

Knowledge, Attitude, Practice and Associated Factors Regarding Vision Screening among Preschool Teachers in Malaysia

ARIFFIN S, MOHAMED AKHIR S, NARAYANASAMY S*

Faculty of Health Sciences, Centre for Community Health Studies (ReaCH), University Kebangsaan Malaysia, Kuala Lumpur, Malaysia

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ABSTRAK

Di Malaysia, saringan penglihatan kanak-kanak prasekolah dijalankan oleh optometris. Namun begitu, disebabkan oleh kekangan kakitangan terlatih, saringan ini tidak dapat dijalankan secara menyeluruh. Penglibatan guru-guru dalam proses saringan penglihatan merupakan salah satu langkah untuk mengatasi masalah ini. Oleh itu, adalah penting untuk mengetahui tahap pengetahuan, sikap dan tindakan (KAP) guru-guru berkenaan saringan penglihatan. Tujuan kajian ini adalah untuk mengenalpasti tahap KAP guru-guru berkenaan saringan penglihatan dan faktor-faktor yang mempengaruhinya. Satu kajian keratan rentas yang melibatkan guru-guru prasekolah awam dan swasta di Malaysia telah dijalankan. Borang soal selidik diedarkan secara atas talian bagi pengumpulan data. Analisa regresi logistik binari telah dijalankan untuk mengenalpasti faktor-faktor yang mempengaruhi tahap KAP. Majoriti guru-guru prasekolah di Malaysia didapati berada pada tahap pengetahuan (74.1%), sikap (75.0%) dan tindakan (81.2%) yang tinggi. Faktor-faktor yang didapati mempengaruhi tahap pengetahuan adalah guru-guru yang bertugas di tadika swasta dan prasekolah yang menjalankan saringan penglihatan. Guru-guru perempuan, guru yang mempunyai latar belakang bukan pendidikan dan yang tidak mempunyai masalah/penyakit mata adalah faktor-faktor yang mempengaruhi tahap sikap. Manakala, faktor-faktor yang mempengaruhi tahap tindakan adalah umur guru, guru Melayu, penglibatan dalam latihan saringan penglihatan dan bertugas di prasekolah yang menjalankan saringan penglihatan. Latihan dan pendedahan terhadap saringan penglihatan didapati dapat meningkatkan tahap KAP guru-guru berkenaan saringan penglihatan.

Kata kunci: Amalan; guru-guru; kesedaran; pengetahuan; prasekolah; sikap; saringan penglihatan

Address for correspondence and reprint requests: Dr. Sumithira Narayanasamy. Faculty of Health Sciences, Centre for Community Health Studies (ReaCH), University Kebangsaan Malaysia, Jalan Raja Muda Abdul Aziz, 50300 Kuala Lumpur, Malaysia. Tel: +603-92897495 Email: sumithira@ukm.edu.my.

ABSTRACT

Preschool vision screening is carried out by optometrist in Malaysia. However, inadequate manpower limits the ability of this screening to be conducted nationwide. Teachers' involvement in the screening team could be beneficial to overcome this issue. Therefore, it is important to understand teachers' knowledge, attitude, and practice (KAP) on vision screening. This study aimed to assess preschool teachers' level of KAP and identify the contributing factors. A cross-sectional study was conducted among public and private preschool teachers in Malaysia. A self-administered online questionnaire was used as the data collection tool. The contributing factors affecting the KAP level were determined using binary logistic regression analysis. The majority of the preschool teachers were in the high-level category for knowledge (74.1%), attitude (75.0%), and practice (81.2%). Factors contributing to the level of knowledge were teachers from private preschools and serving at preschools conducting vision screening. Being female, teachers with a non-education field of study and without a history of eye problems/diseases were associated with attitude level. Meanwhile, factors contributing to the practice level were age, Malay teachers, involvement in vision screening training, and serving at preschools conducting vision screening. Training and exposure to vision screening can increase teachers' KAP levels regarding vision screening.

Keywords: Attitude; awareness; knowledge; practice; preschool; teachers; vision screening

INTRODUCTION

Vision screening among children has been carried out widely in developed countries (Atowa et al. 2019; Mathers et al. 2010; Metsing et al. 2018). As a result of the World Health Organisation's (WHO) Prevention of Blindness program, a vision screening program has also been implemented in underdeveloped countries to prevent blindness (World Health Organisation 2019). In Malaysia, since 1975, vision screening has been carried out among primary school children by the school health team which is comprised of doctors and nurses (Buang 2013).

Although there have been different views on the screening age, a review of the effectiveness of children's vision screening supported children's vision screening during preschool (ages 3 to 5 years) (Mathers et al. 2010) as early detection and treatment of visual impairment could improve visual outcomes (Cools et al. 2009; Nelson 2005; Williams et al. 2003). Realising the importance of vision screening among younger children, the Optometry services under the Ministry of Health Malaysia implemented a preschool vision screening program, through the Amblyopia and Visual Impairment Screening (AVIS) program

(Jawatankuasa AVIS 2019). The screening components included are general inspection of the eye, distant visual acuity, stereopsis, cover test, Hirshberg test, and colour vision.

Personnel also plays an essential role in implementing comprehensive screening programs. Vision screening is usually conducted by health professionals such as doctors and nurses (Chen et al. 2019). Due to the lack of medical professionals in Malaysia, preschool vision screening cannot be performed widely at the national level. However, in some countries, trained teachers, parents, and lay screeners were also involved in vision screening for children (Latorre-Arteaga et al. 2016; Marmamula et al. 2018; Metsing et al. 2018). A pilot study in Malaysia showed that teachers can perform effective vision screening programs given that appropriate training is provided (Omar et al. 2018). This study suggests that teachers are an essential asset and well-suited to conduct vision screening for preschool children.

Before involving teachers in the screening program, baseline data on teachers' knowledge, attitude and practice (KAP) toward vision screening should be gathered. Understanding teachers' awareness level and its associated factors can help in planning, conducting and evaluating the screening program (Andrade et al. 2020). Therefore, this study aimed to assess the KAP regarding vision screening among preschool teachers in Malaysia and its associated factors.

MATERIALS AND METHODS

Study Design and Sampling Methods

A cross-sectional study was conducted among public and private preschool teachers in Malaysia between December 2021 and February 2022. Disproportionate stratified random sampling was used to determine the study sample. The study population was divided into five zones, with each zone comprising the states in Malaysia according to their geographical location i.e. North zone (Perlis, Kedah, and Penang); East zone (Pahang, Terengganu, and Kelantan); West zone (Selangor, Wilayah Persekutuan Kuala Lumpur, and Wilayah Persekutuan Putrajaya); South zone (Negeri Sembilan, Melaka, and Johor) and East Malaysia zone (Sabah, Sarawak, and Wilayah Persekutuan Labuan). To ensure the representation of the study population, one state was selected from each zone. The selection process was done through random sampling using the RAND function in Microsoft Excel, and the selected states for this study were Kedah, Johor, Selangor, Pahang and Sarawak. All public and private preschools registered with the Ministry of Education Malaysia or the Community Development Department in the selected states were invited to participate in the study.

This study was approved by the Community Development Department, the Ministry of Rural Development Malaysia (Ref. no: KEMAS BPAK 620.02/01/01 Jld 20 [47]) and the Research Ethics Committee,

Universiti Kebangsaan Malaysia (Ref. no: UKM PPI/111/8 JEP-2021-674).

Sample Size Determination

The sample size was calculated based on Krejcie and Morgan's formula (Krejcie & Morgan 1970) as followed:

$$n = \frac{X^2 NP(1-P)}{\Delta^2(N-1) + X^2 P(1-P)}$$

Where n was the required sample size, N was the number of public and private preschool teachers in Malaysia (N= 41 690), X^2 was the table value of chi-square (3.84), P was the population proportion (0.5) and Δ was the degree of accuracy (0.05). After taking into consideration 10% of non-respondents, the sample size was determined to be 422.

Data Collection Tools and Procedures

The validated KAP on vision screening for teacher's questionnaire (KAP-VST) was used for data collection. The questionnaire consisted of six sections: (i) Information sheet; (ii) Consent form; (iii) Participants' information; (iv) Knowledge domain; (v) Attitude domain; and (vi) Practice domain. For the public preschools, data was collected by emailing the questionnaire (Google Form) to preschool teachers in the selected states (Kedah, Johor, Selangor, Pahang and Sarawak) through the state Community Development Department. As for the private preschools, the questionnaire was emailed to all preschools registered

with the Ministry of Education Malaysia in the selected states.

The knowledge domain consisted of 42 items on a binary scale with "Yes" or "No" answers. The knowledge domain aimed at assessing the teachers' understanding of topics such as types, signs, and symptoms of visual impairment in children, effects of visual impairment and treatment, children's vision screening and visual hygiene. The attitude and practice domains consisted of 12 and 14 items, respectively, with a Likert scale. For the attitude domain, Likert scale options; "strongly disagree", "disagree", "agree" and "strongly agree" were used. Questions in the attitude domain aimed to identify teachers' attitudes towards vision and visual hygiene, vision screening training and barriers to vision screening. The practice domain also used the Likert scale, with options; "never", "sometimes", "often" and "always". The practice domain questions aimed to identify teachers' practice toward children with vision impairment, vision screening and visual hygiene.

This KAP-VST questionnaire was developed bilingually (English and Malay language) through a structured and systematic approach (Ghahramanian et al. 2015; Rattray & Jones 2007; Zamanzadeh et al. 2015). Content validation was performed by ten expert panels consisting of ophthalmologists, pediatric optometrists, academicians and optometrists. The I-CVI, S-CVI/Ave, and CVR for relevance scales were 0.9- 1.0, 0.99, and 0.8-1.0, respectively. Following that, face validation was

performed by preschool teachers from public and private preschools. The I-FVI was between 0.8-1.0, and S-FVI was 0.95.

The questionnaire was tested in a pilot study among 161 preschool teachers for construct validation and reliability tests. The sample size for this pilot study was determined based on subject: item ratio, 5:1 (Bryman & Cramer 2002). Item analysis was conducted for the knowledge domain (binary scale), whereas Exploratory Factor Analysis (EFA) was conducted for the attitude and practice domain (Likert scale). The average values for the Item Difficulty Index (I-Dif) were 0.80, and the Item Discrimination Index (I-Dis) was 0.40. In this study, EFA Principal Component Analysis with Varimax rotation was performed. EFA for the attitude domain resulted in 3 factor-solution with 12 items (3 subdomains), and the total variance explained was 72.41%. As for the practice domain, EFA resulted in 3 factor-solution with 14 items (3 subdomains), and the total variance explained was 67.63%. The results showed satisfactory reliability values for each domain (Knowledge; Kuder-Richardson 20: 0.93, Attitude; Cronbach's alpha: 0.758, Practice; Cronbach's alpha: 0.856).

Statistical Analysis

Data were analysed using Statistical Package for Social Science (SPSS) version 26. Normality was determined by using Skewness and Kurtosis values. For data larger than 300, Skewness > 2 or Kurtosis > 7 was used to determine if the data was not

normally distributed (Kim 2013). The independent variable, age and years of experience were normally distributed. Descriptive analysis was performed to report the mean and percentage of the socio-demographic distribution and participants' information.

(i) Questionnaire Scoring

The KAP score was calculated for each domain. For the knowledge domain, "1" point was given for correct answers, while the wrong answers were given "0" score. A total score of 42 was considered a full score and converted into a percentage. Teachers' level of knowledge (good and poor) was determined by their knowledge percentage score and classified according to ROC Curve cut-off scores. The attitude domain consisted of 12 items, resulting in a total score of 48 points. Teachers who chose the answer reflecting a positive attitude were given a score of 4, followed by 3, 2 and 1 for a negative attitude. The practice domain consisted of 14 items with a total score of 56. Teachers who answered the questions reflecting good practice were given a score of 4, followed by 3, 2 and 1 for poor practice. All the scores were converted into percentages, which were used to determine the level of KAP among preschool teachers toward preschool screening based on ROC Curve cut-off scores.

(ii) KAP Level Classification

After the KAP score was calculated, the teachers were grouped into two

categories (low and high) based on their KAP score (in percentage). The classification was based on the ROC Curve (Table 1) where, for the Knowledge and Attitude domain, a score between 70-100% was classified as high, while less than 70% was classified as low. As for the practice domain, a score between 51-100% was classified as high and less than 51% was classified as low. Grouping of the teachers was carried out in this manner to determine factors contributing to the level of their KAP.

Factors Associated with KAP Level

To identify sociodemographic factors that might contribute to the level of KAP, binary logistic regression was performed. Four assumptions were checked before conducting the analysis. Firstly, the dependent variable (KAP level) was dichotomous (low and high). Secondly, the independent variable (contributing factors) was either continuous or categorical (nominal or ordinal). Thirdly, multicollinearity was checked, in which the Tolerance

TABLE 1: The cut-off point for KAP level

	Cut-off scores (%)	Sensitivity (%)	Specificity (%)	AUC (95%CI)
Knowledge	70	100	73.1	0.730 (0.705 – 0.756)
Attitude	70	100	72.4	0.724 (0.697 – 0.750)
Practice	51	100	84.4	0.844 (0.823 – 0.864)

value > 0.1 and VIF value < 10 showed all independent variables had no multicollinearity. Finally, most of the independent variables showed linearity of the logit was not a problem to the dataset ($P>0.05$). Hosmer-Lemeshow test showed good model fitting ($P>0.05$).

There were 14 independent variables (factors) that were measured: gender, age, race, level of education, field of study, type of preschool (public/private), location of preschool (urban/rural), years of experience, spectacles/contact lens wearers, presence of eye disease, family members who were spectacles/contact lens wearers, presence of eye disease among family members, teachers' involvement in vision screening training and preschool

involvement in vision screening. Data was coded for all the 14 independent variables. The reference group for the independent variables was decided based on the explanatory component of the variable itself or the categories of the similar relationship to the event of interest (Sperandei 2014). As for the dependent variable (level of KAP), the high level of KAP was used as the reference group.

Univariate logistic regression was performed for each independent variable, in which factors with a $P < 0.05$ were included in the multivariable binary logistic regression. As a result of multivariable binary logistic regression, factors with a $P < 0.05$ were considered to significantly contribute to the level of KAP regarding vision screening

among preschool teachers. The minimum sample size recommended to perform logistic regression in order to represent the targeted population was 500 (Bujang et al. 2018). In this study, the Adjusted Odds Ratio (AOR) was reported to describe the change in an independent variable affecting the odds of a dependent variable while controlling the other independent variables in the model. An AOR provided insights into the real-world impact of exposure on an outcome while taking into account other contributing factors, which was critical to making informed decisions and recommendations.

RESULTS

Socio-demographic Characteristics

A total of 1237 responses were analysed. Of that, 98.9% were female. The mean age of the teachers was 39 (SD = 9) years, and the majority of the teachers were from public preschools (94.1%). Details of the socio-demographic characteristics were presented in Table 2.

KAP Level of Vision Screening among Preschool Teachers

Of the 1237 preschool teachers who responded, 917 (74.1%) had good vision screening knowledge, 928 (75.0%) had a positive attitude, and 1005 (81.2%) had good practice. Table 3 showed the KAP level of vision screening among preschool teachers in Malaysia.

Among the participants, between

66.3% and 92.4% were familiar with the basic tests performed during children's vision screening, between 55.9% and 94.2% were familiar with the tools used in children's vision screening, and between 55.7% and 88.4% were familiar with when it was appropriate to conduct vision screening on children.

As for the participants' attitudes, 96.7% agreed that vision screening can prevent visual impairment in children, and 92.7% believed teachers should be given vision screening training. However, 60.1% felt that teachers' involvement in vision screening was a burden.

The practice of vision screening was generally good among the study participants. About 70% of the study participants were proactive toward their visual-impaired students. For example, the teachers ensured students with visual impairments had a conducive environment for learning, informed parents if students showed signs and symptoms of visual impairment, and ensured students with visual aids were compliant. In terms of vision screening, only some teachers (15%) were involved in vision screening programs.

Factors Associated with KAP level of Vision Screening

(i) Knowledge

Seven factors were associated with knowledge level in the univariate binary logistic regression. In contrast, only two factors were significantly associated with knowledge level about

TABLE 2: The socio-demographic characteristics of preschool teachers

Characteristics	n	Percentage (%)
Age*, years (SD)	1237	39 (9)
Years of experience* (SD)	1237	14 (8)
Gender		
Female	1223	98.9
Male	14	1.1
Race		
Non-Malay	310	25.1
Malay	927	74.9
Education level		
Master's/Bachelor's Degree	146	11.8
Diploma	880	71.1
Certificate	101	8.2
SRP/SPM/STPM	110	8.9
Field of study		
Education	775	62.7
Non-education	462	37.3
Preschool type		
Private	73	5.9
Public	1164	94.1
Preschool location		
Urban	830	67.1
Rural	407	32.9
Spectacle/contact lens wearer (teachers)		
Spectacles	572	46.3
Contact lens	11	0.9
Both	98	7.9
Non-wearer	556	44.9
Presence of eye disease/eye problem (teachers)		
Yes	104	8.4
No	1133	91.6
Spectacle/contact lens wearer (family members)		
Yes	963	77.8
No	274	22.2
Presence of eye disease/eye problem (family members)		
Yes	228	18.4
No	1009	81.6
Involvement in vision screening training		
Yes	174	14.1
No	1063	85.9
Preschools conduct vision screening		
Yes	198	16.0
No	1039	84.0
*Mean (SD)		

TABLE 3: KAP level of vision screening among preschool teachers

Score Level	Knowledge ^a n (%)	Attitude ^b n (%)	Practice ^c n (%)
High	917 (74.1)	928 (75.0)	1005 (81.2)
Low	320 (25.9)	309 (25.0)	232 (18.8)

Notes: ^aHigh= good, Low= poor, ^bHigh= positive, Low= negative, ^cHigh= good, Low= poor

vision screening among preschool teachers in the multivariable binary logistic regression. Level of knowledge was associated with the type of preschool the teachers work in. The odds of private preschool teachers being in the high knowledge (good knowledge) level category were 2.337 times higher (95% CI [1.173, 4.659]) than public preschool teachers, $\chi^2(1)=5.821$, $P = 0.016$. Furthermore, the odds of

teachers working in a preschool with a vision screening program being in the high knowledge (good knowledge) level category were 1.867 times higher (95% CI [1.227, 2.842]) than those working in a preschool without a vision screening program, $\chi^2(1)=8.500$, $P = 0.004$. The factors associated with the level of knowledge regarding vision screening among preschool teachers were presented in Table 4.

TABLE 4: Factors associated with the knowledge level of vision screening among preschool teachers

Variables	Estimate (B)	Adjusted Odd Ratio (95% CI)	P-value
Race			
Non-Malay	-0.094	0.910 (0.657-1.260)	0.570
Malay	reference	reference	
Preschool type			
Private	0.849	2.337 (1.173-4.659)	0.016*
Public	reference	reference	
Preschool location			
Urban	0.274	1.316 (0.975-1.775)	0.072
Rural	reference	reference	
Presence of eye disease/eye problem (teachers)			
Yes	0.342	1.408 (0.816-2.431)	0.219
No	reference	reference	
Presence of eye disease/eye problem (family members)			
Yes	0.311	1.365 (0.949-1.964)	0.093
No	reference	reference	
Involvement in vision screening training			
Yes	0.358	1.431 (0.928-2.206)	0.105
No	reference	reference	
Preschools conduct vision screening			
Yes	0.625	1.867 (1.227-2.842)	0.004*
No	reference	reference	

*Significant, $P < 0.05$

(ii) Attitude

Both the univariate and multivariable binary logistic regression showed three factors associated with preschool teachers' attitude levels toward vision screening. The odds of female teachers being in the high attitude level category (positive attitude) were 3.848 times higher (95% CI [1.307, 11.328]) than the male teachers, $\chi^2(1)=5.984, P=0.014$. It was also found that the odds of teachers with an education background being in the high attitude level category (positive attitude) reduced by 26.1%, compared to teachers with non-education background (AOR=0.739, 95% CI [0.561, 0.972]), $\chi^2(1)=4.681, P=0.031$. The odds of teachers with a history of eye problems/diseases being in the high attitude level category (positive attitude) reduced by 43.5%, compared to teachers without a history of eye problems/diseases (AOR=0.565, 95% CI [0.369, 0.865]), $\chi^2(1)=6.915, P=0.009$. The factors associated with attitude levels toward vision screening among preschool teachers were presented in Table 5.

(iii) Practice

Six factors were associated with practice level towards vision screening among preschool teachers in the univariate binary logistic regression. In multivariable binary logistic regression analysis, four factors were significantly associated with practice level. It was found that the odds of non-Malay teachers being in the high practice level category (good practice) were reduced by 33.2%, compared to Malay teachers (AOR=0.668, 95% CI [0.471, 0.948]), $\chi^2(1)=7.026, P=0.08$. The odds of teachers involved in vision screening training being in the high practice level category (good practice) were 1.716 times higher (95% CI [1.045-2.819]) than those not involved in the vision screening training program, $\chi^2(1)=4.552, P=0.033$. Whereas the odds of teachers working in a preschool with a vision screening program being in the high practice (good practice) level category were 2.022 times higher (95% CI [1.222-3.346]) than those working in a preschool without a vision screening

TABLE 5: Factors associated with attitude level towards vision screening among preschool teachers

Variables	Estimate (B)	Adjusted Odd Ratio (95% CI)	P-value
Gender			
Female	1.348	3.848 (1.307-11.328)	0.014*
Male	reference	reference	
Field of study			
Education	-0.303	0.739 (0.561-0.972)	0.031*
Non-education	reference	reference	
Presence of eye disease/eye problem (teachers)			
Yes	-0.571	0.565 (0.369-0.865)	0.009*
No	reference	Reference	

*Significant, P<0.05

program, $\chi^2(1)=7.510$, $P = 0.006$. The findings also demonstrated that as the age increased, the odds of teachers to be in the high practice (good practice) level category did not change (AOR=0.975, 95% CI [0.958,0.994]), $\chi^2(1)=7.026$, $P = 0.008$. The factors associated with the practice level toward vision screening among preschool teachers were presented in Table 6.

DISCUSSION

In the present study, the majority (74.1%) of preschool teachers in Malaysia had good knowledge regarding vision screening among children. Generally, the teachers had good knowledge of the types, signs and symptoms of vision

impairment in children and screening for vision impairment. This finding was similar to a study conducted in India among primary school teachers (Ambika & Nair 2013). The study showed that 80% of the teachers had good knowledge regarding vision screening and refractive errors. In other studies of similar fields (children's vision disorders) in Ethiopia, the percentage of teachers' knowledge was slightly lower, 55.9% (Alemayehu et al. 2018) and 61.7% (Tabansi et al. 2009) in Nigeria. The difference in value might be due to dissimilar approaches in other countries' school health screening policies. For example, in India, teachers were involved in the vision screening program as part of their school's eye health

TABLE 6: Factors associated with practice level towards vision screening among preschool teachers

Variables	Estimate (B)	Adjusted Odd Ratio (95% CI)	P-value
Race			
Non-Malay	-0.403	0.668 (0.471-0.948)	0.024*
Malay	Reference	Reference	
Education level			
Master's/Bachelor's Degree	0.664	1.943 (0.919-4.106)	0.082
Diploma	-0.060	0.942 (0.557-1.593)	0.824
Certificate	0.205	1.227 (0.624-2.414)	0.553
SRP/SPM/STPM	Reference	Reference	
Preschool location			
Urban	0.219	1.245 (0.895-1.732)	0.194
Rural	Reference	Reference	
Involvement in vision screening training			
Yes	0.540	1.716 (1.045-2.819)	0.033*
No	Reference	Reference	
Preschools conduct vision screening			
Yes	0.704	2.022 (1.222-3.346)	0.006*
No	Reference	Reference	
Age	-0.025	0.974 (0.958-0.994)	0.008*

*Significant, $P < 0.05$

program (Divyajyoti Trust 2014), thus making them more exposed to vision screening among children. In contrast to participants in the Ethiopia study, the teachers were not exposed to such programs as most of them never had training on eye health (Alemayehu et al. 2018).

This current study found that type of preschool that the teacher was significantly associated with knowledge level regarding vision screening. Private preschool teachers were 2.33 times more likely to have good knowledge of vision screening compared to public preschool teachers. This finding could be attributed to the higher prevalence of visual impairment found in private preschool children. A study conducted in Ghana found that children from private schools were 3.00 times more likely to have visual impairment than children from public schools (Ceesay et al. 2022). Therefore, private preschool teachers may develop better awareness of students' needs that leads to better knowledge level.

In addition, exposure to vision screening is associated with knowledge level regarding vision screening. Teachers working in preschools with vision screening programs were 1.86 times more likely to have good knowledge. This is consistent with the findings from the United States of America, in which majority of the teachers (94.9%) that had prior exposure to screening programmes were aware of the impact of vision impairment on children's learning (Hinkley et al. 2011). Through involvement in vision screening programmes, the teachers were able to gather knowledge on the

vision-related issues that lead them to have higher knowledge levels. This is also supported by other study, where teachers with good eye health knowledge come from school with vision screening practice (Sukati et al. 2021).

The majority (75.0%) of Malaysian preschool teachers had a positive attitude towards vision screening. Although 92.7% of teachers supported the need for vision screening training, 60.1% thought of it as a burden. This could be attributed to the fact that teachers are burdened with their teaching responsibilities that involvement in vision screening and training may be perceived as a burden. This is supported by a study conducted in Pakistan where teachers reported that they were aware of the importance of conducting vision screening but participation in such programmes may be an additional burden for them (Bechange et al. 2021).

The current study also demonstrated that gender was associated with attitude towards vision screening. Female teachers were 3.85 times more likely to have a positive attitude towards vision screening than male teachers. This is consistent with a study conducted in India, where being female was associated with having a positive attitude towards management of visual problems (Lillypet 2019). However, in another study, which had equal numbers of female and male teachers, it was found that male teachers were more likely to have favourable attitudes than female teachers (Alemayehu et al. 2018). It was suggested that this could be due

to the socio-cultural in Ethiopia, where males may be exposed to information compared to females (Buehren et al. 2019).

This present study also found that the odds of teachers with education background having positive attitudes were less likely by 26.1% compared to teachers with non-education background. This could be due to the fact that human behaviour is driven by curiosity (Litman et al. 2005; van Lieshout et al. 2019). In a behaviour exploratory study, it was found that participants who answered "Don't know" to a set of questions corresponded with positive feelings of interest (Litman et al. 2005). The feeling of not knowing about certain subjects will create a positive drive of behaviour toward understanding them. This theory could mean that teachers without an educational background are more curious about the topic of vision screening in children, leading them to have a positive attitude.

Teachers with a history of eye problems/diseases were 43.5% less likely to have a positive attitude than teachers without a history of eye problems/diseases. In terms of knowledge, this study found an association between teachers with a history of eye problems/diseases and teachers without a history, but it was not significant. The good knowledge of vision screening could be explained similarly to the study on curiosity and exploratory behaviour (Litman et al. 2005). In that study, participants who answered "I know" corresponded to the lowest level of curiosity. This could be the reason why teachers with a

history of eye problems/diseases were less likely to have a positive attitude toward vision screening.

In this study, most preschool teachers (81.2%) had good practice towards vision screening. This was in contrast to a study in Nigeria, where the outcome shows that most (56.0%) of the teachers had poor practice about their students' eye health, and none of the teachers had eye screenings conducted in the school setting (Okoloagu et al. 2019). According to our data, 14.1% of the study participants were involved in vision screening programs, while 16% worked in a preschool that conducted vision screening programs. This prior exposure to vision screening might have contributed to the good practice seen in the current study.

Four factors were associated with the practice level towards vision screening. As the age increases, the likelihood of teachers to be in the good practice category does not change. However, another study in Pakistan shows different age groups affecting teachers' practice towards students' eye health (Habiba et al. 2017). In the study, the age group between 26-45 years had higher practice score compared to the younger and older group. The reason given was that older teachers could have a lack of awareness regarding eye and less education among the younger teachers. Whereas in Malaysia, the situation might be different due to the availability of information and opportunities for advancement regardless of age (The Star Special 2022).

The next factor associated with practice level was race. Non-Malay

teachers were 33.2% less likely to be in the good practice category compared to the Malay teachers. This finding is consistent with other KAP studies in Malaysia, where Malay was associated with having better practice compared to non-Malay (Leong 2014; Selvarajoo et al. 2020). It is also mentioned that religion and cultural upbringing might play a role in Malay having better KAP than other races. In another study in Ethiopia, it was found that being a Muslim was associated with a higher level of knowledge regarding refractive errors among teachers (Alemayehu et al. 2018).

Involvement in vision screening training was also associated with practice level. Teachers who had been involved in vision screening training being in the good practice category were 1.72 times more likely than those who had not been involved. This is consistent to a study conducted on teachers' practice towards visual impairment and rehabilitation. The study revealed that teachers that had low vision training were 5.50 times more likely to have good practice (Taha & Musa 2023). Besides that, KAP were found to be correlated (Koo et al. 2015). Thus, good knowledge ultimately leads to good practice. This is supported by several studies, that found vision screening training to be effective in improving teachers' knowledge, leading to good practice (Agrawal et al. 2018; Chang et al. 2017; Juggernath & Knight 2015; Tan et al. 2019).

Teachers working in a preschool with a vision screening program were 2.02 times more likely to have good

practice. This is in agreement with a study in the United States of America (Hinkley et al. 2011), in which 86% of the study participants who referred their students for eye examinations were teachers from schools with vision screening programs. This indicates that vision screening programs conducted in school can positively influence teachers' actions toward children's eye health.

CONCLUSION

In the present study, a good level of KAP regarding vision screening was observed among preschool teachers in Malaysia. Several factors were identified to influence this level of awareness. Teachers' eye health status, age, gender, race, field of study and types of preschools are factors that cannot be changed. However, teachers' involvement in vision screening and training can be increased to improve the KAP levels, and it will require collaboration between preschool management and vision screening organisers. Besides teachers, creating awareness about the importance of vision screening among children with management bodies and authorities is also crucial. This can have a positive impact on the desired collaboration.

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