar{y}_k}{\bar{y}}\right)$$

The first term in Equation 1 is the weighted average of the Theil inequality indexes of each group (T_k), with weights represented by the total income share—the prod-

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uct of population shares and relative mean incomes. This is the within-group inequality part of the decomposition. The second term is the Theil index calculated using subgroup means $\bar{y}k$ instead of actual incomes. This transformation replaces actual income distributions in each group to the average income level of the same group. This gives the between group inequality part of the decomposition. The Theil index of inequality is perfectly decomposable to between-group and within-group inequality. Based on the GE class equation, the decomposition can be expressed as follows (29):

Equation 2.

Within-group inequality ***Between-group inequality***

$$GE_a = \sum_{k=1}^{m} \left(\frac{\bar{y}_k}{\bar{y}}\right)^a \left(\frac{n_k}{n}\right)^{1-a} GE(a)_i + \frac{\frac{\bar{y}_k}{\bar{y}} 1}{(a^2 - a)} \left[\sum_{k=1}^{m} \frac{n_k}{n} \left(\frac{\bar{y}_k}{\bar{y}}\right)^a - 1\right]$$

where relative means and population shares are raised at α and (1-α), respectively, while GE (α) is the GE Index of the subgroups. The first term is the within-group part or the weighted average of GE Indexes for each group; and the second part is the between-group. In order to descript the variability "among groups" the GE Index was calculated using the actual OPHP instead of subgroup means. Choosing the desired value for α gives decompositions for the members of the GE class. An interesting result is obtained with α = 0, which gives the MLD in this case the following decomposition (29):

Equation 3.

Within-group inequality ***Between-group inequality***

$$GE_0 = \frac{n_k}{n} GE_0^k + \frac{n_k}{n} ln\left(\frac{\bar{x}}{\bar{y}_k}\right)$$

Results

Iranian Household's Profile

Table 1 provides summary statistics for the variables used in this study during the period 1984 to 2019. The majority of Iranian households were headed by a man (around 90%). However, there was a slight increase in the number of female-headed households from 10.1% in 1984 to 14.3% in 2019. In the sample, urban and rural households have almost the same share during the studied period. The characteristics of the households included in the study show that the insurance coverage rate rose quickly from 26.6% in 1984 to 88.8% in 2019 (Table 1).

Measuring Inequality in the OPHP

The average of the Theil index for a male-headed household was 1.38 (SD ± 0.29) and was 1.34 (SD ± 0.39) for a female-headed household. Figure 1 shows that male-headed household has a higher inequality in OPHP than female-headed households. Despite the slight fluctuation of inequality for male-headed households, inequality has clearly decreased and converged for both groups since 2011 (Table 2).

As is widely observed, the inequality of Iranian households OPHP was larger for urban households than for rural households. According to Figure 2, the means of Theil index was 1.43 (SD ± 0.33) and 1.29 (SD ± 0.29) for the urban and rural households, respectively. According to the calculated inequality time series, urban households have a higher inequality rate, but after 2011 the gap between the 2 groups of households has been decreased (Table 2).

Figure 3 shows the mean of the Theil index for the households covered by insurance was 1.44 (SD ± 0.34), while the index mean was 1.35 (SD ± 0.31) for those without insurance coverage. The trends show that the inequality of health care spending among households that had insurance coverage was higher than other households; however, this difference obviously disappeared after 2011 and inequality decreased for all households (Table 2).

Figure 4 presents the Theil index of inequality in OPHP

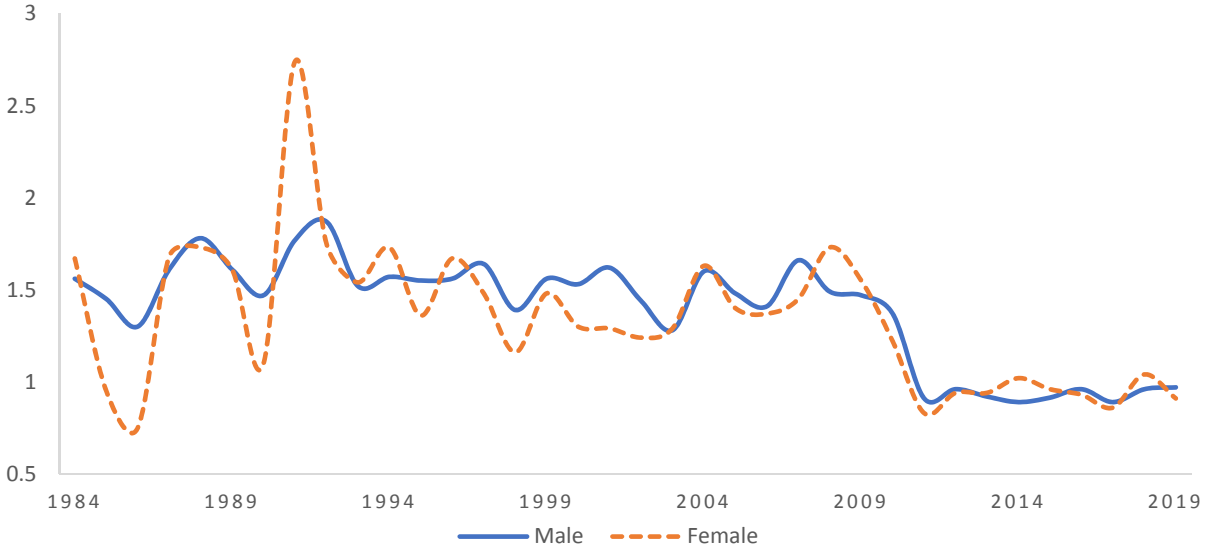

Fig. 1. Theil index of inequality in OPHP among Iranian households by the gender of household's head (1984-2019).

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Table 2. Theil index of inequality in OPHP based on households' characteristics

year	Head of household Gender		Area of residence		Insurance status		Decile groups of households									
	Male	Female	Urban	Rural	Covered by insurance	Not covered by insurance	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
1984	1.56	1.67	1.56	1.52	1.62	1.53	1.34	1.49	1.49	1.75	1.35	1.19	1.41	1.42	1.34	1.66
1985	1.45	0.95	1.51	1.29	1.6	1.35	1.54	1.51	1.19	1.49	0.94	1.21	1.28	1.31	1.26	1.56
1986	1.3	0.75	1.29	1.28	1.6	1.12	1.83	0.83	1.35	1.23	1.43	1.04	1.06	1.16	1.5	1.12
1987	1.61	1.68	1.87	0.92	1.93	1.48	0.81	1.14	0.99	0.84	1.13	1.06	1.16	1.59	2.04	1.72
1988	1.78	1.73	1.86	1.57	1.71	1.81	2.27	1.39	2.34	0.78	2.1	1.49	1.77	1.53	1.25	1.67
1989	1.61	1.61	1.56	1.67	1.36	1.67	1.66	1.72	1.57	0.1	1.02	1.3	1.25	1.25	2.07	1.72
1990	1.47	1.1	1.45	1.49	1.5	1.45	1.48	1.56	1.25	1.45	1.36	1.21	1.69	1.6	1.36	1.34
1991	1.77	2.74	1.84	1.83	1.98	1.77	1.69	1.7	1.31	2.38	1.21	1.69	1.63	1.59	2.09	1.8
1992	1.87	1.75	2.02	1.58	2.21	1.7	1.45	1.88	1.37	1.18	1.97	1.72	1.46	1.68	1.58	1.3
1993	1.52	1.54	1.42	1.67	1.53	1.53	1.21	1.3	2.11	1.53	1.31	1.45	1.12	1.53	1.61	1.42
1994	1.57	1.73	1.63	1.4	1.51	1.63	0.81	1.46	1.87	1.85	1.26	1.15	1.52	1.48	1.28	1.71
1995	1.55	1.36	1.54	1.54	1.59	1.52	1.71	1.88	1.37	1.56	1.51	1.31	1.31	1.43	1.57	1.52
1996	1.56	1.67	1.61	1.51	1.61	1.55	1.73	1.24	1.71	1.48	1.35	1.52	1.57	1.31	1.62	1.68
1997	1.64	1.48	1.66	1.59	1.7	1.58	1.34	1.63	1.42	1.19	1.32	1.16	1.16	2.15	1.43	1.82
1998	1.39	1.16	1.44	1.37	1.43	1.42	1.51	1.26	1.24	1.66	1.34	1.23	1.27	1.64	1.38	1.3
1999	1.56	1.48	1.4	1.75	1.75	1.4	1.33	1.47	1.1	1.29	1.88	1.26	1.9	1.56	1.3	1.61
2000	1.53	1.3	1.58	1.41	1.51	1.52	1.09	1.47	1.25	1.22	1.11	1.7	1.62	1.26	1.58	1.69
2001	1.62	1.29	1.84	1.24	1.54	1.66	1.39	1.2	1.76	1.23	1.25	1.25	1.6	1.35	1.36	2.17
2002	1.44	1.24	1.54	1.27	1.57	1.32	1.11	1.33	1.14	1.16	1.16	1.61	1.4	1.19	1.3	1.67
2003	1.28	1.29	1.28	1.26	1.37	1.2	0.94	1.38	1.22	0.96	1.04	1.14	1.1	1.18	1.4	1.44
2004	1.6	1.63	1.66	1.52	1.7	1.51	1.42	1.23	1.02	1.49	1.18	1.81	1.3	1.87	1.83	1.49
2005	1.48	1.4	1.59	1.29	1.59	1.32	1.26	1.08	1.29	1.02	1.49	1.29	1.92	1.37	1.33	1.51
2006	1.41	1.37	1.43	1.37	1.47	1.22	1.32	1.36	1.09	1.1	1.48	1.33	1.68	1.16	1.22	1.45
2007	1.66	1.45	1.84	1.36	1.77	1.35	1.45	0.97	1.29	1.67	1.22	1.19	1.01	1.08	1.37	2.29
2007	1.49	1.73	1.6	1.31	1.55	1.35	1.29	1.22	1.52	1.34	1.08	1.28	1.15	1.62	1.62	1.62
2009	1.47	1.55	1.5	1.4	1.32	1.99	1.1	1.23	1.34	1.38	1.41	1.36	2.23	1.26	1.28	1.38
2010	1.37	1.22	1.39	1.27	1.38	1.21	1.11	1.11	1.2	1.61	1.35	1.12	1.54	1.23	1.48	1.36
2011	0.91	0.83	0.93	0.84	0.91	0.84	0.81	0.81	0.84	0.85	0.86	0.94	0.85	0.79	0.9	0.94
2012	0.96	0.94	0.96	0.95	0.96	0.94	0.87	0.8	0.95	0.87	1.14	0.82	0.96	0.86	0.89	1
2013	0.92	0.94	0.94	0.87	0.91	0.92	0.93	0.87	0.77	0.87	0.77	0.87	0.87	0.88	0.88	0.96
2014	0.89	1.02	0.92	0.85	0.91	0.89	0.8	0.93	0.79	0.8	0.78	0.91	0.78	0.78	0.81	1.01
2015	0.91	0.96	0.92	0.86	0.91	0.91	0.8	0.8	0.85	0.9	0.85	0.76	0.83	0.88	0.85	0.89
2016	0.96	0.93	0.98	0.89	0.96	0.96	0.83	0.83	0.89	0.84	0.85	0.86	0.91	0.87	0.92	0.99
2017	0.89	0.86	0.89	0.85	0.9	0.89	0.68	0.68	0.69	0.77	0.77	0.8	0.8	0.86	0.88	0.89
2018	0.96	1.04	0.98	0.93	0.98	0.96	1.25	1.25	0.81	0.77	0.85	0.92	0.83	0.84	1.02	0.92
2019	0.97	0.91	1	0.87	0.97	0.97	0.78	0.78	0.82	0.73	0.89	0.74	0.91	0.81	1.15	0.94

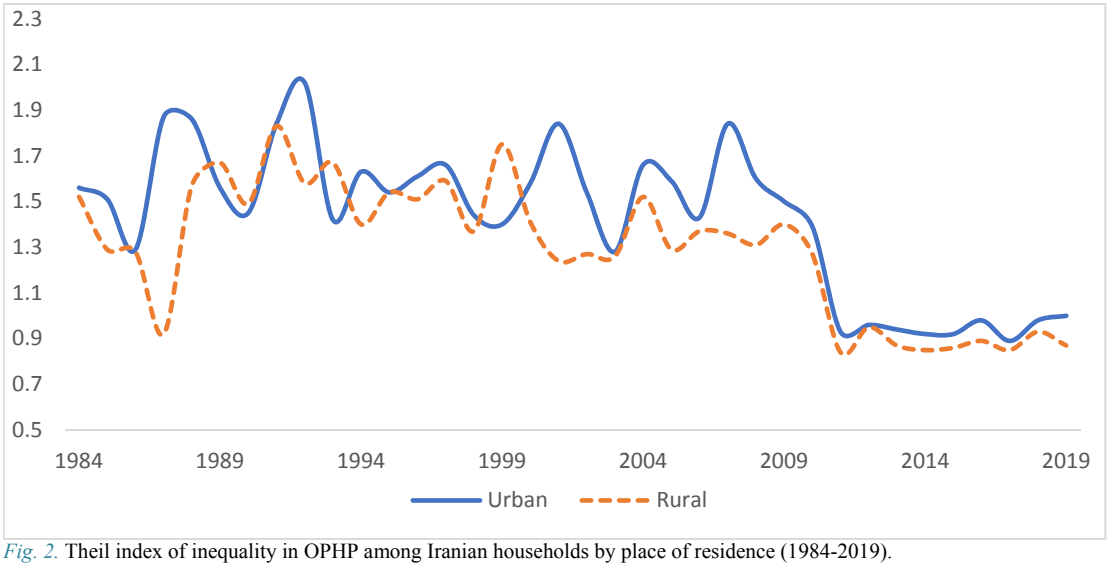

Fig. 2. Theil index of inequality in OPHP among Iranian households by place of residence (1984-2019).

among different income deciles. The OPHP is highly unequal for the topmost income decile. The mean of the Theil index for 1984 to 2019 period for the 10th income decile was 1.43 (SD ± 0.36). The means of Theil index for the

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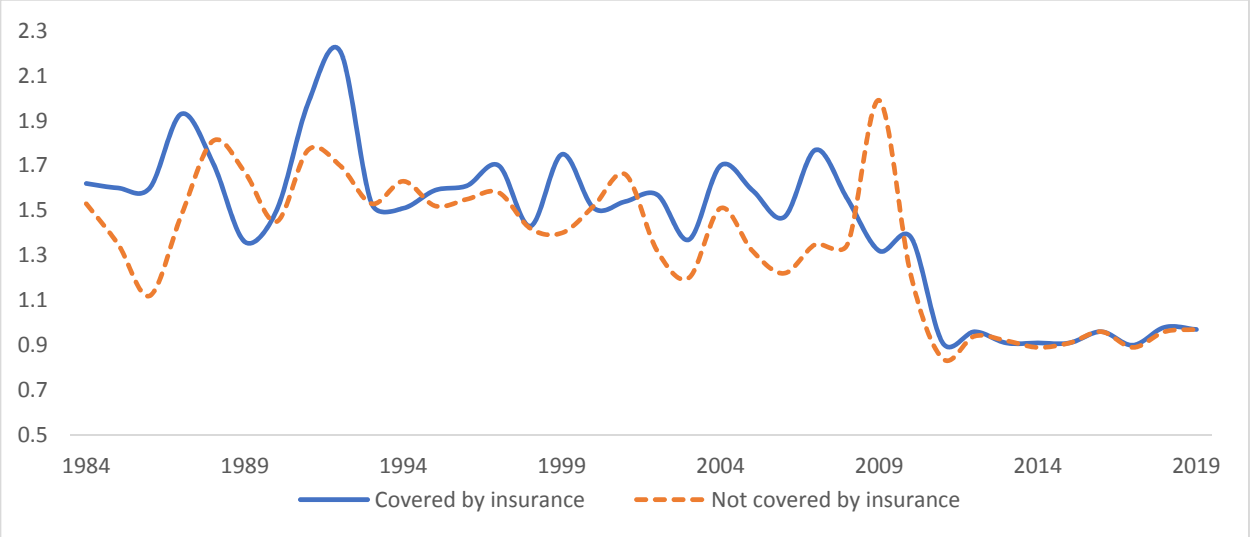

Fig. 3. Theil index of inequality in OPHP among Iranian households by insurance coverage status (1984-2019).

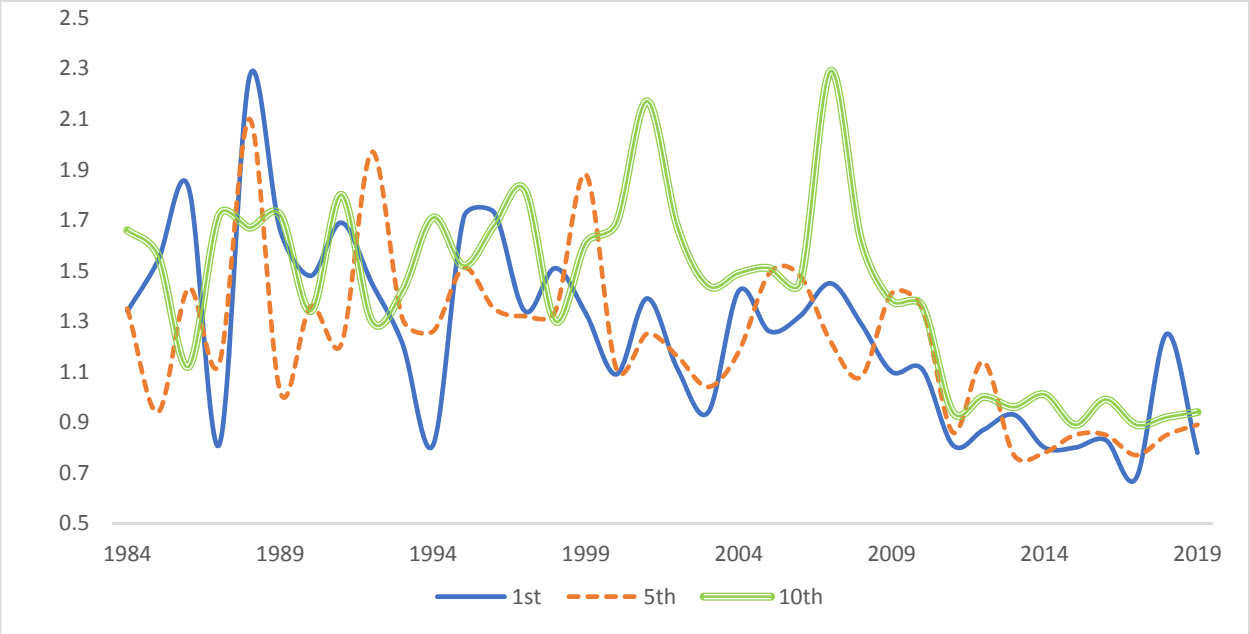

Fig. 4. Theil index of inequality in OPHP among Iranian households by selected income decile groups (1984-2019).

lowest income decile and the fifth income decile were 1.25 (SD ± 0.37) and 1.22 (SD ± 0.36), respectively. Similar to the previous classifications, the level of inequality, regardless of income status, has clearly decreased since 2011 (Table 2).

Decomposition Analysis

Based on the annual data on the Iranian households' health care expenditures, inequality indexes (Thiel index and MLD) have been decomposed for a period of 36 years. The results indicate that within-group inequalities have formed the main part of inequalities for both the Theil index and the MLD.

Figure 5 shows the between-group inequality for the Theil index. The highest levels of between-groups inequality were related to households in different income deciles, and this fact has not changed during the last 36 years. The contribution of this characteristic just explains around 0.06 (SD ± 0.03) of the Theil index, and other household characteristics played an even smaller role in explaining inequality in private health expenditures. Therefore, among the households' characteristics, only the different level of income for households cause the formation of a different level of inequality in health care spending. The same outcomes are obtained when the MLD index of inequality is broken down. Figure 6 shows that the between-group inequality in OPHP among Iranian households is notable when households are grouped according to their income deciles; while the other households' classifications do not capture a considerable difference in between-group inequality. Considering the result, there is no significant group differences in OPHP inequality among the Iranian households, and policymakers should focus on inequality within mentioned groups rather

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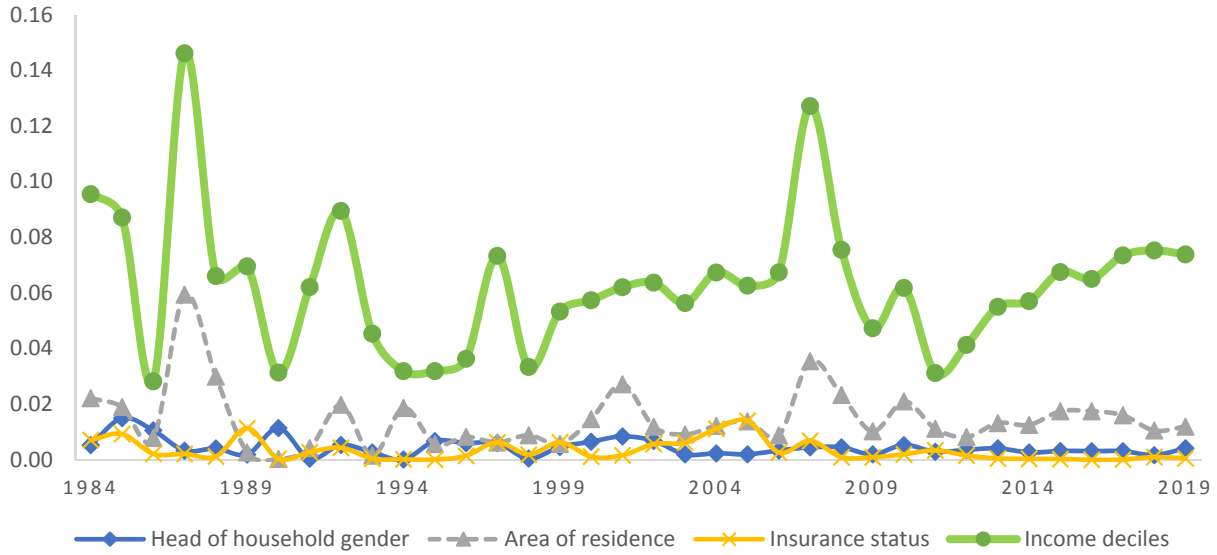

Fig. 5. Between-group inequality decomposed by Theil index for selected characteristics of households (1984-2019).

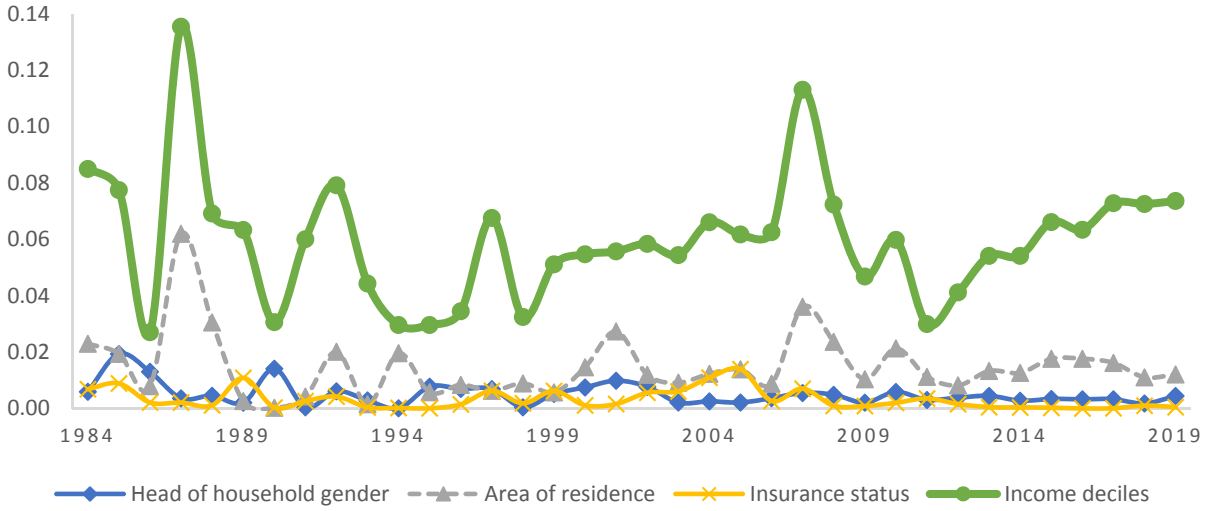

Fig. 6. Between-group inequality decomposed by MLDI for selected characteristics of households (1984-2019).

than that between them. However, one should be cautious about the importance of this part of inequality, as between-group inequality depends not only on differences among groups in the mean OPHP, but also on the number of the groups, and their relative sizes. However, the trend of the inequality that this study has been looking for provides irrefutable information. It is clear that since 2011, despite the reduction in overall inequality, inequality between income groups has increased (Table 3).

Figure 7 shows the within-group inequality for the Theil index based on selected household's characteristics. The highest level of between-group inequality is related to the households grouped by gender of the household's head (99.7%). According to Figure 7, within-group inequality for different households' groups are greater than the magnitude of between-groups inequality. The amount and proportion of this decomposed inequality, as previously indicated, are less significant, but an examination at within-group inequality trends reveals that, despite a trend that has been constant over the past 3 decades, these inequalities have declined since 2011. Almost the same results have been derived from the decomposed MLD index of inequality (Table 4, Fig. 8).

Discussion

This study has attempted to generate time series data about inequality in OPHP among Iranian households. It was also tried to estimate the inequality for different sociodemographic groups separately. Based on the generated information, inequality was divided into inequality between sociodemographic subgroups and inequality within these subgroups. The measures used to calculate the inequality are the Theil index and the MLD index.

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Table 3. Between group and within group Theil index of inequity in OPHP based on households' characteristics

Year	Head of household gender			Area of residence			Insurance status			Income decile		
	W%	B%	total	W%	B%	total	W%	B%	total	W%	B%	total
1984	99.66	0.34	1.57	98.59	1.41	1.57	99.55	0.45	1.57	93.92	6.08	1.57
1985	98.97	1.03	1.45	98.69	1.31	1.45	99.36	0.64	1.45	93.98	6.02	1.45
1986	99.18	0.82	1.29	99.39	0.61	1.29	99.83	0.17	1.26	97.81	2.19	1.29
1987	99.80	0.20	1.62	96.33	3.67	1.62	99.87	0.13	1.62	90.98	9.02	1.62
1988	99.77	0.23	1.79	98.32	1.68	1.79	99.93	0.07	1.79	96.30	3.70	1.79
1989	99.88	0.12	1.62	99.83	0.17	1.62	99.12	0.89	1.29	95.69	4.31	1.62
1990	99.22	0.78	1.47	99.98	0.02	1.47	99.98	0.02	1.47	97.86	2.14	1.47
1991	99.98	0.02	1.84	99.77	0.23	1.84	99.85	0.15	1.84	96.62	3.38	1.84
1992	99.71	0.29	1.87	98.94	1.06	1.87	99.77	0.23	1.87	95.22	4.78	1.87
1993	99.83	0.17	1.53	99.90	0.10	1.53	99.97	0.03	1.53	97.03	2.97	1.53
1994	99.99	0.01	1.59	98.82	1.18	1.59	99.99	0.01	1.59	97.94	2.06	1.55
1995	99.57	0.43	1.55	99.63	0.37	1.55	100.00	0.00	1.55	97.94	2.06	1.55
1996	99.62	0.38	1.57	99.47	0.53	1.57	99.91	0.09	1.57	97.69	2.31	1.58
1997	99.64	0.36	1.64	99.62	0.38	1.64	99.62	0.39	1.64	95.53	4.47	1.64
1998	99.97	0.03	1.42	99.38	0.62	1.42	99.87	0.13	1.42	97.66	2.34	1.42
1999	99.70	0.30	1.56	99.64	0.36	1.56	99.60	0.40	1.56	96.59	3.41	1.57
2000	99.57	0.43	1.52	99.04	0.96	1.52	99.93	0.07	1.52	96.23	3.77	1.52
2001	99.48	0.52	1.61	98.31	1.69	1.61	99.90	0.10	1.61	96.15	3.85	1.61
2002	99.53	0.47	1.44	99.17	0.83	1.44	99.61	0.40	1.44	95.56	4.44	1.44
2003	99.85	0.15	1.28	99.29	0.71	1.28	99.52	0.48	1.28	95.61	4.39	1.28
2004	99.86	0.14	1.61	99.24	0.76	1.61	99.30	0.70	1.61	95.81	4.19	1.61
2005	99.87	0.13	1.47	99.06	0.94	1.47	99.05	0.96	1.47	95.75	4.25	1.47
2006	99.76	0.24	1.41	99.38	0.62	1.41	99.81	0.19	1.41	95.22	4.78	1.41
2007	99.73	0.27	1.65	97.86	2.14	1.65	99.59	0.41	1.65	92.31	7.69	1.65
2008	99.70	0.30	1.51	98.46	1.54	1.51	99.94	0.06	1.51	95.00	5.00	1.51
2009	99.87	0.13	1.48	99.31	0.69	1.48	99.94	0.06	1.48	96.81	3.19	1.48
2010	99.61	0.39	1.37	98.46	1.54	1.37	99.86	0.14	1.37	95.48	4.52	1.37
2011	99.68	0.32	0.90	98.76	1.24	0.90	99.62	0.38	0.90	96.54	3.46	0.90
2012	99.63	0.37	0.97	99.15	0.85	0.97	99.84	0.16	0.97	95.72	4.28	0.97
2013	99.55	0.45	0.92	98.57	1.43	0.92	99.95	0.05	0.92	94.05	5.95	0.92
2014	99.71	0.29	0.90	98.61	1.39	0.90	99.96	0.04	0.90	93.69	6.31	0.90
2015	99.65	0.35	0.91	98.09	1.91	0.91	99.97	0.03	0.91	92.62	7.38	0.91
2016	99.68	0.32	0.96	98.18	1.82	0.96	100.00	0.00	0.96	93.24	6.76	0.96
2017	99.65	0.35	0.89	98.21	1.79	0.90	99.99	0.01	0.90	91.80	8.20	0.90
2018	99.83	0.17	0.98	98.93	1.07	0.98	99.90	0.10	0.98	92.33	7.67	0.98
2019	99.57	0.43	0.97	98.77	1.23	0.97	99.95	0.05	0.97	92.37	7.63	0.97

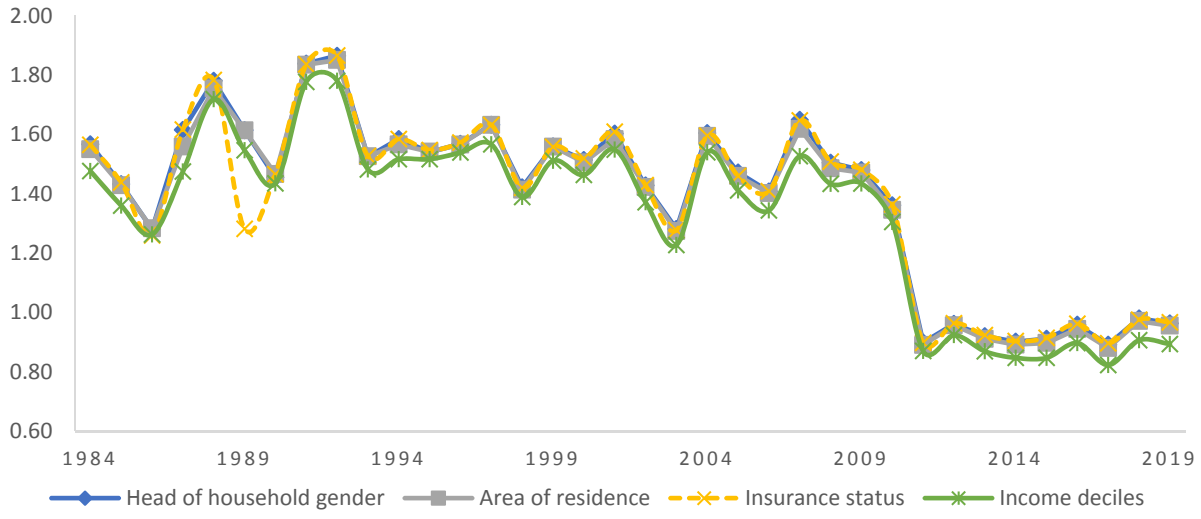

Fig. 7. Within-group inequality decomposed by Theil index for selected characteristics of households (1984-2019).

Based on the results, despite the fluctuations, the inequality in OPHP has been decreasing in the last decade. There is no research with such a long study period in Iran, but similar studies have had contradictory results. According to Ghaedamini et al, the Gini coefficient for private health care expenditure has had a stable trend during the years 1989 to 2005 and has been fluctuating around 0.7 to 0.9 (30). The calculation of the inequality in expenses by the sociodemographic subgroups showed that male-headed households, urban households, households with insurance coverage, and households in the upper income decile of the society have had a higher inequality in

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Table 4. Between group and within group MLD index of inequity in OPHP based on households' characteristics

Year	Head of household gender			Area of residence			Insurance status			Income decile		
	W%	B%	Total	W%	B%	Total	W%	B%	Total	W%	B%	Total
1984	99.57	0.43	1.39	98.34	1.66	1.39	99.51	0.49	1.39	93.87	6.13	1.39
1985	98.49	1.51	1.28	98.48	1.52	1.28	99.31	0.69	1.28	93.94	6.06	1.28
1986	98.81	1.19	1.09	99.28	0.72	1.09	99.81	0.19	1.08	97.52	2.48	1.09
1987	99.71	0.29	1.23	94.97	5.03	1.23	99.83	0.17	1.23	89.00	11.00	1.23
1988	99.67	0.33	1.39	97.80	2.20	1.39	99.91	0.09	1.37	95.01	4.99	1.39
1989	99.84	0.16	1.26	99.79	0.21	1.26	99.01	0.99	1.09	94.99	5.01	1.26
1990	98.82	1.18	1.19	99.98	0.02	1.19	99.97	0.03	1.19	97.43	2.57	1.19
1991	99.97	0.03	1.33	99.68	0.32	1.33	99.80	0.20	1.33	95.48	4.52	1.33
1992	99.54	0.46	1.34	98.49	1.51	1.34	99.68	0.32	1.34	94.09	5.91	1.34
1993	99.76	0.24	1.17	99.87	0.13	1.17	99.98	0.02	1.71	96.22	3.78	1.17
1994	99.99	0.01	1.21	98.38	1.62	1.21	99.99	0.01	1.21	97.55	2.45	1.21
1995	99.36	0.64	1.21	99.52	0.48	1.21	99.99	0.01	1.21	97.55	2.45	1.21
1996	99.42	0.58	1.21	99.31	0.69	1.21	99.88	0.12	1.21	97.16	2.84	1.21
1997	99.43	0.57	1.21	99.48	0.52	1.21	99.48	0.52	1.21	94.40	5.60	1.21
1998	99.96	0.04	1.17	99.24	0.76	1.17	99.84	0.16	1.17	97.24	2.76	1.17
1999	99.57	0.43	1.20	99.52	0.48	1.20	99.48	0.52	1.20	95.73	4.27	1.20
2000	99.34	0.66	1.14	98.71	1.29	1.14	99.90	0.10	1.14	95.19	4.81	1.14
2001	99.16	0.84	1.17	97.66	2.34	1.17	99.86	0.14	1.17	95.24	4.76	1.17
2002	99.31	0.69	1.12	98.93	1.07	1.12	99.50	0.50	1.12	94.80	5.20	1.12
2003	99.80	0.20	1.03	99.11	0.89	1.03	99.41	0.59	1.03	94.72	5.28	1.03
2004	99.79	0.21	1.21	98.99	1.01	1.21	99.10	0.90	1.21	94.54	5.46	1.21
2005	99.82	0.18	1.17	98.81	1.19	1.17	98.80	1.20	1.17	94.71	5.29	1.17
2006	99.68	0.32	1.16	99.24	0.76	1.16	99.83	0.17	1.59	94.62	5.38	1.16
2007	99.54	0.46	1.20	96.99	3.01	1.20	99.41	0.59	1.20	90.57	9.43	1.20
2008	99.59	0.41	1.18	98.00	2.00	1.18	99.92	0.08	1.18	93.89	6.11	1.18
2009	99.82	0.18	1.13	99.09	0.91	1.13	99.92	0.08	1.13	95.87	4.13	1.13
2010	99.47	0.53	1.11	98.08	1.92	1.11	99.82	0.18	1.11	94.62	5.38	1.11
2011	99.65	0.35	0.88	98.73	1.27	0.88	99.60	0.40	0.88	96.61	3.39	0.88
2012	99.58	0.42	0.91	99.10	0.90	0.91	99.83	0.17	0.91	95.48	4.52	0.91
2013	99.50	0.50	0.89	98.51	1.49	0.89	99.95	0.05	0.89	93.94	6.06	0.89
2014	99.69	0.31	0.90	98.60	1.40	0.90	99.96	0.04	0.90	94.00	6.00	0.90
2015	99.64	0.36	0.95	98.14	1.86	0.95	99.97	0.03	0.95	92.27	7.73	0.86
2016	99.67	0.33	0.99	98.22	1.78	0.99	100.00	0.00	0.99	93.59	6.41	0.99
2017	99.65	0.35	0.95	98.31	1.69	0.96	99.99	0.01	0.96	92.38	7.62	0.96
2018	99.82	0.18	1.00	98.89	1.11	1.00	99.90	0.10	0.99	92.74	7.26	1.00
2019	99.54	0.46	0.97	98.75	1.25	0.97	99.95	0.05	0.97	92.39	7.61	0.97

OPHP. However, Mehrara et al in a cross-sectional study showed that inequality was higher in rural areas than in urban areas in 2006. (31). The result strengthens the conjecture that the inequality among the forehanded households was higher than the deprived households. Households living in cities, households with insurance coverage, and households in high income levels have experienced more inequality in health care expenditure than competing households. Therefore, high inequality in private health care spending may have meant more access to health services.

Analysis of inequality for Iranian households showed that a small part of this is related to between- group inequalities. However, the trends showed that the inequalities between income deciles as well as between urban and rural households has been increasing in the last decade. This can be attributed to the increased access to health services among high-income urban households. Consequently, it is expected that the need for necessary health services lead to the CHE among the deprived households.

Rezaei et al showed that the prevalence of CHE among Iranian households was 5.26% and was mainly concentrated among socioeconomically disadvantaged households (32). Woldemichael et al. found statistically significant correlations between families' use of dental health care services and their likelihood of developing CHE. Alternative health care financing strategies and policies targeted to the reduction in CHE in general and CHE due to dental services in particular are urgently required in low- and middle-income countries such as Iran (33). Rezaei et al showed that decomposition analyses indicated socioeconomic status as the most important factor contributing to the concentration of CHE among the poor. In contrast, health insurance coverage was found to increase the concentration of CHE among the rich in Iran (34). Allin noted that the main causes of inequality in dental care utilisation included income and insurance coverage (35). Rashidian et al indicated that, from a rural-urban perspective, there was a significant relationship between dental expenditure and households' residential area (p<0.001); thus, urban families were more likely to be exposed to dental expenditure than rural families (36). A study in Nigeria approved that the within-group inequality had more significant influence on total inequality (37), as the findings of this study have achieved.

Although the relative share of between-group and within-group inequalities cannot be considered as the basis for comparing their importance (38), their trends can be a guide for policymakers. Regardless of the fluctuations, the trends of between-group and within-group inequalities in

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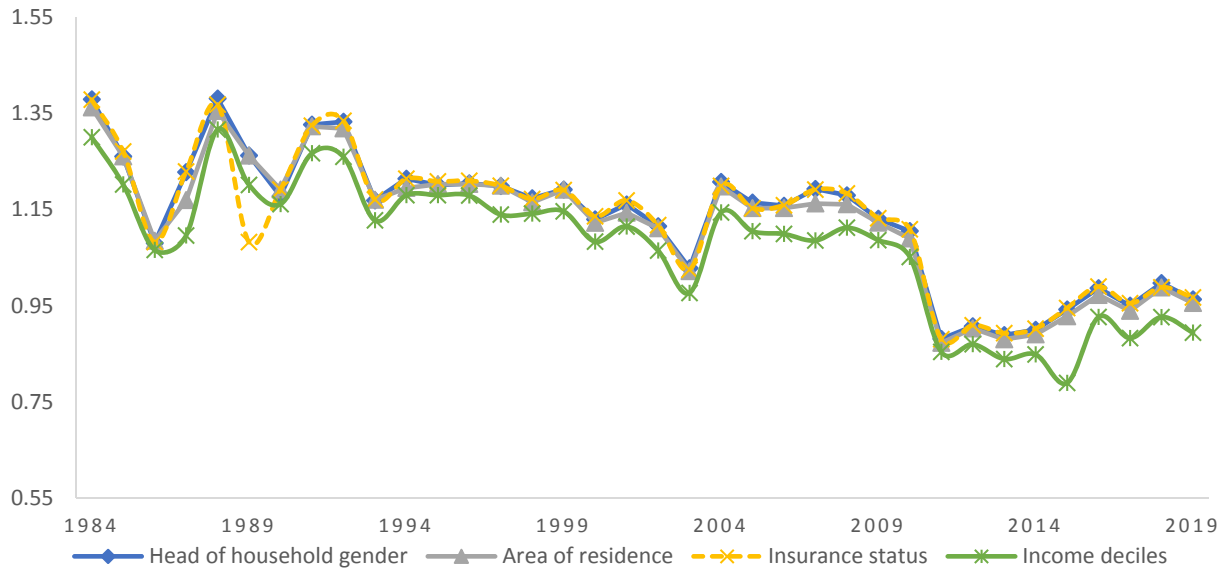

Fig. 8. Within-group inequality decomposed by MLD for selected characteristics of households (1984-2019).

OPHP were almost similar until 2011, they have followed a different path since then. The increase in between-group inequalities indicates that the health care disparities among social groups has intensified. It means that the better-off households have been able to meet their health care needs more easily, which is the result of the expansion of the health care infrastructures. On the other hand, the reduction of intragroup inequality can also be caused by widespread restrictions in the use of health services. Therefore, the interpretation of changes in inequality in OPHP, especially in a country with an inimical insurance system, should be done very cautiously.

For instance, in 2011 an exchange rate shock in Iran, severely damaged people's purchasing power and reduced their capacity to pay for health care (5), including for those who had indispensable and continuous need for health care services, such as people with disabilities or rare diseases. As a result, health services may be pushed out of affordability for some families. In our results, households with better socioeconomic status has had higher inequality in OPHP. Visibly, households who have faced restrictions in accessing health services have experienced less inequality in OPHP. After 2011, between-groups inequalities—especially among households with different income level—increased among all household, while within-group inequality has had a completely opposite trend. It can be said that affluent households meet their health needs better than other groups, resulting in a higher revealed inequality.

This research faced some limitations. One limitation was that data collected by Iranian Statistics Centre are self-reported and thus prone to recall bias. It also represents only the OPHP for health care in the previous month at data gathering time. However, the data collected includes all Iranian payments on health care expenditures. It is also possible that the data include some medically unnecessary services. There is a growing trend to utilize services, such as elective caesareans and cosmetic surgeries, among some Iranian households and this may distort the inequality.

Conclusion

This study aimed to prepare an update time series information on inequality in OPHP and decompose this inequality. Iranian households exhibited a downward trend in OPHP inequality from 1984 to 2019. This reduction in inequality of health care expenditures can be justified by a decreased purchasing power of the households in the health care sector.

A major contribution of the study was to provide a long-term categorized inequality in OPHP for Iranian households. The findings may help to restructure health policies to promote the use of health services and the policy effect assessment.

Acknowledgment

The authors acknowledge the University of Social Welfare and Rehabilitation Sciences for facility supports.

Ethical Approval

This study was conducted based on the principles of ethics in research and ethical approval with the license number IR. USWR REC.1398.201 of the University of Social Welfare and Rehabilitation Sciences. The study uses data provided by the national statistic institution and researchers were not involved in any data gathering process.

Availability of Data

The data used in the study were adopted from the HIESs collected by the Iranian Statistical Center (ISC). https://www.amar.org.ir/english/Statistics-by-Topic/Household-Expenditure-andIncome#2220530-releases

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[DOI: 10.47176/mjiri.36.145]

Authors' Contributions

All authors contributed to the study design. Conceptualization: E.A., M.B.. Data preparation: E.A., M.B. Data analysis: E.A., M.B., S.H.M.K. Methodology: E.A., M.B., A.P. Project administration: M.B. Writing the original draft: E.A. Writing, review and editing: M.B., AP, S.H.M.K.

Abreviations

OPHP: Out of pocket health payment
HIES: Households 'income and expenditure survey
SCI: Statistical Center of Iran.
MLD: Mean logarithmic deviation.
CHE: Catastrophic healthcare expenditure.

Conflict of Interests

The authors declare that they have no competing interests.

References

1. Rezaei S, Woldemichael A, Ebrahimi M, Ahmadi S. Trend and status of out-of-pocket payments for healthcare in Iran: equity and catastrophic effect. J Egypt Public Health Assoc. 2020;95(1):29.
2. Doshmangir L, Rashidian A, Kouhi F, Sergeevich Gordeev V. Setting health care services tariffs in Iran: half a century quest for a window of opportunity. Int J Equity Health. 2020;19(1):112.
3. WHO Global Health Observatory Data. World Health Organization. http://www.who.int/gho/database/en/. Accessed 2014; 15 Feb.
4. Edmonds S, Hajizadeh M. Assessing progressivity and catastrophic effect of out-of-pocket payments for healthcare in Canada: 2010-2015. Eur J Health Econ. 2019 Sep;20(7):1001-1011.
5. Aghapour E, Basakha M, Mohaqeqi Kamal SH, Pourreza A. Inequality in Private Health Care Expenditures: a 36-Year Trend Study of Iranian Households. J Prev Med Public Health. 2022;55:379-388.
6. Akazili J, McIntyre D, Kanmiki EW, Gyapong J, Oduro A, Sankoh O, et al. Assessing the catastrophic effects of out-of-pocket healthcare payments prior to the uptake of a nationwide health insurance scheme in Ghana. Glob Health Action. 2017;10(1):1289735.
7. Kanmiki EW, Bawah AA, Phillips JF, Awoonor-Williams JK, Kachur SP, Asuming PO, et al. Out-of-pocket payment for primary healthcare in the era of national health insurance: evidence from northern Ghana. PLoS One. 2019;14(8):e0221146.
8. Pourasghari H, Jafari M, Bakhtiari M, Keliddar I, Irani A, Afshari M. Analysis of equality in Iranian household healthcare payments during Iran's fourth development program. Electron. Physician. 2016;8(7):2645-2649.
9. Charles-Coll, Jorge A. Understanding income inequality: Concept, causes and measurement. Int J Econ Manag. 2011;1:17–28.
10. Dabla-Norris E, Kochhar K, Ricka F, Suphaphiphat N, Tsounta E. Causes and consequences of income inequality: A global perspective. 2015, IMF Staff Discussion Note 15/13.
11. Rani U, Furrer M. Decomposing income inequality into factor income components: Evidence from selected G20 countries. ILO Research Paper. 2016, Series No.15. Geneva: ILO.
12. Aceytuno MT, Sánchez-López C, de Paz-Báñez MA. Rising Inequality and Entrepreneurship during Economic Downturn: An Analysis of Opportunity and Necessity Entrepreneurship in Spain. Sustainability. 2020;12(11):4540.
13. Berg J. Labour Markets, Institutions and Inequality: Building Just Societies in the 21st Century.Cheltenham: Edward Elgar Publishing, Geneva: ILO 2015.
14. Rani U, Krishnakumar J, Bigotta M. Accounting for income inequality: Empirical evidence from India. Indian Econ. Rev. 2017;52:193–229.
15. Buffie N. The problem of black unemployment: Racial inequalities persist even amongst the unemployed. Washington, DC: Center for Economic and Policy Research; Nov 4, 2015. [October 31, 2016]. CEPR Blog. http://cepr.net/blogs/cepr-blog/the-problem-of-black-unemployment-racial-inequalities-persist-even-amongst-the-unemployed.
16. Ayyash M, Sek SK. Decomposing Inequality in Household Consumption Expenditure in Malaysia. Economies. 2020;8(83).
17. Attanasio OP, Pistaferri L. Consumption inequality. J Econ Perspect. 2016;30:3–28.
18. Jafari M, Bastani P, Ibrahimpour H, Dehnavieh R. Attitude of health information system managers and officials of the hspitals regarding the business producers: A qualitative study. Healthmed. 2012;6(1):208-15.
19. Eshetu EB, Woldesenbet SA. Are there particular social determinants of health for the world's poorest countries? Afr Health Sci. 2011;11(1):108-114.
20. Zere E, Oluwole D, Kirigia JM, Mwikisa CN, Mbeeli T. Inequities in skilled attendance at birth in Namibia: a decomposition analysis'. BMC Pregnancy Childbirth. 2011;11(34):11-34.
21. Barros AJ, Ronsmans C, Axelson H, Loaiza E, Bertoldi AD, França GV, et al. Equity in maternal, newborn, and child health interventions in Countdown to 2015: a retrospective review of survey data from 54 countries'. The Lancet. 2012;379(1):1225-1233.
22. Homaie Rad E, Vahedi S, Teimourizad A, Esmaeilzadeh F, Hadian M, Torabi Pour A. Comparison of the effects of public and private health expenditures on the health status: a panel data analysis in eastern mediterranean countries. Int J Health Policy Manag. 2013;1(2):163–7.
23. Vahedi S, Yazdi-Feyzabadi V, Amini-Rarani M, Mohammadbeigi A, Khosravi A, Rezapour A. Tracking socio-economic inequalities in healthcare utilization in Iran: a repeated cross-sectional analysis. BMC Public Health. 2020;20(1):929.
24. Bazyar M, Rashidian A, Alipouri Sakha M, Vaez Mahdavi MR, Doshmangir L. Combining health insurance funds in a fragmented context: what kind of challenges should be considered? BMC Health Serv Res. 2020;20(1):26.
25. Waghei Y, Niktinat S, Mohtashami Borzadaran Gh. Statistical map analysis of the mean and the gini coefficient of healthcare expenses in Iran. J Res Health. 2015;5(1):28-34.
26. Ekholuenetale M, Barrow A. Inequalities in out-of-pocket health expenditure among women of reproductive age: after-effects of national health insurance scheme initiation in Ghana. J Egypt Public Health Assoc. 2021;96:6.
27. Tambor M, Pavlova M, Woch P, Groot W. Diversity and dynamics of patient cost-sharing for physicians' and hospital services in the 27 European Union countries. Eur J Public Health. 2011;21(5):585-590.
28. Jenkins SP. INEQDECO: Stata module to calculate inequality indices with decomposition by subgroup. 2001. [cited 2021 Feb 22]. Available from: https://ideas.repec.org/c/boc/bocode/s366007.html.
29. Mohammadi A, Shariati R. Investigating the contribution of between group inequality in overall inequality using maximum between-group inequality approach: urban and rural areas of Iran. J Theor Appl Eng. 2018;5(2):177–198 [Article in Persian].
30. Çinaroğlu S. Inequality and inequity in financing out-of-pocket health expenditures: an applied econometric approach. J Bus Res Turk. 2018;10(1):876-897.
31. Mehrara M, Fazaeli AA, Fazaeli AA. Health Finance Equity in Iran: An Analysis of Household Survey Data (1382-1386). J Health Adm. 2010;13(40).
32. Rezaei S, Hajizadeh M. Measuring and decomposing socioeconomic inequality in catastrophic healthcare expenditures in Iran. J Prev Med Public Health. 2019;52(4):214-223.
33. Woldemichael A, Rezaei S, Kazemi Karyani A, Ebrahimi M, Soltani S, Aghaei A. The impact of out-of pocket payments of households for dental healthcare services on catastrophic healthcare expenditure in Iran. BMC Public Health. 2021;21:1474.
34. Rezaei S, Hajizadeh M, Ahmadi S, Sedghi S, Piroozi B, Mohamadi-Bolbanabad A, et al. Socioeconomic inequality in catastrophic healthcare expenditures in Western Iran: A decomposition analysis. Int J Soc Econ. 2019;46(9):1049-1060.

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[DOI: 10.47176/mjiri.36.145]