



CODEN [USA]: IAJPB

ISSN: 2349-7750

**INDO AMERICAN JOURNAL OF  
PHARMACEUTICAL SCIENCES**<http://doi.org/10.5281/zenodo.2562668>Available online at: <http://www.iajps.com>

Research Article

**ELDERLY AND MIDDLE-AGED HEALTHCARE EXPENDITURES AND FACTORS CONTRIBUTING TO THEM: A CROSS-SECTIONAL STUDY AT KING KHALID UNIVERSITY HOSPITAL**Prof. Sulaiman Alshammari<sup>1</sup>, Abdulaziz M. AlSudairi<sup>2</sup>, Abdulaziz S. Almasoud<sup>2</sup>, Meshari Z. Alshaashaa<sup>2</sup>, Abdullah I. Aldraihem<sup>2</sup><sup>1</sup> Department of Family & community medicine, College of Medicine, King Saud Medical University, Riyadh, Saudi Arabia., <sup>1</sup> Medical Intern, Collage of Medicine, King Saud University, Riyadh, Saudi Arabia.**Abstract:**

**Introduction:** We estimated the healthcare costs for elderly and middle-aged patients over six months in 2015 at King Khalid University Hospital (KKUH); evaluated the impact of age, sex, marital status, presence of a chronic condition, and education level on these costs; and estimated patients' out-of-pocket expenses.

**Methods and Material:** This cross-sectional study targeted 246 elderly (aged  $\geq 60$  years) and middle-aged (aged 45–59 years) patients at KKUH, Riyadh, Saudi Arabia. We distributed self-administered, paper-based questionnaires to in- and out-patients. Then, out-of-pocket expenses were estimated and medical files were reviewed to estimate healthcare costs over a period of six months.

**Results:** Of the 229 participants, 142 (65.7%) were middle-aged and 87 (34.3%) were elderly. Further, 124 (54.9%) were women, 186 (80.7%) were married; 51 (23.2%) were illiterate and 54 (23.2%) had a university level education; 161 (70.6%) lived in Riyadh; 207 (91.4%) had at least one chronic condition; 138 (59.2%) had diabetes, 118 (50.6%) had hypertension, and 109 (46.8%) had hyperlipidemia; 106 (45.5%) used private out-patient services and 18 (7.7%) used private in-patient services in the last six months; 134 (57.5%) paid for medications in the last six months; and 98 (42.1%) bought medical aids in the last six months. Middle-aged and elderly participants' healthcare costs were 5821.6 and 9774 Saudi riyals per head, respectively. Body Mass index and Presence of Chronic conditions were significantly associated with total healthcare costs ( $P$ -value  $<.017$  and  $.013$  respectively). Gender and Body Mass Index (BMI) were significantly associated with total out-of-pocket expenses ( $P$ -value  $.0014$  and  $.002$  respectively).

**Conclusions:** Elderly patients incur more healthcare costs and pay more than do middle-aged patients. There is a need to find more cost-effective ways of caring for growing number of elderly people. Further studies addressing healthcare costs among multicentered nationwide governmental hospitals are recommended.

**Key words:** healthcare costs; out-of-pocket expenses; chronic conditions.

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Please cite this article in press Sulaiman Alshammari et al., *Elderly And Middle-Aged Healthcare Expenditures And Factors Contributing To Them: A Cross-Sectional Study At King Khalid University Hospital.*, Indo Am. J. P. Sci, 2019; 06(02).

## INTRODUCTION:

The healthcare system in Saudi Arabia is funded by the government and is provided with an annual budget. Healthcare services are provided for free to all citizens and are considered an individual's right as a Saudi citizen. [1] Furthermore, the government provides healthcare services to 5 million pilgrims and visitors of holy mosques in Makkah and Medina. [1] Moreover, the Ministry of Health (MOH) is the largest provider for healthcare (about 60%) in Saudi Arabia. Other providers of healthcare in Saudi Arabia are medical services departments in the Ministry of Interior, Ministry of Defense and others (about 20%). They direct their services for their employees and their dependents. Furthermore, the private sectors contribute to the rest 20% of the services. [1]. The MOH has three levels of healthcare centers: primary, secondary, and tertiary. The former, deals with disease prevention and cure as an outpatient; the latter two deal with more complicated cases and inpatients setting. The government has initiated steps toward healthcare privatization; therefore, many government hospitals will be sold or rented to private companies. Experts expect that privatization will improve healthcare services, reduce annual expenditures, and offer new financial resources to the MOH [2].

The government of Saudi Arabia considers healthcare a very high priority; consequently, healthcare has dramatically improved over the last decade, and the amount of money spent per year on healthcare is steadily increasing. In 1970, the Saudi Arabian government spent 2.8% of its annual budget on healthcare, which increased to 6% in 2005 and 6.2% in 2009 [2]. This indicates that healthcare is highly needed and demanded by the people; however, owing to the rapidly growing population and high-priced new technology, the government of Saudi Arabia established the Council for Cooperative Health Insurance to introduce, supervise, and regulate the Saudi health market [2].

According to the United Nations, an elderly person is defined as any person who is aged older than 60 years [3]. Owing to the increase in life expectancy and the low fertility rate in Saudi Arabia, 20.9% of people are expected to be aged 60 years or older by the end of 2050 [4]. Elderly people are more likely than younger individuals to have a chronic condition or functional disability [5], thus making healthcare that much more critical. Further, the probability of having a chronic condition increases with age: almost three out of four elderly people experience multiple chronic conditions. Hypertension is the leading chronic condition among elderly people (60%), followed by cholesterol disorders (41%), arthritis (28%) and heart

disease (25%). For people aged 18–64 years, hypertension is also the leading chronic condition (30%), followed by cholesterol disorders (20%), respiratory diseases (19%) and diabetes mellitus (12%) [6]. Regarding functional disabilities, they are common later in life and can lead to many negative physical and psychological results (e.g., isolation, depression, pain, and loss of autonomy) [7].

Consequently, the healthcare costs of the elderly population should be addressed separately from middle-aged individuals (i.e., those aged 40–60 years) [8, 9], as should their out-of-pocket expenses [10]. Compared to the United Arab Emirates (\$14 billion), Malaysia (\$13.7 billion), and Singapore (\$11.6 billion), Saudi Arabia has the highest total estimated healthcare expenditures (\$35.9 billion) [11, 12]. However, in Saudi Arabia there are several unanswered questions about healthcare costs, including the average costs per person, how much citizens pay for healthcare services, and age-group differences. These concerns are critical to elucidate individuals' healthcare-related financial burden in Saudi Arabia.

## METHODS AND MATERIAL:

This cross-sectional study included middle-aged (aged 40–59 years) and elderly patients (aged  $\geq 60$  years), who visited in- and out-patient wards and clinics, respectively, at King Khalid University Hospital (KKUH). When calculating our sample size ( $N = 246$ ), we assumed a standard deviation of 16 for healthcare costs, with  $d = \pm 2$  at  $\alpha = .05$ . The response rate was 94.7%; therefore, the actual sample size was 233. Participants were approached in the out-patient clinics and in-patient wards at KKUH.

We divided our study into three parts. First, self-administered, paper-based questionnaires who used to estimate the out-of-pocket expenses and socio-demographic characteristics of participants. The questionnaires were designed based on two previously used questionnaires [13, 14]. The questionnaire included five parts. The first part addressed socio-demographic characteristics and additional information related to participants as well as the Smoking Status Scale, which was based on smoking status records of the Center of Disease Control [15]. The second part was related to visiting private out-patient services and the amount of money spent on each service over the last six months. The third part concerned visiting private in-patient services and the amount of money spent on it over the last six-months. The fourth part concerned buying medication over the last six-months and the amount of money spent on them. Finally, the fifth part was

related to buying any medical aids over the last six-months and the amount of money spent on them.

Questionnaires were distributed between January 1–15, 2016. For missing prices, the average of each service was taken and assumed as the missing value in that category. Non-Saudi patients, patients who had files created during our study period, and participants who provided the wrong file number were excluded from analyses.

Second, we distributed a medical records abstraction form that sought information pertaining to the previous six months. The form included all visits, medications, investigations, medical aids, and procedures provided to or completed by the participant during our study period.

Finally, we obtained a pricing list for the health-related services that were acquired by participants. For medications, the pharmacy at KKHU had a per/pill pricing system. For investigations, a list was given by the business center at KKHU. For missing investigation prices and procedures, we visited three private hospitals/clinics from diverse areas in Riyadh to obtain their price list (we used the average across all three).

Data analyses were conducted using SPSS 21.0, IBM, Armonk, NY, USA. Mann-Whiteby tests were used when comparing medians and Kruskal-Wallis test was used for comparing multiple means. A p-value less than .05 was considered significant.

Concerning ethical considerations, the written consent form was clear, had all details regarding the

study, and stated clearly that the participant could withdraw from the study at any time without penalty. Further, the authors report no conflicts of interest, participants were not motivated to participate in any way, and the study was approved by the institutional review board of the College of Medicine, King Saud University, (Research Project No. E-16-1913) prior to the initiation of the study on 25.04.2016.

## RESULTS:

Participants' demographics are shown in Table 1. Among the patients with a chronic condition, 138 (59.2%) had diabetes, 118 (50.6%) had hypertension, and 109 (46.8%) had hyperlipidemia. Further, 106 (45.5%) participants used private out-patient services in the last six months, 18 (7.7%) used private in-patient services in the last six months, 134 (57.5%) paid for medications in the last six months, and 98 (42.1%) bought medical aids in the last six months. Moreover, the association between healthcare costs and sex, employment status, income, smoking status, marital status and education level were non-significant. However, presence of a chronic condition and normal body mass index (BMI) was associated with increase in healthcare costs. Gender and BMI was significantly related to participants' out-of-pocket expenses. Women spent more out-of-pocket than did men. In addition, there was no significant association between out-of-pocket expenses and marital status, education level, income, smoking status, or presence of a chronic condition (Table 1).

**Table 1. Participants' demographic characteristics and health expenditures**

Variable	N = 105 n (%)	Healthcare costs (SR) (IQR)	P- value	Out pocket expenditure (SR) (IQR)	P-value
<b>Age (years)</b>					
40–59	142 (65.7 %)	5821.6 (14556.14)	0.072	1000 (3050.5)	0.382
≥ 60	87 (34.3 %)	9774 (23137)		800 (3000)	
<b>Sex</b>					
Male	104 (45.1 %)	6709.5 (19173.65)	0.479	598 (1956.5)	0.014
Female	124 (54.9%)	7033.45 (17034.67)		1167 (4146.5)	
<b>Education level</b>					
Non-educated	51 (23.27%)	7210.4 (18213.95)	0.786	500 (2400)	0.115
Educated	178 (77.72%)	6462 (16141.6)		964.5 (3137)	
<b>Marital status</b>					
Single\divorced\widowed	42 (18.34%)	7033.45 (20511.23)	0.879	1331.5 (3569.5)	0.233
married	187 (81.65%)	6710.9 (16471)		750 (2924)	
<b>Employment status</b>					
Not employed	178 (77.7%)	6783.7 (17282.3)	0.986	883 (3141.75)	0.694
Employed	51 (22.3%)	6864 (18202)		800 (2090)	
<b>Income (SR)</b>					

<b>None</b>	75 (32.75%)	6856.5 (15977.8)	0.341	930 (3670)	0.927
<b>&lt; 8000</b>	72 (31.44%)	9159.63 (19455.72)		883 (2693.5)	
<b>&gt; 8000</b>	74 (32.31%)	5962 (14386.75)		800 (3224.25)	
<b>Residence</b>					
<b>Riyadh</b>	161 (70.6%)	6564 (16053.5)	0.840	850 (2852.5)	0.636
<b>Outside of Riyadh</b>	67 (29.4%)	7210.4 (20149.3)		866 (3600)	
<b>Smoking status</b>					
<b>Yes</b>	29 (12.7%)	11194.36	0.131	1500 (3658)	0.942
<b>No</b>	191 (83.4%)	(19716.75) 6856.5 (18076.57)		840 (3044)	
<b>Body mass index</b>					
<b>Normal</b>	49 (21.4%)	11259 (24091.6)	0.017	300 (2256)	0.002
<b>Over weight</b>	162 (70.7)	5821.565 (14654.7)		1128 (2844.25)	
<b>Chronic condition</b>					
<b>Yes</b>	207 (91.4%)	7600 (17724.15)	0.013	850 (2845)	0.679
<b>No</b>	20 (8.6%)	1986 (5296.75)		675 (6553.75)	

\* The currency in this study conducted in Saudi Riyal. (1 USD = 3.75 SR)

Regarding healthcare costs in an in-patient setting, healthcare costs were not significantly associated with residency, employment status, income, smoking status, education level, marital, BMI, or presence of a chronic condition. On the other hand, gender and age were significantly associated with healthcare costs. Regarding out-of-pocket expenses in in-patient

settings, age and sex were not significantly associated with out-of-pocket expenses, nor was education level, employment status, income, smoking status, or presence of a chronic condition. However, marital status, residency, and BMI were all significantly associated with out-of-pocket expenses (Table 2).

<b>Table 2. Participants' demographic characteristics and health expenditures in an in-patient setting</b>					
<b>Variable</b>	<b>N = 105 n (%)</b>	<b>Healthcare costs (SR) (IQR)</b>	<b>P- value</b>	<b>Out pocket expenditure (SR) (IQR)</b>	<b>P-value</b>
<b>Age (years)</b>					
<b>40-59</b>	64 (60.95%)	15317.1(25852.04)	0.039	1202.5 (7170.25)	0.330
<b>≥ 60</b>	41 (39.05%)	20638.3 (37143.7)		918 (3426.5)	
<b>Sex</b>					
<b>Male</b>	42 (40%)	23736.5 (44598.75)	0.032	974 (3329)	0.177
<b>Female</b>	63 (60%)	15140.13 (18330.1)		1205 (7549)	
<b>Education level</b>					
<b>Non-educated</b>	24 (22.9%)	18930.73 (19525.1)	0.963	520 (3002.25)	0.063
<b>Educated</b>	81 (77.1%)	16356 (30423.15)		1300 (6459)	
<b>Marital status</b>					
<b>Single\divorced\widowed</b>	22 (21%)	16477.28 (49306.7)	0.804	974 (3672.5)	0.327
<b>married</b>	83 (79%)	17453 (25236)		1205 (5715)	
<b>Employment status</b>					
<b>Not employed</b>	80 (76.2%)	17591.4 (29111.55)	0.955	1352 (4955.63)	0.615
<b>Employed</b>	25 (23.8%)	16356 (28071.89)		1025 (5030.5)	
<b>Income (SR)</b>					
<b>None</b>	36 (34.3%)	14760.6 (23556.8)	0.684	2111 (9110.5)	0.158
<b>&lt; 8000</b>	38 (36.2%)	18013.23 (36733.7)		879 (2550)	
<b>&gt; 8000</b>	28 (26.7%)	19027.32 (28815.1)		1165 (6771.75)	
<b>Residence</b>					
<b>Riyadh</b>	71 (67.6%)	17453 (32405.74)	0.796	1170 (5561)	0.628
<b>Outside of Riyadh</b>	33 (31.4%)	17729.8 (23287.75)		1200 (4904.75)	
<b>Smoking status</b>					

Yes	17 (16.2%)	17729.8 (25432.3)	0.619	1600 (5808)	0.867
No	87 (82.8%)	16245.5 (30038.03)		1150 (5079.5)	
<b>Body mass index</b>					
Normal	30 (28.6%)	19361.5 (35124.93)	0.465	253 (1322.5)	0.001
Over weight	64 (61%)	15834.5 (22250.45)		1700.5 (6428.75)	
<b>Chronic condition</b>					
Yes	96 (91.4%)	18151.63 (28947.2)	0.413	1185 (4333.5)	0.603
No	7 (6.7%)	12796 (34058)		0 (26000)	

\* The currency in this study conducted in Saudi Riyal. (1 USD = 3.75 SR)

Regarding healthcare costs in an out-patient setting, healthcare costs were not significantly associated with sex, education, , employment status, income, residency, smoking status, BMI, or presence of a chronic condition. On the other hand, healthcare costs

were significantly associated with age. Regarding out-of-pocket expenses in out-patient settings, only marital status was significantly associated with out-of-pocket expenses (Table 3).

**Table 3. Participants' demographic characteristics and health expenditures in an out-patient setting**

Variable	N = 105 n (%)	Healthcare costs (SR) (IQR)	P- value	Out pocket expenditure (SR) (IQR)	P-value
<b>Age (years)</b>					
40-59	75 (62.5%)	2279.4 (5622.2)	0.698	700 (2090)	0.731
≥ 60	45 (37.5%)	3336 (5983.46)		600 (2491.25)	
<b>Sex</b>					
Male	61 (50.8%)	3590 (5652.05)	0.247	500 (1706)	0.057
Female	58 (48.3%)	1412.5 (5940.98)		1022.5 (2588.63)	
<b>Education level</b>					
Non-educated	26 (21.7%)	1632.5 (8071.91)	0.921	508 (2299.63)	0.720
Educated	94 (78.3%)	2362.8 (5414.93)		700 (2212.75)	
<b>Marital status</b>					
Single\divorced\widowed	19 (15.8%)	1505.73 (4145)	0.454	1900 (4503)	0.007
married	101 (84.2%)	2765.1 (5896.05)		500 (1961)	
<b>Employment status</b>					
Not employed	94 (78.3%)	2362.8 (6124.67)	0.651	675 (2335.25)	0.855
Employed	26 (21.7%)	1966.1 (4946.30)		650 (1575)	
<b>Income (SR)</b>					
None	38 (31.7%)	1635.5 (6925.25)	0.782	450 (2050)	0.287
< 8000	33 (27.5%)	3336 (5787.71)		900 (2737)	
> 8000	44 (36.7%)	2522.65 (5758.23)		625 (2446.75)	
<b>Residence</b>					
Riyadh	87 (72.5%)	3131 (5571.02)	0.782	700 (2100)	0.595
Outside of Riyadh	33 (27.5%)	1362 (6353.65)		500 (2005)	
<b>Smoking status</b>					
Yes	12 (10%)	3969.5 (4980.25)	0.418	560 (2297.25)	0.526
No	100 (83.3%)	1719.75 (6273.98)		675 (2161.75)	
<b>Body mass index</b>					
Normal	19 (15.8%)	3855 (9931)	0.388	596 (3160)	0.310
Over weight	95 (79.2%)	1727 (5459.52)		750 (1892)	
<b>Chronic condition</b>					
Yes	108 (90%)	2948.05 (6333.27)	0.059	675 (2162.75)	0.864
No	12 (10%)	783.85 (3048.25)		675 (5575)	

\* The currency in this study conducted in Saudi Riyal. (1 USD = 3.75 SR)



**DISCUSSION:**

To the best of our knowledge, this is the first study to examine the Saudi healthcare costs.

Although non-significant, we found that male patients incurred more healthcare costs than female patients, which was consistent with one earlier study [13] but inconsistent with others [8, 16–18]. The association between healthcare costs and marital status was significant—an unmarried person incurred more costs than a married person, which was consistent with an earlier study [14]. Although education level was not significantly associated with healthcare costs in this study, a prior study showed that uneducated/illiterate persons incurred more costs than their higher educated counterparts [14]. Further, it was found that the presence of a chronic condition was not significantly related to healthcare costs. The same finding was noticed in other studies [8, 19–22].

Moreover, the relationship between out-of-pocket expenses and sex was significant—women spent more than men, which was consistent with a prior study [13]. Further, an unmarried person spent more than did a married person, which was also noticed before [13]. Out-of-pocket expenses were not associated with the presence of a chronic condition, which contrasts some of the previous research [13, 20].

**CONCLUSION:**

In sum, elderly people incur more healthcare costs and pay more out-of-pocket expenses than do middle-aged people in Saudi Arabia. Widowed individuals incur more healthcare costs than those with another marital status and women spent more than men.

Updated and accurate price lists are recommended for all government hospitals to determine the exact healthcare financial burden. In addition, further studies are recommended to further evaluate the healthcare costs in Saudi Arabia.

**LIMITATIONS:**

Since the healthcare system in Saudi Arabia depends mostly on the government, we faced many limitations during our project. The price list was difficult to obtain in governmental hospitals; therefore, we used the price list from the business center at KKUH. However, the KKUH has lower costs than do outside hospitals; therefore, our results may not reflect the true costs. In addition, as noted earlier, some prices were not listed, and we needed to take the average price from among three private hospitals. Further study recommended to find unit costing in public

health services nationwide. Second, our examination of out-of-pocket expenses depended on patients' reports, which could have been incorrect for several reasons, which can be further studied using prospective study design. Lastly, this study was conducted at one center in one city in Saudi Arabia. The results would be more representative if the project was multi-centered.

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