

ORIGINAL ARTICLE

Parents' knowledge and attitudes toward rheumatic heart disease in Saudi Arabia

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ABSTRACT

Background: Rheumatic heart diseases (RHD) are significant public health concerns worldwide. The present study aimed at assessing the level of parents' knowledge regarding RHD and its predisposing factors in Saudi Arabia and comparing the knowledge of RHD among different genders, age groups, levels of education, and occupation of the parents.

Methods: A cross-sectional study was conducted to determine the relationship between socio-demographic characteristics and parents' knowledge toward RHD in Saudi Arabia. Data were collected using a questionnaire and analyzed using Statistical Package for the Social Sciences.

Results: A total of 430 respondents were enrolled in the study; about 297 (69.1%) were females and 133 (30.9%) were males. The overall knowledge level of parents about RHD was moderate, with 179 (41.6%) of parents having a good knowledge level and 251 (58.4%) having a poor level of knowledge. The mean knowledge score was 5.85 (SD ± 2.26) out of 10. Prior history of sore throat was reported in 332 (77.2%) participants most of them treated the sore throat with antibiotics (74.8%) while 38 (9.8%) used traditional herbs and 22 (5.7%) treated it with salt. There was a significant association between the level of knowledge about RHD and age ($p = 0.000$).

Conclusions: The present study found moderate overall knowledge level among parents toward RHD. About two-fifths of parents had a good knowledge level and more than half of parents had poor knowledge. The level of knowledge about RHD was significantly associated with age, occupation, and region of residence.

Keywords: Parents, knowledge, attitude, rheumatic heart disease, knowledge of parents toward RHD.

Introduction

Rheumatic heart disease (RHD) is a chronic sequel of either a single severe attack or multiple recurrent attacks of acute rheumatic fever (ARF). In contrast, ARF is an inflammatory disease that results from the body's autoimmune response after Group-A Beta-hemolytic Streptococcal (GABS) throat infection. ARF is diagnosed depending on "Jones criteria" [1,2]. In RHD, valvular heart disease is the most common complication. The mitral valve is the most frequently involved valve followed by the aortic valve followed by a tricuspid valve, which is less frequently involved but reported. Valvular heart disease can be manifest by either stenosis or regurgitation. The other complication includes atrial fibrillation, especially if the mitral valve is involved. Ultimately after many years, heart failure may develop. In severe cases, valvular abnormalities can persist, requiring lifelong medical management and eventual

valvular replacement surgeries [2-4]. Early diagnosis and appropriate treatment of GABS throat infection is an important and initial step in primary prevention of ARF. The consequence of untreated or under-treated GABS throat infection leads to ARF development after approximately 2 weeks in a certain portion of patients. Therefore, about half of the patients with ARF will progress to develop RHD [2,5].

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Rheumatic valvular heart disease is long-term cardiac damage characterized by fibrous thickening, adhesion, calcification of valve leaflets results in valve's stenosis or regurgitation with an increased risk of infective endocarditis either with or without thromboembolism event [3]. Previously, RHD was common across all populations, but recently it became less and affected ~1:10,000 children in developed countries and much more prevalent in developing countries [3-6]. The number of newly diagnosed cases of RHD was estimated at 282,000 per year, with approximately 350,000 deaths per year due to either ARF or RHD [7]. Qurashi [8] did a study on 83 children with ARF admitted to the Children's Hospital in Riyadh, Saudi Arabia, during the period of 1994–2003, which showed that ARF continues to occur in Saudi Arabia regardless of the improvement in the socio-economic status of the country. It was associated with severe cardiac involvement in 53% of the cases. Saeed and Afzal [9] did a study, on 200 patients suffering from RHD in Faisalabad Institute of Cardiology to assess the degree of RHD awareness in patients with RHD showed that only 5% of the patients were aware that sore throat is a leading factor for RHD [10]. A study was done on 265 participants in Cameroon by Nkoke et al. [10] to assess the degree of RHD awareness in the general population showed that the awareness of RHD was low. 73% of the participants did not know what causes sore throat. 71.1% were incognizant of any complications that could arise from poorly treated sore throat, and more than 70% did not know that sore throat can be associated with heart disease. 82% did not know RHD, and only 5.1% of the participants had an adequate awareness of RHD. A more recent study was done by Kamal et al. [11] on 1,596 respondents from the general population in Saudi Arabia, including married and non-married population, to assess the degree of RF without aiming to assess the degree of RHD showed the knowledge and attitude about RF among participants was 70%. Limitation and prevention of this death-dealing disease require comprehensive understanding and a high level of awareness by the health care provider, general population, especially the parents. Parents' level of awareness toward RHD was poorly documented in most developing countries, where they have a high prevalence of RHD and postulated a high incidence of ARF [12].

Regarding parent's knowledge about rheumatic heart, 30% out of 1,595 were found to have good background knowledge about rheumatic fever in comparison to 70% of poor knowledge, despite this knowledge fact most of the studied parents tend to have a good attitude toward rheumatic fever and health-seeking behavior in the case of upper respiratory tract infections and throat infections. Most of the studied respondents, 70% out of 1,595, demonstrate a positive attitude toward the disease. Knowledge and attitude significantly differ among mothers and fathers [11]. Further a large study that has been done in Saudi Arabia in 1991 has shown the prevalence of RF to be 0.3 per 1,000. The chronic RF to be 2.8 per 1,000 with a total of 3.1 per 1,000,

having good knowledge about the causes, presentation, and complication of rheumatic fever and positive behavior toward treatment and prevention will give a great hand in reducing the increasing prevalence of complications of RHD [11]. This study was conducted to prospectively and cross-sectionally assess the degree of parents' knowledge regarding RHD together with its predisposing factors in Saudi Arabia. The study objectives included: to compare the knowledge of RHD among different genders of the parents, to compare the knowledge of RHD among different ages of the parents, to compare the knowledge of RHD among different levels of education of the parents and to compare the knowledge of RHD among different occupations of the parents.

Because there is a limited number of studies regarding the public knowledge of RHD. To the best of our knowledge, there is only one study targeting the general population in Saudi Arabia to assess their knowledge regarding RF [11]. So, we sought to gather accurate information about the parents' knowledge of RHD in Saudi Arabia among different ages, genders, and levels of education. The study will help us know whether the parents in Saudi Arabia lack knowledge about RHD. Thereby, to consider knowledge strategies and plan for proper health education, which has a profound effect on the incidence, complications, need for cardiac surgeries, and mortality of the disease.

Subjects and Methods

The study was set to investigate the level of knowledge and attitudes of parents toward RHD. A cross-sectional study will be used to determine if there is a significant relationship between socio-demographic characteristics and knowledge of parents toward RHD. The study made use of a questionnaire that was given to 385 parents in Saudi Arabia. The questionnaire was adopted from Nkoke et al. [10] and was divided into two parts. The first part of the questionnaire was designed to assess the socio-demographic characteristics of the parents. Questions were categorized into age, gender, level of education, occupation status, and region of residency. The second part of the questionnaire was designed to evaluate the level of parent's knowledge and attitude toward RHD. Parents were evaluated firstly on their history and experience dealing with RHD, if their children exhibited RHD symptoms and the type of treatment used to manage such symptoms. Secondly, the questionnaire evaluated the parents' opinion on handling RHD, what they considered the main risk factors, and how they perceived the importance of different types of treatment. Most of the questions are simple "yes," "no," and "don't know" answers. The study setting for the present study was in Saudi Arabia, including all 13 administrative areas (Riyadh, Jouf, Northern borders, Tabuk, Hail, Qassim, Madinah, Makkah, Bahah, Asir, Jizan, Najran, and Eastern province). The sample size was calculated as 385 using the formulae $n = [P(1-P)z^2]/d^2$.

The sampling frame included all Saudi parents at various 13 administrative areas as the target population. The sample size was calculated according to the total Saudi population (15 years and over) by gender, marital status, and the administrative area declared by the general authority for statistics on its official website <https://www.stats.gov.sa>. According to it, the total number was "14,215,901 married and never married males and females" subtracted from it "5,244,463 never married males and females" to get a total of "8,971,438 married males and females." The total sample size was 385 using the EPI sample size calculator at a 95% confidence interval and estimated error of 0.05. The inclusion criteria were all Saudi parents of children in Saudi Arabia. All non-Saudi parents of children in Saudi Arabia as there is no data about the population number of non-Saudi married in Saudi Arabia was excluded. A Pilot study on 34 participants was done to validate the questionnaire. To determine the validity and the reliability of the questionnaire, the study employed the use of the Cronbach alpha test. The test measures the internal consistency of the questionnaires to determine their reliability to the research study and enhance the accuracy of the evaluation and assessment [13]. Internal consistency describes the extent to which all the items in a test measure the same concept or construct. Reliability is closely associated with validity, and for a questionnaire to be valid, it has to be reliable. The Cronbach alpha has a scale of between 0 and 1 with an acceptable range value of 0.6 to 0.90. A higher alpha score indicates that the question is reliable and its attribute to error is minimal. A lower alpha may indicate that the items under test are few, and there is a need to increase the number of questionnaires. Also, a low alpha may be due to low inter-Correlations between the questionnaires. The study computed correlation tests for individual questions to determine their correlations with the low correlation being dropped. The test was done on questions that evaluated the knowledge of RHD and the attitude of the parents toward dealing with RHD. The questions touched on the complications, causes of RHD, and treatment. Descriptive statistics from the pilot study was tabulated and expressed as percentage frequency of the total participants in a separate file. The participation was entirely voluntary after proper consent. The participants were free to withdraw at any stage of the study without any consequences.

A validated and reliable online questionnaire was developed on Google forms. It was randomly distributed through social media, including WhatsApp and Twitter, using official accounts for each administrative area in Saudi Arabia, targeting the parents who were allowed to respond in their own time and privacy. Data analysis was performed using Statistical Package for the Social Sciences latest version. Descriptive statistics and chi-square tests were performed to assess the relations of the variables. Data forms will be confidential and monitor by PI. De-identified data will be anonymously collected, and group statistically analyzed before publication. There is

no harm or wastes expected to come out of this study. The study was conducted after approval from the ethics review committee of the College of Medicine, and the Local Committee of Bioethics, Jouf University.

Results

Four hundred thirty parents participated in this study. There were 297 (69.1%) females and 133 (30.9%) males. The distribution of their age was as follows: <20 years (8.8%), 20 to 25 years (22.3%), 26 to 30 years (10.9%), 31 to 35 years (12.8%), and >35 years (45.1%). The majority of the participants were working in the governmental sector (46%), 41 (9.5%) working in the private sector, and 191 (44.4%) had other occupations. Regarding their highest level of education, 398 (92.6%) participants had completed their secondary school studies or had bachelor's degrees, 20 (4.7%) completed their intermediate school studies, and 12 (2.8%) had primary education. There are equal percentages of participants who live in Bahah, Jouf, Northern borders, Jizan, Hail, and Najran, each representing 8.4%. The characteristics of the participants are shown in Table 1.

Parents' knowledge and attitudes toward RHD

The overall knowledge level of parents toward RHD was moderate, with 179 (41.6%) of parents having a good knowledge level and 251 (58.4%) having a poor level of knowledge (Figure 1). The mean knowledge score was 5.85 (SD \pm 2.26) out of 10.

Out of 430 participating parents, a prior history of sore throat was reported in 332 (77.2%) participants, with 291 (67.7%) parents their children had a previous history of sore throat, most of them treated their kid's sore throat with antibiotics (74.8%) while 38 (9.8%) used traditional herbs and 22 (5.7%) treated it with salt (Figure 2, Table 2). The majority of the participants (70.5%) used the medications prescribed by a medical doctor or health care professional when they or their children had a sore throat. In comparison, 89 (20.7%) had given medication to their kids by themselves and 38 (8.8%) by asking their friends. 246 (57.2%) of the participants have a family member or know someone who frequently has a sore throat more than three times in the year, and about half of the participants (51.2%) knew that bacteria cause sore throat. About the complications of sore throat infection, 247 (57.4%) of the participants knew that the complications are associated with a poorly treated sore throat. 202 (47%) of the participants correctly knew that sore throat infection could be associated with heart disease and 354 (82.3%) knew that adequate treatment of acute sore throat infection is an important tool in preventing heart disease. Nearly half of the participants (47.7%) have heard about RHD, while only 225 (52.3%) did not hear about it. About the causes of RHD, more than half of the participants (52.3%) did not know the causes. In comparison, 50 (11.6%) of the participants knew that sore throat was the cause, followed by a bacterial infection

Parents' knowledge and attitudes toward rheumatic heart disease

Table 1. Socio-demographic data of the study respondents (n = 430).

Variable	Category	Frequency	Percent
Gender	Male	133	30.9
	Female	297	69.1
Age	<20	38	8.8
	20-25	96	22.3
	26-30	47	10.9
	31-35	55	12.8
	>35	194	45.1
Occupation	Governmental sector	198	46
	Private sector	41	9.5
	Other	191	44.4
Level of education	Primary school	12	2.8
	Intermediate school	20	4.7
	Secondary/University	398	92.6
Region of residence	Bahah	36	8.4
	Jouf	36	8.4
	Northern borders	36	8.4
	Riyadh	28	6.5
	Eastern province	35	8.1
	Qassim	7	1.6
	Madinah	17	4
	Tabuk	35	8.1
	Jizan	36	8.4
	Hail	36	8.4
	Asir	21	4.9
	Makkah	35	8.1
	Najran	36	8.4
Other	36	8.4	

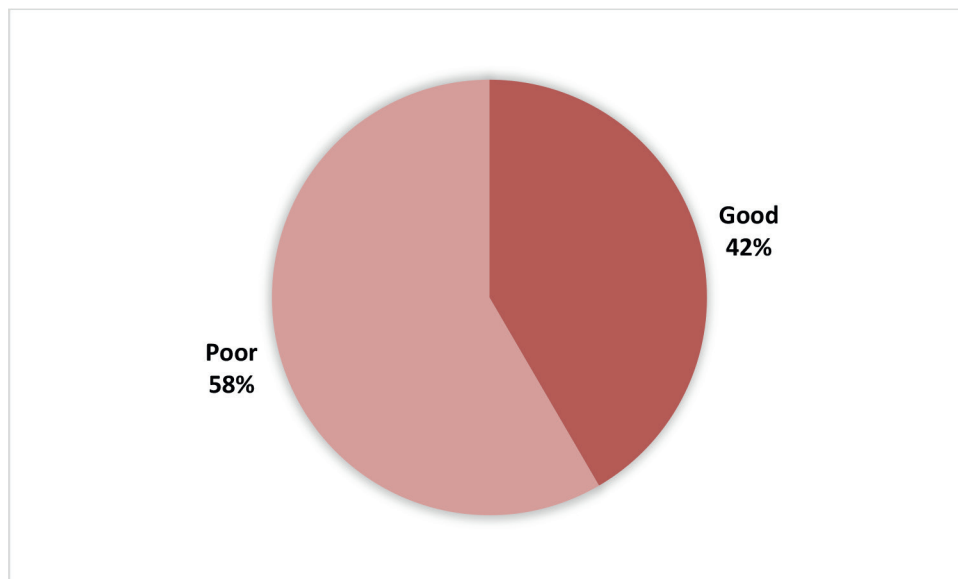


Figure 1. Level of knowledge about RHD (n = 430).

Parents' knowledge and attitudes toward rheumatic heart disease

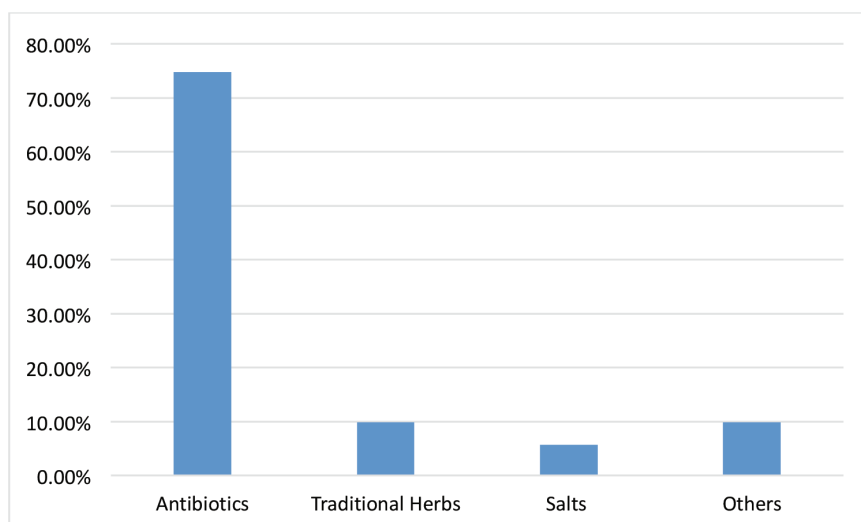


Figure 2. What did you do to treat the sore throat? (n = 389).

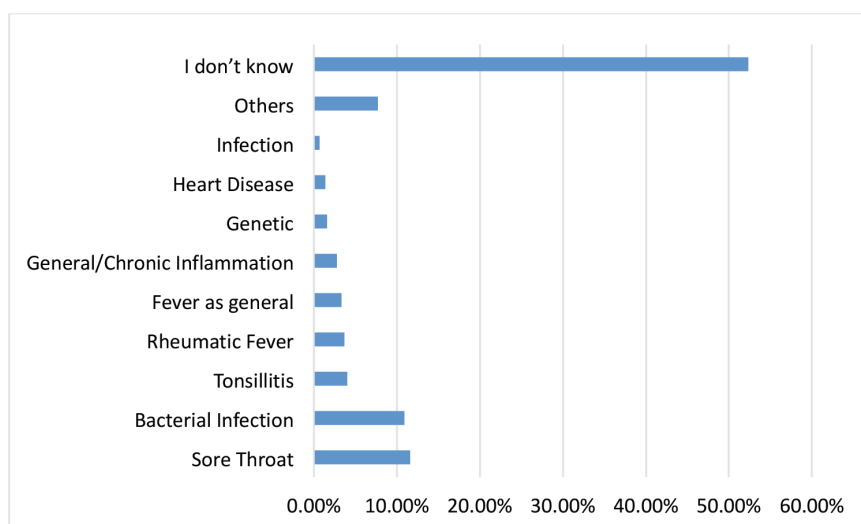


Figure 3. What causes RHD?

(10.9%), tonsillitis (4%), rheumatic fever (3.7%), fever as general (3.3%), general/chronic inflammation (2.8%), genetic causes (1.6%), heart diseases (1.4%), infection (0.7%), and other causes (7.7%). In comparison, more than half of the participants (52.3%) did not know the causes of the RHD (Figure 3).

The level of knowledge about RHD was significantly associated with age ($p = 0.000$); participants aged more than 35 years had the highest level of knowledge compared to other age groups. Also, the level of knowledge about RHD was significantly related to the occupation and region of residence ($p = 0.005$, 0.000 respectively). A higher percentage of the governmental sector workers and hail region residents had good knowledge when compared to others. On the contrary, gender and educational level did not have any significant impact on knowledge about RHD (Table 3).

Discussion

Raising the population's level of knowledge about RHD and its wide range of pathological effects is considered one of the most important measures to prevent its serious associated complications, which may cause significant morbidity and mortality. These complications range from asymptomatic rheumatic fever attack to more serious complications such as a valvular lesion, arrhythmias, stroke, and heart failure [14,15].

The main purpose of this study was to assess the level of parents' knowledge about RHD and its predisposing factors in Saudi Arabia and compare the level of knowledge of RHD among different genders, age groups, and educational levels and occupations of the parents. In this study, about two-thirds were females, and nearly half of parents were within the age group of above

Parents' knowledge and attitudes toward rheumatic heart disease

Table 2. Knowledge and attitude toward RHD (n = 430).

Question	Yes		No
	1. Have you ever had a sore throat?	332 (77.2%)	98 (22.8%)
2. Has any of your children ever had a sore throat?	291 (67.7%)	139 (32.3%)	
3. Do you have any family members or know someone who frequently has a sore throat (more than three times in the year)?	246 (57.2%)	184 (42.8%)	
4. Are you aware of any complications that could occur in case sore throat is poorly treated?	247 (57.4%)	183 (42.6%)	
5. Have you ever heard about RHD	205 (47.7%)	225 (52.3%)	
	True	False	
6. Adequate treatment of acute sore throat is an important tool in the prevention of heart disease:	354 (82.3%)	76 (17.7%)	
	Myself	Friend	Medical doctor/health care professional
7. Who prescribed medication when you or a child had a sore throat?	89 (20.7%)	38 (8.8%)	303 (70.5%)
	Bacteria	Others	I don't know
8. In your opinion, what causes a sore throat?	220 (51.2%)	90 (20.9%)	120 (27.9%)
	Yes	No	I don't know
9. Can sore throat be associated with heart disease?	202 (47%)	49 (11.4%)	179 (41.6%)

Table 3. Factors associated with RHD knowledge (the percentages were calculated within each studied group).

Variable	Category	Knowledge about RHD		p-value
		Good	Poor	
Gender	Male	53 (39.8%)	80 (60.2%)	0.617
	Female	126 (42.4%)	171 (57.6%)	
Age in years	<20	11 (28.9%)	27 (71.1%)	0.000
	21-25	37 (38.5%)	59 (61.5%)	
	26-30	12 (25.5%)	35 (74.5%)	
	31-35	12 (21.8%)	43 (78.2%)	
	>35	107 (55.2%)	87 (44.8%)	
Occupation	Governmental sector	99 (50%)	99 (50%)	0.005
	Private sector	14 (34.1%)	27 (65.9%)	
	Other	66 (34.6%)	125 (65.4%)	
Level of education	Primary school	7 (58.3%)	5 (41.7%)	0.106
	Intermediate school	12 (60%)	8 (40%)	
	Secondary/University	160 (40.2%)	238 (59.8%)	
Region of residence	Bahah	24 (66.7%)	12 (33.3%)	0.000
	Jouf	14 (38.9%)	22 (61.1%)	
	Northern borders	12 (33.3%)	24 (66.7%)	
	Riyadh	4 (14.3%)	24 (85.7%)	
	Eastern province	13 (37.1%)	22 (62.9%)	
	Qassim	5 (71.4%)	2 (28.6%)	
	Madinah	8 (47.1%)	9 (52.9%)	
	Tabuk	16 (45.7%)	19 (54.3%)	
	Jizan	19 (52.8%)	17 (47.2%)	
	Hail	33 (91.7%)	3 (8.3%)	
	Asir	8 (38.1%)	13 (61.9%)	
	Makkah	10 (28.6%)	25 (71.4%)	
	Najran	7 (19.4%)	29 (80.6%)	
Other	6 (16.7%)	30 (83.3%)		

35 years and about 20% of the parents aged between 20 and 25 years. About half of the respondents worked in the governmental sector, followed by other jobs or free business, and only less than 10% worked in the private sector. The vast majority of participants had completed their secondary school studies or had bachelor's degrees. Most of the respondents are residents of Bahah, Jouf, Northern borders, Jizan, Hail, and Najran, representing 8.4%. Socio-demographic determinants of the population are important as they significantly affect the actual level of the population's knowledge about the disease. Regarding the general level of knowledge about RHD in Saudi Arabia, about two-fifths of respondents had good general knowledge about RHD, and about 60% of them had poor knowledge about RHD. This reflects the decreased level of knowledge about RHD, although relatively acceptable educational level, similar findings were found in other parallel studies conducted in Saudi Arabia [9,16]. More than two-thirds of parents were involved in this study; their children had a previous history of sore throat, most of them treated with antibiotics, while less than 15% of them used traditional herbs and salt to treat sore throat. This demonstrates a good level of knowledge regarding the primary prevention of RHD, which is early treatment of active streptococcal sore throat infection with antibiotics. Most of the participants in these two studies have a family member or know someone who frequently has a sore throat infection more than three times per year. About half of the participants correctly knew that bacteria cause sore throat infection, which was contradictory to other studies [10,16].

Regarding the complications of sore throat; more than half of the respondents knew that complications are associated with a poorly treated sore throat. Slightly less than half of them correctly knew that sore throat could be associated with heart disease. The vast majority knew that adequate treatment of acute sore throat is an important factor in preventing RHD. About half of respondents have heard about RHD, while more than half did not hear about it, and this result was inconsistent with the results of other studies [17,18]. Concerning the causes of RHD, more than half of the respondents did not know the causes of RHD. Sore throat infection was identified by only slightly more than 10% of the participants as a cause of RHD, followed by bacterial infection and tonsillitis. This is similar to the findings in the studies [10,19]. There was a significant association between the level of knowledge about RHD and the age of the participants ($p = 0.000$), with respondents aged more than 35 years having the highest level of knowledge compared to other age groups. Also, the level of knowledge about RHD was significantly related to the occupation and region of residence ($p = 0.005, 0.000$), respectively. With governmental sector workers and Hail region, residents had good knowledge when compared to others. Gender and educational level did not found to be affecting the level of knowledge about RHD; similar results were found in other parallel studies [11,16].

Conclusion

The present study found moderate overall knowledge level of parents toward RHD, about 40% of parents having a good knowledge level and more than half of parents had a poor level of knowledge. Nearly two-thirds of respondents have a family member or know someone who frequently has a sore throat more than three times per year and about half of the respondents correctly knew that bacteria cause sore throat. About half of the respondents have heard about RHD, while the other half did not hear about it. Regarding the etiology of RHD, more than half of the respondents did not know the causes. The level of knowledge about RHD was found to be significantly associated with the age of respondents as respondents aged more than 35 years had the highest level of knowledge compared to other age groups. Also, it was significantly related to the occupation and region of residence as governmental sector workers and Hail region residents had good knowledge when compared to other groups. Gender and educational level did not have any significant impact on knowledge about RHD.

More public awareness about RHD is required to lower the incidence of the disease. This could be achieved through continuous and integrated health educational programs. Also, these programs should involve all healthcare workers and doctors to deliver the information to their community in a smooth way and an organized process to raise the level of knowledge and general awareness of the community about the disease. These programs could be presented through media or social events and campaigns.

List of Abbreviations

RHD Rheumatic heart disease

Conflict of interest

The authors declare that there is no conflict of interest regarding the publication of this article.

Funding

None.

Consent to participate

Informed consent was obtained from all the participants.

Ethical approval

The study was conducted after approval from the ethics review committee of the College of Medicine, and the Local Committee of Bioethics, Jouf University, Ref # 07-06-42, dated 11 March 2021.

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