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Analyzing the Socioeconomic Factors Influencing Household Expenditures on Medical Equipment and Supplies in Iran

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Abstract

Background: The World Health Organization emphasizes the critical role of medical equipment in patient care, noting an increasing demand due to population growth and aging. This study explores the factors influencing out-of-pocket (OOP) payments for medical equipment, examining both households that have made payments and those unable to do so due to financial or geographical limitations.

Objectives: The present study aims to explore the factors influencing OOP payments among households that have made payments for medical equipment and supplies, as well as those that could not due to financial and geographic constraints.

Methods: This cross-sectional study was conducted in two stages, utilizing household budget data from 2023. In the first stage, the Delphi method was employed to reach a consensus among experts on the influencing factors. In the second stage, a double hurdle model was used to assess the impact of these factors on household expenditures. Analyses were conducted using Excel 2019 and Stata 14 software, with a significance level set at 0.05 for all tests.

Results: In the third round of the Delphi method, a panel identified 13 factors affecting household OOP expenditures based on a study of 37,883 predominantly urban, male-headed households. Gamma regression indicated that income and health insurance costs slightly increased health expenditures. The double hurdle model revealed that the gender of the household head significantly influenced participation in medical equipment payments, with female-headed households experiencing a negative impact ($B = -0.117$, $P < 0.05$).

Conclusions: This study demonstrated that socioeconomic factors such as income, health insurance, gender of the household head, and rural residence significantly affect both the decision to participate in the healthcare market and the level of expenditures on medical equipment and supplies. These findings highlight the need for targeted policies to enhance equity in health financing.

Keywords: Health Expenditure, Medical Equipment and Supplies, Double Hurdle, Iran

1. Background

Countries focus on different health priorities, with medical equipment being essential for accurate diagnosis and treatment (1). The World Health Organization highlights its importance for patient prevention, diagnosis, treatment, and rehabilitation. Medical equipment includes various instruments, tools, devices, and machines used in healthcare (2-4). Understanding household behavior is essential for healthcare providers and policymakers to improve service delivery, identify consumer needs, and allocate resources effectively for low-income groups and target populations (5). In Iran, out-of-pocket (OOP) payments account for approximately 40% of total health expenditures, placing a heavy financial burden on low-income families. This underscores the need to understand the factors contributing to these costs to promote fair health financing (6, 7). Iran's healthcare system relies significantly on OOP payments, especially for medical equipment in rural areas, due to limited insurance coverage. This highlights the necessity to explore factors affecting household expenditures, as previous studies have mainly concentrated on

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financially stable households, neglecting those facing financial or geographic difficulties (8-10). The Statistical Center of Iran conducts an annual survey to gather demographic and socioeconomic data on households, focusing on their residence, assets, and spending on food and non-food items to analyze household budgets and expenditure needs (11, 12). Prior studies have extensively explored OOP payments among households that incurred expenses, revealing factors such as income and education as key drivers (13, 14). However, little is known about households that forego payments due to financial or geographic barriers, representing a critical knowledge gap. This study addresses this gap by examining both paying and non-paying households using a double hurdle model to capture participation and expenditure decisions.

2. Objectives

Given the significant share of OOP payments in financing Iran's healthcare system and the fact that OOP payments are considered a key indicator of equity in health financing, this study aims to explore the factors influencing OOP payments among households that have made payments for medical equipment and supplies, as well as those that could not due to financial and geographic constraints.

3. Methods

This cross-sectional study was conducted in two stages using household budget data for 2023.

3.1. Stage 1

The Delphi method was employed to identify socioeconomic factors affecting the costs of medical equipment and supplies for Iranian households. A panel of 30 experts in health management and economics was selected based on their expertise and experience. Consent forms were distributed to ensure participation, and incomplete questionnaires were excluded. Consensus was reached through median scores of 4 or higher and narrow interquartile ranges over three rounds of discussion. Due to geographical dispersion and the impracticality of face-to-face interviews, the Delphi technique was used. The inclusion criteria for panel members were based on their expertise in health management and economics, willingness to participate, researcher availability, and at least 5 years of work experience. To ensure a high response rate, consent forms for participation in the Delphi study were distributed before the start of the study. Failure to complete the questionnaire in full at any stage was considered an exclusion criterion. To reach consensus, up to three Delphi rounds were conducted. In each round, items were rated by the expert panel. Consensus was defined as a median score of 4 or higher, along with a narrow interquartile range (IQR ≤ 1), indicating a high level of agreement. Items not meeting this threshold were re-evaluated in subsequent rounds until consensus was achieved or no further convergence was observed.

3.1.1. Round 1

A literature review analyzed factors affecting healthcare expenditure in Iran from 1999 to 2023, using databases such as Web of Science and PubMed. It focused on keywords related to household and healthcare spending, evaluated by a researcher and a health economics expert. A Delphi panel assessed these factors, while quantitative content analysis identified which variables to keep or modify based on their frequency.

3.1.2. Round 2

A questionnaire was created for panel members to rate various factors on a scale of 1 to 5. The results were compiled into a report displaying response frequencies, median scores, and interquartile ranges. A median score of 4 or higher signified consensus among the panel members.

3.1.3. Round 3

In the third round, each Delphi panel member received a questionnaire that included the variables and ratings created in previous rounds for review. The analysis method at this stage involved calculating the IQR and median scores to assess the level of consensus among experts.

3.2. Stage 2

The study utilized data from the 2023 Household Budget Survey conducted by the Statistical Center of Iran to analyze the impact of various factors on household medical equipment expenditures. This survey includes all households without exclusion criteria and gathers comprehensive information on sociodemographic characteristics, income, and expenditures. Data were collected through face-to-face interviews with household heads, making households the primary unit of analysis. The Household Income and Expenditure Survey (HIES) categorized health expenditures into areas like hospital services, medications, complementary medicine, dental care, and medical equipment and supplies. The medical products

subgroup included family planning devices and thermometers, while the medical equipment subgroup encompassed eyeglasses and mobility aids. Total household spending on medical equipment and supplies was calculated from these categories, and a two-part hurdle model was used to analyze factors influencing household OOP expenses.

3.3. Hurdle Model

The study uses a double-hurdle model to examine factors affecting household spending on medical equipment, as it distinguishes between the likelihood of consumption and the amount spent. This approach is favored over single-equation methods like logit and probit, which may produce errors due to non-random sampling and the assumption that the same factors influence both consumption and spending. Alternative models, such as Heckman and hurdle, have been created to address these issues. The models assume that when a consumer does not make a purchase, the dependent variable is zero, indicating a boundary solution where consumers optimize for zero expenditure due to constraints. In the theory of consumer behavior, a boundary optimum refers to a situation in which a consumer makes an optimal allocation of resources (such as budget) such that the consumption of one or more goods or services is completely zero, while the consumption of other goods is positive. This usually occurs when the consumer's utility function and budget constraint are such that utility maximization occurs at one of the boundary points of the choice set, rather than within it. In contrast to the interior solution, in which the consumption of all goods is positive, a corner solution indicates a strong preference by the consumer to allocate all resources to a subset of goods. Based on the research conducted, the double-hurdle model is more flexible than the Heckman model, and its findings are more consistent with reality, providing a better fit to the data. In addition, it does not require the assumption of normality of errors (15-18). Therefore, zero consumption values may arise from corner solutions, non-participation, infrequent consumption, or unobserved data. Consumers need to decide to participate and determine their spending amount to report positive consumption, especially for medical equipment and supplies.

Data analysis was performed with Stata 14, accounting for confounders such as age, gender, and region affecting health expenditure patterns. The study followed ethical standards by utilizing anonymized data from the Statistical Center of Iran to protect participant privacy.

4. Results

4.1. Findings from Literature Review and Delphi Panel

Three rounds of surveys were conducted with participation rates of 83% in the first round and 75% in the subsequent rounds. The study identified 16 variables impacting household OOP expenditures. In the second round, 6 variables achieved high consensus, 6 had moderate consensus, and 4 had low consensus. By the third round, 13 key factors influencing household OOP expenditures were selected based on panel consensus.

4.2. Findings from Analysis and Distribution of Selected Socioeconomic Variables of the Samples

In this phase of the study, 37,883 households were analyzed based on the variables identified in the previous phase. Of these, 1,994 households had a total expenditure of 126,006,367,613 Rials on medical supplies and equipment. The variables finalized in the first phase were also integrated and aligned with the data available in the HIES, such as income, gender, and region. Over 50% of the study population, consisting of 19,640 households, lived in urban areas. Most household heads (83%) were male, with the largest age group being 31 - 43 years (29.2%) and the smallest being those over 83 years. About 29% of household heads had primary education, and 60.98% were employed. More than 80.1% were married. Additionally, 10,150 households did not own their homes, and 9,748 had elderly members aged 65 or older or children under 5.

4.3. Gamma Regression Estimation Findings

The analysis in Table 1 shows that income and health insurance expenditures have a slight positive effect on household health spending, while urban residency has a negative impact. The gender and age of the household head do not significantly affect health expenditures. Employed heads of households and those with income exhibit a significant negative effect on health spending. Married heads tend to spend more on health than single heads, and higher education levels of the household head are associated with increased health expenditures, even among the literate.

4.4. Results from the Two-Part Hurdle Model Estimation

The study analyzed household participation in funding medical equipment and supplies, focusing on participation likelihood and expenditure levels (Table 2). It revealed that higher household insurance expenditures led to increased spending on medical

Table 1. Gamma Regression Between Total Health Expenditure and Socioeconomic Variables of Iranian Households in 2023 [a, b, c]

Total Health Expenditure	Coefficient	Standard Error	Z	P-Value	95% Confidence Interval		Unadjusted	
							Coefficient	95% Confidence Interval
Income	0	0	9. 05	0	0	0	0	(0 to 0)
Insurance expenditure	0	0	10. 7	0	0	0	0	(0 to 0)
Region								
Urban	-0. 13	0. 031	-2. 91	0	-0. 18	-0. 06	-0.16	(-0.21 to -0.12)
Rural	Reference							
Gender								
Male	0. 02	0. 09	0. 12	0. 82	-0. 16	0. 18	0.01	(-0.15 to 0.17)
Female	Reference							
Chilled below 5 or elderly above 65								
No	0. 02	0. 05	0. 34	0. 65	-0. 01	0. 13	0.03	(-0.09 to 0.14)
Yes	Reference							
Age								
18 - 30	-0. 19	0. 14	-1. 23	0. 29	-0. 43	0. 09	-0.12	(-0.68 to 0.03)
31 - 43	-0. 11	0. 12	-0. 99	0. 13	-0. 32	0. 11	-0.17	(-0.27 to 0.27)
44 - 56	0. 02	0. 15	0. 11	0. 45	-0. 19	0. 23	0.09	(-0.46 to 0.39)
57 - 69	0. 12	0. 06	1. 01	0. 60	-0. 09	0. 29	0.19	(-0.01 to 0.91)
70 - 82	0. 09	0. 07	0. 7	0. 86	-0. 09	0. 26	0.07	(-0.08 to 0.21)
< 83	Reference							
Employment status								
Employed	-0.26	0. 13	-2. 49	0. 01	-0. 61	-0. 07	-0.62	(-0.11 to -0.73)
Unemployed without income	-0.33	0. 18	-1. 41	0. 15	-0. 62	0. 10	-0.29	(-0.82 to 0.89)
Unemployed with income	-0. 65	0. 13	-1. 29	0. 02	-0. 58	-0. 04	-0.55	(-0.61 to 0.03)
Student	0	(omitted)	-	-	-	-	-0.29	-
Housekeeper	-0. 05	0. 19	-0. 28	0. 78	-0. 42	0. 31	-0.26	(-0.61 to -0.07)
Other	Reference							
Marital status								
Married	0. 49	0. 14	3. 44	0. 00	0. 21	0. 78	0.41	(0.24 to 0.81)
Widow	0. 41	0. 14	2. 87	0. 00	0. 13	0. 70	0.49	(0.16 to 0.76)
Divorced	0. 59	0. 18	3. 21	0. 00	0. 23	0. 96	0.74	(0.16 to 0.91)
Single	Reference							
Ownership status								
Real estate and nobles	0. 79	0. 58	1. 37	0. 171	-0. 34	1. 93	0.77	(-0.33 to 1.93)
Real estate	0. 58	0. 61	0. 94	0. 346	-0. 62	1. 79	0.78	(-0.36 to 1.22)
Rent	0. 77	0. 58	1. 33	0. 183	-0. 36	1. 92	0.97	(-0.24 to 1.38)
Mortgage	0. 85	0. 58	1. 45	0. 146	-0. 29	2. 01	0.98	(-0.79 to 1.92)
For service	1. 02	0. 61	1. 67	0. 096	-0. 17	2. 22	0.22	(-0.34 to 1.39)
Free	0. 66	0. 58	1. 14	0. 255	-0. 48	1. 81	0.39	(-0.94 to 1.92)
Other	Reference							
Educational status								
Illiterate	0. 01	0. 16	0. 08	0. 93	-0. 30	0. 32	0.68	(-0.48 to 1.93)
Elementary	0. 28	0. 16	1. 79	0. 07	-0. 02	0. 60	0.53	(0.36 to 1.2)
Intermediate	0. 29	0. 16	1. 79	0. 07	-0. 02	0. 61	0.34	(0.24 to 0.38)
Secondary	0. 71	0. 20	3. 53	0	0. 32	1. 11	0.25	(0.19 to 0.54)
Diploma	0. 47	0. 16	2. 89	0. 00	0. 15	0. 8	0.46	(0.34 to 1.3)
Post-diploma	0. 44	0. 17	2. 52	0. 01	0. 1	0. 8	0.31	(0.24 to 0.92)
Bachelor's	0. 57	0. 17	3. 38	0. 00	0. 24	0. 90	0.01	(0.0 to 0.14)
Master	0. 77	0. 19	4. 16	0	0. 41	1. 14	0.87	(0.4 to 0.99)
Ph.D.	0. 42	0. 32	1. 33	0. 18	-0. 20	1. 05	0.74	(-0.44 to 0.92)
Other	Reference							
Constant	13. 76	0. 65	21	0	12. 48	15. 05	-	-

[a] BIC = -191828. 5.

[b] Log likelihood = -378943. 9507.

[c] AIC = 32. 23681.

supplies (B = 870, P < 0.001). Female-headed households were less likely to participate in payments (B = -0.117, P < 0.05), and living in rural areas also reduced participation likelihood (B = -0.113, P < 0.001).

5. Discussion

This study investigates the socioeconomic factors affecting Iranian households' spending on medical equipment and supplies in 2023. The two-part hurdle model analysis found that rural living significantly decreases the likelihood of households spending on medical equipment and supplies (B = -0.113, P < 0.001). This is primarily due to limited insurance coverage for private healthcare and a reliance on traditional medicine, as rural insurance schemes often do not cover private facilities, resulting in lower health expenditures and insufficient insurance for private hospitals. A study revealed that rural households in Iran are less inclined to pay for health services and spend less on medication than urban households, mainly due to extensive insurance coverage and reliance on public services. Traditional medicine plays a vital role in rural culture, with many residents, especially those with chronic illnesses, using complementary medicine. Consequently, rising health expenditures may result in decreased spending in rural areas (19-22).

The regression analysis revealed that the education level of the household head positively influences health

Table 2. Two-Part Hurdle Model Between Medical Equipment and Supplies Expenditure and Socioeconomic Variables of Iranian Households in 2023

Explanatory Variables	Medical Equipment and Supplies Expenditure									
	First Hurdle					Second Hurdle				
	Coefficient	SE	z	P-Value > z	Confidence Interval	Coefficient	SE	t	P-Value > t	Confidence Interval
Region										
Urban	Reference									
Rural	-0. 1131909	0. 016543	-6. 84	0	-0. 1456146	-0. 0807672	-710829. 4	113066. 4	-6. 29	0	-932442. 5	-489216. 2
Gender										
Male	Reference									
Female	-0. 1172563	0. 0418278	-2. 8	0. 005	-0. 1992373	-0. 0352752	-530730. 2	288444. 1	-1. 84	0. 066	-1096088	34627. 86
Chilled below 5 or elderly above 65										
No	Reference									
Yes	0. 0915882	0. 0331254	2. 76	0. 006	0. 0266636	0. 1565128	616178. 6	224236. 9	2. 75	0. 006	176668. 4	1055689
Family size	0. 0214482	0. 0063868	3. 36	0. 001	0. 0089304	0. 033966	174916. 8	43675. 42	4	0	89311. 81	260521. 8
Income	2. 58E-11	6. 32E-12	4. 09	0	1. 35E-11	3. 82E-11	0. 0001777	0. 0000431	4. 12	0	0. 0000932	0. 0002622
Age										
18 - 30	Reference									
31 - 43	0. 150861	0. 0404535	3. 73	0	0. 0715737	0. 2301483	932164. 9	279381. 4	3. 34	0. 001	384570	1479760
44 - 56	0. 2083121	0. 041417	5. 03	0	0. 1271363	0. 289488	1221422	286014. 3	4. 27	0	660826. 1	1782017
57 - 69	0. 2144894	0. 0443368	4. 84	0	0. 1275909	0. 301388	1494053	305208. 7	4. 9	0	895835. 8	2092270
70 - 82	0. 0801141	0. 057466	1. 39	0. 163	-0. 0325171	0. 1927453	643432. 4	393557. 3	1. 63	0. 102	-127950. 3	1414815
83 >	0. 0347418	0. 0718975	0. 48	0. 629	-0. 1061746	0. 1756583	225955. 7	495044. 3	0. 46	0. 648	-744344. 4	1196256
Marital status										
Married	Reference									
Widow	-0. 0143306	0. 0438642	-0. 33	0. 744	-0. 1003028	0. 0716415	-79846. 29	301999. 7	-0. 26	0. 791	-671773. 6	512081
Divorced	-0. 0302301	0. 0658203	-0. 46	0. 646	-0. 1592355	0. 0987754	-37874. 85	451412. 8	-0. 08	0. 933	-922655. 9	846906. 2
Single	-0. 1346237	0. 0742159	-1. 81	0. 07	-0. 2800841	0. 0108367	-873340. 4	514804. 2	-1. 7	0. 09	-1882370	135689. 4
Ownership										
Real estate and nobles	Reference									
Real estate	-0. 0182806	0. 1127479	-0. 16	0. 871	-0. 2392625	0. 2027013	-331201. 1	771799. 3	-0. 43	0. 668	-1843948	1181546
Rent	0. 0536918	0. 0267544	2. 01	0. 045	0. 0012541	0. 1061295	236488. 6	181942. 6	1. 3	0. 194	-120123. 8	593100. 9
Mortgage	0. 103645	0. 0419052	2. 47	0. 013	0. 0215123	0. 1857776	477288. 3	284425. 3	1. 68	0. 093	-80192. 72	1034769
For service	-0. 0898891	0. 0835604	-1. 08	0. 282	-0. 2536644	0. 0738862	-466203. 4	570875. 7	-0. 82	0. 414	-1585135	652728
Free	0. 003647	0. 0303101	0. 12	0. 904	-0. 0557598	0. 0630537	-18342. 09	207479. 1	-0. 09	0. 93	-425006. 6	388322. 4
Other	-0. 346791	0. 306261	-1. 13	0. 257	-0. 9470514	0. 2534695	-2354942	2145621	-1. 1	0. 272	-6560415	1850532
Employment status										
Employed	0. 2856	0. 1615	1. 5100	0. 1011	-0. 0573	0. 5223	-0. 1601	3. 0160	-0. 0501	0. 6310	-3. 1013	1. 8014
Unemployed without income	0. 2741	0. 0308	3. 0210	0. 0050	0. 0655	0. 3027	-0. 5175	0. 6329	-0. 2700	0. 1095	-2. 0478	0. 8799
Unemployed with income	1. 2741	0. 2158	4. 0318	0. 1254	0. 8974	0. 4871	-0. 1124	0. 7895	-0. 5632	0. 0095	-1. 5631	0. 6941
Student	0. 2741	0. 0308	3. 0210	0. 0050	0. 0655	0. 3027	0. 3654	0. 1234	-0. 3214	0. 3563	1. 9203	0. 2710
Housekeeper	0. 2741	0. 6357	6. 2142	0. 5103	0. 7021	0. 4800	0. 5175	0. 6021	-0. 7524	0. 4030	0. 1354	0. 4799
Other	Reference									
Educational status										
Illiterate	Reference									
Elementary	0. 1711534	0. 0253646	6. 75	0	0. 1214396	0. 2208672	1123124	174323. 5	6. 44	0	781445. 8	1464803
Intermediate	0. 2769012	0. 0298297	9. 28	0	0. 218436	0. 3353664	1646081	204752. 1	8. 04	0	1244761	2047401
Secondary	0. 4421637	0. 0702977	6. 29	0	0. 3043827	0. 5799447	2717211	474073. 9	5. 73	0	1788013	3646408
Diploma	0. 3513737	0. 0298557	11. 77	0	0. 2928576	0. 4098899	2033106	204839. 6	9. 93	0	1631615	2434597
Post-diploma	0. 4138134	0. 0456204	9. 07	0	0. 324399	0. 5032278	3161588	305138. 1	10. 36	0	2563509	3759666
Bachelor's	0. 4035432	0. 0370399	10. 89	0	0. 3309463	0. 4761401	2461110	252212. 4	9. 76	0	1966768	2955453
Master	0. 3297984	0. 0549959	6	0	0. 2220084	0. 4375885	2203274	372119. 3	5. 92	0	1473910	2932638
Ph. D.	0. 401318	0. 1402558	2. 86	0. 004	0. 1264216	0. 6762143	3261912	923349. 9	3. 53	0	1452122	5071702
Other	0. 5194176	0. 0799026	6. 5	0	0. 3628114	0. 6760238	2764735	539310. 8	5. 13	0	1707672	3821799
Insurance Costs	0. 1589481	0. 025201	6. 31	0	0. 109555	0. 2083412	870874. 9	172971. 8	5. 03	0	531845. 7	1209904
Constant	-1. 238229	0. 0776896	-15. 94	0	-1. 390497	-1. 08596	-9622840	539520. 6	-17. 84	0	-10700000	-8565365
LR chi ^{2}	749. 13					576. 76				
Probability	0					0				
Pseudo R ^{2}	0. 0206					0. 0022				
Log-likelihood	-17847. 497					-130001. 2				

expenditures. Higher education is associated with lower treatment costs and increased preventive spending, indicating more efficient health investments. Educated individuals often incur higher medication costs due to their higher-paying jobs and a greater emphasis on health for workforce participation. Furthermore, those with higher education possess better knowledge of health inputs, leading to improved decision-making regarding health expenditures (23-27).

Regression findings indicated that employed household heads and income negatively affected household health expenditures, contrasting with Faraji et al.'s results (28), which found no significant employment impact, likely due to sample size differences. Health is a necessity with low elasticity, prompting unemployed, student, and low-income households to pursue healthcare despite financial limitations. Therefore, healthcare services should be prioritized in household support. Additionally, higher income may lead to lower essential medical expenses due to better insurance, while spending on discretionary services, such as cosmetic surgeries, tends to rise with income, as noted by Wu et al. (29).

The regression analysis indicates that housing ownership status does not significantly impact household health expenditures, with research showing

no major differences in health spending between homeowners and non-homeowners. Homeownership does not improve the ability to pay for healthcare, and housing costs often take priority in budgets, resulting in unmet health needs. The study also found that households with housing loans face challenges in affording medication costs (23, 28, 30).

The study finds that male-headed households positively influence willingness to consume and medication spending, aligning with previous research in Iran that shows higher poverty rates among female-headed households. Men typically have better job prospects and incomes, leading to greater economic security and health expenditures. Additionally, research from Ethiopia indicates that female-headed households are 2.92 times more likely to incur catastrophic OOP expenses compared to male-headed ones, a trend also seen in Austria. Furthermore, self-medication is more common among women, highlighting their financial challenges (30-35).

The study indicates that household insurance costs have a small but significant impact on overall health spending in Iran. While basic insurance plans fully cover inpatient services, they offer limited support for medical equipment, leading to higher OOP expenses. Insured households utilize health services more, whereas the uninsured face financial barriers. However, health insurance does not substantially lower health expenditures, and deficiencies in the insurance system may promote self-medication, which could result in further health issues (28, 36).

Households with children under 5 or elderly members over 65 face higher health expenditures, particularly those led by individuals aged 44 - 69. This age group experiences increased health costs due to chronic diseases and polypharmacy, resulting in greater expenses for these households (37).

5.1. Conclusions

The study highlights the significant impact of household socioeconomic factors on healthcare-seeking behavior and health expenditures, particularly in Iran's aging population. Policymakers need to identify these factors to create effective health cost management strategies. Enhancing socioeconomic status can lower health expenditures and disparities, especially through job creation for female-headed households, self-care education, preventive measures for non-communicable diseases, promotion of generic drugs, full implementation of the family physician system, and improved insurance coverage for the elderly. Continuous monitoring of OOP health expenses is also crucial.

5.2. Limitations and Strengths

The study may have recall bias due to reliance on survey data rather than patient bills and cannot specify types of medical equipment. However, it has a large sample size of 37,883 households and uses a double hurdle model to manage zero expenditures effectively.

Footnotes

Authors' Contribution: Study concept and design: B. H.; Acquisition of data: S. M.; Analysis and interpretation of data: D. Kh.; Drafting of the manuscript: D. Kh.; Critical revision of the manuscript for important intellectual content: M. R.; Statistical analysis: D. Kh.; Administrative, technical, and material support: T. Sh.; Study supervision: B. H.

Conflict of Interests Statement: The authors declare no conflict of interests.

Data Availability: The data presented in this study are openly available in Statistical Center of Iran.

Ethical Approval: The present study was approved with the code 162606892 by Islamic Azad University, Khomeinishahr Branch, and Isfahan, Iran.

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Informed Consent: Informed consent was obtained from all participants.

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