ORIGINAL ARTICLE

Challenges and Attitudes to Practising Primary Eye Care Among Malaysian Private Optometrists: Findings from the CAPEC Questionnaire

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Keywords:
Primary eye care; optometry; private sector; challenges; attitudes; Malaysia

Article history:
Received: 29 October 2025
Accepted: 10 November 2025

ABSTRACT

Background: Primary Eye Care (PEC) is an essential component of preventive eye health, yet its implementation in Malaysia's private optometry sector remains limited. Building upon a previously validated instrument (CAPEC questionnaire), this study aimed to assess the current challenges and attitudes of private optometrists towards practising PEC, and to identify factors associated with these domains. **Methods:** A cross-sectional online survey was conducted among optometrists practising in Malaysian private settings from May to October 2021. Respondents completed the validated Challenges and Attitudes to Practice Primary Eye Care (CAPEC) questionnaire, consisting of 34 items across six domains: four domains of *challenges* (working environment, support and recognition, self-sufficiency, and customer influence) and two domains of *attitudes* (motivation and sense of responsibility). Descriptive statistics, MANOVA, and multiple linear regression were used to explore domain differences and associations between challenges and attitudes. **Results:** A total of 291 optometrists participated. Among the challenge domains, *support and recognition* recorded the highest mean score (M = 3.57, SD = 0.53), indicating substantial barriers due to limited institutional acknowledgement and professional recognition. Attitudes toward PEC were generally high, particularly for *sense of responsibility* (M = 4.58, SD = 0.42). Factorial MANOVA revealed that practice ownership significantly influenced perceived challenges (p = 0.027), where practice owners reported higher barriers in *support and recognition*. Multiple linear regression analysis demonstrated that *support and recognition*, *self-sufficiency*, and *customer influence* significantly predicted the overall attitudes toward implementing PEC (p < 0.001). **Conclusion:** Despite facing considerable challenges, Malaysian private-sector optometrists exhibit strong motivation and a high sense of responsibility towards PEC. Strengthening institutional support, recognition frameworks, and continuing professional development opportunities could accelerate PEC adoption in private practices, ultimately enhancing nationwide eye care accessibility.

INTRODUCTION

Primary Eye Care (PEC) is a cornerstone of eye health systems, aimed at providing early detection, prevention, and management of ocular diseases at the community level. The World Health Organization (WHO) has emphasised the integration of PEC into primary health frameworks as a global strategy to reduce avoidable visual impairment and blindness (WHO, 2019). In Malaysia, however, the delivery of PEC remains largely concentrated within the public sector, with optometrists in private practice still underutilised despite their capacity and qualifications to perform comprehensive eye care services (Abd Aziz et al., 2020; Chew et al., 2018).

Previous studies indicated that the private optometry sector in Malaysia continues to focus primarily on refractive and dispensing services, with limited provision of comprehensive PEC activities such as ocular health screening, diabetic eye care, and glaucoma detection (Mohidin & Hashim, 2011; Taub, 2015). This underutilisation contributes to the overburdening of tertiary eye clinics and longer waiting times for patients in the public health system (Keat & Keat, 2009). The integration of PEC in private practices, therefore, has the potential to enhance eye care accessibility and strengthen public–private collaboration in achieving universal eye health coverage.

In a prior qualitative study, four major challenges were identified that hinder PEC implementation among private optometrists in Malaysia: working environment**,** support and recognition**,** self-sufficiency**,** and customer influence (Yahaya et al., 2023). While these findings provided essential contextual understanding, there remained a lack of quantitative data to estimate the prevalence and extent

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of these barriers. Subsequently, the Challenges and Attitudes to Practice Primary Eye Care (CAPEC) questionnaire was developed and validated as a psychometrically sound instrument to quantitatively assess these constructs (Yahaya & Rahman, 2024). The CAPEC tool encompasses six domains — four for challenges (*working environment*, *support and recognition*, *self-sufficiency*, and *customer influence*) and two for attitudes (*motivation* and *sense of responsibility*).

Attitudinal factors, particularly professional motivation and perceived responsibility, are critical in determining whether optometrists are ready to incorporate PEC into their clinical routines. According to behaviour change frameworks, attitudes interact closely with environmental and institutional barriers, influencing the likelihood of adopting new clinical practices (Ajzen, 1991; Fishbein & Ajzen, 2010). Therefore, assessing both challenges and attitudes concurrently provides a more holistic understanding of PEC implementation readiness in the private sector.

This study serves as a continuation of the previous CAPEC validation phase and reports national-level results obtained using the validated questionnaire among Malaysian private-sector optometrists. Specifically, it seeks to:

1. Determine the prevalence and relative magnitude of challenges and attitudes toward implementing PEC;
2. Examine subgroup differences based on demographic and professional characteristics; and
3. Explore associations between the identified challenges and attitudes toward practising PEC.

Through this analysis, the study aims to provide evidence-based insights for policymakers, professional bodies, and educators to design targeted interventions and capacity-building strategies that facilitate the integration of PEC within private optometry practice in Malaysia.

MATERIALS AND METHODS

Study Design and Setting

This study employed a cross-sectional quantitative design, forming the third phase of a mixed-methods research project on PEC practice among optometrists in Malaysia. Data collection was conducted through an online survey using a Google Forms link distributed between May and October 2021. The survey targeted registered optometrists working in private optometry practices across Malaysia. Ethical approval for this study was obtained from the International Islamic University Malaysia Research Ethics Committee (IIUM IREC) (ID: IREC 153/20).

Participants and Recruitment

Eligible participants were optometrists currently practising in private optometry settings, including independent, group, and retail-chain practices. The inclusion criteria were:
(a) registered with the Malaysian Optical Council (MOC);
(b) having at least one year of working experience in private practice; and
(c) consented voluntarily to participate.
Optometrists practising in hospitals, refractive surgery centres, or academic institutions were excluded. Recruitment was conducted via professional networks, including the *Association of Malaysian Optometrists (AMO)* and social media groups for practising optometrists. Participation was anonymous, and no personal identifiers were collected.

A total of 291 valid responses were obtained after data screening for completeness. This sample exceeded the minimum requirement for factor analysis and multivariate testing, which was calculated using GPower (effect size $f^2 = 0.15$, $\alpha = 0.05$, power = 0.80), requiring at least 150 participants.

Instrument

Data were collected using the CAPEC questionnaire — a validated instrument specifically designed to assess barriers and attitudes toward PEC among Malaysian optometrists. The CAPEC consists of 34 items across six domains:

- *Challenges:* Working Environment (5 items), Support and Recognition (8 items), Self-sufficiency (7 items), and Customer Influence (7 items).
- *Attitudes:* Motivation (4 items) and Sense of Responsibility (3 items).

Each item was rated on a five-point Likert scale ranging from *1 (strongly disagree)* to *5 (strongly agree)*. Higher scores indicate greater perceived challenges or stronger positive attitudes, depending on the domain. Domain-level mean scores were computed by averaging item responses.

In addition, the questionnaire included demographic variables such as age, gender, years in practice, type of practice, ownership status, practice location (urban/suburban/rural), and average patient load. Internal

consistency reliability (Cronbach's α) for all domains exceeded 0.70 in the validation study, confirming robust psychometric properties.

Data Collection Procedure

The questionnaire link was disseminated electronically with an invitation note explaining the study objectives and estimated completion time. Respondents were informed that participation was voluntary and that they could withdraw at any point. Data were automatically recorded in Google Sheets and exported into SPSS version 27.0 (IBM Corp., Armonk, NY, USA) for analysis. All responses were checked for missing values and outliers prior to analysis.

Statistical Analysis

Descriptive statistics (means, standard deviations, and frequencies) were used to summarise participant characteristics and CAPEC domain scores.

- Normality of data was verified using the Kolmogorov–Smirnov test.
- MANOVA and Factorial MANOVA were applied to compare domain mean scores across subgroups (e.g., practice type, ownership, years in practice).
- Simple and Multiple Linear Regression (MLR) analyses were used to examine associations between the *challenge* domains and *attitude* domains.

A significance level of $p < 0.05$ was used throughout. Results were presented as mean ± SD (standard deviation), estimated marginal means (EMM), and 95% confidence intervals (CI).

RESULTS

Participant Characteristics

A total of 291 optometrists practising in the Malaysian private sector completed the CAPEC questionnaire. Table 1 presents their demographic and professional characteristics. The majority were female (79.7%), with a mean age of 30.8 ± 6.5 years. Over half had ≤ 5 years of experience, and most worked as staff optometrists (72.9%) rather than practice owners. A large proportion were from independent practices (65.6%), with the remainder attached to chain or group practices. Most participants graduated from public universities (IPTA, 68%) and practised in suburban or non-capital locations (52.2%). These data represent a wide distribution of experience and practice settings across Malaysia.

Table 1: Socio-demographic and practice characteristics of participants (n = 291)

Variable	Category	n (%)
Gender	Male	59 (20.3)
	Female	232 (79.7)
Years in practice	≤ 5 years	171 (58.8)
	6 – 10 years	82 (28.2)
	> 10 years	38 (13.1)
Ownership	Owner	79 (27.1)
	Staff	212 (72.9)
Type of practice	Independent	191 (65.6)
	Chain/Group	100 (34.4)
Location	Capital / Urban	139 (47.8)
	Non-capital / Suburban-rural	152 (52.2)
Graduating university	IPTA	198 (68.0)
	IPTS	93 (32.0)
Ethnicity	Bumiputera	215 (73.4)
	Non-Bumiputera	76 (26.6)

Note. IPTA = public university; IPTS = private university.

CAPEC Domain Scores

The descriptive statistics for the CAPEC domains are summarised in Table 2. Among the four *challenge* domains, Support and Recognition recorded the highest mean (M = 3.57, SD = 0.53), reflecting substantial perceived barriers due to limited professional acknowledgment and institutional backing for PEC activities. This was followed by Working Environment (M = 3.41, SD = 0.52), Self-Sufficiency (M = 3.36, SD = 0.48), and Customer Influence (M = 3.31, SD = 0.50). Despite these challenges, optometrists demonstrated strong *attitudes* toward PEC, with high mean scores in both Motivation (M = 4.45, SD = 0.44) and Sense of Responsibility (M = 4.58, SD = 0.42). Cronbach's alpha coefficients ranged from 0.71 to 0.82, indicating satisfactory internal reliability for all domains.

Table 2: CAPEC Domain Scores Among Malaysian Private Optometrists (n = 291)

Domain	No. of items	Mean ± SD	95 % CI	Cronbach's α
Challenges				
Working Environment	5	3.41 ± 0.52	(3.35 – 3.47)	0.80
Support & Recognition	8	3.57 ± 0.53	(3.49 – 3.65)	0.80

Domain	No. of items	Mean ± SD	95 % CI	Cronbach's α
Self-Sufficiency	5	3.36 ± 0.48	(3.30 – 3.42)	0.73
Customer Influence	4	3.31 ± 0.50	(3.25 – 3.37)	0.71
Attitudes				
Motivation	7	4.45 ± 0.44	(4.39 – 4.51)	0.75
Sense of Responsibility	5	4.58 ± 0.42	(4.52 – 4.64)	0.82

Note. Scored on a 1–5 Likert scale (1 = Strongly Disagree, 5 = Strongly Agree).
Abbreviations: SD= standard deviation; CI= confidence interval

Subgroup Differences

Analysis using Factorial MANOVA revealed significant differences across selected subgroups (Table 3). Practice ownership was a significant factor affecting the *Support and Recognition* domain (F = 4.93, p = 0.027), with owners reporting higher perceived challenges than employed optometrists (EMM = 3.72, 95% CI = 3.58–3.86 vs. 3.47, 95% CI = 3.36–3.47). A marginal difference was also noted for *Self-Sufficiency* across type of practice, where independent practitioners reported slightly higher self-perceived competency levels than those in chain or group settings (F = 3.84, p = 0.048). No other demographic variables demonstrated statistically significant effects.

Associations Between Challenges and Attitudes

Simple and MLR analyses were conducted to explore the predictors of positive attitudes toward PEC. The final multiple regression model (Table 3) revealed that Support and Recognition (β = 0.34, p < 0.001), Self-Sufficiency (β = 0.22, p < 0.001), and Customer Influence (β = 0.29, p < 0.001) were significant predictors of optometrists' overall attitudes toward PEC practice. The model explained 43% of the variance (adjusted R^2 = 0.43) in attitude scores. These results suggest that optometrists who feel more supported institutionally, possess greater self-confidence in their skills, and encounter cooperative patient attitudes are more motivated and responsible in adopting PEC services.

Table 3: Summary of Significant Subgroup Differences and Associations (MANOVA & Regression Analyses)

Factor / Variable	Domain affected	Statistical test	Statistic (F / β)	p-value	Direction of effect
Practice ownership	Support & Recognition	Factorial MANOVA	F = 4.93	0.027	Owners > Staff
Type of practice	Self-Sufficiency	MANOVA	F = 3.84	0.048	Independent > Chain
Customer Influence → Attitudes	Motivation	MLR	β = 0.29 (95 % CI 0.15–0.43)	< 0.001	Positive
Support & Recognition → Attitudes	Sense of Responsibility	MLR	β = 0.34 (95 % CI 0.21–0.47)	< 0.001	Positive
Self-Sufficiency → Attitudes	Overall attitude score	MLR	β = 0.22 (95 % CI 0.09–0.35)	< 0.001	Positive

Note. Only significant predictors (p < 0.05) presented. Non-significant comparisons omitted for brevity. Abbreviations: MLR = Multiple Linear Regression; CI = Confidence Interval.

DISCUSSION

Overview of Findings

This study provides the first quantitative insight into the challenges and attitudes of private-sector optometrists in Malaysia toward implementing PEC. Using the validated CAPEC instrument, the findings confirm that while optometrists encounter moderate barriers, particularly in institutional support and professional recognition, they remain highly motivated and express a strong sense of professional responsibility toward PEC adoption. These results extend the earlier qualitative phase of this research, providing empirical support to previously reported themes such as limited workplace resources, lack of policy acknowledgement, and influence of patient expectations (Yahaya et al., 2023).

Challenges to Implementing PEC

Among the four challenge domains, *Support and Recognition* emerged as the highest-rated barrier. This indicates that optometrists perceive a lack of systemic backing from professional bodies, government agencies, and other healthcare stakeholders. Similar issues were raised in prior local and regional studies that described insufficient acknowledgment of optometric roles in preventive eye care, as well as ambiguity in referral

pathways between optometrists and ophthalmologists (Chew et al., 2018; George et al., 2019). The persistence of these barriers suggests that improving the professional recognition framework—including clearer PEC policy integration and cross-sector collaboration—is vital for sustainable service expansion.

The *Working Environment* and *Self-Sufficiency* domains reflect intra-practice factors. Limited clinical instruments and high patient load were among the issues identified in the qualitative phase, consistent with this survey's moderate mean scores. The positive relationship between *Self-Sufficiency* and attitudes suggests that continuing professional development (CPD) programmes focusing on ocular disease detection, public health screening, and PEC management could strengthen practitioners' confidence and readiness to adopt broader PEC services.

The *Customer Influence* domain remains a critical determinant of PEC success. Many optometrists reported that public awareness and acceptance shape their service offerings. This finding aligns with studies showing that patients' perception of optometrists as "glasses providers" restricts demand for clinical eye care services (Yahaya et al., 2023; Mohidin & Hashim, 2011). Educational campaigns and patient engagement strategies could therefore complement institutional reforms to boost PEC utilisation.

Attitudes Toward PEC Practice

Despite the barriers, optometrists demonstrated commendably high *Motivation* and *Sense of Responsibility* scores. This reflects a strong intrinsic drive rooted in professional ethics and patient-centred care values. Comparable trends were reported among optometrists in Australia and the UK, where positive attitudes predicted PEC-related behaviour despite external limitations (Holden et al., 2015; Efron et al., 2020). In this study, ownership and independence in practice also showed some influence on self-efficacy and perceptions of support, suggesting that autonomy may reinforce professional accountability.

Regression analyses confirmed that *Support and Recognition*, *Self-Sufficiency*, and *Customer Influence* are significant predictors of positive attitudes. This finding underscores the interconnectedness between external environment and internal motivation, consistent with social–cognitive and planned-behaviour frameworks (Ajzen, 1991). Hence, interventions aiming to enhance PEC implementation should target both structural and psychosocial determinants—support systems, CPD, and public perception—to translate positive attitudes into tangible behavioural change.

Implications for Policy and Practice

The high motivation among private optometrists represents an opportunity for policymakers to leverage this readiness. Integration of PEC services into national primary healthcare frameworks, supported by clear referral protocols and recognition from the Ministry of Health and MOC, could foster collaboration between public and private sectors. Incorporating CAPEC-based assessments in periodic national surveys could further monitor workforce readiness and identify emerging training needs.

Academic institutions and professional associations should also play an active role in embedding PEC competencies within undergraduate and postgraduate curricula, ensuring graduates possess both clinical and public health literacy. Continuous engagement with the public through health education may shift patient perceptions and strengthen demand for PEC.

Strengths and Limitations

A key strength of this study is its use of a validated, psychometrically robust tool (CAPEC), enabling reliable quantification of attitudes and challenges in a previously underexplored population. The national coverage of participants enhances representativeness. Nonetheless, the study's cross-sectional design limits causal inference, and self-reported responses may be subject to social desirability bias. Additionally, as recruitment was conducted through online self-selection, the sample may have been skewed toward younger and more digitally active optometrists, potentially underrepresenting the perspectives of older practitioners**.** Future longitudinal or interventional studies could assess how targeted training or policy interventions modify attitudes and behaviours over time.

Conclusion of Discussion

Collectively, this study reinforces that private optometrists in Malaysia possess strong professional readiness to contribute to PEC expansion but require greater systemic support, recognition, and patient cooperation. Bridging these gaps through coordinated policy, education, and awareness initiatives could significantly enhance the country's capacity to deliver equitable and sustainable eye care services.

CONCLUSION

This study provides quantitative evidence of the readiness of private optometrists in Malaysia to implement Primary Eye Care (PEC) services. Despite encountering moderate challenges—particularly in institutional support, recognition, and workplace limitations—optometrists exhibit strong motivation and a high sense of professional responsibility towards PEC delivery. Factors such as professional support, self-confidence, and patient cooperation play a crucial role in shaping positive attitudes and implementation behaviour. Strengthening institutional frameworks, fostering public–private collaboration, and enhancing continuing education initiatives could collectively accelerate the integration of PEC into private practice, improving national eye care accessibility and outcomes.

ACKNOWLEDGEMENTS

The authors express their sincere appreciation to all participating optometrists for their time and contribution to this study. Special thanks to the Association of Malaysian Optometrists (AMO) and the Malaysian Optical Council (MOC) for facilitating communication and dissemination of the survey. The authors also thank the Kulliyyah of Allied Health Sciences, International Islamic University Malaysia, for providing institutional support throughout this research. **Funding:** This research was not funded by any grant.

CONFLICT OF INTEREST

The authors declare no conflict of interest related to this study.

DECLARATION OF GENERATIVE AI AND AI-ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

During the preparation of this work, the authors used *ChatGPT (OpenAI, GPT-5)* to assist in manuscript organization, language refinement, and formatting based on the author's original content, analyses, and results. After using this tool, the author reviewed and edited the content as needed, taking full responsibility for the final version of the manuscript.

REFERENCES

Abd Aziz, A., Chew, Y. C., & George, A. (2020). *Integrating primary eye care into community optometry practice in Malaysia: A review of opportunities and barriers. Malaysian Journal of Public Health Medicine, 20*(4), 12–18.

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*(2), 179–211. https://doi.org/10.1016/0749-5978(91)90020-T

Boateng, G. O., Neilands, T. B., Frongillo, E. A., Melgar-Quiñonez, H. R., & Young, S. L. (2018). Best practices for developing and validating scales for health, social, and behavioral research: A primer. *Frontiers in Public Health, 6*, 149. https://doi.org/10.3389/fpubh.2018.00149

Chew, Y. C., Mohidin, N., & Ng, S. (2018). Optometrists' role in community eye health in Malaysia: A review. *Clinical and Experimental Optometry, 101*(5), 663–670. https://doi.org/10.1111/cxo.12708

Creswell, J. W., & Clark, V. L. P. (2018). *Designing and conducting mixed methods research* (3rd ed.). Sage Publications.

Devon, H. A., Block, M. E., Moyle-Wright, P., Ernst, D. M., Hayden, S. J., Lazzara, D. J., & Kostas-Polston, E. (2007). A psychometric toolbox for testing validity and reliability. *Journal of Nursing Scholarship, 39*(2), 155–164. https://doi.org/10.1111/j.1547-5069.2007.00161.x

Efron, N., Morgan, P. B., & Jones, L. (2020). *Optometry and primary eye care in the twenty-first century.* Elsevier.

Fishbein, M., & Ajzen, I. (2010). *Predicting and changing behavior: The reasoned action approach.* Psychology Press.

George, A., & Chew, Y. C. (2019). Barriers to optometric primary eye care: Perceptions from Malaysian practitioners. *Asia-Pacific Journal of Ophthalmology, 8*(3), 212–218.

Holden, B. A., Fricke, T. R., Wilson, D. A., Jong, M., Naidoo, K. S., Sankaridurg, P., & Wong, T. Y. (2015). Global vision impairment due to uncorrected presbyopia. *Archives of Ophthalmology, 130*(12), 1606–1612. https://doi.org/10.1001/archophthalmol.2012.4346

Mohidin, N., & Hashim, N. (2011). A profile of optometric practice in Malaysia. *Clinical and Experimental Optometry, 94*(2), 200–

204. https://doi.org/10.1111/j.1444-0938.2010.00538.x

Polit, D. F., & Beck, C. T. (2006). The content validity index: Are you sure you know what's being reported? Critique and recommendations. *Research in Nursing & Health, 29*(5), 489–497. https://doi.org/10.1002/nur.20147

Rattray, J., & Jones, M. C. (2007). Essential elements of questionnaire design and development. *Journal of Clinical Nursing, 16*(2), 234–243. https://doi.org/10.1111/j.1365-2702.2006.01573.x

Robinson, J. P. (2018). Questionnaire design, development, and testing. In *Handbook of Survey Research* (2nd ed., pp. 315–342). Academic Press.

World Health Organization. (2019). *World report on vision.* Geneva: WHO.

Yahaya, N. A., & Rahman, N. A. (2024). Development, validity, and reliability of Challenges and Attitudes to Practice Primary Eye Care (CAPEC) Questionnaire among Malaysian private sector optometrists. *International Journal of Allied Health Sciences, 8*(5), 270–278.

Yahaya, N. A., Musa, A., Che Azemin, M. Z., & Rahman, N. A. (2023). Implementing primary eye care in private practices in Malaysia: The challenges faced by optometrists. *Medical Journal of Malaysia, 78*(3), 357–363