



## ORIGINAL ARTICLE

# Comparison of open-ended and close-ended questions to determine signs and symptoms of eye problems among children



Ai-Hong Chen<sup>a,\*</sup>, Nurul-Farhana Abu Bakar<sup>a</sup>, Carly Siu-Yin Lam<sup>b</sup>

<sup>a</sup> Optometry, Faculty of Health Sciences, Universiti Teknologi MARA, Cawangan Selangor, Kampus Puncak Alam, Malaysia

<sup>b</sup> Centre of Myopia, School of Optometry, The Hong Kong Polytechnic University, Hong Kong, China

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### KEYWORDS

Visual signs;  
Visual symptoms;  
Paediatric eye care;  
Open-ended question;  
Close-ended question

### Abstract

**Background:** Parents play important role in providing information regarding their children's health status to healthcare providers. However, parents' ability in reporting signs and symptoms of eye problems among their children required more in-depth investigation. Our study aimed to compare the differences of parental report regarding eye problems among their children using two different question approaches.

**Methods:** A total of 416 parents with children aged between two months old and 17 years old were participated in this cross-sectional survey. The responses of parents' observation on signs and symptoms of eye problems were compared between one open-ended question and ten close-ended questions. We also examined the demographic contributing factors that could influence parental responses.

**Results:** The total count of reported signs and symptoms through open-ended and close-ended question was 164 and 529 reports, respectively. Parents reported more diverse (70% higher) categories of signs and symptoms in open-ended compared to close-ended questions. Parent's ability to report eye problems using open-ended question was associated with their gender ( $p < 0.05$ ), but no similar significant association was found in close-ended questions.

**Conclusion:** Parents reported more signs and symptoms of eye problems among their children through close-ended questions (regardless of gender) and more diversified categories through open-ended question in this study suggested that different communication approaches might be needed in clinical practice between those who requested specific appointment and those attending screening or routine assessment. The discrepancy might imply the importance to

\* Corresponding author at: Optometry, Faculty of Health Sciences, Universiti Teknologi MARA, Cawangan Selangor, Kampus Puncak Alam, 42300, Bandar Puncak Alam, Selangor Darul Ehsan, Malaysia.

E-mail addresses: [aihong0707@yahoo.com](mailto:aihong0707@yahoo.com) (A.-H. Chen), [farhana\\_sb@yahoo.com](mailto:farhana_sb@yahoo.com) (N.-F.A. Bakar), [carly.lam@polyu.edu.hk](mailto:carly.lam@polyu.edu.hk) (C.S.-Y. Lam).

**PALABRAS CLAVE**

Signos visuales;  
Síntomas visuales;  
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pediátrica;  
Pregunta con  
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Pregunta con  
respuesta cerrada

enhance the parent's role in preventive eye care. Effective communication between eyecare providers and parents has the potential to improve paediatric eyecare delivery.

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### Comparación entre las preguntas con respuesta abierta y cerrada para determinar los signos y síntomas de los problemas oculares en los niños

**Resumen**

*Antecedentes:* Los padres juegan un papel importante a la hora de suministrar información a los profesionales sanitarios, con relación a la situación sanitaria de sus hijos. Sin embargo, la capacidad de los padres para reportar los signos y síntomas de los problemas oculares de sus hijos requiere una investigación más profunda. El objetivo de nuestro estudio fue comparar las diferencias de los informes parentales sobre los problemas oculares de sus hijos, utilizando dos enfoques de preguntas diferentes.

*Métodos:* Un total de 416 padres con hijos de edades comprendidas entre dos meses y 17 años participaron en esta encuesta transversal. Las respuestas de la observación de los padres sobre los signos y síntomas de los problemas oculares fueron comparados utilizando una pregunta con respuesta abierta y diez preguntas con respuesta cerrada. También examinamos los factores contributivos demográficos que podrían influir en las respuestas parentales.

*Resultados:* El recuento total de los signos y síntomas reportados a través de las preguntas con respuesta abierta y cerrada fue de 164 y 529 informes, respectivamente. Los padres reportaron más categorías diversas de signos y síntomas en las preguntas con respuestas abiertas (un 70% más) que en las de respuestas cerradas. La capacidad de los padres para reportar los problemas oculares utilizando preguntas con respuestas abiertas guardó relación con el sexo ( $p < 0,05$ ), aunque no se encontró una asociación similar significativa en las preguntas con respuesta cerrada.

*Conclusión:* En este estudio, los padres reportaron más signos y síntomas de problemas oculares entre sus hijos a través de preguntas con respuesta cerrada (independientemente del sexo), y más categorías diversificadas entre las preguntas con respuesta abierta, lo cual sugiere que podrían necesitarse diferentes enfoques de comunicación en la práctica clínica entre aquellos que solicitaron una cita específica y aquellos que asistieron a un cribado o a una evaluación rutinaria. La discrepancia podría implicar la importancia de resaltar el papel de los padres en los cuidados oculares preventivos. La comunicación efectiva entre los profesionales de atención ocular y los padres tiene el potencial de mejorar la prestación de atención ocular pediátrica.

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**Introduction**

Late detection of eye problems among children remains to be a global issue that requires urgent attention.<sup>1-3</sup> Despite many countries worldwide establishing paediatric eye care programs,<sup>1-3</sup> there is a high percentage of children not undergoing any type of eye examination which reflects a lack of paediatric eye care delivery.<sup>3-5</sup> The deficiency in paediatric eye care delivery can be attributed to various barriers related to the availability, accessibility, affordability of eye care services and parental awareness.<sup>6-8</sup>

Parents' awareness influences attentiveness to health-care seeking behavior.<sup>9,10</sup> Parents play an important role in providing information regarding their children's health status to the healthcare providers. Parents were reported capable of recognizing imperative patterns based on infant

behaviour.<sup>11</sup> Unfortunately, parents tend to adopt a passive approach in this respect and take action only when the problem arises or their children complain of certain issues.<sup>9,12</sup> Poor awareness and misconception among parents regarding their children's eye health condition deprives their children from receiving proper eye care.<sup>7,9,13</sup> Approximately 70% of parents think that their children need an eye examination only based on child complain or if there is a problem,<sup>7</sup> despite the recommendation of periodic eye examination for children from infant until school-age by the American Optometric Association.<sup>14</sup> Inadequate communication on the part of the children might complicate the situation further because they might not express correctly or timely to attain preventive care with early detection. Several demographic factors that affect parental eye care seeking behaviour have been identified which majorly include age, level of educa-

tion and gender.<sup>4,12</sup> Empowering parental participations in paediatric eye care might change the landscape of prevention effectiveness.

A study on response patterns towards opening question showed that patients who seek eye care intervention most often report problems while those attending routine eye examination had no history of such problems.<sup>15</sup> This finding suggested that appropriate approach to retrieve information regarding children's eye condition is vital on parents' end. Different approach in medical interviews produced different outcomes.<sup>16-18</sup> In clinician-centred approach, clinician often dictates interaction with close-ended questions; while a patient-centred approach involves patient led conversation wherein the patients answer open-ended questions based on their knowledge, feeling, and understanding.<sup>16,18</sup> Discussions with parents regarding problems with their child's eye through open-ended questions and the extent to which the parents are able to report the problem through close-ended questions is important in enabling effective communication between eye care providers and parents. Therefore, our study aimed to compare the difference of parental report on eye problems among their children using two different question approaches and examined the demographic contributing factors that could influence parental response. Link between parent's perception towards eye health-related issues among their children and their eye care seeking behaviour was also explored. Understanding barriers towards paediatric eye care issues is essential for providing recommendations towards better paediatric eye care delivery.

## Method

The role of parents in the detection of eye problems among children was investigated in this study based on two aspects: (1) their ability to respond to open-ended and close-ended questions, and (2) their health care seeking behaviour. This cross-sectional study adhered to the Declaration of Helsinki and ethical approval was obtained for the same. Adults having children aged between 2 months to 17 years were selected using convenience sampling and informed consent was obtained prior to participation. Our study aimed to gather at least 384 complete responses in order to have a margin of error of under five per cent with confidence level of 95 per cent. All respondents were recruited from public locations (such as shopping complex, university, schools and recreational park) instead of the clinical setting to minimize bias in responses by those seeking eye care intervention and those who do not.<sup>15</sup> Information regarding respondents' relationship with children, age, level of education and occupation was obtained prior to further interview. Our study included only parents with children from infant to secondary school where parental consent to proceed with health care was mandatory to give a better perspective of the parental role as decision makers of their children's eye healthcare. Exclusion criteria included adults with no children and adults with any language difficulties or mental disabilities.

A structured interview was conducted to compare the ability of parents to recall eye problems among their children through both open-ended as well as closed-ended questions. The interviews were audio-recorded and later

transcribed. Each participant was interviewed with one open-ended question and 10 close-ended questions. Information about parental observation on signs and symptoms related to eye issues of their children was obtained based on one open-ended question, "Could you describe or tell anything about your observation related to eye problems in your child?" Upon completion of the self-reporting session, the respondents proceeded to complete ten guided recall close-ended questions related to common signs and symptoms of eye problems among children with dichotomous response options. Interviewer scored "1" for "Yes" answer and "0" for "No" for close-ended questions. After the session on closed-ended questions, each respondent was asked if their child(ren) had received any type of eye examination and also the reason(s) for not receiving eye examination, if applicable. Thematic content analysis was used to analyse the transcripts for open-ended question. The analysis followed the principle of classifying and organizing data according to key themes.<sup>19</sup> Every "positive" sign and symptom reported in open-ended question was scored "1", and "0" for "negative" answer. Seventeen key themes regarding signs and symptoms, and five key themes for the reasons why children did not receive any type of eye examination were identified. The transcripts were then re-examined, coded according to the identified themes and reported descriptively. Chi-square analysis was performed to investigate further the association between parental responses regarding their children's eye health and their demographic factors such as relationship with child, occupational status and education level.

## Results

A total of 416 parents were included in our study and completed the interviews out of more than 500 individuals that were randomly approached. The parents consisted of mothers (62.3%) and fathers (37.7%) aged between 24 and 60 years old. The proportion of respondents with level of education up to secondary school was 51.7% while college and universities was 48.3%. The percentage of their child according to four age groups of infants and toddlers, preschools, primary schools and secondary schools were 24.2%, 25.0%, 24.0% and 26.8%, respectively.

Based on the analysis of 416 parental responses, 25% of parents reported at least one sign and symptom of eye problem through open-ended question compared to 46% through close-ended questions. Parents reported 17 categories of signs and symptoms related to eye problems through open-ended question that was 70% higher than signs and symptoms categories that were captured in close-ended questions. Only one response category ("clumsy, knock things over") from the close-ended question was not captured in open-ended questions. The total count of signs and symptoms reported by parents through close-ended questions (529 reports) was three times higher than signs and symptoms reported in open-ended question (164 reports). The highest percentage of signs and symptoms reported through open-ended question was "blur vision" (13.2%) (Table 1). On the other hand, the highest percentage of signs and symptoms reported through close-ended questions was "eye rubbing" (23.6%), followed by 'squeezing/squinting eye when look-

**Table 1** Parental responses to open-ended question, "Could you describe or tell anything about your observation related to eye problem in your child?"

Reported eye-related problems	Frequency of responses	Percentage of total responses (n = 416)
Child had no eye problem	312	75.0
Child complaint of blur vision	55	13.2
Child watching TV too close	29	7.0
Child had squinting his/ her eyes	17	4.1
Child complaint of headache/ dizziness	14	3.3
Child had watery eyes/tearing	12	2.9
Child complaint of glare	8	1.9
Child complaint of eye pain	6	1.4
Child had rubbing his/her eyes	5	1.2
Child complaint of itchy eyes	4	1.0
Child had poor academic performance	4	1.0
Child complaint of eye fatigue	3	0.7
Child had head tilt	2	0.5
Child had red eye	1	0.2
Child had occasional squint	1	0.2
Child had color vision problem	1	0.2
Child had sty	1	0.2
Child had difficulties to find things	1	0.2

**Table 2** Parental responses to 10 close-ended questions.

Reported eye-related problems	Number of "Yes" responses	Percentage of total responses (n = 416)
Did your child complain of headache/dizzy after reading?	54	13.0
Did your child complain of eye pain?	32	7.7
Did your child complain of eye itchininess?	58	13.9
Did your child complain of blur vision?	71	17.1
Did your child like to squeeze/squint eyes when looking at distant object?	80	19.2
Did your child like to rub the eyes?	98	23.6
Did your child have tearing/watery eyes?	43	10.3
Did your child have difficulty to focus the eyes or have occasional squint?	20	4.8
Did your child like to tilt head when he/she looked at an object?	45	10.8
Did your child clumsy and tend to knock things over?	28	6.7

ing at distant object' (19.2%). 'Blur vision' was at third place with 17.1% (Table 2). The percentages of all categories of signs and symptoms reported through close-ended questions were relatively higher than similar categories reported through open-ended question. About 33% of parents who reported that their child had no eye problem through open-ended question were found to have reported that their child had at least one sign and symptom through close-ended questions.

Chi-square ( $\chi^2$ ) analysis was used to report the association of demographic factors with the eye problems reported by parents through both open-ended and closed-ended questions (Table 3). Significant association of gender (Chi-squared analysis  $\chi^2 = 4.67$ ,  $p < 0.05$ ) of parents was found with the reported eye problems but not with other demographic factors under open-ended question approach. A higher percentage of reported eye problems were found among mothers (28.5%) when compared to fathers

(19.1%). Demographic factors had negligible influence on the reported eye problems pattern under close-ended question approach ( $p > 0.05$ ).

Approximately 67% of the children did not receive any type of vision screening or eye examination. We also explored the underlying reasons behind the lack of parental efforts towards proactive eye care in children. We noticed two main categories among the reasons given by the parents. High percentage of perception issues (99%) with small proportion of coping mechanism issues (1%). Perception issues included 'presumption of no abnormalities regarding their children's eye condition' (91.7%), 'believed that their children were too young to have vision problems or to receive any kind of eye examination' (4.7%), and 'had confusion between complete eye examination and vision screening' (2.5%). Coping mechanism issues were due to 'time constraints' (0.7%) and 'preoccupied with other medical conditions' (0.4%).

**Table 3** Parents' ability to perceived eye problems.

	Total number (n)	Open-ended question			Close-ended questions		
		Child had eye problem (%)	Chi-square ( $\chi^2$ )	P-value <sup>a</sup>	Child had eye problem (%)	Chi-square ( $\chi^2$ )	P-value <sup>a</sup>
Father	157	19.1	4.668	0.031*	42.0	1.924	0.165
Mother	259	28.5			49.0		
Unemployed	112	31.2	3.192	0.074	53.6	3.147	0.075
Employed	304	22.7			43.7		
Primary & Secondary school	215	24.9	0.003	0.955	49.8	2.256	0.133
College & university	201	25.1			42.4		

<sup>a</sup> P-Value Chi-square ( $\chi^2$ ).

\*  $p < 0.05$ .

## Discussion

Close-ended question approach captured three-time higher parental response pertaining to the signs and symptoms of eye problems when compared to open-ended question approach in our study. Higher response rate through close-ended questions was expected as there were higher number of items (10 items) in this approach against only one item in the open-ended question approach. Of the total respondents interviewed, 33% gave a negative response through open-ended but reported at least one sign and symptom through close-ended questions. Thus, it was supported that close-ended questions could improve the response rate.<sup>20</sup> Open-ended question demanded more cognitive efforts compared to close-ended questions that lead to higher non-response rate.<sup>20,21</sup> Parents had to recall observed signs and symptoms and relate them with eye problems in open-ended question while it is easier to recall signs and symptoms being asked in close-ended questions.<sup>21</sup>

Closed-ended question approach exhibited less demographic variation in parental responses compared to the open-ended question. Mothers in our study seemed to be able to report eye problems among their children better than the fathers through open-ended question but no significant difference was found when gathering same responses through close-ended questions. Possible explanations provided by previous findings about the gender disparity were included age factor, education influence and attitude in responding towards open-ended question.<sup>20</sup> Typically, mothers tend to engage more in childcare as compared to fathers. Therefore, mothers explicitly made more efforts in recalling signs and symptoms of eye problems among their children through the open-ended question. No significant difference in the ability to recognize eye problems based on education level, occupational status and gender was found. The differences in the open-ended response were more psychosocial in nature rather than socioeconomic. The discrepancies in psychosocial impact of responses based on open-ended question advocated the implementation of the directive and focussed approach that could be obtained through close-ended questions.

The responses obtained on the open-ended question in our study revealed more categories of signs and symptoms than the close-ended questions. The nature of freedom in answering the open-ended question enabled more information and yielded deeper and new insight.<sup>22</sup> Open-ended question covered broader scope of intended information. However, the threshold in reporting depended on parents' awareness and knowledge. Most parents were aware that "reduced vision" could be related to eye problems (76% of total reported signs and symptoms) but were less aware that "clumsy, knock things over" could also be related to eye problems. Parents' ability to report signs and symptoms was dependent on the domain that is being measured.<sup>23</sup> The children's physical anomalies might be easier to notice for parents rather than their behavioural changes.<sup>23</sup> Parental ability of perceiving signs and symptoms in the open-ended question was associated with apparent restriction in gross daily activities (blur vision and watching TV too close) rather than subtle visual behavioural change (head tilt).<sup>24</sup> Although open-ended questions might provide more diversi-

fied responses compared to close-ended questions, yet, this approach might need experienced clinician to extract important issues from information provided by respondent as previous study showed that less educated respondents might provide inappropriate responses.<sup>22</sup> A wider and more in-depth information obtained through open-ended questions was also reported to have no role in increasing the prediction of mental health measures which suggests that additional information gathered through open-ended questions might not be practically beneficial for statistical prediction of health problems.<sup>25</sup>

More than 90% of the parents did not bring their child for an eye examination based on presumption of no eye problems in this study which implies that parental say on their children's eye problems influenced their eye care seeking behaviour. Older children were more likely to receive eye examination as compared to the younger children as they are likely to show more distinct signs and were able to complain. This finding supported that parents rely solely on their children's complaints.<sup>12</sup> Previous researches have reported that more than 80% of parents realized that their children had vision problems based on the information they received from their teachers or family doctors.<sup>13</sup> Thus, parents' tendency to report signs and symptoms of vision problems among their children might heavily be biased towards complaint and information from the third party rather than self-observation. Misconception regarding paediatric eye care can be seen among 4.7% of parents in this study who thought that their child was too young to receive any kind of eye examination that was similar to previous studies.<sup>9,12,24</sup> Less than 1% of the parents were aware that children as young as six months old could have an eye examination.<sup>12</sup> Parents also believed that children below four years should not wear spectacle and they were cautious to provide spectacle correction for their children as they perceived wearing glasses as a stigma.<sup>9,24</sup> No apparent previous research reports that parental ability to report eye problem has an influence on their decision towards further investigation and intervention,<sup>26</sup> but, our findings supported the same. Our findings showed that parents oriented their responses towards two distinct options; either the problems require expert attention or the problem may be considered as normal situation.<sup>15</sup> Since parents in this study were recruited from non-clinical setting, majority (75%) of parents reported that their child had no eye problem through open-ended question while close-ended questions guided 33% of the parents to encounter eye problems that might be initially considered as normal. This finding inferred that parental ability to report eye problems among their children could be improved by systematic guidance. Improving the communication between eye care providers and community members might increase the utilization of public eye care services.<sup>27</sup>

Coordination issue in health education and promotion remains a concern among public and healthcare providers. High proportion of children who did not undergo any type of eye examination in this study reflected underutilization of eye care services similar to previous studies.<sup>4,5,8</sup> Underutilization of eye care services was associated with availability, accessibility, affordability and individual perception.<sup>5,7,28</sup> Despite deprived socio-economic status and restriction of resources being reported as hindrances to utilization of eye

care services in the previous studies,<sup>1,9,26,27</sup> only one per cent of parents in this study reported accessibility issue while none of parents reported socio-economic problems as a barrier to utilization of eye care services. No significant association was found between children who received eye examination and parental demographic factors other than their age. Perception issue (99%) accounted to be the main reason for parents for not bringing their children for eye examination in this study. Based on a study in Iran, one-third of respondents had never had an eye examination done despite available eye care services.<sup>29</sup> Therefore, major barriers to underutilization of eye care services among children in our population seemed to be more about parental perception and beliefs rather than accessibility and affordability issues.<sup>12</sup>

## Conclusion

In the present study, parents reported more signs and symptoms of eye problems among their children through close-ended questions (regardless of gender) and more diversified categories through the open-ended question which suggests that different communication approaches might be needed in clinical practice between those who requested specific appointment and those attending screening or routine assessment. Open-ended questions might be a better approach for those who seek eye care intervention to probe for more in-depth information while close-ended questions might be more suitable for screening or routine eye examination to focus directly on a particular condition. This study identified high percentages of children who did not receive any type of eye examination, which implies the need to enhance parental efforts towards preventive eye care. There was evidence of some parental misconceptions about paediatric eye care that formed invisible barriers to eye care seeking behaviour. A more innovative eye healthcare strategy is needed and it is important to educate and improve awareness among parents to enhance the proficiency of early detection of eye problems among young children. Our study did not intend to examine the accuracy of the reported information but to emphasize the relative comparison between open-ended and close-ended question approaches. The strength of this study was its large sample size, which was essential to explore a broader range of ideas and enable wider information gathering. However, future investigations involving eye examination to confirm the diagnosis might be able to provide more comprehensive information along with the effective use of both question approaches.

## Conflict of interest

None of the authors has any proprietary interests or conflicts of interest related to this submission.

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