

Association Between Knowledge, Awareness on Low Vision Services and Years of Experience among Retail Optometrists in Malaysia

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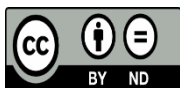


Keywords:

Awareness, Knowledge, Retail Optometrist, Low Vision Services, Years of Experiences.

ABSTRACT

With the estimated increase in the number of low vision patients, the need for optometrists with expertise in low vision rehabilitation services will increase especially among retail optometrist. The knowledge and awareness of low vision services among optometrists are needed to improve low vision rehabilitation services. This study intends to investigate the association between awareness, knowledge and years of experience among retail optometrists in Malaysia. A total of 344 registered retail optometrists across Malaysia participated in this cross-sectional web-based survey. A standardised questionnaire was generated using the Google Form, and the link was shared through social media-WhatsApp and Telegram from April to June 2021. From their responses, knowledge and awareness level on low vision services were assessed. Pearson chi-square tests for independence were used for knowledge and awareness on low vision services with years of experience comparisons. The knowledge and awareness of low vision services among retail optometrists in Malaysia was inadequate (1.78 ± 0.543 and 1.76 ± 0.545), respectively. Based on the results, no significant association between knowledge ($\chi^2 = 11.517, p = 0.074$) and awareness ($\chi^2 = 9.837, p = 0.132$) on low vision services with years of experience of the respondents. These findings indicate that there is lack of knowledge and awareness on low vision services among retail optometrists in Malaysia despite the years of experience. More research is needed to enhance knowledge while also raising awareness among optometrists working in retail about the need of managing low vision patients, despite their years of experience.



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1. INTRODUCTION

Low vision is a permanent visual impairment, broadly defined as a best-corrected visual acuity worse than 6/18 in the better eye, substantial visual field loss, or substantial loss of contrast sensitivity, that is not correctable by refraction, medical treatment, or surgery [1]. The 1996 National Eye Survey (NES) indicated

that up to 50% of 54 000 blind people and 80% of 464 000 people with low vision. In Malaysia, among 18027 subjects examined, it was found that the age adjusted prevalence of blindness and low vision was 0.29% and 2.44% respectively [2]. The significant contribution to the percentage of people with low vision were cataracts and uncorrected refractive errors, which are readily treatable with good visual restoration. Diabetic retinopathy, age-related macular degeneration, glaucoma was found to be the most commonly reported causes of low vision across all countries [3]. The prevalence of low vision in most country rely on the socioeconomic status, availability of medical and health care services, and literacy of the population [4]. Low vision services work well in controlling the functional and psychological impacts of visual impairment [5]. The low vision services that available in Malaysia are Ministry of Health Ophthalmology Department, special schools for visually impaired students, Malaysian Association for Blind, and St Nicholas home, Penang [4]. However, there is still limited of low vision services offering at a primary care level among retail optometrists [6], [7]. There was little encouragement to put low vision training from tertiary education into practice resulting in limited interest among optometrists in low vision management. Some optometrists felt that low vision care was time-consuming and not lucrative [8]. A previous study carried out in Melbourne, Australia found that low utilization of eye care services was due to lack of knowledge of the available eye care services [9]. Optometrists requires to have a good knowledge on low vision services as it is an emerging subspecialty practice area in several fields of rehabilitation therapy and is usually multidisciplinary, involving optometry, low vision specialties, and occupational therapy [10]. The focus of low vision services is often to help individuals maximize the use of any residual vision and compensate for lost vision using adaptive devices or task/environmental adaptations [11]. A working understanding of low vision services is essential so that appropriate patients may be recognised and referred promptly. It is because, low vision patients have difficulty with activities of daily living (ADLs), leading to a lower quality of life (QoL) and possibly loss of independence. They may need low vision aids for training, standard options (including magnifiers), electronic options, non-optical options, and surgical options [12].

Meanwhile, a study reported that a lack of awareness (91.5%) and availability of low vision care centres (81.5%) were the significant barriers to access low vision services by the patients from practitioners' perspective [13]. There is a similarity in findings of those reported by previous study who also found little encouragement to put low vision training from tertiary education into practice, which resulted in limited interest among optometrists in low vision management [14]. A lack of awareness by both the public and health care professionals is one of the significant global barriers to low vision services. The substantial constraints or barriers to providing low vision care are lack of training/knowledge (82.3%), lack of awareness (74.7%) and non-availability of low vision devices (72.2%) [8]. Another issue with access to services is the lack of effective referral systems for continuity of care. It is more likely because of the geographic distribution of services or lack of awareness about low vision services among eye care professionals. It has been identified that most developing countries lack formal training and professional development opportunities in the low vision field [15]. Meanwhile, optometrists in Ghana receive training in providing primary low vision services as part of their course requirement in school; however, the practice of low vision is on the downside. There are numerous anecdotes but little research on referral and provision of services for visually impaired people in Ghana [16]. This situation has led to assumptions that most of optometrists or eye care provider are lack interest or do not find the practice of low vision to be rewarding [17].

The years of experience somehow affect the level of knowledge and awareness among primary eye care practitioners who work in a non-hospital based setting [18]. For instance, competent-level optometrists who have lesser years of experience compared to expert optometrists have less structured clinical knowledge bases in their practice [19]. At present, only one-third of potential providers make an active contribution to

low vision services, and the majority either do not provide this service at all or sell magnifiers without professional support, especially in the retail shop [7]. According to prior research, expert optometrists use a more patient- centered approach than competent-level optometrists [18]. The statement correlates with data from previous study that expertise is characterised by a personal approach that is unique to each patient. Furthermore, expert- level optometrists have more diagnostic proficiency than competent-level optometrists since experts have more years of experience confronting patients on a regular basis [20]. The study is in accordance with the literature on expertise, which stipulates that experts are likely to recognise important information more rapidly than are professionals at lower levels of expertise development. This is due to competent-level optometrists having a less structured clinical knowledge base because their knowledge is not the same as in experts [19]. A more experienced retail optometrist was significantly less likely to generate a false positive referral. If an inexperienced optometrist is unsure of a diagnosis, it would be unfair and potentially dangerous to criticise or discourage referral as there is a natural learning curve with experience in any profession [21]. Years of experience has the most significant effect on referral accuracy [22]. As practitioners become more experienced, they appear to become more confident about their ability to monitor or manage patients rather than refer them. There is also a significant effect of gender on referral accuracy, with women tending to refer more false positives. This may be due to a different approach to patient care and possibly a greater sensitivity to litigation [23].

Based on what is said above, the lack of knowledge, training and awareness on low vision services among optometrists contribute to the patients' significant barriers to access low vision services. It is important to have data on the knowledge and awareness of low vision services among eye care practitioners to improve low vision care in the developing world [5]. To the best of our knowledge, no recent study has been conducted on assessing the association between knowledge, awareness, low vision services and years of experience among retail optometrists in Malaysia. Hence, the aim of this study is to determine the level of knowledge and awareness on low vision services among retail optometrists in Malaysia. Also, this study aims to investigate the association between awareness, knowledge on low vision services and years of experience among retail optometrists in Malaysia.

2. METHODS AND MATERIALS

2.1 Sampling

The recruitment strategy of subjects includes a convenience sampling method, and the participants were among retail optometrists from the Malaysian Optical Council (MOC) and Association of Malaysian Optometrist (AMO) committee that was readily available with the subjects' contact information. The sample size was calculated using Raosoft sample size software from a total population of 2200 retail optometrists in Malaysia [24]. Raosoft software was used to calculate the sample size with a 95% Confidence Interval, 50% response distribution, 5% margin error and population size of 2200 participants. From the calculation, the sample size of 328 retail optometrists in Malaysia was needed to participate in this study. By considering the 20% drop out rate of the participants), the total number of participants recruited in this study is 344 retail optometrists.

2.2 Inclusion and exclusion criteria

The optometrists registered under the Malaysian Optical Council (MOC) currently working in retail participated in this research. Optometrists registered under the MOC but are currently working in hospitals, clinics, or eye care specialist centres were excluded from this study.

2.3 Research instruments and procedure

The close-ended questionnaires were used in this study for data collection. The questionnaire was adopted and reconstructed from previous studies about the questionnaires on the awareness, knowledge, and barriers to low vision services among eye care practitioners [13]. Since the questionnaires were adapted from the previous study, a pilot study consisting of 15 retail optometrists was conducted to validate the questionnaires. A pilot study was conducted among 15 retail optometrists, and the Cronbach's alpha values obtained for knowledge and awareness were 0.932 and 0.856, respectively. Cronbach's alpha value of between 0.8 and 0.9 is considered as high reliability of the questionnaire [25].

The first part (section A) of the questionnaires comprised the retail optometrist' demographic information, such as age, gender, qualification level, years of experience and type of private practice. The second part (section B) of the questionnaires consisted of 23 items in total. It was divided into two categories which were knowledge on low vision services (A1, A2, A3, A4, A5, A6, A7 A8) and awareness of low vision services (B1, B2, B3, B4, B5, B6, B7, B8, B9, B10, B11, B12, B13, B14, B15). The five points Likert Scale was used from "Strongly Disagree" to "Strongly Agree." It took approximately 15 minutes for the respondents to complete the questionnaires. A validated self-administered questionnaire is made available in a web-based questionnaire format (google form). The e-survey included the purpose of the study, informed consent, the confidentiality of the survey and instructions on how to answer the questionnaire. The link for Google Form that contained the questionnaire was distributed through WhatsApp, Telegram and email to the retail optometrists. As the participants were given consent, the confidentiality and anonymity of the participant were assured.

2.4 Research instruments and procedure

All the responses were directly collected into Microsoft Excel and exported to Statistical Package for the Social Sciences (SPSS) version 25 for data analysis. The data were analysed using the computer software SPSS version 25. The data was analysed using two types of statistics: descriptive statistics and inferential statistics. The level of knowledge and awareness on low vision services among retail optometrists in Malaysia and demographic variables was examined with descriptive statistics (median, mean, standard deviation). Meanwhile, the Chi-Square Test of Association is used to assess the association between awareness, knowledge on low vision services and years of experience among retail optometrists in Malaysia.

3. RESULTS

3.1 Demographic data

Questionnaires were sent to 360 retail optometrists, and the responses were obtained from 344 practitioners, indicating a 95.5% response rate of the participants. More than half of the respondents (n = 195, 56.7%) were women, and 149 respondents (43.3%) were men. The findings showed that the age group with the highest frequency (47.7%) was 20- 30 years old. Among the participants, retail optometrists who had the most working experience of more than ten years working in retail showed the highest frequency (36.9%). Demographic data of the retail optometrists are shown in Table 1.

Table 1 Demographic information of retail optometrists

Variable	Total (N)	Percentage (%)
Gender		
Male	149	43.3
Female	195	56.7
Age		

20 to 30 years-old	164	47.7
30 to 40 years-old	94	27.3
40 to 50 years-old	79	23.0
50 to 60 years-old	7	2.0
Qualification Level		
Bachelor of Optometry (Hons.)	276	80.2
Master of Optometry (M.Optom)	58	16.9
Doctor of Philosophy Optometry (Ph.D)	10	2.9
Type of Private Practice		
Individual Practice	61	17.7
Optometry Center	139	40.4
Optical Outlet	144	41.9
Years of Experience		
Less than 5 years	125	36.3
5 to 10 years	92	26.7
More than 10 years	127	36.9

3.2 Responses of retail optometrists to each item

In this study, the findings revealed that knowledge on low vision services among retail optometrists in Malaysia were at a low level (1.78 ± 0.54) despite the years of experience. Only 21.8% of the respondents with the lowest mean value (1.97 ± 1.28) denoted that they would consider a patient is having a low vision with the best-corrected visual acuity in the better eye is worsen than 6/18, which was in accordance to World Health Organization (WHO) criteria of low vision. However, 41.6% with highest mean value (2.45 ± 1.42) who participated in this study acknowledged that they would provide glasses, telescopes, and magnifiers for low vision patients (Figure 1).

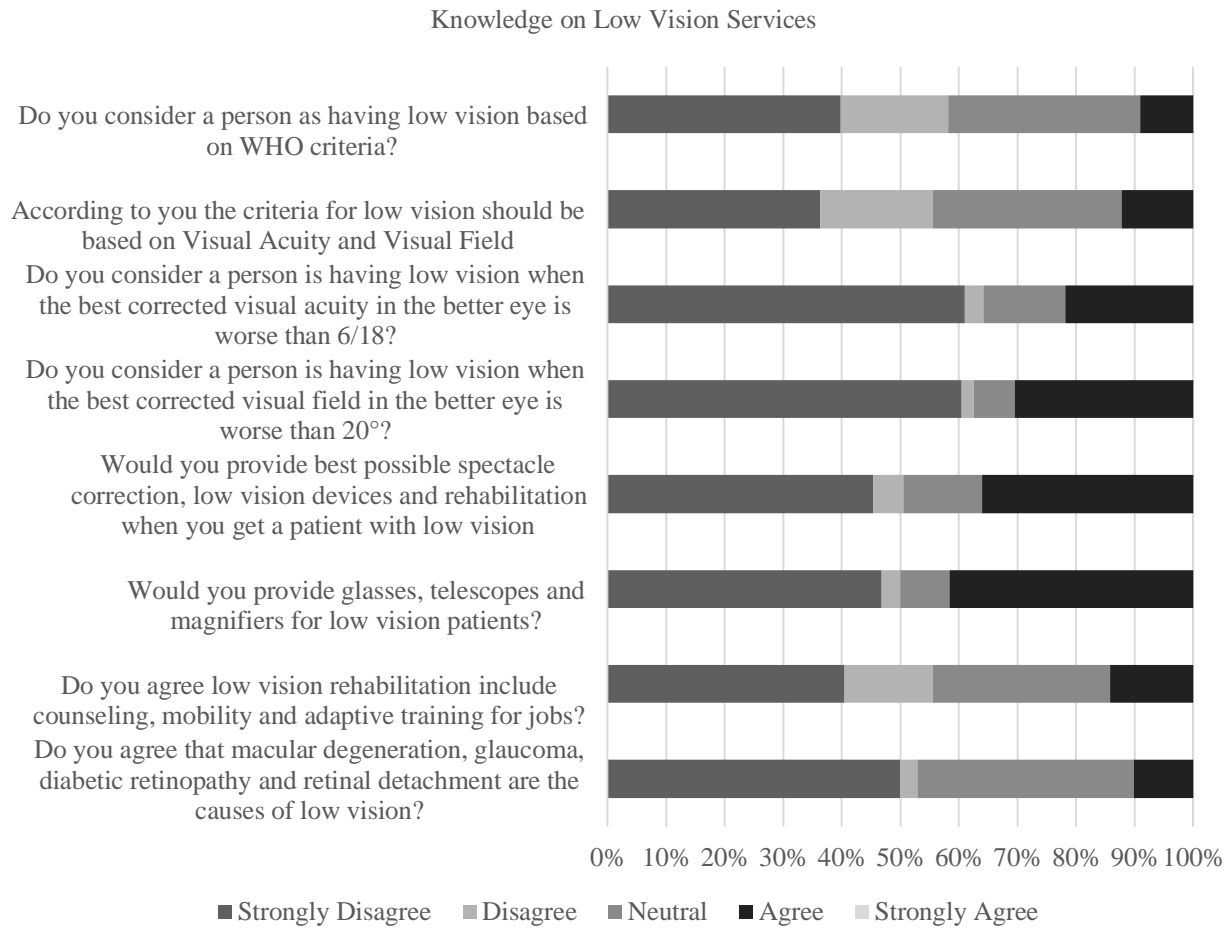


Figure 1 Knowledge on low vision services among retail optometrists in Malaysia

Meanwhile, the results showed that the awareness level on low vision services among retail optometrists was also at a low level (1.76 ± 0.55). Just a small number of the participants (20.7%) knew the current WHO definition of low vision. Awareness of organisations that provide low vision rehabilitation and concession facilities were observed among 12.5% and 14% of the participants, respectively. Of the 344 respondents who responded to the survey, 44.5 per cent said that raising public knowledge of low vision services is critical to improve low vision practice. Figure 2 depicts retail optometrists' awareness of low vision services in Malaysia.

Awareness on Low Vision Services

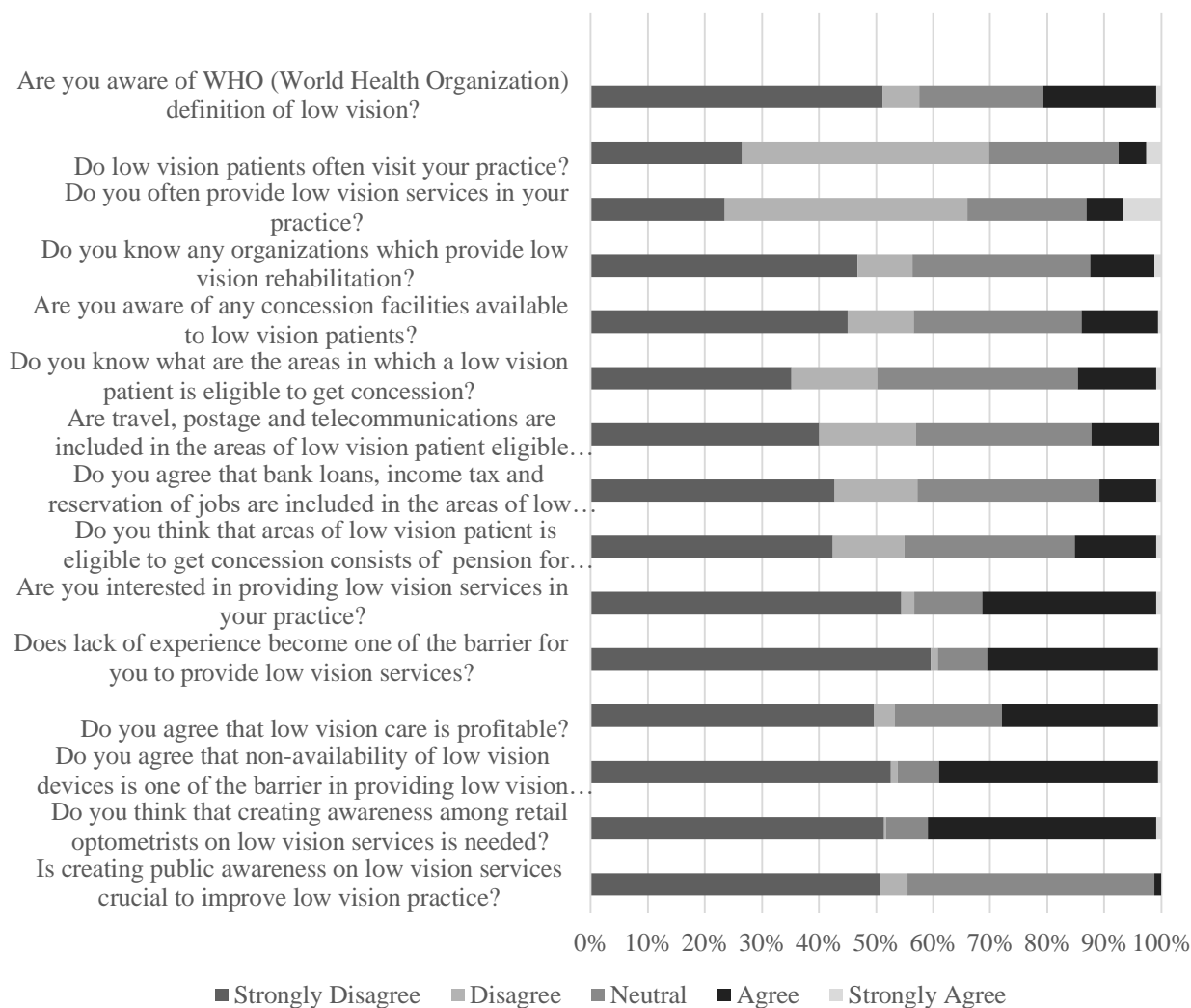


Figure 2 Awareness on low vision services among retail optometrists in Malaysia

3.3 Knowledge on low vision services and years of experience

The degree of freedom (df), Pearson chi-square (χ^2) and significance value (p) for the association of years of experience with knowledge level on low vision services were presented in Table 2. The key result in the Chi-Square tests table includes the Pearson Chi Square value of the test statistic is 11.52 with expected cell counts are all greater than 5. 6 cells (50.0%) have expected count less than 5. The corresponding p-value of the statistic is $p=0.074$. As $p>0.05$, the result revealed no significant association between years of experience and knowledge level on low vision services among retail optometrists in Malaysia.

Table 2 Association of years of experience and knowledge level on low vision services using Chi-Square Test of Independence

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	11.517 ^a	6	.074
Likelihood Ratio	11.850	6	.065
Linear-by-Linear Association	5.520	1	.019
N of Valid Cases	344		

^a. 6 cells (50.0%) have expected count of less than 5. The minimum expected count is 1.07.

3.4 Awareness on low vision services and years of experience

Table 3 shows the Pearson's chi-square test (with $\alpha=0.05$) that was used to evaluate whether years of experience among retail optometrist is associate to whether or not with the awareness on low vision. The key result in the chi-square tests table includes the Pearson chi-square value of the test statistic is 9.84, with expected cell counts are all greater than 5. 4 cells (33.33%) have expected count less than 5. The corresponding p-value of the test statistic is $p=0.132$. As $p>0.05$, the result revealed there is no significant association between years of experience and awareness level on low vision services among optometrists in Malaysia.

Table 3 Association of years of experience and awareness level on low vision services using chi-square test of independence

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	9.837 ^a	6	.132
Likelihood Ratio	10.746	6	.097
Linear-by-Linear Association	.429	1	.512
N of Valid Cases	344		

^a. 4 cells (33.3%) have expected count less than 5. The minimum expected count is .27.

3.5 Association between knowledge, awareness of low vision services and years of experience among retail optometrists in Malaysia

Since the p-value is 0.074 and 0.132, which is greater than our chosen significance level ($\alpha = 0.05$), we do not reject the null hypothesis. Based on the results, we can state that there is no significant association observed between knowledge ($\chi^2 = 11.517$, $p = 0.074$) and awareness ($\chi^2 = 9.837$, $p = 0.132$) with years of experience of the respondents.

4. DISCUSSION

4.1 Knowledge on low vision services among retail optometrists in Malaysia

The primary objective of this study is to determine the knowledge level on low vision services of retail optometrists in Malaysia. The findings revealed that the knowledge on low vision services among retail optometrists in Malaysia was at a low level. As a long-term measure, optometrists should have a minimal level of understanding in low vision rehabilitation. Three main reasons for the high prevalence of visual impairment are non-availability, non-accessibility and non-affordability of eye care services. However, there are several factors that may act as barriers to the use of available, accessible and affordable eye care services. These include the lack of knowledge of the services among eye care practitioners [26]. As cited by lack of trained personnel and infrastructure has been identified as barrier to refractive error corrections in Southern India [8]. Contrary to what is beginning to be seen in some developed and underdeveloped countries, the optometrists' model in Malaysia is reduced. The majority of the sample's individuals, 41.9%, are exclusively practicing in retail optical shops. The results indicate that Malaysian optometrists' who work in optical outlets are most frequently performed procedures that have very reductive views of the optometrist scope of practice, especially in the specialisation of low vision. These could result in low knowledge on low vision services among retail optometrists despite their years of experience.

The current study found that half of the respondents (41.6%) agreed that they would provide glasses, telescopes and magnifiers for low vision patients in which it was similar finding with the previous literature.

A study reported that magnifiers were found to be most commonly prescribed low vision devices which was 79% [13]. However, the discrepancy in percentages on providing magnifiers between these two studies could be due to different target populations. The previous study that was being conducted in Kerala, India, included all eye care practitioners that consisting of clinical-based optometrists and ophthalmologists, which tend to have more exposure to handling patients with low vision in providing the most effective assistive devices as there is easy accessibility in providing low vision aids for low vision patient [13]. On the other hand, the target population of current study only focuses on retail optometrists in Malaysia. A visual acuity chart, trial frame, and trial lenses would typically be available for performing a routine eye exam in a retail-based practice. If respondents only had this equipment, they would only be able to provide low vision services up to prescribing for high additions and giving lighting advice. Therefore, having the proper devices and equipment would be essential to provide a higher level of low vision service. The most frequent reason for not providing low vision examination beyond was the lack of equipment and devices.

In real, a certain number of professionals lacked of knowledge and awareness on the significance of optical low vision aids [27]. For example, low vision devices were also not being the topic of discussion with their patients nor oriented them towards low vision rehabilitation services. It appeared that maintaining positive interactions between the patient or client and low vision health care professionals were essential in the process of acquiring and incorporating low vision devices [28]. Poor knowledge of devices, unmet device needs, negative health care experiences, and delays in obtaining an appointment were considered as barriers to the use of magnifying devices [29].

4.2 Awareness on low vision services in Malaysia

This study also aims in determining the awareness level on low vision services among retail optometrists in Malaysia. In this study, it was found that there was a lack of awareness on low vision services among retail optometrists in Malaysia as the majority of the respondents (94.8%) was at a low or very low level of awareness. The study outcomes showed a similarity with the recent studies, in which majority of the practitioners 88.7% and 73%, respectively have lack of awareness that lead to major barriers restricting the provision of low vision services [5] [30]. It is important to raise awareness among optometrists by organizing outreach programs to inform them the general health and eye care issues that enhance awareness and improve uptake of the low vision services [30]. However, there is a discrepancy between current and a previous study, in which current study discovered that only a minority of the participants (20.7%) are familiar with the WHO definition of low vision and are aware of organizations that provide low vision rehabilitation and concession facilities [13]. Meanwhile, cited in their study that awareness about the WHO definition of low vision and organisations that provide low vision rehabilitation and concession facilities were observed among 86.3%, 75.4%, and 64% of the participants, respectively [13]. This might be due to different exposures from different modes of practice, either clinical or retail as majority do not provide low vision service at all or simply sell magnifiers without professional support especially in retail shop. Besides, among the participants in this study, only 34% of them responded that they provide low vision services in their private practices throughout their years of experience. These responses were in accordance with the recent study as the findings revealed that 30.2% provided low-vision services [31]. It was dissatisfying to find optometrists investing little time in providing these core optometry services. The primary cause of the discrepancy is due to inadequate funding, less interested, and preoccupation with general ophthalmic care are additional factors for poor coverage of low vision services in the country [32].

More than half of the respondents in current study (61.1%) agreed that the non-availability of low vision devices is one of the barriers in providing low vision services. The findings portrayed a similarity with a previous study where the majority of the participants in the study highlighted that the main reason (95.2%)

for not providing and delivering low vision services was non-availability of low vision aids and equipments [16]. With the increasing prevalence of visual impairment, the non-availability of low-vision services is a major concern in developing countries, especially in the Asia Pacific region. Among 178 (out of 195) countries that responded to a recent global low vision services survey, low vision services were reported to be present in 115 (64%) countries [15]. However, the presence of services does not necessarily equate to good coverage of services. Another study done by [33]. Among ophthalmologists in Nigeria also agreed that non-availability of low vision devices within the country, and lack of public awareness of low vision care and its practitioners and the ophthalmologists' preoccupation with general ophthalmic practice as the major barriers in clinical low vision provision.

Hence, educational campaigns would lead to better understanding and promote greater utilization of eye care services where there is poor utilization of available services [34]. Early detection and management of eye diseases would reduce the burden of visual impairment and disability. Therefore, eye care providers and health care managers must have good knowledge of the various factors that would negatively influence utilization of eye care services and be responsive to them. Low vision also has significant implications for economic growth and the health care system of the country. Despite the need for awareness towards increasing health care for those with low vision, the global coverage and availability of low vision care in most countries has been found to be 10%. Lack of availability of low-vision services in hospitals and countries is a main reason for the increasing global low-vision burden [35]. Our study also provides additional support and considerable insight into past research done in Pakistan [36]. Out of the 344 subjects who took part in the survey, 49.1% agreed that creating awareness among retail optometrists on low vision services is needed to improve accessibility of low vision practice for low vision patients in Malaysia [36]. The study also stated majority (42%) of providers suggested that awareness of low vision services is the key factor to improve the uptake [36]. An increasing awareness of the need for providing such services on a daily basis would be pivotal in preventing missed referrals, despite easy access. Also, frequent reminders and the possible inclusion of regular classes in teaching hospitals may ensure that such information is not forgotten during routine clinical patient care [7].

4.3 Association between knowledge, awareness on low vision services and years of experience among retail optometrists in Malaysia

Based on the findings, there was no significant association between knowledge on low vision services and years of experience among retail optometrists in Malaysia. This study finding shared a number of similarities with previous findings, as they deduced no association between awareness, knowledge, age, type of practice, and years of experience of the participants in their study [13]. These outcomes correlate favourably well with our study, which further support our hypothesis. Less year of experiences among retail optometrists should be no excuse for them to prepare with low vision services at their workplace. The limitations of study include limited previous literatures that relevant to this study. There are a number of additional areas for further research that can be highlighted from this study. These include the further investigation on the knowledge, awareness on low vision services and the barriers of providing low vision services from retail optometrists' perspectives. From there, further research could rule out the factors associated with each barrier or constraint and perceptions on providing low vision care in retail-based practice.

5. CONCLUSION

This study has investigated the knowledge and awareness level among retail optometrists in Malaysia which the evidence from this study implies that the knowledge and awareness on low vision services among retail optometrists in Malaysia was at a low level. Our research has highlighted that there was no significant

association observed between knowledge, awareness on low vision services and years of experience among retail optometrists in Malaysia. These findings add to a growing body of literature on the association between knowledge, awareness on low vision services and years of experience among retail optometrists in Malaysia. Thus, further study is expected to enhance the knowledge in spite of creating awareness among optometrists that are currently working in retail on the importance of managing low vision patients despite their years of experience. With this initiative of improving the provision of low vision services in Malaysia, it could solve the needs of low vision patients towards accessibility of low vision services. The knowledge and awareness among retail optometrist is essential in allowing patients the necessary access to resources and services without waiting their list appointment in government hospital or clinic.

6. Acknowledgement

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7. Conflict of Interests

The authors declares no conflict of interest, financial or otherwise in this study.

8. References

- [1] Scheiman, M., Scheiman, M. and Whittaker, S., (2007). Low vision rehabilitation: A practical guide for occupational therapists. Slack Incorporated.
- [2] Zainal, M., Ismail, S.M., Ropilah, A.R., Elias, H., Arumugam, G., Alias, D., Fathilah, J., Lim, T.O., Ding, L.M. and Goh, P.P. (2002). Prevalence of blindness and low vision in Malaysian population: results from the National Eye Survey 1996. *British journal of ophthalmology*, 86(9), pp.951-956.
- [3] World Health Organization (2010). Global data on visual impairment.
- [4] Reddy, S.C. and Thevi, T. (2017). Blindness and low vision in Malaysia. *International Journal of Ophthalmic Research*, 3(2), pp.234-238.
- [5] Paras. D. (2021). Awareness and Gujarat, Barriers to Low Vision Services Among Eye Care Practitioners in *International Journal of Medical and Health Research*.
- [6] Carlson, A.M. and Hinkley, S.B. (2011). The status of low vision rehabilitation and certification in the state of Michigan. *Optometry-Journal of the American Optometric Association*, 82(11), pp.697-709.
- [7] Culham, L.E., Ryan, B., Jackson, A.J., Hill, A.R., Jones, B., Miles, C., Young, J.A., Bunce, C. and Bird, A.C. (2002). Low vision services for vision rehabilitation in the United Kingdom. *British Journal of Ophthalmology*, 86(7), pp.743-747.
- [8] Khan, S.A., Shamanna, B.R. and Nuthethi, R. (2005). Perceived barriers to the provision of low vision services among ophthalmologists in India. *Indian journal of ophthalmology*, 53(1), pp.69-75.
- [9] Paudel, P., Cronjé, S., O'connor, P.M., Rao, G.N. and Holden, B.A., (2014). Selection considerations when using a 'standard optometrist' to evaluate clinical performance of other eye-care personnel. *Clinical and Experimental Optometry*, 97(5), pp.426-432.
- [10] Jacko, V.A., Brady-Simmons, C., Dias, N., Van Der Biest, R., Abdel-Moty, A. and Richard, L.

(2020). Bringing low-vision assessments and interventions to underserved seniors affected by age-related eye disease. *British Journal of Visual Impairment*, 38(1), pp.15-23.

[11] Dagnelie, G. (2013). Age-related psychophysical changes and low vision. *Investigative Ophthalmology & Visual Science*, 54(14), pp. ORSF88-ORSF93.

[12] Shah, P., Schwartz, S.G., Gartner, S., Scott, I.U. and Flynn Jr, H.W. (2018). Low vision services: a practical guide for the clinician. *Therapeutic advances in ophthalmology*, 10, p.2515841418776264.

[13] Jose, J., Thomas, J., Bhakat, P. and Krithica, S. (2016). Awareness, knowledge, and barriers to low vision services among eye care practitioners. *Oman journal of ophthalmology*, 9(1), p.37.

[14] Rumney, N. (1992). An optometric approach to low vision services. *British Journal of Visual Impairment*, 10(3), pp.89-92.

[15] Chiang, P.P.C., Marella, M., Ormsby, G. and Keeffe, J. (2012). Critical issues in implementing low vision care in the Asia-Pacific region. *Indian journal of ophthalmology*, 60(5), p.456.

[16] Nyankerh, C.N.A., Agyekum, S., Boateng, A.K. and Appah, M. (2019). Low vision service delivery by optometrists in Ghana. *Private practice*, 101, pp.78-9.

[17] Lam, N., Leat, S.J. and Leung, A. (2015). Low-vision service provision by optometrists: a Canadian nationwide survey. *Optometry and Vision Science*, 92(3), pp.365-374.

[18] Persky, A.M. and Robinson, J.D. (2017). Moving from novice to expertise and its implications for instruction. *American journal of pharmaceutical education*, 81(9).

[19] Faucher, C., Tardif, J. and Chamberland, M. (2012). Optometrists' clinical reasoning made explicit: a qualitative study. *Optometry and Vision Science*, 89(12), pp.1774-1784.

[20] Batalden, P., Leach, D., Swing, S., Dreyfus, H. and Dreyfus, S. (2002). General competencies and accreditation in graduate medical education. *Health affairs*, 21(5), pp.103-111.

[21] Davey, C.J., Scally, A.J., Green, C., Mitchell, E.S. and Elliott, D.B., (2016). Factors influencing accuracy of referral and the likelihood of false positive referral by optometrists in Bradford, United Kingdom. *Journal of optometry*, 9(3), pp.158-165.

[22] Resnik, L. and Jensen, G.M. (2003). Using clinical outcomes to explore the theory of expert practice in physical therapy. *Physical therapy*, 83(12), pp.1090-1106.

[23] Ewbank A. (2010) Women of Vision survey. Part 2: Job satisfaction and future plans.

[24] Software Reviews: Raosoft Survey. (1992). *Social Science Computer Review*, 10(3), 402–403.

[25] Cortina, J. M. (1993). What is coefficient alpha? An examination of theory and applications. *Journal of Applied Psychology*, 78(1), 98-104.

- [26] Ntsoane, M.D. and Oduntan, O.A., (2010). A review of factors influencing the utilization of eye care services. *African Vision and Eye Health*, 69(4), pp.182-192.
- [27] Copolillo, A. and Teitelman, J.L. (2005). Acquisition and integration of low vision assistive devices: understanding the decision-making process of older adults with low vision. *American Journal of Occupational Therapy*, 59(3), pp.305-313.
- [28] Senjam, S.S. (2021). Developing a disability inclusive model for low vision service. *Indian Journal of Ophthalmology*, 69(2), p.417.
- [29] Lorenzini, M.C. and Wittich, W. (2020). Factors related to the use of magnifying low vision AIDS: a scoping review. *Disability and rehabilitation*, 42(24), pp.3525-3537.
- [30] Kyeremeh, S. and Mashige, K.P., (2021). Availability of low vision services and barriers to their provision and uptake in Ghana: practitioners' perspectives. *African Health Sciences*, 21(2), pp.896-903.
- [31] Thite, N., Jaggernath, J., Chinanayi, F., Bharadwaj, S. and Kunjeer, G. (2015). Pattern of optometry practice and range of services in India. *Optometry and Vision Science*, 92(5), pp.615-622.
- [32] Sarika, G., Venugopal, D., Sailaja, M.V.S., Evangeline, S. and Kumar, R.K. (2019). Barriers and enablers to low vision care services in a tertiary eye care hospital: A mixed method study. *Indian journal of ophthalmology*, 67(4), p.536.
- [33] Okoye, O.I., Aghaji, A.E., Umeh, R.E., Nwagbo, D.F.E. and Chuku, A. (2007). Barriers to the provision of clinical low-vision services among ophthalmologists in Nigeria. *Visual Impairment Research*, 9(1), pp.11- 17.
- [34] Ntsoane, M.D. and Oduntan, O.A., (2010). A review of factors influencing the utilization of eye care services. *African Vision and Eye Health*, 69(4), pp.182-192.
- [35] Matti, A.I., Pesudovs, K., Daly, A., Brown, M. and Chen, C.S. (2011). Access to low-vision rehabilitation services: barriers and enablers. *Clinical and Experimental Optometry*, 94(2), pp.181-186.
- [36] Javed, M., Afghani, T. and Zafar, K., (2015). Barriers to Low Vision Services and Challenges Faced by The Providers in Pakistan. *Journal of Korean Clinical Health Science*, 3(3), pp.399-408.