



# Hidden burden of non-medical spending associated with inpatient care among the poor in Afghanistan

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## Abstract

**Objectives** To elucidate the household payments required for medical and non-medical spending for inpatient health care and examine the pattern of household payments according to household economic status and the degree of remoteness of the area of residence.

**Methods** The subjects were 5940 individuals included in a nationally representative survey in 2010. Their medical (diagnosis and medicine) and non-medical (accommodation and transportation) expenses for their most recent hospitalization were analyzed.

**Results** Compared with the richest group, the poorest group paid less for diagnosis and medicine (AOR = 0.37,  $P < 0.001$ ; AOR = 0.78,  $P = 0.009$ , respectively), paid similar amounts for accommodation (AOR = 1.19,  $P = 0.164$ ), and more for transportation (AOR = 2.09,  $P < 0.001$ ). Residents in urban areas paid less than residents in rural areas for accommodation and transportation (AOR = 0.73,  $P < 0.001$ ; AOR = 0.58,  $P < 0.001$ , respectively).

**Conclusions** Poor households paid less for diagnosis and medicine, but more for transportation related to inpatient care. Non-medical spending for inpatient care among the poor should be considered for affordable and accessible health-care utilization.

**Keywords** Afghanistan · Financial burden · Medical and non-medical payments · Poor

## Introduction

Paying at the point of health-care services from a household source is a widespread mode of health-care financing in developing countries (O'Donnell et al. 2008). Reportedly, the bulk of spending on health care in low-income countries (76 %) is private, with more than 90 % of private health-care spending (70 % of total health-care spending) coming from households (Schieber et al. 2007).

Afghanistan has experienced long years of devastating conflict. Consequently, most of the country's infrastructure has been disrupted, including the health-care and social welfare systems. Over the past decade, considerable efforts have been made by the government and international agencies to restore the country's health-care system and to provide quality health-care services. As a result of these efforts, particularly by introducing the Basic Package of Healthcare Services and an Essential Package of Hospital Services, Afghanistan has made substantial progress in its health care (Edward et al. 2011; Newbrander et al. 2014). The maternal mortality ratio has fallen from 1600/100,000 live births in 2002 (Bartlett et al. 2005) to 327/100,000 live births in 2010 (Rasooly et al. 2014). Similarly, the under-five mortality rate decreased from 257/1000 live births in 2002 (UNICEF 2004) to 97/1000 live births in 2010

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(Rasooly et al. 2014). During the same period, access to basic health-care services has dramatically increased from 9 % before 2002 to 85 % in 2008 (Acerra et al. 2009). However, considerable challenges remain for the health-care system and quality health-care services in Afghanistan. One of the distinct challenge is health-care financing (Acerra et al. 2009).

In Afghanistan, the government's share in the total health-care expenditure is only 6 % and 18 % and is funded by international donors (Ministry of Public Health Afghanistan 2011). Health insurance systems are not available yet. Therefore, payment from a household source is the dominant mode of health-care financing. According to a national health account report (Ministry of Public Health Afghanistan 2011), 76 % of total health-care payments are paid from private sources, of which 99 % is household money.

In developed countries, risk protection mechanisms protect households against the severe financial burden of high medical payments for health care (Xu et al. 2007). However, in some developing countries, socioeconomically disadvantaged populations spend a higher proportion of their household income on health care and can experience catastrophic spending (Muhammad Malik and Azam Syed 2012; Sulku and Bernard 2012). As a consequence, such populations are restricted from seeking health-care services when needed (Makinen et al. 2000) and are sometimes pushed into severe impoverishment (van Doorslaer et al. 2006), because of the need to sell household assets (Kruk et al. 2009), disability (Pham et al. 2013), and a higher burden for medical care that must be paid as an out-of-pocket expense (Rahman et al. 2013).

Over and above the direct medical health-care payments (diagnosis fee, physician fee, medicine costs, etc.), there are direct non-medical health-care payments such as for accommodation and transportation, the hidden cost of health care. According to reports from Serbia, Sri Lanka, and Zambia, non-medical payments can be a substantial proportion of a household's spending on health care (Bredenkamp et al. 2011; Attanayake et al. 2000; Needham et al. 2004).

The findings from Sri Lanka and Zambia mentioned above were based on small-scale studies and a single disease burden. However, in some developing countries the share of the non-medical burden is still high and is not included in many estimates of household spending on health care (Xu et al. 2007). Therefore, further investigation will help policy makers to become more aware of the burden of non-medical payments. The patterns and the burden of health-care payments have not yet been studied in Afghanistan, and data in relation to household socioeconomic status is scarce. Therefore, using a nationwide survey, this study attempted to elucidate the household

payments in Afghanistan for medical and non-medical spending related to inpatient health care where the physician fee, hospital fee, and basic medicine are provided free of charge and to examine the patterns of household payments according to the household economic status, remoteness of the area of residence, and living in urban or rural area in Afghanistan.

## Methods

### Data source

Our study used data from the Afghanistan Mortality Survey (AMS) conducted in 2010, which surveyed mortality, health-care use, and household expenditures related to health-care use; the survey included responses from 22,351 households from all 34 provinces selected using a stratified multistage sampling method and was performed by the Ministry of Public Health and the Central Statistic Organization of Afghanistan (Ministry of Public Health Afghanistan 2010).

Information was collected through face-to-face interviews in Pashto or Dari, the two most widely spoken languages in the country. Interviews were conducted at each individual's household by a team of two male and two female interviewers who had been trained to administer the interview.

The following information regarding the household members was used for the current analysis: demographic and socioeconomic characteristics, inpatient health-care utilization, and household expenses for medical (diagnosis and medicine) and non-medical (accommodation and transportation) expenses related to inpatient care.

### Demographic and socioeconomic variables

Information regarding the age and sex of the individual household members belonging to the household and the place of residence (urban/rural), wealth status, and remoteness of the area of residence of the household were used for the analysis.

Wealth status is an index of socioeconomic status and was constructed through a principal component analysis using household asset data and dwelling characteristics: television, bicycle or car, source of drinking water, sanitation facilities, and type of material used for flooring (Ministry of Public Health Afghanistan 2010). The subjects were then divided into quintiles [WQ1 (poorest), WQ2, WQ3, WQ4, and WQ5 (richest)].

The remoteness of the area of residence is an index developed using cluster-level information, including availability of a cell phone signal in the center of the

cluster, a paved road into the cluster, and a police station or post in the cluster, the presence of the highest available medical facility, the highest level of school, and the frequency of public transportation to and from the cluster. This index describes the degree of the household distance from a service center (Ministry of Public Health Afghanistan, 2010). The subjects were then divided into quintiles [RQ1 (most remote), RQ2, RQ3, RQ4, and RQ5 (least remote)].

#### Variables in health-care use and household spending

The information used for the analysis was: whether or not a household member had experienced an overnight stay in a hospital in the previous 12 months; how many nights that person had spent in the most recent stay, and whether it had been at a public, private, or some other type of health-care facility.

Information was obtained on household spending related to the most recent inpatient stay by individual household members. The following items were used for analysis in this study: the total amounts spent and the amounts by components. The components of diagnosis and medicine were referred to as medical spending, and accommodation and transportation were referred to as non-medical spending.

Payments related to diagnosis included medical examinations, such as blood and urine tests, X-ray, electrocardiogram, ultrasound, computed tomography, endoscopy examinations, and pathological tests.

Payments related to medicine included the purchase of medicine during inpatient care in hospitals. In principle, basic medicines, such as first-line analgesics and antibiotics, were provided free of charge. However, most patients were required to purchase some medicine.

Payments related to accommodation mainly covered patients' health-care needs. However, these payments covered some of the caregiver expenses as well and included payments for food for the patients and their caregivers, including special nutritional foods for patients, lodging for the caregivers, expenses for private hospital rooms, bedsheets, and blankets. In Afghanistan, when patients stay at a public hospital, the bedroom, bedsheets, and blankets are provided without charge, in principle. In practice, many patients are required to purchase extra sheets or blankets. When patients stay at a private hospital, they have to pay all costs for the bedroom, sheets, and blankets.

Payments related to transportation included payments for the use of a non-ambulance vehicle to and from the hospital and to and from other health-care facilities for diagnostic tests performed during inpatient care.

The amount of payment was reported in Afghani currency (50 Afghani = 1 USD, as of the survey time in April 2010).

#### Statistical analysis

The percentages of subjects who stayed overnight in hospitals during the previous 12 months were calculated according to the socioeconomic characteristics of the household. The frequencies of the demographic and socioeconomic characteristics of the patients, types of health-care facility, and number of nights in the hospital among the subjects reporting at least one hospital stay during the previous 12 months were also calculated.

The descriptive distributions of the amounts of household payments related to inpatient care were examined. These distributions were further analyzed to explore the burden of medical and non-medical household payments among households with different socioeconomic characteristics.

The health-care payments are characterized by a positively skewed distribution with a large number of zeroes and heavy upper tails (Mullahy 2009). Using a log transformation or an ordinary least squares model is inappropriate for this unique sample selection and could generate biased results (Gregori et al. 2011). Therefore, in this study, the amounts of payment for the total and for each of the components were individually categorized into five classes: (1) 0–1000; (2) 1001–3000; (3) 3001–5000; (4) 5001–10,000; (5) 10,001 or more (in Afghani). These categories were used for the ranked order for further analyses.

A bivariate ordinal logistic regression analysis was performed to quantify the difference in the burden of each type of medical and non-medical household payment associated with inpatient care among subjects with different socioeconomic characteristics. To adjust for confounding socioeconomic characteristics, a multivariate ordinal logistic model was used to identify independent associations between the type of household payment related to inpatient care and the socioeconomic characteristics of the study participants. An ordinal logistic regression model is the best fit when the response variable is an ordinal and ordered in a natural way (Bender and Grouven 1997).

The survey included a household sampling weight; we did not adjust our analysis for the sampling weight because the results were similar when the survey sampling weight was used. All the analyses were performed using SPSS version 18.0.  $P < 0.05$  indicates significant difference.

#### Ethics

The institutional review board at the MoPH approved the study protocol for the AMS 2010. According to this protocol, prior to collecting data, the interviewer read the consent form to the participants and briefly explained the

aims and the importance of the study, freedom of participation, and confidentiality of information. All participants gave informed written consent.

## Results

A total of 180,676 subjects were interviewed from 22,351 randomly selected households. Among them, 7542 subjects reported at least one overnight stay in a hospital during the 12 months prior to the interview. Table 1 shows the percentage of patients who had overnight stays according to their area of residence, wealth quintile, and remoteness quintile. The rate of inpatient care use did not differ greatly according to whether a subject resided in an urban or rural area, wealth status, and remoteness of the area of residence.

Table 2 shows the socio-demographic and health-care utilization characteristics of the patients who had paid for recent overnight hospital stays during the previous 12 months. Among them, 67.6 % were living in rural areas, 28.5 % belonged to the richest wealth quintile, and 23.6 % were living in the most remote areas. Overall, 78.3 % of the patients used public health-care facilities, and 29.8 % of them stayed in the hospital for 6 days or longer.

Table 3 shows the distribution of the amounts of spending in total and for each component of medical and

**Table 1** Percentage of patients who had overnight stays in hospital in the previous 12 months (Afghanistan 2010)

	Total <i>n</i>	Overnight stay	
		<i>n</i>	%
All	180,676	7542	4.2
Area of residence			
Urban	56,174	2444	4.4
Rural	124,502	5098	4.1
Wealth quintile			
WQ1 (poorest)	29,056	1105	3.8
WQ2	30,325	1326	4.4
WQ3	33,159	1318	4.0
WQ4	37,612	1644	4.4
WQ5 (richest)	50,524	2149	4.3
Remoteness quintile			
RQ1 (most remote)	41,847	1781	4.3
RQ2	46,723	1919	4.1
RQ3	36,220	1558	4.3
RQ4	32,437	1322	4.1
RQ5 (least remote)	23,449	962	4.1

Total refers to the total number of patients in the survey; WQ1 = poorest, WQ5 = richest, RQ1 = most remote, RQ5 = least remote

**Table 2** Characteristics of patients who had overnight stays in the hospital in the previous 12 months (Afghanistan 2010)

	<i>N</i>	%
All	7542	100.0
Age (years)		
0–19	2987	39.6
20–39	2301	30.5
40–59	1383	18.3
≥60	868	11.5
DK	1	0.0
Missing	2	0.0
Area of residence		
Urban	2444	32.4
Rural	5098	67.6
Wealth quintile		
WQ1 (poorest)	1105	14.7
WQ2	1326	17.6
WQ3	1318	17.5
WQ4	1644	21.8
WQ5 (richest)	2149	28.5
Remoteness quintile		
RQ1 (most remote)	1781	23.6
RQ2	1919	25.4
RQ3	1558	20.7
RQ4	1322	17.5
RQ5 (least remote)	962	12.8
Type of health-care facility		
Private	1326	17.6
Public	5904	78.3
Others	119	1.6
Missing	193	2.6
Nights in health-care facility		
1–5	5189	68.8
6–10	1385	18.4
11–15	364	4.8
16–20	189	2.5
≥21	310	4.1
Missing	105	1.4

DK do not know, WQ1 poorest, WQ5 richest, RQ1 most remote, RQ5 least remote, “Others” refers to specialized hospitals such as trauma centers, drug addiction treatment centers, rehabilitation hospitals, and so on

non-medical inpatient care from household sources. The total amount of payments ranged from 20 to 8,00,000 Afghani, and nearly half (47.6 %) of the patients had spent more than 5000 Afghani in total for inpatient care during their recent overnight stay in the hospital. The means for the amounts of spending according to the cost categories were 11,091, 1677, 5879, 1585, and 1950 Afghani in total and for diagnosis, medicine, accommodation, and

**Table 3** Distribution of inpatient care payment (in Afghani) during recent overnight stays in the hospital in the previous 12 months (Afghanistan 2010)

	<i>N</i>	%	Mean
All	5490	100.0	
Total payment			11,091
20–1000	594	10.8	
1001–3000	1357	24.7	
3001–5000	927	16.9	
5001–10,000	1196	21.8	
10,001–8,00,000	1416	25.8	
Diagnosis			1677
0–1000	4286	78.1	
1001–3000	666	12.1	
3001–5000	232	4.2	
5001–10,000	181	3.3	
10,001–3,00,000	125	2.3	
Medicine			5879
0–1000	1690	30.8	
1001–3000	1715	31.2	
3001–5000	727	13.2	
5001–10,000	791	14.4	
10,001–5,00,000	567	10.3	
Accommodation			1585
0–1000	4008	73.0	
1001–3000	958	17.4	
3001–5000	265	4.8	
5001–10,000	172	3.1	
10,001–2,50,000	87	1.6	
Transportation			1950
0–1000	3668	66.8	
1001–3000	1025	18.7	
3001–5000	410	7.5	
5001–10,000	272	5.0	
10,001–2,50,000	115	2.1	

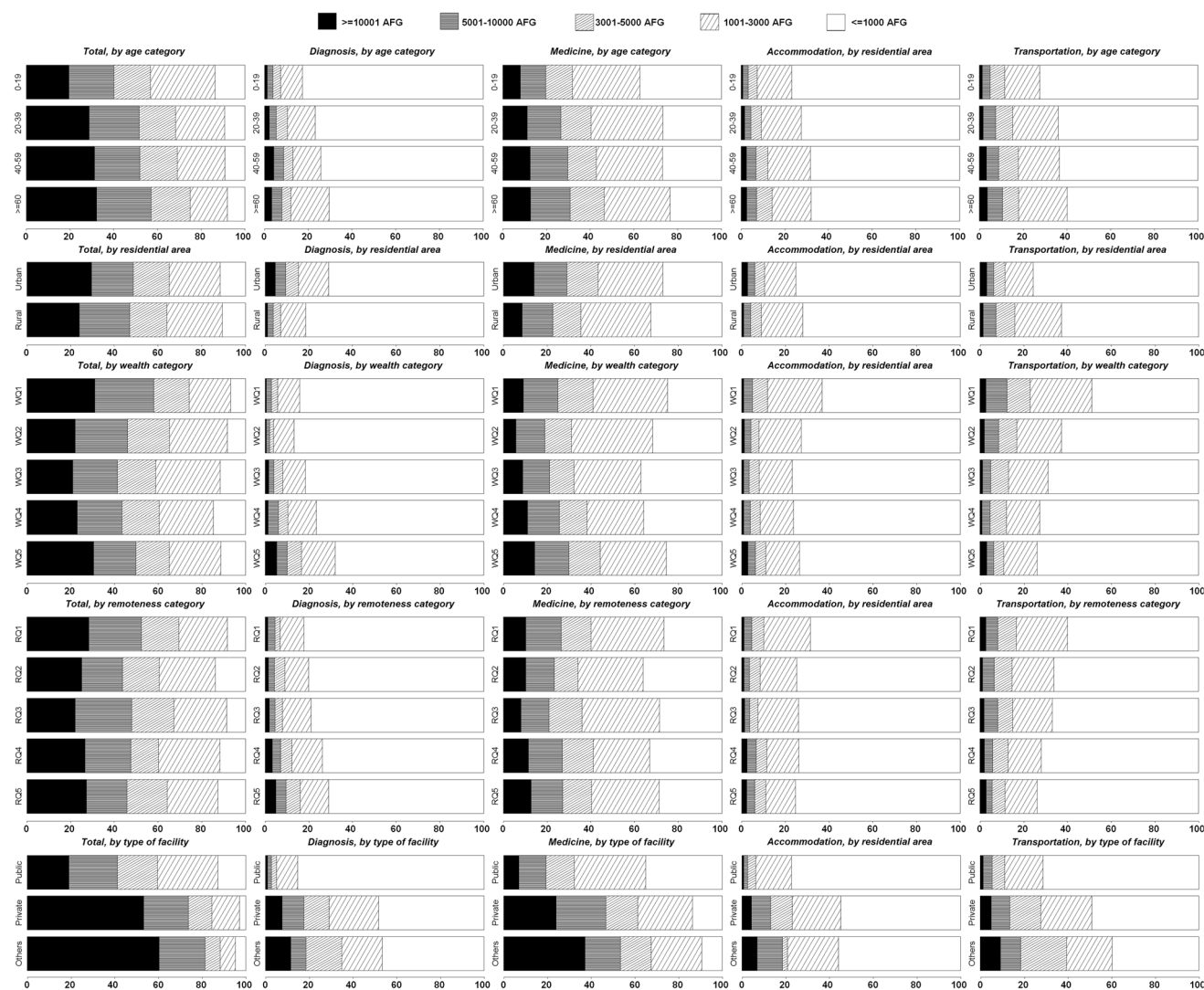
50 Afghani 1 USD during the time of survey, April 2010, *WQ1* poorest, *WQ5* richest, *RQ1* most remote, *RQ5* least remote

transportation, respectively. Among the 7542 subjects who had at least one overnight stay in the hospital in the last 12 months, results were obtained from 5490 subjects who had reported all of the following variables: age; type of health-care facility; length of stay in the health-care facility; all components of the expenses related to the recent inpatient care; and the total expense. Although 2052 subjects were excluded in the cost analysis because of the unavailability of even one component of the payment subcategories, the distributions of the place of residence and the remoteness for the included and excluded subjects were similar, although the subjects included in the analysis were slightly younger and poorer (Table S1).

Figure 1 further shows the distributions of the amounts of spending according to the place of residence, wealth, and remoteness. A larger dark-colored area indicates a larger proportion of patients with high payments. Patients who used private health facilities spent much more, compared with those who used public health facilities.

Table 4 shows the results of a bivariate analysis indicating the relative financial burden of payments related to recent inpatient care among household members with different demographic and socioeconomic statuses and health-care utilization characteristics. Patients in the poorest group paid more for total payment, accommodation, and transportation, compared with their richest counterparts (OR = 1.30,  $P < 0.001$ ; OR = 1.51,  $P < 0.001$ ; and OR = 2.79;  $P < 0.001$ ; respectively). However, the poorest group paid less for diagnosis (OR = 0.38,  $P < 0.001$ ). Similar results were observed for patients living in the most remote areas: they paid more for total payment, accommodation, and transportation (OR = 1.23,  $P = 0.011$ ; OR = 1.32,  $P = 0.007$ ; and OR = 1.81,  $P < 0.001$ , respectively) but paid less for diagnosis (OR = 0.50,  $P < 0.001$ ), compared with patients living in the least remote area. Compared with rural residents, urban residents paid more for total payment, diagnosis, and medicine (OR = 1.11,  $P = 0.037$ ; OR = 1.87,  $P < 0.001$ ; OR = 1.39,  $P < 0.001$ , respectively). However, urban patients paid less for transportation services associated with inpatient care (OR = 0.56,  $P < 0.001$ ). The results of a bivariate analysis further demonstrated an unadjusted higher amount of payments associated with inpatient care among the older age group, a longer hospital stay, and staying in a private health-care facility.

Table 5 shows the results of a multivariable analysis estimating independent associations between payments related to inpatient care and demographic/socioeconomic characteristics or health-care utilization. Compared with the richest group, patients in the poorest group paid more for total payment associated with inpatient care and transportation services (AOR = 1.24,  $P = 0.031$ ; AOR = 2.09,  $P < 0.001$ ; respectively). However, the poorest group paid less for diagnosis and medicine payments (AOR = 0.37,  $P < 0.001$ ; AOR = 0.78,  $P = 0.009$ , respectively). There was no significant difference in accommodation costs between the poorest and richest groups. Urban residents spent less for accommodation and transportation services associated with inpatient care, compared with rural residents (AOR = 0.73,  $P < 0.001$ ; AOR = 0.58,  $P < 0.001$ , respectively). For patients in the older age group, the adjusted results from the multivariable analysis also showed a higher amount of payments, with longer stays in hospital, and more stays in private health-care facilities for the total and every component of medical and non-medical services associated with inpatient care.



**Fig. 1** Distribution of the total and of each category of medical and non-medical payments associated with inpatient health care by subjects' socio-demographic and health-care utilization characteristics

(Afghanistan 2010). *WQ1* poorest, *WQ5* richest, *RQ1* most remote, *RQ5* least remote, *AFG* Afghani (50 Afghani = 1USD)

## Discussion

Using nationally representative data, this study demonstrated the patterns of household payments for medical and non-medical spending related to inpatient health care in Afghanistan according to household economic status, place of residence, and remoteness of the area of residence. Poor people spent more for total payments and transportation services than the rich. However, poor people spent less for diagnosis and medicine. Patients in urban areas spent less for accommodation and transportation than patients in rural areas. A crude analysis showed higher payments for total, accommodation, and transportation among patients living in remote areas compared with those living in non-remote areas. However, after adjustments for other socioeconomic

and health-care utilization variables, the independent associations between remoteness and amount of payment disappeared.

This study has the strengths of using nation-wide population-based representative data for the first time from a large sample, and standard data collection tools to explore the patterns and financial burdens of medical and non-medical spending for health care in Afghanistan. It covered a wide range of health-care spending for both direct medical and non-medical services associated with inpatient care, including accommodation and transportation. Most studies measuring the burden of health-care spending omit or do not account for non-medical payments associated with health care, which could be a substantial proportion of health-care spending. Therefore, the inclusion of non-medical payments

**Table 4** Bivariate association between payments related to inpatient care and subjects' socio-demographic and health-care utilization characteristics (Afghanistan 2010)

	Total payment			Diagnosis			Medicine			Accommodation			Transportation		
	OR	95 % CI		OR	95 % CI		OR	95 % CI		OR	95 % CI		OR	95 % CI	
Age															
0–19 (years)	0.50***	0.42, 0.59		0.51***	0.41, 0.63		0.54***	0.45, 0.63		0.61***	0.50, 0.75		0.57***	0.47, 0.68	
20–39	0.80*	0.68, 0.95		0.73***	0.59, 0.90		0.82*	0.69, 0.97		0.77*	0.63, 0.95		0.83	0.68, 1.00	
40–59	0.85	0.71, 1.02		0.86	0.69, 1.08		0.88	0.73, 1.06		0.97	0.78, 1.20		0.88	0.72, 1.08	
≥60	1.00			1.00			1.00			1.00			1.00		
Area of residence															
Urban	1.11*	1.01, 1.23		1.87***	1.64, 2.13		1.39***	1.25, 1.54		0.89	0.78, 1.01		0.56***	0.50, 0.64	
Rural	1.00			1.00			1.00			1.00			1.00		
Wealth quintile															
WQ1 (poorest)	1.30***	1.12, 1.52		0.38***	0.31, 0.47		0.88	0.75, 1.02		1.51***	1.26, 1.81		2.79***	2.35, 3.31	
WQ2	0.87	0.75, 1.00		0.31***	0.25, 0.38		0.62***	0.54, 0.72		0.99	0.83, 1.18		1.67***	1.42, 1.98	
WQ3	0.71***	0.62, 0.83		0.47***	0.38, 0.57		0.59***	0.51, 0.68		0.82*	0.68, 0.98		1.26*	1.06, 1.50	
WQ4	0.74***	0.65, 0.85		0.63***	0.53, 0.75		0.70***	0.61, 0.80		0.84	0.71, 1.00		1.06	0.90, 1.26	
WQ5 (richest)	1.00			1.00			1.00			1.00			1.00		
Remoteness quintile															
RQ1 (most remote)	1.23*	1.05, 1.45		0.50***	0.41, 0.62		1.01	0.86, 1.19		1.32*	1.08, 1.62		1.81***	1.49, 2.20	
RQ2	0.88	0.75, 1.04		0.58***	0.48, 0.72		0.74***	0.63, 0.87		0.99	0.81, 1.21		1.41***	1.16, 1.72	
RQ3	1.03	0.88, 1.22		0.61***	0.50, 0.76		0.86	0.73, 1.01		1.02	0.82, 1.26		1.40***	1.14, 1.71	
RQ4	0.97	0.82, 1.15		0.84	0.68, 1.03		0.92	0.77, 1.09		1.08	0.87, 1.34		1.10	0.89, 1.37	
RQ5 (least remote)	1.00			1.00			1.00			1.00			1.00		
Type of health-care facility															
Private	1.00			1.00			1.00			1.00			1.00		
Public	0.23***	0.20, 0.26		0.15***	0.13, 0.18		0.28***	0.25, 0.32		0.32***	0.28, 0.37		0.37***	0.32, 0.42	
Others	1.38	0.76, 2.52		1.16	0.66, 2.03		1.56	0.90, 2.69		0.98	0.55, 1.75		1.58	0.91, 2.74	
Nights in health-care facility															
1–5	1.00			1.00			1.00			1.00			1.00		
6–10	5.56***	4.84, 6.38		2.91***	2.48, 3.41		4.36***	3.82, 4.98		4.59***	3.96, 5.33		3.79***	3.29, 4.36	
11–15	13.63***	10.29, 18.06		4.83***	3.73, 6.24		9.76***	7.66, 12.44		9.03***	7.05, 11.58		5.55***	4.36, 7.08	
16–20	16.39***	10.91, 24.61		5.95***	4.21, 8.40		10.79***	7.73, 15.07		11.25***	8.03, 15.77		7.34***	5.27, 10.23	
21 or more	22.87***	16.18, 32.33		8.61***	6.60, 11.24		21.61***	16.37, 28.52		16.41***	12.56, 21.44		10.66***	8.21, 13.83	

OR odds ratio, WQ1 poorest, WQ5 richest, RQ1 most remote, RQ5 least remote, "Others" refers to specialized hospitals like trauma centers, drug addiction treatment centers, rehabilitation hospitals, and so on; \*  $P < 0.05$ ; \*\*\*  $P < 0.001$

**Table 5** Multivariate association between payments related to inpatient care and subjects' socio-demographic and health-care utilization characteristics (Afghanistan 2010)

	Total payment		Diagnosis		Medicine		Accommodation		Transportation	
	AOR	95 % CI	AOR	95 % CI	AOR	95 % CI	AOR	95 % CI	AOR	95 % CI
Age										
0–19 (years)	0.57***	0.48, 0.68	0.56***	0.45, 0.71	0.63***	0.53, 0.74	0.75*	0.61, 0.93	0.66***	0.54, 0.80
20–39	0.93	0.78, 1.12	0.81	0.64, 1.02	0.95	0.80, 1.13	0.89	0.72, 1.11	0.91	0.75, 1.12
40–59	0.88	0.72, 1.07	0.88	0.69, 1.13	0.92	0.76, 1.11	1.02	0.81, 1.30	0.89	0.72, 1.11
≥60	1.00		1.00		1.00		1.00		1.00	
Area of residence										
Urban	0.93	0.82, 1.06	1.08	0.90, 1.30	1.08	0.95, 1.23	0.73***	0.61, 0.87	0.58***	0.49, 0.68
Rural	1.00		1.00		1.00		1.00		1.00	
Wealth quintile										
WQ1 (poorest)	1.24*	1.02, 1.50	0.37***	0.28, 0.49	0.78*	0.64, 0.94	1.19	0.93, 1.52	2.09***	1.67, 2.61
WQ2	0.90	0.75, 1.07	0.34***	0.26, 0.45	0.64***	0.54, 0.76	0.90	0.72, 1.13	1.38***	1.11, 1.70
WQ3	0.81*	0.68, 0.95	0.58***	0.46, 0.73	0.66***	0.56, 0.78	0.82	0.65, 1.03	1.13	0.92, 1.39
WQ4	0.81*	0.70, 0.95	0.72***	0.59, 0.89	0.77***	0.66, 0.90	0.81	0.66, 1.00	0.97	0.80, 1.18
WQ5 (richest)	1.00		1.00		1.00		1.00		1.00	
Remoteness quintile										
RQ1 (most remote)	1.17	0.97, 1.40	0.70*	0.55, 0.90	1.19	0.99, 1.42	1.11	0.88, 1.41	1.15	0.92, 1.45
RQ2	0.98	0.82, 1.17	0.84	0.66, 1.06	0.98	0.82, 1.17	1.03	0.82, 1.30	1.18	0.95, 1.47
RQ3	1.14	0.95, 1.36	0.73*	0.57, 0.92	1.06	0.89, 1.27	1.05	0.83, 1.33	1.25	1.00, 1.56
RQ4	1.06	0.89, 1.27	0.87	0.69, 1.10	1.02	0.85, 1.22	1.16	0.91, 1.47	1.06	0.84, 1.34
RQ5 (least remote)	1.00		1.00		1.00		1.00		1.00	
Type of health-care facility										
Private	1.00		1.00		1.00		1.00		1.00	
Public	0.18***	0.15, 0.20	0.14***	0.12, 0.17	0.26***	0.23, 0.29	0.27***	0.23, 0.31	0.31***	0.27, 0.36
Others	1.02	0.53, 1.95	0.76	0.42, 1.37	1.16	0.66, 2.06	0.75	0.40, 1.38	1.27	0.72, 2.23
Nights in health-care facility										
1–5	1.00		1.00		1.00		1.00		1.00	
6–10	6.14***	5.32, 7.09	3.75***	3.16, 4.46	4.68***	4.09, 5.36	4.83***	4.14, 5.63	3.78***	3.27, 4.38
11–15	16.21***	12.11, 21.69	6.23***	4.73, 8.19	10.61***	8.29, 13.59	9.91***	7.68, 12.78	6.30***	4.90, 8.09
16–20	18.63***	12.24, 28.36	8.07***	5.60, 11.63	11.66***	8.29, 16.40	11.89***	8.45, 16.74	7.66***	5.47, 10.72
21 or more	26.10***	18.28, 37.26	10.92***	8.22, 14.50	23.08***	17.36, 30.69	17.34***	13.20, 22.78	11.56***	8.85, 15.09

AOR adjusted odds ratio (adjusted for age, place of residence, remoteness quintile, type of health-care facility, and number of nights stayed in the health facility). WQ1 poorest, WQ5 richest, RQ1 most remote, RQ5 least remote, "Others" refers to specialized hospitals like trauma centers, drug addiction treatment centers, rehabilitation hospitals, and so on; \*  $P < 0.05$ ; \*\*\*  $P < 0.001$

in estimates of health-care spending presents a more complete picture of the financial burden associated with health care among this population. In general, utilization of health-care services might be different according to the household economic status, place of residence, or remoteness of the area of residence. However, in this study, there was little difference in inpatient health-care utilization between socioeconomic subgroups; the higher amount for total and non-medical spending associated with inpatient care among the poorest group was not associated with difference in health-care utilization percentage.

Previous studies conducted in other developing countries have reported a higher financial burden for health care among the poor, by indicating catastrophic spending, which means the proportion of health-care spending exceeded a certain proportion of the overall household expenditure (Bredenkamp et al. 2011; Rahman et al. 2013). In the present study, however, we reported the actual amount of payment for health care, including non-medical costs (accommodation and transportation) for inpatient care which was high among the poor. The higher amounts of total and transportation spending associated with inpatient care among the poorest group might be explained by the higher impact of diseases and renting or paying for transportation while traveling to and from the hospital.

Poor people tend to choose alternative ways to pay when health-care costs exceed a certain level of household food and non-food consumption by adopting of several coping strategies, such as borrowing money from relatives or friends, selling household assets, and mortgaging properties (Leive, 2008; Kruk et al. 2009).

The consequences of higher spending on health care are very serious for the poor population: they might be driven to cut basic (food and non-food) consumption and their children might be withdrawn from school to compensate for health-care expenses for a household member (Alam and Mahal, 2014). In addition to placing a burden on other family members, they could be pushed into severe impoverishment (van Doorslaer et al. 2006), which restricts them from seeking health care when needed (Makinen et al. 2000), and this develops into a vicious cycle.

Patients purchase drugs and ancillary health services, such as an expensive medicine or advanced laboratory tests, apart from fees paid to hospitals (Gotsadze et al. 2009). The high amount of spending for diagnosis and medicine among the richest population might be a reflection of using advanced diagnostic technology and the relative affordability of expensive medicines (Hetemaa et al. 2006; Yong et al. 2014). Although poor people pay more for non-medical services associated with inpatient care in Afghanistan, they might not be able to pay at all for expensive advanced diagnostic services and medicines, unlike their richest counterparts.

The U-shaped pattern indicates a higher amount of total spending for inpatient care among the poorest group, compared with the richest; however, the middle-income group did not spend as much for the total cost, compared with their poorest and richest counterparts.

Another finding of this study was the higher level of spending for non-medical services (accommodation and transportation) associated with inpatient care among patients living in rural areas. Studies from Nepal and Vietnam also reported a higher proportion of household income being spent on medical care in rural areas, but those studies did not analyze the proportion of non-medical payments (Rous and Hotchkiss, 2003; Van Minh et al. 2013). The higher amount of spending for health care among rural residents could be due to low-quality housing and poor sanitation, which could have substantial effects on illness and consequently increase the amount of spending for health care (Rous and Hotchkiss 2003).

The results of an unadjusted analysis showed that households living in the most remote areas spent more for total and non-medical (accommodation and transportation) services associated with inpatient care. However, after controlling for the effects of socioeconomic and health-care utilization variables, the association turned out to be not significant. Future studies are needed to explore the independent association between living in remote areas and health-care spending.

In addition to the aforementioned findings, the results of the multivariate analysis showed higher spending for both medical and non-medical services related to inpatient care for the elderly, those with longer hospital stays, and those using private health-care services. The older population mainly has a greater burden of disabilities and chronic non-communicable diseases, which might create a huge and continuing financial burden on these populations because of the need for long-term routine visits to health-care centers, the chronic nature of diseases, and continuing medication (Brinda et al. 2015; Wang et al. 2015). At the same time, a longer hospital stay, which could partially be a reflection of their diseases severity, was also found to be associated with the increased cost of inpatient care.

The reported amount of spending when patients use inpatient care was higher among those who stayed at private hospitals than at public hospitals. People use private hospitals because of the desire for quality health care, short waiting times, and advanced medical supplies (Ergler et al. 2011). Sometimes not only rich people, but also poor people use private hospitals, because other hospitals are not available in their area of residence, therefore, they should pay for expensive services. Although only 17.6 % of patients used private hospitals in this study, a majority used public hospitals. Paying unofficial user fees, which are not reflected in the current analysis, is widely practiced among both private and public hospital users (Killingsworth et al.

1999). Therefore, the actual financial burden of patients might be greater than that reported in this study.

This study has some caveats that should be taken into account when interpreting the results. First, data on disease patterns to explain the need for hospitalization were not available. Second, information on health-care spending was self-reported because of the cross-sectional nature of the study design and was subject to recall bias. Third, this study presents the financial burden for inpatient health care only and does not report the burden of outpatient spending. However, outpatient care does not require accommodation and frequent transportation.

This study has important policy implications. If attention is not paid to the hidden burden of non-medical expenses among disadvantaged groups, it will exacerbate impoverishment among the Afghan population, where 36.5 % of households are already living below the poverty line (Central Statistics Organization (CSO) 2014). The higher financial burden will further increase the burden of diseases among vulnerable populations. A national health system should be financed in a way that protects the poor and those living in rural areas from the high spending associated with accommodation and transportation required for inpatient care. Financial risk protection mechanisms, such as a health-care equity fund provided by the national government and compulsory, salary-based insurance from the formal sector are the primary and potential steps toward initiating a social security system in Afghanistan to protect the poor from high health-care costs and to ensure affordable and accessible health care.

## Conclusion

Among the different socioeconomic groups, poor households pay less for diagnosis and medicine, but they pay more for transportation related to inpatient care. We also found an unadjusted higher spending for non-medical inpatient care among the population living in the most remote areas.

The results showing higher spending for non-medical inpatient care among the poor population in this study could be generalized to other developing countries similar to Afghanistan where basic hospital services are provided free of charge and health insurance systems are not available or barely functioning.

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## Compliance with ethical standards

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**Conflict of interest** MOM declares that he has no conflict of interest. KN declares that she has no conflict of interest. MK declares that he has no conflict of interest.

**Ethical approval** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional review board and national research committee and with the 1964 Helsinki Declaration and its later amendments. Data were collected upon the receipt of written informed consent from participants.

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