

# Parental Knowledge, Attitudes and Practices Towards Paediatric Ear Infections in Riyadh, Saudi Arabia A quantitative study

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## معرفة الوالدين والإتجاهات والممارسات بخصوص إلتهابات الأذن لدى الأطفال في مدينة الرياض بالمملكة العربية السعودية دراسة كمية

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**ABSTRACT: Objectives:** This study aimed to assess the knowledge, attitude and care-seeking practices of parents towards childhood ear infections in Riyadh, Saudi Arabia. **Methods:** This quantitative cross-sectional study was conducted in Riyadh, Saudi Arabia, between April and June 2018. An online survey was sent to a random selection of parents who were  $\geq 18$  years old with children of  $\leq 10$  years old. Associations between parental knowledge, attitude, care-seeking practices, socioeconomic status, level of education and age were assessed using the chi square test and logistic regression analysis. **Results:** A total of 782 subjects participated in this study (response rate: 78.2%). Most respondents were knowledgeable (76.2%), had a positive attitude (78.9%) and had positive care-seeking practices (89.5%). There was a statistically significant difference on both bivariate and multivariate analyses ( $P < 0.05$ ) between parental care seeking practice and knowledge. Parents who sought modern approaches to treatment were found to be almost nine times more likely to have a good attitude towards ear infections than those who did not seek treatment (odds ratio = 8.907, 95% confidence interval = 2.655–34.928;  $P < 0.001$ ). A statistically significant relationship was found between good care-seeking practice and age, as well as socioeconomic status ( $P < 0.05$  each). **Conclusion:** This study showed that knowledge, attitude and practice regarding paediatric ear infections were positive in the majority of parents in Riyadh, Saudi Arabia. Future studies should assess other factors that enhance the knowledge, attitude and practices regarding ear infections.

**Keywords:** Otitis Media; Infection; Knowledge; Attitude; Pediatrics; Parents; Saudi Arabia.

**المخلص:** الهدف: تهدف هذه الدراسة لقياس المعرفة والإتجاهات والممارسات للبحث عن الرعاية الصحية لدى الأطفال المصابين بإلتهابات الأذن في مدينة الرياض بالمملكة العربية السعودية. **الطريقة:** هذه الدراسة مقطعية وتم إجرائها في مدينة الرياض بالمملكة العربية السعودية في الفترة ما بين أبريل ويونيو عام 2018م عن طريق إستبيان إلكتروني تم إرساله لمجموعة من الآباء والأمهات والذين تم إختيارهم عشوائيا ممن يبلغون 18 عشر عاما وأكثر ولديهم أطفال يبلغون عشرة سنين وأقل وذلك لتحديد مستوى المعرفة والإتجاهات والممارسات للبحث عن الرعاية الصحية للأطفال المصابين بإلتهابات الأذن، وقد تم الحصول على المستوى الاجتماعي والاقتصادي والمستوى التعليمي والعمر حيث تم الربط بين هذه العوامل وقياسها عن طريق إختبار مربع كاي. **النتائج:** شارك في هذه الدراسة 782 شخصا حيث كانت نسبة التجاوب مع الإستبيان المرسل (78.2%)، وكان معظم المشاركين لديهم معرفة بإلتهابات الأذن ونسبتهم (76.2%)، وشكلت التوجهات الإيجابية (89.5%)، وشكلت نسبة الممارسات الإيجابية (89.5%)، وكان هنالك فرق ذو دلالات إحصائية على المتغيرات الثنائية والمتعددة ( $P < 0.05$ ) بين ممارسات الوالدين نحو إلتهابات الأذن والمعرفة. ولقد تبين أن الآباء والأمهات الذين سعوا إلى طرق علاجية حديثة لديهم توجهات جيدة 9 مرات مقارنة بمن لم يبحثوا عن العلاج بالطرق الحديثة (حيث شكلت نسبة الأرجحية = 8.907، وقد شكل مجال الثقة 95% = 2.655–34.928،  $P < 0.001$ )، وقد تم العثور على علاقة ذات دلالة إحصائية بين الممارسات الجيدة للرعاية والعمر بالإضافة للوضع الاجتماعي والاقتصادي. الخلاصة: لقد وضحت الدراسة الحالية المعرفة والإتجاهات والممارسات نحو إلتهابات الأذن لدى الأطفال وتعتبر النتيجة إيجابية لدى أغلب الآباء والأمهات المشاركين في الدراسة التي أقيمت في مدينة الرياض بالمملكة العربية السعودية ويوصي الباحثين بالقيام بدراسات أخرى مستقبلية لقياس عوامل أخرى وزيادة الوعي بإلتهاب الأذن لدى الأطفال.

**الكلمات المفتاحية:** إلتهاب الأذن الوسطى؛ العدوى؛ المعرفة؛ السلوك؛ الأطفال؛ الوالدين؛ السعودية.

### ADVANCES IN KNOWLEDGE

- The current study showed that parental knowledge of, attitude towards and care-seeking practice for paediatric ear infections were generally positive in more than two-thirds of the parents living in Riyadh, Saudi Arabia, in 2018.
- Higher educational level and socioeconomic status were the main factors responsible for better parental knowledge, attitude and care-seeking practice for paediatric ear infections.

**APPLICATION TO PATIENT CARE**

- The results of the study will help the Saudi Arabian Ministry of Health and the Saudi Otolaryngology Society to identify which population groups should be selected for educational programmes.
- This study emphasised improvements in parental knowledge, attitude and care-seeking practice to avoid complications of ear infections and reduce the cost of treatment.

**I**N DEVELOPING COUNTRIES, EAR DISEASES ARE considered a major public health problem with the potential to affect the psychological and social health of children and their families.<sup>1,2</sup> Among ear diseases, ear infections are one of the most common infectious diseases in children.<sup>2</sup> Many studies have shown that the majority of children (approximately 80%) will experience at least one episode of *otitis media* by three years of age and 40% will have at least six recurrences before the age of seven.<sup>3-5</sup> *Otitis media* is defined as the inflammation of the *mucosa* of the middle ear, including the tympanic cavity, eustachian tube, mastoid antrum and mastoid air cells and can be caused by bacterial or viral infections.<sup>6-8</sup>

*Otitis media* is subdivided into acute *otitis media* (AOM), *otitis media* with effusion (OME), recurrent acute *otitis media* and chronic suppurative *otitis media* (CSOM).<sup>7</sup> AOM presents acutely with both local and systemic signs such as otalgia and fever.<sup>9-11</sup> In some cases, AOM causes an ear discharge from a perforated tympanic membrane, which may heal spontaneously within 2–14 days.<sup>11</sup> OME usually occurs after the inflammation of the AOM has resolved.<sup>12</sup> CSOM involves ongoing inflammation and persistent ear discharge for more than 14 days with perforation of the tympanic membrane.<sup>13</sup> Children with CSOM may not only present with persistent discharge refractory to medical treatment but may also have hearing loss or *tinnitus*.<sup>5</sup> In some cases of CSOM, treatment involves both antibiotic ear drops and surgical repair of the perforated tympanic membrane.<sup>14</sup> Furthermore, CSOM is associated with serious complications such as mastoiditis, facial nerve paralysis, neck abscess, brain abscess, meningitis, labyrinthitis and lateral sinus thrombosis.<sup>5,11,14</sup> Globally, an estimated 330 million individuals have had CSOM; 60% had hearing loss and the majority were children.<sup>5,15</sup> Hearing loss in children may impede language, cognitive and psychosocial development as well as early communication and school performance.<sup>5,14</sup> Even in adulthood, hearing loss can be a challenge when seeking employment.<sup>5</sup> The complications of *otitis media* result in 28,000 annual deaths globally with meningitis and brain abscesses being the main life-threatening complications.<sup>14</sup>

*Otitis media* is associated with many risk factors including passive smoking, bottle feeding, short duration of breastfeeding, day-care attendance, low socio-economic status, upper respiratory tract infections, aller-

gies and has a male preponderance.<sup>16-19</sup> Some of these risk factors are modifiable;<sup>20</sup> therefore, the prevalence of *otitis media* can be reduced if parents have the knowledge and willingness to make the appropriate lifestyle alterations.<sup>21</sup> However, Srikanth *et al.* found that most parents underestimate the risk of *otitis media*.<sup>21</sup> Although *otitis media* is mostly self-limiting it is the most frequent reason for antibiotic prescriptions for children.<sup>7,18</sup> Furthermore, most developing countries do not have guidelines for the antibiotic treatment of *otitis media* and parents/caregivers can obtain antibacterial drugs without prescription.<sup>7</sup> Consequently, multiple resistance to antibiotics has been increasing.<sup>6</sup> This study aimed to assess the knowledge, attitude and care-seeking practices of parents towards childhood ear infections in Riyadh, Saudi Arabia.

## Methods

This quantitative cross-sectional study was conducted between April and June 2018 in Riyadh, Saudi Arabia. A total of 1,000 Saudi Arabian parents who were  $\geq 18$  years old with children  $\leq 10$  years old were invited to participate in this online-based study. For the selection process, Riyadh City was divided into five parts: north, east, south, west and central. A nursery school and a primary school were randomly selected from each part. Each selected nursery school and primary school was requested to provide the telephone numbers of parents of children  $\leq 10$  years of age (i.e. all nursery school students and primary school students up to and including 4<sup>th</sup> grade). Participants received an online questionnaire with an explanation of the purpose of the study and an informed consent form prior to the completion of the questionnaire.

The questionnaire was adapted with permission from Mukara *et al.* and translated to Arabic.<sup>5</sup> The translation process included cross-cultural validation of the questionnaire and review by a committee of translation at Al Imam Mohammad Ibn Saud Islamic University, Riyadh, Saudi Arabia, in addition to a senior otolaryngologist. Each survey response was linked with an internet protocol address to prevent duplicates.

The self-administrated questionnaire included 12 items that assessed the parental knowledge of, attitude towards and care-seeking practice for paediatric ear

infections. It comprised of close-ended and multiple-choice questions subdivided into three main sections: seven general knowledge (causes, symptoms, prevention, treatment and consequences of ear infections), two questions on parental attitude towards ear infections and one question each on parental practice for ear infections, health services and the incidence of ear disease in the participant's child. Causes of ear infection include poor hygiene, water in the ears, wax and foreign body and/or microbes. Participants who knew one or more correct cause scored one point (i.e. discharge, hearing loss and pain). Participants who knew two of the three symptoms obtained one point. Participants selected "yes" or "no" for the prevention and treatment questions and obtained one point for each correct answer. Participants who identified one or more correct consequences obtained one point. Participants who scored >50% were considered knowledgeable about ear infections. Participants who answered that they would seek care from a medical doctor or nurse for their child's ear infection were considered to have good practice. Reasons for not taking their child to a health centre included "not being worried", "no need for treatment" and being "incurable" were considered a negative attitude. Participants who chose media, health professional, health campaigns or community outreach as information sources were considered to have a positive attitude. Participants who had a total score of >50% were considered to have a positive attitude overall.

The questionnaire included demographic variables (age, gender, educational level and socioeconomic status). To ensure reliability and validity, a pilot study was conducted with 10 parents to improve the questionnaire's face/content validity and prevent discrepancies in the parents' responses.

Statistical analysis was performed using RStudio, Version 1.1.149 (RStudio Inc., Boston, Massachusetts, USA). Categorical variables were presented as frequencies and percentages. The chi square test and logistic regression analysis were used to obtain associations between knowledge of the parents, socioeconomic status, level of education, age and care-seeking practices. A *P* value of <0.05 was considered statistically significant.

This study protocol was approved by the Institutional Review Board of Al-Imam Muhammad Ibn Saud Islamic University.

## Results

A total of 839 responses were received, of which 782 were complete and 57 were excluded from the study due to missing data (response rate: 78.2%). Most participants (61.8%) were female and ranged from 18–64

years with a mean age of  $33.9 \pm 9$  years. The majority of respondents completed a secondary level of education (73.5%) and reported a middle socioeconomic status (80.9%) [Table 1].

Most participants reported having information about ear infections (58.6%), most of which knew that ear infections are treatable (93.7%) and can be prevented (70.7%). The majority reported at least one correct symptom (55.9%) and only 96 (12.3%) did not know any correct symptoms. The most commonly-listed symptom was pain in the infected ear (79%), followed by ear discharge from the infected ear (35.7%). The vast majority of participants reported at least one correct consequence of ear infections (95%); hearing loss was the most reported consequence (67.6%) [Table 2].

On bivariate analysis, fathers were found to be significantly less knowledgeable compared to mothers about ear infections (odds ratio [OR] = 0.4, 95% confidence interval [CI] = 0.29–0.56; *P* <0.001). Parents who completed their secondary education were four times more likely to be knowledgeable about ear infections compared to their uneducated counterparts (OR = 4.13, CI: 1.13–15.09; *P* = 0.03); this finding was still significant after adjustment for other factors (OR = 5.79, CI = 1.42–23.78; *P* = 0.007). Vocational education was a significant predictor of good knowledge after adjustment for confounders (OR = 5.06,

**Table 1:** Characteristics of parents  $\geq 18$  years old with children of  $\leq 10$  years old who participated in this study in Riyadh, Saudi Arabia (N = 782)

Characteristics	n (%)
<b>Gender</b>	
Female	483 (61.8)
Male	299 (38.2)
<b>Age in years</b>	
$\leq 30$	320 (40.9)
31–45	386 (49.4)
46–60	71 (9.1)
>60	5 (0.6)
<b>Education</b>	
None	10 (1.3)
Primary	172 (22)
Secondary	575 (73.5)
Vocational	25 (3.2)
<b>Socioeconomic status</b>	
Low	67 (8.6)
Middle	633 (80.9)
High	82 (10.5)

**Table 2:** Knowledge about ear infections among parents with children ≤10 years old in Riyadh, Saudi Arabia (N = 782)

Item	n (%)
<b>Knowledge of correct symptoms of ear infections*</b>	
None	96 (12.3)
One symptom	437 (55.8)
Two symptoms	186 (23.8)
Three symptoms	63 (8.1)
<b>Knowledge about prevention of ear infections</b>	
Yes	553 (70.7)
No	229 (29.3)
<b>Knowledge about treatment of ear infections</b>	
Yes	733 (93.7)
No	49 (6.3)
<b>Knowledge about causes of ear infections</b>	
Yes	642 (82.1)
No	140 (17.9)
<b>Knowledge about consequences of ear infections</b>	
Yes	743 (95)
No	39 (5)
<b>Consequences of ear infection*</b>	
Death	20 (2.6)
Infection spreads to organs	215 (27.5)
I don't know	3 (0.4)
Persistence of disease	280 (35.8)
Poor school performance	194 (24.8)
Hearing loss	529 (67.6)
None	38 (4.9)
<b>Overall knowledge (≥4 points)</b>	
Knowledgeable	596 (76.2)
Not knowledgeable	186 (23.8)

\*Multiple responses could be chosen.

CI = 0.98–27.48;  $P = 0.03$ ). Middle and high socioeconomic statuses were significant only before adjustment ( $P < 0.001$  each). There was a statistically significant correlation between a pluralistic approach to parental ear care-seeking practice and knowledge after the adjustment for potential confounders (OR = 43.2, CI = 6.84–858.21;  $P = 0.004$ ); this illustrates the benefit of knowledge about ear infections [Table 3].

Overall, most parents (78.9%) had a positive attitude towards paediatric ear infections [Table 4]. There were no statistically significant correlations between attitude and gender, age, educational level or socioeconomic status. However, care-seeking practice was significantly

**Table 3:** Knowledge about paediatric ear infections stratified by participant's characteristics (N = 782)

Characteristic	Unadjusted OR (95% CI)	<i>P</i> value*	Adjusted OR (95% CI)	<i>P</i> value†
<b>Gender</b>				
Female	-	-	-	-
Male	0.4 (0.29–0.56)	<0.001	0.45 (0.31–0.66)	<0.001
<b>Age in years</b>				
≤30	-	-	-	-
31–45	0.78 (0.54–1.10)	0.161	1.13 (0.77–1.68)	0.672
46–60	1.24 (0.66–2.49)	0.507	2.23 (1.09–4.93)	0.037
>60	1.12 (0.16–22.09)	0.92	3.76 (0.37–103.38)	0.41
<b>Education</b>				
None	-	-	-	-
Primary	1.77 (0.47–6.61)	0.379	2.80 (0.68–11.63)	0.119
Secondary	4.13 (1.13–15.09)	0.03	5.79 (1.42–23.78)	0.007
Vocational	2.57 (0.56–12.23)	0.222	5.06 (0.98–27.48)	0.03
<b>Socioeconomic status</b>				
Low	-	-	-	-
Middle	2.25 (1.32–3.77)	<0.001	1.27 (0.69–2.28)	0.486
High	3.58 (1.69–7.91)	<0.001	1.8 (0.78–4.28)	0.14
<b>Type of treatment parent would seek</b>				
None	-	-	-	-
Traditional	19.25 (3.37–365.1)	0.006	15.74 (2.60–306.05)	0.036
Modern	38.76 (7.45–711.57)	0.005	28.85 (5.25–541.24)	0.01
Pluralism	53.9 (9.02–1,044.14)	<0.001	43.2 (6.84–858.21)	0.004

OR = odds ratio; CI = confidence interval.

\*Using bivariate analysis. †Using multivariate analysis.

associated with attitude on a bivariate analysis. The odds of having good attitude towards ear infections among parents who sought modern approaches was eight times higher than in parents who did not seek medical care (OR = 8.25, CI = 2.55–31.30;  $P < 0.001$ ). This relation remained significant even after the adjustment of other factors (OR = 8.97, CI = 2.65–34.92;  $P < 0.001$ ). Similarly, the odds were also higher in parents who practice pluralism compared to parents who do not seek medical care (OR = 11.11, CI = 2.89–49.64;  $P < 0.001$ ); this finding remained significant on multivariate analysis (OR = 12.73, CI = 3.201–58.79;  $P < 0.001$ ) [Table 5].

**Table 4:** Attitudes towards and care-seeking practices for paediatric ear infections among parents with children ≤10 years old in Riyadh, Saudi Arabia (N = 782)

Item	n (%)
<b>Why would you seek alternative therapy*</b>	
I don't know	2 (0.3)
It heals without any treatment	29 (3.7)
No health insurance	194 (24.8)
No need because no one can cure it	114 (14.6)
No reason because it is on/off	201 (25.7)
Not worried about it/someone can live with it safely	84 (10.7)
Poverty	279 (35.7)
Ignorance	379 (48.5)
<b>Where would you seek treatment*</b>	
Medical doctor	690 (88.2)
Nobody	9 (1.2)
Nurse	60 (7.7)
Pharmacist	55 (7)
Self-medication	102 (13)
Traditional healer/medicine	13 (1.7)
<b>Source of information*</b>	
Health campaigns and community outreach programs	164 (21)
Health professional	452 (57.8)
Internet	464 (59.3)
Media	137 (17.5)
No where	26 (3.3)
Family members or neighbours	160 (20.5)
I don't know	1 (0.1)
<b>Overall attitude</b>	
Good	617 (78.9)
Bad	165 (21.1)
<b>Overall care-seeking practice</b>	
Good	700 (89.5)
Bad	82 (10.5)

\*Multiple responses could be chosen.

The majority of parents had positive care-seeking practices (89.5%) and most preferred to seek treatment from a medical doctor (88.2%). Very few parents stated that they would seek help from a traditional healer (1.7%) or not seek help at all (1.2%). The main reason for seeking alternative therapy was ignorance (48.5%) followed by poverty (35.7%) [Table 4].

**Table 5:** Attitude towards paediatric ear infections stratified by participant's characteristics (N = 782)

Characteristic	Unadjusted OR (95% CI)	P value*	Adjusted OR (95% CI)	P value†
<b>Gender</b>				
Female	-	-	-	-
Male	0.94 (0.66–1.34)	0.73	1.04 (0.71–1.55)	0.812
<b>Age in years</b>				
≤30	-	-	-	-
31–45	1.12 (0.78–1.61)	0.512	1.28 (0.86–1.89)	0.21
46–60	1.29 (0.69–2.58)	0.44	1.72 (0.87–3.63)	0.132
>60	1.16 (0.16–22.9)	0.894	2.15 (0.26–47.18)	0.527
<b>Education</b>				
None	-	-	-	-
Primary	1.21 (0.25–4.55)	0.789	1.48 (0.29–5.89)	0.593
Secondary	1.83 (0.39–6.7)	0.386	2.24 (0.45–8.8)	0.268
Vocational	0.91 (0.16–4.3)	0.908	1.16 (0.2–5.82)	0.854
<b>Socioeconomic status</b>				
Low	-	-	-	-
Middle	1.36 (0.75–2.38)	0.284	0.92 (0.47–1.7)	0.799
High	1.95 (0.88–4.42)	0.103	1.18 (0.49–2.85)	0.699
<b>Type of treatment parent would seek</b>				
None	-	-	-	-
Traditional	3.5 (0.97–14.5)	0.063	3.83 (1.03–16.31)	0.05
Modern	8.25 (2.55–31.3)	<0.001	8.9 (2.65–34.92)	<0.001
Pluralism	11.11 (2.89–49.64)	<0.001	12.73 (3.2–58.79)	<0.001

OR = odds ratio; CI = confidence interval.

\*Using bivariate analysis. †Using multivariate analysis.

There was a significant association between age and care-seeking practice before and after the adjustment of potential confounders. Parents >45 years were more likely to have better care-seeking practice than parents <31 years ( $P < 0.05$ ). The odds of good care-seeking practices were higher in parents who had a secondary level education compared to parents who had no education (OR = 5.17, CI = 1.08–19.32;  $P = 0.02$ ). Parents with middle (OR = 4.47, CI = 2.43–8.00;  $P < 0.001$ ) and high (OR = 4.55, CI = 1.86–12.38;  $P < 0.001$ ) socioeconomic status were four times more likely to have positive practice regarding ear infections than parents with low socioeconomic status; this finding was also

**Table 6:** Care-seeking practices for paediatric ear infections stratified by participant's characteristics (N = 782)

Characteristic	Unadjusted OR (95% CI)	P value*	Adjusted OR (95% CI)	P value†
<b>Gender</b>				
Female	-	-	-	-
Male	0.52 (0.32–0.82)	0.006	0.76 (0.45–1.27)	0.294
<b>Age in years</b>				
≤30	-	-	-	-
31–45	0.63 (0.36–1.07)	0.09	0.7 (0.39–1.24)	0.235
46–60	0.31 (0.15–0.66)	0.002	0.37 (0.16–0.83)	0.014
>60	0.05 (0.007–0.32)	0.002	0.1 (0.01–0.76)	0.025
<b>Education</b>				
None	-	-	-	-
Primary	2.4 (0.49–9.28)	0.224	1.57 (0.25–7.29)	0.585
Secondary	5.17 (1.08–19.32)	0.02	2.37 (0.38–10.72)	0.296
Vocational	0.76 (0.13–3.53)	0.736	0.56 (0.08–3.12)	0.527
<b>Socioeconomic status</b>				
Low	-	-	-	-
Middle	4.47 (2.43–8)	<0.001	3.44 (1.76–6.59)	<0.001
High	4.55 (1.86–12.38)	<0.001	4.23 (1.56–12.69)	0.006

OR = odds ratio; CI = confidence interval.

\*Using bivariate analysis. †Using multivariate analysis.

significant after adjustment for potential confounders (OR = 3.44, CI = 1.76–6.59;  $P < 0.001$  and OR = 4.23, CI = 1.56–12.69;  $P = 0.006$ ) [Table 6].

## Discussion

This study measured the knowledge of, attitude towards and care-seeking practices for paediatric ear infections among parents with children ≤10 years of age. The majority of participants (76.6%) were knowledgeable about ear infections, while 78.9% had good attitude and 89.5% reported positive care-seeking practices. These results support the findings from other similarly conducted studies.<sup>5,21,22</sup>

There was a significant positive correlation between female gender and knowledge, attitude and practice. Di Berardino *et al.* also found that females had better knowledge than their male counterparts about ear and hearing management.<sup>23</sup>

The majority of participants (49.4%) were aged between 31–45 years; however, this age group did not significantly correlate with knowledge of or attitude towards ear infections. Parents >60 years old were most likely to have good care-seeking practices. Irwan *et al.* studied health seeking behaviours among elderly people in an Indonesian community and found that younger individuals are less likely to seek healthcare, based on monthly health check-ups as a tool of assessment.<sup>24</sup>

Those who practiced less modern medicine attributed their reluctance to seek care to poverty (35.7%), lack of a health insurance (24.8%) and ignorance (48.5%). These proportions align with studies on knowledge, attitudes and practices in regard to *otitis media* in different parts of the world and highlights that CSOM is a disease of the low-income population.<sup>5,21,25</sup> In addition, poverty was associated with the inability to pay for healthcare services as well as the transport costs even if the child had medical insurance. Parents with higher levels of education were more likely to have more knowledge and positive care-seeking practices compared to parents with lower levels of education. However, there was no significant relationship between attitude and education level. Yip *et al.* found an association between education status and healthcare seeking behaviour.<sup>26</sup>

Overall, the current study found lower levels of knowledge about symptoms compared to previous studies; only 23% of the participants could identify two symptoms of ear infections, while almost half could in Mukara *et al.*'s study.<sup>5</sup> The fluctuating attitude and healthcare seeking behaviour of medical treatment revealed in the current study may be due to a shortage of knowledge, the presence of poverty and/or dissatisfaction with the provided healthcare services such as referral delays. These findings are in agreement with Shaheen *et al.*'s study.<sup>27</sup> In Bangladesh, Shaheen *et al.* found that the majority (85%) of CSOM patients preferred to seek over-the-counter medications instead of aid from medical staff.<sup>27</sup> Therefore, to increase the usage of healthcare services, it is important to promote awareness of prevention and treatment. Social status can have an important role in healthcare-seeking practices and involves provision, planning and improvement of healthcare services.

To the best of the authors' knowledge, this is the first study to investigate knowledge of, attitude towards and care-seeking practice for ear infections among parents of children ≤10 years of age in Saudi Arabia. The sample can be considered representative of Riyadh as data were collected from five different parts of Riyadh

City. Thus, the current study represents a starting point for further investigations about ear infections in the Saudi Arabian population.

However, this study did have limitations. The information was collected through a self-reporting questionnaire and is therefore inherently subject to misclassification. Moreover, one questionnaire cannot encompass all aspects of ear infections. Future studies should assess more extensive factors that could influence parental practices regarding paediatric ear infections. The findings of this study cannot be generalised on a national level due to the cultural variation among different populations living in different regions of Saudi Arabia.

## Conclusion

Most Saudi Arabian parents in this study had good behaviour in terms of knowledge of, attitude towards and care-seeking practice for paediatric ear infections. The main factors associated with these positive behaviours were the educational level and socioeconomic status of the parents. These findings suggest that it may be beneficial to conduct educational programmes regarding paediatric ear infections for Saudi parents to direct them towards better behaviours.

## CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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