Knowledge of health insurance benefits among male expatriates in Saudi Arabia

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الأهداف: قياس مدى معرفة العاملين غير السعوديين بفوائد التأمين الصحي المرتبطة بالعيادات الخارجية، والتنويم، والأسنان، وصرف الأدوية، ومعرفة تأثير صفاتهم الشخصية والوظيفية بمعرفتهم.

الطريقة: تم تصميم أسئلة وعمل مقابلة مباشرة للعاملين في القطاع الخاص من غير السعوديين. وعملت الدراسة ذات المقطع المستعرض عبر جمع عينة طبقية عنقودية (3,398 عينة) في مدينة الرياض بين شهر مارس 2015م وشهر فبراير 2016م. تم استخدام التحليل الوصفي وتحليل التباين والانحدار الخطي لتحقيق أهداف الدراسة. وتم قياس المعرفة بفوائد التأمين الصحي عبر 4 متغيرات (العيادات الخارجية، والتنويم، والأسنان، والدواء) و5 متغيرات إضافية تقيس مدى المعرفة بمقدار المشاركة في دفع التكلفة العلاجية بما في ذلك مقدار المشاركة في تكلفة زيارة الطبيب.

النتائج: أكثر من 87% و62% و86% و62% من المشاركين ذكروا أنهم يعرفون مميزات التأمين الصحي الخاصة بالعيادات الخارجية والتنويم والدواء والاسنان حسب الترتيب. لكن فقط 7.5% و64% و13% و15% و 9.6% يعرفون حقيقة التكلفة الصحية لزيادة العيادات الاولية والعيادات الخارجية (شاملة كل الخدمات) والتنويم، والدواء، ورعاية الأسنان حسب الترتيب. أظهرت الدراسة أن الناس تبالغ في مدى معرفتها بفوائد التأمين الصحي. شرحت الدراسة 55% من العوامل المؤثرة في معرفة العاملين بفوائد التأمين الصحي لكن تظل هناك أسباب أخرى يمكن تغطيتها في دراسات مستقبلية.

الخاتمة: معرفة العاملين من غير السعوديين بالتأمين الصحي محدودة مما يدل على أهمية وجود سياسية تساعد في زيادة المعرفة بفوائد التأمين الصحي للعاملين غير السعوديين في المملكة العربية السعودية.

Objectives: To measure expatriates' knowledge of health insurance benefits with respect to outpatient, inpatient, prescription drug, and dental services, and to link this knowledge to sociodemographic and employment characteristic.

Methods: Cross-sectional, face-to-face interviews were conducted from March 2015 to February 2016 with a stratified random sample of 3,398 male insured expatriate workers in the private sector of Riyadh, Kingdom of Saudi Arabia. Descriptive analysis, one-way ANOVA, and linear regression were used to interpret data. Data on knowledge of health insurance benefits was compiled by adding the scores of the 4 service category items (outpatient, inpatient, prescription drug, and dental services) to those of the 5 objective knowledge items on copayments.

Results: More than 87% of the participants reported knowledge on their health insurance benefits coverage for outpatient, 62% for the inpatient, 86% for the prescription drug and 62% for the dental services. However, 7.5% knew the correct copayments for general practitioner, 64% for the outpatient (inclusive), 13% for the inpatient visits, 15% for the prescription drugs and 9.6% for the dental care. Most personal and job characteristics had associations with knowledge measures. A total of 55% of the overall knowledge variance was explained by the independent variables ($R^2=0.55$), suggesting that other factors also influence knowledge.

Conclusion: Expatriates' knowledge of their health insurance benefits is very limited, which indicates the importance of developing a policy for increasing this knowledge among expatriates in Saudi Arabia.

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Assessing people's knowledge of health insurance is critical for efficient delivery of care. Many studies have assessed health insurance knowledge using various measures.[1,2] Studies conducted by the Medicare or Medicaid insurance programs in the United States have targeted either older or low-income individuals,[3,1] which raises the question of whether these study findings can be generalized to other populations. No previous studies have assessed expatriates' knowledge of health insurance benefits in the context of Saudi Arabia. Historically, one study examined physicians' perceptions of health insurance in the country prior to implementation of Compulsory Employment-Based Health Insurance (CEBHI).[4] Other studies in the context of Saudi Arabia assessed knowledge on topics unrelated to health insurance, such as other medical services or health care professionals.[5]

Various studies from Asian countries have measured awareness regarding the health insurance, but have relied on self-reports from participants.[6,7] A number of studies have commented on the limitations of self-reported information, namely, that participants might overestimate their awareness.[8,9] In Saudi Arabia, over 84% of private sector employees are expatriates, and they account for 56% of total employment.[10,11] This increases interest in assessing what these employees know about health insurance benefits, considering that the native language of the majority of expatriates is neither Arabic nor English.[12] The CEBHI scheme not only makes it mandatory for all employers to bear the full cost of health insurance premiums but also determines the unified benefits packages, which are managed by a government body called the Council of Cooperative Health Insurance (CCHI).[13] The CCHI is responsible for regulating and monitoring the implementation of health insurance benefits. In addition, all necessary medical examinations, treatments, medications, outpatient and inpatient testing, as well as dental and prescription drug services are determined by the unified health insurance policy. For example, the insured maximum copayments are predetermined so as not to exceed 20% of the health care expenses or a maximum of SAR 100 (USD 26.67).[14] There are no coinsurance or deductibles for inpatient services and prescription drugs, and the health policy covers up to USD 533.30 for dental treatment.[14] (More details on health insurance benefits coverage can be found on the CCHI website: www.cchi.gov.sa).[14]

Because the health insurance plan managed by CCHI includes prescription drugs and dental services as part of its benefits, these services can be included when assessing expatriates' perceived knowledge and validating their knowledge of copayments. Few international studies have included knowledge assessment for dental care because many health insurance plans exclude dental services,[15] and Medicare and Medicaid do not cover most dental services.[16] This paper aims to measure knowledge about health insurance benefits, including those for dental care and prescription drugs, among expatriates, and to link this knowledge to sociodemographic and employment characteristics.

Methods. Cross-sectional survey data were collected in Riyadh, Kingdom of Saudi Arabia. Riyadh was chosen as the study site because more than one-third of the total expatriate population in the country lives in this city.[17] Face-to-face interviews were conducted among 3,398 male insured expatriate workers in the private sector, with a response rate of around 96%. The questionnaire was orally administered by trained bilingual research assistants to overcome any language and literacy barriers. These research assistants spoke the expatriates' main languages (Arabic, Bengali, Hindi, Malayalam, Nepali, Tagalog, and Urdu). The face-to-face interview mode is suitable for increasing participants' comprehension of survey questions and is commonly used with expatriate populations.

Data collection was conducted over an 11-month period, from March 2015 to February 2016, at expatriates' workplaces. However, data collection was stopped during national holidays and during the holy month of Ramadan. Participants' employing organizations were identified and randomly selected from the Ministry of Labor database and were stratified based on business sector, company size, and number of employees, similar to a previously used approach.[18] All sectors associated with health care and health insurance were excluded because the knowledge of individuals working in these sectors could be influenced by external factors. Statistical Package for the Social Sciences version 23 (IBM Corp, Armonk, NY, USA) was used for randomization. Company names and other relevant information were concealed and were only known to the manager of the Statistics Department at the Ministry of Labor.

Questionnaire development. There is no current consensus on measures to assess health insurance

knowledge.[1] Awareness about health insurance varies based on health insurance plans.[9] Therefore, certain factors were considered in this study to increase the validity and reliability of our survey questions. First, the questionnaire was developed from a comprehensive review of the literature and used the same approaches as have been used in other studies assessing knowledge of health insurance benefits. Second, the questionnaire was reviewed by 4 experts and academicians in the areas of health insurance and research methods, as well as 2 health insurance experts.

Third, cognitive interviewing was used to pretest the questions. This is a useful tool when developing survey questions, as it allows modifications that can enhance the accuracy and reliability of the final instrument.[19] Cognitive interviewing was conducted in 3 stages. The questionnaire was first piloted among 10 research assistants. Each research assistant was then asked to administer the questionnaire to 10 selected participants (a total of 110 surveyed). Finally, the research team met to review the survey questions and provide their feedback.

Study variables. Independent variables in this study included questions related to expatriates' health status, personal and job characteristics, and previous knowledge concerning the insurance in their home countries. Previous knowledge was assessed by asking several questions, which were then summarized as one independent variable denoted as "previous knowledge." An individual was considered to have previous knowledge if the answer to any of the following questions was yes: "Have you seen any materials regarding Cooperative Health Insurance?" and "Do you know who pays for your health care costs in your home country (health insurance)? Your life insurance, auto insurance, crop insurance, pension insurance, health or medical insurance, unemployment insurance, benefits or other?"

Personal characteristics included age, nationality, educational level, marital status, length of employment in Saudi Arabia, and comfort levels for conversing in Arabic and English. Job characteristics included the respondent's position in the company, company size and economic sector, and monthly income. Questions for both personal and job characteristics were adapted from the Medical Expenditure Panel Survey,[20] with a few modifications to suit the study site. Although an employee's position in the company determines the required level of education, most expatriates in Saudi Arabia report working below their actual educational level.[11] Therefore, this study used Ministry of Labor data to determine the educational levels of respondents.[21]

The dependent variables were expatriates' perceived knowledge and objective (verified) knowledge of their main health insurance benefits. Nine questions were asked to measure knowledge, as described in the next section.

Statistical analysis. To ensure the accuracy of data entry, all data were double-entered into a Microsoft Excel spreadsheet. The 2 data sets were then compared, differences examined, errors verified against the original questionnaire, and corrections made. The final data set was then exported to SPSS, where frequencies for all variables were generated. The frequency tables were then examined for anomalies.

The following 4 questions were used to obtain information on perceived knowledge: "Does your health insurance cover (1) outpatient care (such as doctor visits); (2) inpatient care (including surgery); (3) prescription drugs; and (4) dental care?" Five questions verified participants' objective knowledge: "Do you know (1) the amount of partial payment for seeing a general practitioner as an outpatient; (2) the maximum amount for visiting a doctor as an outpatient; (3) how much you have to pay for inpatient services in case you are admitted to a hospital; (4) how much you have to pay for prescription drugs; and (5) how much your health insurance covers for dental expenses?" For every "Yes" answer to each of the 5 questions, the follow-up question, "How much?" was asked for verification.

Participants entered a value in response. There have been 2 health insurance plans, an older and a modified one. Although there are similarities between them with regard to prescription drugs, dental, and inpatient services, there are also some differences. Therefore, we asked participants which plan they had, and checked the accuracy of their responses to the objective knowledge questions against that plan. In addition, although the employer has the option of reducing the maximum copayments, these maxima are predetermined so as not to exceed 20% of the health care expenses or a maximum of SAR 100 (USD 26.67) in both the old and new plans. However, with regard to the minimum copayment, which is optional (in the new plan) based on their insurance to the employers, the participants were asked to identify their insurance classes and benefits packages, although the majority had essentially the same minimum benefits package offered in both the old and new insurance plans. However, for those who were unclear about their copayment options, a trained bilingual research assistant helped them verify this information, either by using their insurance card or by checking with the company. This assistance was important for minimizing the confusion that the

participants may have had with regard to the old and new plans.

Both perceived and objective knowledge questions were scored as follows: Incorrect responses were assigned 0 points and correct responses 1 point. Responses that required participants to enter a value were accepted as correct if it came within 10% of the correct answer, as has been reported elsewhere.[22] The total number of points constituted the knowledge score, with a range of 0 to 9 points (4 points available for perceived knowledge and 5 points for objective knowledge).

Data for the qualitative variables were summarized

Table 1 - Personal characteristics of expatriates workers in the study group. N=3398

Parameters	n	(%)
Age (years) n=3328		
18 to 30	974	(28.8)
31 to 45	2048	(60.6
46 to 55	300	(8.8)
56 and above	60	(1.8)
Range		18–69.5
Mean±SD		36.19±7.86
Median		35.52
Highest educational attainment n=3397		
No formal education	89	(2.6)
Elementary	1489	(43.8)
High school	556	(16.4)
Higher education (Diploma and above)	1263	(37.2)
Marital status n=3346		
Single	499	(14.9)
Married	2824	(84.4)
Divorced/Widow/Widower	23	(0.7)
Nationality n=3394		
India	1040	(30.6)
Bangladesh	283	(8.3)
Pakistan	797	(23.5)
Egypt	342	(10.1)
Philippines	259	(7.6)
Yemen	190	(5.6)
Other	483	(14.2)
Native language n=3385		
Arabic	762	(22.5)
Urdu	864	(25.5)
Hindi	745	(22.0)
Malayalam	122	(3.6)
Bengali	299	(8.8)
Tagalog	262	(7.7)
Other	334	(9.8)
Comfortable conversing in English		
Yes	1836	(54.1)
Comfortable conversing in Arabic		
Yes	2752	(81.2)
Health status n=3392		
Excellent	2933	(86.5)
Good	366	(10.8)
Fair	93	(2.7)

Table 2 - Job characteristics of expatriates workers and their previous knowledge about health insurance. N=3398

Parameters	n	(%)
Job position n=3394		
Specialist with university education	739	(21.8)
Professional with education level higher than high school	395	(11.6)
Technician with high school education	417	(12.3)
Manual laborer with less than high school education	959	(28.3)
Unskilled laborer, usually with no education	884	(26.0)
Duration of work in KSA n=3398		
Less than 1 year	278	(8.2)
1 – < 3 years	503	(14.8)
3 – < 5 years	669	(19.7)
5–10 years	1442	(42.4)
More than 10 years	506	(14.9)
No. of employees in company or organization n=3398		
≤ 50 employees	1512	(44.5)
More than 50	1886	(55.5)
Type of business or industry n=3398		
Industrial	350	(10.3)
Construction	1242	(36.6)
Trade	873	(25.7)
Other	933	(27.5)
Monthly income (SAR, including all allowances) n=3397		
Less than 2000	1548	(45.6)
2001–4500	1194	(35.1)
4501–7500	501	(14.7)
Above 7501	154	(4.5)
Expatriates' previous knowledge of health insurance n=3396		
No	1284	(37.8)
Yes	2112	(62.2)
Perceived knowledge of health insurance benefits and services		
Knowledge about coverage for outpatient care n=3398		
No	428	(12.6)
Yes	2969	(87.4)
Knowledge about coverage for inpatient care n=3398		
No	1261	(37.1)
Yes	2137	(62.9)
Knowledge about coverage for prescription drugs n=3397		
No	463	(13.6)
Yes	2934	(86.4)
Dental care n=3396		
No	1291	(38.0)
Yes	2105	(62.0)

Table 3 - Descriptive analysis of validated knowledge about copayments. N=3398

Knowledge	Participants who responded they knew about copayments	Participants who responded they did not know about copayments	Participants in total sample with correct knowledge of copayments	Participants who said they knew about copayments but who had incorrect knowledge	Participants who said they knew about copayments and who had correct knowledge
	n (%)				
copayment for general practitioner visits	2274 (66.9)	1123 (33.1)	256 (7.5)	2018 (88.7)	256 (11.3)
copayment for outpatient visits (inclusive)	2421 (71.2)	977 (28.8)	2178 (64.1)	243 (10.0)	2178 (90)
copayment for inpatient visits	1432 (42.2)	1965 (57.8)	453 (13.3)	979 (68.4)	453 (31.6)
prescription drug copayments	2772 (81.6)	625 (18.4)	523 (15.4)	2249 (81)	523 (19)
Knowledge of health insurance covers for dental services	1475 (43.4)	1922 (56.6)	326 (9.6)	1149 (78)	326 (22)

as frequencies and percentages. For knowledge variables, frequency and percentage of each score were computed. In addition, the mean score, standard deviation, median, and interquartile range were calculated for each knowledge score. Normality of the 3 knowledge scores was examined using the general rule of equality of the mean, median, and mode and considering the histogram of the knowledge score. Using this approach, we concluded that the knowledge scores were reasonably normal and would therefore be analyzed with parametric methods. To evaluate the demographic and workplace variables associated with levels of knowledge, one-way ANOVA was used. For each knowledge variable, multiple linear regression analysis was performed to examine the joint impact of demographic and job characteristic variables on scores. One-way ANOVA was used for univariate analysis because there was no need to create dummy variables. More output is produced by ANOVA than by regression, e.g., means for each level of independent variable and confidence intervals.

The results of the regression were summarized as regression confidence intervals with their standard errors. Adjusted R-squared (R^2) was used as a measure of the overall model fit. All tests of significance were two-sided and *p*-values <0.05 were considered statistically significant. All analyses were performed with SPSS, version 23 with the exception that multiple linear regression was fitted using Stata Release 14.0 (StataCorp., College Station, TX, USA) because of its ease of creating dummy variables.

Results. Table 1 indicates that the majority of expatriates in our study were young (90.% under 45 years of age), less educated (46.5% had elementary-level education or lower), married (84.4%), from Asian countries (77.4%), comfortable speaking Arabic (81.2%), and able to converse in English (54.1%).

Table 2 shows that more than half of the expatriates interviewed worked in a large company (55.5%), had been working in Saudi Arabia for more than 5 years (57.3%), and occupied positions that required an education level lower than high school or no education at all (54.3%). The table also indicates that more than one-third (36%) of respondents worked in the construction sector, and most (80%) earned a salary below SAR 4500. Most participants (86.5%) were either in excellent or very good health, and 62.2% reported having previous knowledge about health insurance. Table 2 shows that most expatriates knew about their coverage for outpatient services (87.4%), inpatient services (62.9%), prescription drugs (86.4%), and dental care (62%).

Appendices 1 & 2 show that the variables associated with perceived, verified, and overall knowledge were similar. The Appendices also indicate that most personal and workplace characteristics were significantly associated with the 3 measures of knowledge of health insurance benefits (perceived, verified and overall knowledge). Age, educational level, marital status, nationality, native language, comfort with conversing in Arabic, length of time in Saudi Arabia, company size, economic sector, income, access to health insurance, and previous knowledge on health insurance had significant associations with perceived, verified, and overall knowledge of health insurance benefits. One interesting study result is that both the highest educational levels and the education level required to perform their jobs were significantly associated with expatriates' knowledge of health insurance benefits. The higher the educational level, the higher the knowledge score. The mean overall knowledge score of respondents with higher levels of education (high school graduate and above) was

Table 4 - Regression analysis results for perceived, verified and overall knowledge of health insurance for the personal characteristics of workers.

Parameters	Perceived Knowledge		Verified Knowledge		Overall Knowledge	
	Coef(se)	*p*-value	Coef(se)	*p*-value	Coef(se)	*p*-value
Age (years)						
18–30 (reference)						
31–45	0.07(0.04)	0.5	0.17(0.04)	0.001	0.24(0.06)	0.001
46–55	0.26(0.07)	0.001	0.40(0.07)	0.001	0.67(0.11)	0.001
56 and above	0.39(0.13)	0.01	0.22(0.14)	0.5	0.61(0.20)	0.01
Nationality						
Asian (reference)						
Arab	–0.83(0.23)	0.001	–1.96(0.25)	0.05	–2.79(0.36)	0.001
Other	0.69(0.35)	0.5	1.17(0.38)	0.01	1.86(0.55)	0.01
Health status						
Fair/Poor (reference)						
Excellent	0.81(0.10)	0.001	0.33(0.11)	0.01	1.14(0.16)	0.001
Good	0.40(0.11)	0.001	0.03(0.12)	0.5	0.43(0.17)	0.05
Highest educational attainment						
No formal education (reference)						
Elementary	0.26(0.11)	0.05	0.19(0.11)	0.5	0.45(0.16)	0.01
High School	0.16(0.11)	0.5	0.34(0.12)	0.01	0.50(0.18)	0.01
Higher education (diploma & above)	0.36(0.12)	0.01	0.64(0.12)	0.001	1.00(0.18)	0.001
Marital status						
Single (reference)						
Married	0.11(0.05)	0.05	–0.06(0.05)	0.5	0.05(0.07)	0.5
Divorced/Widow/Widower	–0.02(0.20)	0.05	0.05(0.21)	0.5	0.03(0.31)	0.5
Native Language						
Arabic (reference)						
Urdu	–0.01(0.23)	0.5	–0.68(0.25)	0.01	–0.69(0.37)	0.5
Hindi	–0.04(0.23)	0.5	–0.60(0.25)	0.05	–0.64(0.37)	0.5
Malayalam	0.01(0.24)	0.5	–0.68(0.26)	0.01	–0.67(0.38)	0.5
Bengali	0.07(0.24)	0.5	–0.74(0.25)	0.01	–0.67(0.37)	0.5
Tagalog	0.07(0.24)	0.5	–1.09(0.26)	0.001	–1.01(0.38)	0.05
Other	–0.26(0.24)	0.5	–0.56(0.25)	0.05	–0.82(0.37)	0.05
Comfortable conversing in English						
No (reference)						
Yes	–0.06(0.04)	0.5	–0.44(0.04)	0.001	–0.50(0.06)	0.001
Comfortable conversing in Arabic						
No (reference)						
Yes	0.39(0.05)	0.001	0.24(0.05)	0.001	0.64(0.07)	0.001
Previous knowledge of health insurance						
No (reference)						
Yes	0.18(0.04)	0.001	0.07(0.04)	0.5	0.24(0.06)	0.001

4.6±2.4 compared with those respondents who had no schooling with scores of 2.9±1.6, or elementary with scores of 3.8±1.8 or high school education with scores of 3.5±1.8. **Appendices 1 & 2** show the significant associations between required education level and knowledge of health insurance. The higher the required education level, the higher the knowledge score. The mean overall knowledge score of expatriates who were specialists with a university-level education was 5.2±2.8.

A significant association was noted between company size and knowledge of health insurance benefits. The mean score on overall knowledge for those who worked at a company with more than 50 employees was 4.48±2.04, whereas for those who worked at a company with fewer than 50 employees, the score was 3.59±2.12. Respondents who reported previous knowledge about health insurance were more

Table 4 - Regression analysis results for perceived, verified and overall knowledge of health insurance for the workplace characteristics of workers (continued).

Parameters	Perceived knowledge		Verified knowledge		Overall knowledge	
	Coef(se)	*p*-value	Coef(se)	*p*-value	Coef(se)	*p*-value
Position in company						
Specialist with university education	0.26(0.07)	0.001	1.31(0.07)	0.001	1.58(0.10)	0.001
Professional with education above high school	0.07(0.06)	0.5	0.26(0.07)	0.001	0.34(0.10)	0.05
Technician with high school education	0.10(0.07)	0.5	0.25(0.07)	0.001	0.36(0.10)	0.01
Manual laborer with less than high school education	−0.08(0.04)	0.5	0.07(0.05)	0.5	−0.01(0.07)	0.5
Unskilled laborer, usually with no education (reference)						
Length of time working in Saudi Arabia						
Less than 1 year (reference)						
1–3 years	0.41(0.07)	0.001	0.05(0.08)	0.5	0.46(0.11)	0.001
3–5 years	0.78(0.07)	0.001	0.18(0.07)	0.05	0.96(0.11)	0.001
5–10 years	1.01(0.07)	0.001	0.30(0.07)	0.001	1.32(0.11)	0.001
More than 10 years	0.65(0.08)	0.001	−0.13(0.08)	0.5	0.52(0.12)	0.001
Number of Employees in company or organization						
>=50 (reference)						
<50	0.28(0.04)	0.001	0.20(0.04)	0.001	0.48(0.06)	0.001
Type of business or industry						
Construction (reference)						
Industrial	−0.56(0.06)	0.001	−0.44(0.06)	0.001	−0.99(0.09)	0.001
Trade	−0.48(0.05)	0.001	−0.39(0.05)	0.001	−0.88(0.08)	0.001
Other	−0.63(0.05)	0.001	−0.51(0.05)	0.001	−1.14(0.07)	0.001
Monthly income (SAR)						
Less than 2000 (reference)						
2001–4500	0.24(0.04)	0.001	0.13(0.05)	0.01	0.37(0.07)	0.001
4501–7500	0.63(0.06)	0.001	0.21(0.06)	0.01	0.84(0.09)	0.001
Above 7501	0.50(0.09)	0.001	0.80(0.10)	0.001	1.31(0.14)	0.001
Adjusted R-squared		0.43		0.44		5450

likely to have better overall knowledge about their current health insurance benefits (mean 4.3±2.16) than were those who reported they did not have previous knowledge (mean 3.7±2)

Table 3 shows the percentage of expatriates who believed they knew the copayments for general practitioner visits (66.9%), outpatient visits (inclusive) (71.2%), inpatient visits (42.2%), prescription drugs (81.6%), and dental services (43.4%). However, the percentage of respondents who actually knew the correct copayments was considerably different in most cases: general practitioner visits (7.5%), outpatient visits (64.4%), inpatient visits (13.3%), prescriptions (15.4%), and dental services (9.6%). Of those who claimed to know the copayment amounts, the percentage who gave incorrect responses were 11.3% for general practitioner, 90% for outpatient, and 31.6% for inpatient visits; 19% for prescription drugs; and 22% for dental services.

To study the joint effect of all independent variables on knowledge scores (perceived, objective and overall), a multiple linear regression model was fit for each score. Results of the regression analyses are presented in parts 1& 2 in **Table 4**. In **Table 4**, part 1 represents the personal characteristics of workers and part 2 represents workplace characteristics of workers. In **Table 4**, part 2 shows that the adjusted R^2 of model fit for perceived knowledge was 0.43, indicating that nearly 43% of the variation in perceived knowledge can be explained by all of the independent variables. For objective knowledge, the adjusted R^2 was similar at 0.44, whereas for overall knowledge R^2 was larger at 0.55.

Part 1 and part 2 (**Table 4**) also show the regression coefficients and their standard errors, as well as *p*-values, for all variables. Most variables retained a significant association with perceived knowledge, as seen in the univariate analysis, except for native language and comfort level conversing in English. Since all variables

were categorical, a reference group was chosen for each variable. For the variables reflecting attained educational level and required educational level of the job, the category of no (required) education was chosen as the reference. Only the category of positions requiring a university degree were significantly different from the reference. There was no significant difference between positions requiring less than a high school education and those that did not require any education. With respect to expatriates with higher levels of education, those with a high school diploma or above were the only category that differed significantly from the reference.

Interestingly previous knowledge of health insurance had no significant impact on verified knowledge (p=0.154), but was significantly associated with both perceived and overall knowledge.

Discussion. This study assesses expatriates' knowledge of health insurance benefits by analyzing their self-reported knowledge, objectively verified knowledge about copayments, and the combination of perceived and objective knowledge.

There are similarities between our sample and the expatriate population in Saudi Arabia, as reported by the Ministry of Labor.[17] For example, the average (and median) age, the 4 most common nationalities (Indian, Pakistani, Egyptian, and Bengali), and the 3 most common economic sectors are consistent with Ministry data, although some economic sectors, such as health care and health insurance, were excluded in this study.

This study found that participants were more likely to claim knowledge of insurance coverage for outpatient services and prescription drugs, with almost equal percentages (approximately 87%). However, Paez and colleagues[23] found that less than 60% of people knew about their health care coverage before attending health care facilities. Benedetti et al[24] reported that half of study participants knew their copayment amounts. Our study finding of 64.1% correct responses to objective knowledge items about copayments for outpatient visits (inclusive) is in line with these previous studies.

Variations between what people think they know and what they truly know also support the findings of other studies in which people tended to overestimate their knowledge on health insurance coverage.[23,24] Paez et al[23] found that 3 out of 4 participants think they know how to use health insurance, and the authors estimated that only one in 5 people were capable of calculating their out-of-pocket costs; however, our study found that these percentages differed from one service to another. Among those who believed they knew their health insurance copayments, we found variable percentages

of those who actually knew the correct copayment for general practitioner (11%), outpatient (90%) and inpatient visits (31.6%), prescription drugs (19%) and dental services (22%). Moreover, a gap was noted between participants' estimation of their copayments and the actual values, although a 10% margin was allowed. This gap supports the importance of verifying knowledge rather than relying on self-report.[24,23]

Our study revealed that knowledge with respect to dental services was low. Only 22% of respondents knew the maximum coverage for these services. There have been few studies about knowledge of dental care coverage because these services are excluded from many international health insurance plans.[15] In the United States, Medicare and Medicaid programs do not cover most dental services.[16]

Study participants had high self-reported knowledge on prescription drug coverage (86.4%). However, their verified knowledge of copayments for medication was very low. People tended to overestimate their knowledge on prescription drugs more than any other service. This large variation between respondents' perceived (81.6%) and actual (19%) knowledge is supported by previous research in which participants were shown to lack specific knowledge about their prescription drug copayments.[24]

Our study findings are inconsistent with those of other studies showing that people are well informed about their coverage for inpatient services relative to outpatient coverage.[22] Our study indicates that self-reported knowledge was low for both inpatient services and copayments compared with knowledge about outpatient coverage. The expatriate population in Saudi Arabia is young and their need for major surgery is low, contrary to that among older adults covered by Medicare or low-income individuals enrolled in Medicaid. Moreover, expatriates are required to undertake 2 medical exams prior to beginning work in Saudi Arabia, thereby reducing the likelihood of major surgery.

We found not only a significant association between expatriates' education levels and their knowledge of health insurance benefits but also an association between this knowledge and the education required to perform their jobs, a finding that has not been reported previously. The importance of educational requirements for employment may indicate that employers treat employees differently based on the importance of their position, from the employer's perspectives. The role of employers in access to health insurance, particularly for minorities, cannot be underestimated, as has been

asserted by others.[25,26] Our findings are in agreement with other research reporting that minority workers in large companies have better knowledge of their health insurance benefits compared with those working in small companies.[27] This finding can be explained by the fact that people obtain their knowledge about health insurance benefits from their employers as a first source,[28] and larger employers have better methods of informing their employees about these benefits.

As with most research, our study has limitations. The cross-sectional study design limits our ability to derive causal inferences.[29] Although the linear regression analyses increase our confidence on the association between different variables and expatriates' knowledge, the current regression analysis cannot explain more than 55% of expatriates' knowledge. Therefore, it is possible that influencing variables are missing such as a negative attitude toward health insurance from a religious perspective,[7] differences in health insurance benefits packages,[30] and the absence of basic familiarity with program terminology.[31] In addition, our study did not consider that there are variations among health insurance companies with respect to informing insured participants.

Another study limitation was the fact that the sample included only males. Female expatriates and children were excluded because the number of female employees in the private sector is small (98.30% of private sector expatriates are male), thus making it difficult to obtain a sufficient sample size. Most women work in the health care sector, which was excluded from the study sample, as stated above. Moreover, not all expatriates' families were covered under CEBHI during the study period.

Last, this study measured knowledge of health insurance benefits from the employee's point of view. Further studies are needed to assess this knowledge from the points of view of both employers and health insurance companies because these are the main sources of information on health insurance.[18,28] Moreover, further study is needed to assess whether knowledge of insurance benefits has implications for expatriates' access to health care.

Conclusion and recommendation. In conclusion, many expatriates face challenges in understanding how health insurance works and how to estimate out-of-pocket costs. Knowledge of health insurance benefits is very limited among expatriates, with most tending to overestimate their knowledge. The factors influencing this knowledge are very complex. Our study outcomes raise questions about the effectiveness of health insurance companies in communicating with their customers. The CCHI website is only available in Arabic and English. Most expatriates speak and write in Urdu, Hindi, Malayalam, and Bengali. Expatriates who can speak Arabic and English have better familiarity with their health insurance benefits. Therefore, health insurance benefits and other insurance policy information should be made available in other languages. In addition, it should be mandated that all health insurance company policies as well as expatriates' work contracts, which describe their right to health insurance, be translated into employees' native languages. The CCHI must develop a national policy to help increase expatriates' knowledge about health insurance benefits in collaboration with health insurance companies, employers, and government agencies such as the Ministry of Labor.

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Appendix 1 - Result of one-way Analysis of Variance for perceived, verified, and overall knowledge of health insurance and workers personal characteristics (N=3398).

Personal characteristics of workers	Perceived knowledge			Verified knowledge			Overall knowledge		
	n	Mean (SD)	*P*-value	n	Mean (SD)	*P*-value	n	Mean (SD)	*P*-value
Age group (years)			0.001			0.001			0.001
18 to 30	957	2.63(1.25)		974	.78(1.01)		974	3.36(1.93)	
31 to 45	2036	3.13(1.15)		2048	1.19(1.34)		2048	4.30(2.11)	
46 to 55	300	3.45(0.94)		300	1.57(1.60)		300	5.02(2.10)	
56 and above	60	3.28(0.92)		60	1.08(1.28)		60	4.37(1.86)	
Nationality			0.001			0.001			0.001
Asian	2606	3.18(1.07)		2621	1.28(1.33)		2621	4.44(2.04)	
Arab	752	2.41(1.35)		766	.47(.91)		766	2.84(1.86)	
Other	7	3.43(1.51)		7	2.86(2.67)		7	6.29(3.63)	
Highest educational attainment			0.001			0.001			0.001
No formal education	85	2.41(1.19)		89	.64(.63)		89	2.94(1.66)	
Elementary	1476	2.96(1.19)		1489	.95(.94)		1489	3.88(1.82)	
High school	553	2.74(1.23)		556	.85(.99)		556	3.58(1.89)	
Higher education (diploma and above)	1254	3.23(1.12)		1263	1.42(1.69)		1263	4.63(2.42)	
Marital status			0.001			0.001			0.001
Single	493	3(1.22)		499	1.27(1.52)		499	4.24(2.39)	
Married	2803	3.0(1.18)		2824	1.07(1.25)		2824	4.07(2.07)	
Divorced / widowed	22	2.86(1.36)		23	1.30(1.52)		23	4.04(2.53)	
Native language			0.001			0.001			0.001
Arabic	748	2.43(1.35)		762	.49(.96)		762	2.87(1.91)	
Urdu	858	3.19(1.09)		864	1.32(1.34)		864	4.49(2.08)	
Hindi	743	3.02(1.01)		745	1.29(1.34)		745	4.30(2.00)	
Malayalam	122	3.20(1.06)		122	1.20(1.30)		122	4.40(1.99)	
Bengali	299	3.41(1.03)		299	1.22(1.12)		299	4.64(1.73)	
Tagalog	259	3.77(0.75)		262	1.18(1.15)		262	4.90(1.63)	
Other	330	2.81(1.24)		334	1.30(1.56)		334	4.07(2.50)	
Comfortable conversing in English			0.001			0.05			0.5
No	1546	2.92(1.20)		1556	1.15(1.31)		1556	4.05(2.16)	
Yes	1817	3.09(1.18)		1836	1.05(1.28)		1836	4.11(2.08)	
Comfortable conversing in Arabic			0.05			0.05			0.05
No	624	2.54(1.35)		637	.92(1.24)		637	3.40(2.26)	
Yes	2736	3.12(1.12)		2752	1.14(1.31)		2752	4.24(2.05)	
Health status			0.001			0.001			0.001
Excellent	2907	3.13(1.14)		2933	1.18(1.33)		2933	4.28(2.11)	
Good	363	2.36(1.21)		366	.58(.90)		366	2.92(1.73)	
Fair	93	1.95(1.07)		93	.54(.81)		93	2.48(1.52)	
Previous knowledge of health insurance			0.001			0.001			0.001
No	1268	2.79(1.21)		1284	0.98(1.10)		1284	3.73(2.0)	

Appendix 2 - Result of one-way ANOVA for Perceived, Verified, and Overall Knowledge of Health Insurance and job/workplace characteristics.

Job/workplace characteristics of workers	Perceived Knowledge		Verified Knowledge*		Overall Knowledge*	
	N	Mean(SD)	N	Mean(SD)	N	Mean(SD)
*Position in company**						
Specialist with university education	738	3.27(1.06)	739	1.93(2.08)	739	5.19(2.81)
Professional with education above high school	393	3.22(1.00)	395	1.14(1.08)	395	4.34(1.76)
Technician with high school education	414	2.92(1.17)	417	.72(.90)	417	3.62(1.71)
Manual laborer with less than high school education	944	2.86(1.27)	959	.88(.80)	959	3.70(1.79)
Unskilled laborer, usually with no education	876	2.91(1.23)	884	.80(.68)	884	3.69(1.71)
*Length of time working in Saudi Arabia**						
Less than 1 year	262	1.87(1.49)	278	.44(.78)	278	2.20(1.94)
1–3 years	493	2.41(1.29)	503	.74(1.04)	503	3.10(2.00)
3–5 years	666	2.98(1.09)	669	1.09(1.29)	669	4.06(2.03)
5–10 years	1442	3.51(0.89)	1442	1.49(1.46)	1442	4.99(1.95)
More than 10 years	506	2.82(1.01)	506	.72(.83)	506	3.53(1.47)
*Number of employees in company / organization**						
≤50	1486	2.81(1.40)	1512	0.83(1.04)	1512	3.59(2.12)
More than 50	1883	3.17(0.97)	1886	1.32(1.44)	1886	4.48(2.04)
*Type of business or industry**						
Industrial	347	2.85(1.19)	350	.92(1.10)	350	3.75(1.96)
Construction	1238	3.50(0.87)	1242	1.55(1.43)	1242	5.04(1.92)
Trade	865	2.78(1.23)	873	.78(.98)	873	3.54(186)
Other	919	2.52(1.33)	933	.86(1.27)	933	3.45(2.20)
*Monthly income (SAR) including allowances**						
Less than 2000	1534	2.76(1.17)	1548	.90(.95)	1548	3.63(1.82)
2001–4500	1180	3.07(1.21)	1194	1.06(1.27)	1194	4.09(2.14)
4501–7500	501	3.48(1.03)	501	1.44(1.68)	501	4.92(2.24)
Above 7501	153	3.59(0.83)	154	2.33(2.04)	154	5.90(2.48)

**p*-value is significant at <0.05