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Eye screenings among Singaporeans aged 40–60 years: formative research based on the theory of planned behaviour

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Singapore Med J 2021, 1–9

<https://doi.org/10.11622/smedj.2021099>

Published ahead of print: 19 August 2021

Online version can be found at
<http://www.smj.org.sg/online-first>

INTRODUCTION

According to the Singapore National Eye Centre (SNEC), the incidence of age-related eye diseases increases when individuals are aged 40 years and above.⁽¹⁾ In Singapore, the four major eye diseases that are caused by ageing are cataract, glaucoma, diabetic retinopathy (DR), and age-related macular degeneration (AMD).⁽²⁾ Health professionals emphasise the importance of early detection of age-related eye diseases via eye screenings for preserving vision and effective treatment.⁽³⁻⁵⁾ For instance, SNEC encourages Singaporean adults to attend a baseline comprehensive eye examination at 40 years of age,⁽⁶⁾ while the Optometrists and Opticians Board recommends that Singaporean adults aged 59 years and under attend an eye screening biannually.⁽⁷⁾ However, only diabetics are currently recommended by a national body to have regular annual eye examinations, as stated in the Ministry of Health's clinical practice guidelines on diabetes;⁽⁸⁾ there are no such national recommendations for cataract, glaucoma and AMD. Yet, eye screenings are important, as age-related eye diseases can be asymptomatic,⁽⁶⁾ with symptoms only appearing in the disease's advanced stages.

Some communication campaigns have been launched in Singapore to tackle age-related eye diseases, such as VisionSave, which aimed to educate the general public about eye diseases.⁽⁹⁾ However, there is a lack of eye screening campaigns specifically targeted at Singaporeans aged 40–60 years to encourage the prevention and early detection of age-related eye diseases, even though studies have found that communication campaigns can help to encourage the adoption of health screening behaviours.^(10,11) To develop effective strategies for the promotion of eye screenings among this group, the current study aims to examine psychosocial motivators for eye screenings guided by the theory of planned behaviour (TPB),^(12,13) one of the most widely adopted theoretical frameworks in health interventions.

THEORY OF PLANNED BEHAVIOUR

The TPB is a behaviour prediction theory that identifies key psychosocial factors that formulate intention to perform a behaviour, as intention is theorised to be the closest predictor of actual behaviour.⁽¹³⁾ A person is likely to perform a behaviour if he/she has strong intentions to do so, which is determined by three factors: attitude, subjective norms, and self-efficacy.⁽¹²⁻¹⁴⁾

Attitude is defined as an individual's evaluation of the extent to which performing a specific behaviour is favourable or unfavourable.^(12,13) The more favourable the attitude with respect to the behaviour, the more likely the individual will have the intention to perform the behaviour.^(12,13) Subjective norms refers to an individual's perceived social pressures to perform or not perform a specific behaviour.^(12,13) An individual is more likely to have the intention to perform a behaviour when (a) the individual believes his/her important referents (e.g. family, friends and doctors) support the adoption of the behaviour, and (b) the individual is motivated to comply with these important referents.⁽¹⁴⁾ Self-efficacy is defined as an individual's perceived ability to perform a specific behaviour even in the face of any challenges.⁽¹⁴⁾ The stronger the individual's self-efficacy with respect to the behaviour, the more likely the individual will have the intention to perform the behaviour.⁽¹⁴⁾

Although theoreticians of the TPB conceptualise risk as a distal predictor of behaviour, many health communication theories such as the health belief model^(15,16) and protection motivation theory^(17,18) posit perceived risk as an important motivator for the adoption of a health behaviour. This paper aims to extend research on the TPB by integrating the construct of perceived risk as a potential determinant of behavioural intention. Perceived risk comprises two constructs: perceived susceptibility and perceived severity of the disease.⁽¹⁹⁻²¹⁾ The higher an individual perceives the likelihood of contracting a disease to be and evaluates it to be harmful, the more likely the individual will engage in a health behaviour, such as health screening, to combat the disease's threat.⁽¹⁹⁻²¹⁾

METHODS AND RESULTS

To examine psychosocial motivators for eye screening, an online survey was conducted with Singaporeans aged 40–60 years and living in Tampines. A total of 216 survey responses were collected via quota sampling based on ethnicity from 25 October to 20 November 2017 through a survey hosted on Qualtrics. The survey was in English and took 20 minutes to complete. The final sample population was 37.5% male, and 80.6% of respondents were Chinese. Education levels ranged from Primary 6 or below to postgraduate (Table I). The research procedures were approved by Nanyang Technological University, Singapore.

Table I. Descriptive characteristics of survey respondents (n = 216).

Characteristic	No. (%)
Age (yr)	
40–45	31 (14.4)
46–50	56 (25.9)
51–55	64 (29.6)
56–60	65 (30.1)
Gender	
Male	81 (37.5)
Female	135 (62.5)
Education level	
Primary 6 or below	6 (2.8)
Secondary	13 (6.0)
N-level/ITE	8 (3.7)
O-level	60 (27.8)
A-level	17 (7.9)
Diploma	37 (17.1)
Degree	58 (26.9)
Postgraduate	17 (7.9)
Ethnicity	
Chinese	174 (80.6)
Malay	24 (11.1)
Indian	9 (4.2)
Eurasian	2 (0.9)
Others	7 (3.2)
Attended an eye screening after turning 40	
Yes	87 (40.3)
No	125 (57.9)
Don't know	4 (1.9)
Aware of	
Glaucoma	114 (52.8)

Cataract	190 (88.0)
DR	68 (31.5)
AMD	87 (40.3)
None of the above	17 (7.9)

AMD; age-related macular degeneration; *DR*: diabetic retinopathy; *ITE*: Institute of Technical Education

To assess intention to attend eye screenings, respondents were asked three questions (e.g. ‘I expect to attend eye screenings’; $\alpha = 0.92$, mean \pm standard deviation [SD]: 3.47 ± 0.94). For attitude, respondents reported on four semantic differential scales (e.g. not beneficial/beneficial, useless/useful) and five statements on benefits (e.g. ‘Eye screenings can help in the early detection of eye diseases or conditions’; $\alpha = 0.90$, mean \pm SD: 4.15 ± 0.67). For subjective norms, respondents were asked if their family, friends and doctor(s) thought they should attend eye screenings, and if most members of their family and friends attended eye screenings ($\alpha = 0.87$, mean \pm SD: 3.16 ± 0.73). For self-efficacy, respondents were asked if they were (a) confident of attending eye screenings, (b) whether attending eye screenings was completely up to them, and (c) whether attending eye screenings was within their control ($\alpha = 0.75$; mean \pm SD: 3.96 ± 0.62).

To measure perceived risk of eye diseases, respondents were first asked if they were aware of glaucoma, cataract, DR, AMD or none of the diseases. To measure perceived susceptibility, respondents reported to what extent they agreed with the statement ‘I will develop age-related eye diseases’ (mean \pm SD: 3.38 ± 0.87). To measure perceived severity, respondents reported to what extent they agree with ‘Eye diseases may cause severe vision problems’ (mean \pm SD: 4.18 ± 0.65). All measures were assessed with a 5-point scale.

Theoreticians of the TPB have suggested that demographic factors and risk perception are distal predictors of intentions and behaviours.⁽¹²⁻¹⁴⁾ Thus, using the ordinary least squares (OLS) regression model, we entered demographic characteristics in the first block, perceived risk in the second block and the TPB constructs in the third block (Table II).

Table II. Ordinary least squares regression analysis predicting intention.

Variable	β	p-value	<i>t</i>
Block 1: Demographic			
Age	0.07	0.374	0.89
Gender*	0.21	0.003	3.05
Education	0.03	0.719	0.36
Ethnicity [†]	-0.11	0.093	-1.69
Adjusted R ²	0.04		
Block 2: Perceived risk			
Perceived susceptibility	0.16	0.018	2.38
Perceived severity	0.18	0.007	2.72
Adjusted R ²	0.11		
Block 3: TPB constructs			
Attitude	0.34	0	4.41
Subjective norms	0.14	0.044	2.03
Self-efficacy	0.19	0.010	2.59
Adjusted R ²	0.37		
ANOVA	<i>F</i> (4, 211) = 3.17	<i>F</i> (6, 209) = 5.22	<i>F</i> (9, 206) = 14.95

*Gender was binary coded as: 1 = male, 2 = female. [†]Ethnicity was binary coded as: 1 = Malay, Indian, Eurasian and others, 2 = Chinese.

In the first block, none of the demographic variables were significantly associated with intention, apart from gender ($\beta = 0.21$, $p < 0.01$, $t = 3.05$); women were more likely than men to have the intention to attend eye screenings. In the second block, both perceived susceptibility ($\beta = 0.16$, $p < 0.05$, $t = 2.38$) and perceived severity ($\beta = 0.18$, $p < 0.01$, $t = 2.72$) were positively associated with the intention to attend eye screenings. In the third block, the three TPB constructs explained a 26% additional variance in intention to attend eye screenings. As expected, attitude ($\beta = 0.34$, $p < 0.001$, $t = 4.41$), subjective norms ($\beta = 0.14$, $p < 0.05$, $t = 2.03$), and self-efficacy ($\beta = 0.19$, $p < 0.01$, $t = 2.59$) all had significant positive associations with the intention to attend eye screenings.

DISCUSSION

Guided by the TPB, this study aimed to understand why Singaporeans aged 40–60 years were reluctant to attend eye screenings and to propose effective campaign strategies to encourage the adoption of eye screening behaviour, as recommended by organisations such as SNEC.

Consistent with the theory's predictions,⁽¹²⁻¹⁴⁾ we found that the three TPB constructs of attitude, subjective norms and self-efficacy were significant predictors of intention to attend eye screenings. This means that individuals are more likely to attend eye screenings if they have a more positive attitude, greater perceived approval from important referents and greater self-efficacy towards attending eye screenings.

In addition, consistent with previous literature on the TPB in different health screening contexts,⁽²²⁾ attitude was the strongest predictor, while subjective norms was the weakest predictor of intention. Hence, campaigns aiming to encourage eye screening behaviour can focus on improving attitude via emphasising positive outcomes of eye screenings, such as early detection of asymptomatic eye diseases.

We also found that both perceived susceptibility and perceived severity were significant predictors of intention to attend eye screenings. However, our survey revealed that although there is high awareness of cataract, there is lower awareness of glaucoma, DR and AMD. Hence, campaigns should focus on raising levels of awareness and knowledge about eye diseases to increase perceived risk.

Our analysis of demographic factors also found that women were more likely than men to have the intention to attend eye screenings. Further research is needed to investigate the role of gender as a predictor of intention to attend eye health screenings.

LIMITATIONS AND FUTURE RESEARCH

Because the population studied comprised only Tampines residents, future research should replicate our findings on a nationwide scale using random sampling to derive more generalisable conclusions. This research focused on individuals aged 40–60 years to develop campaign strategies targeting this particular age group in Singapore. Arguably, due to the higher prevalence of age-related eye diseases in older individuals, those aged 60 years and

above would be more in need of treatment rather than preventive interventions. Nevertheless, past studies on the uptake of eye screenings have shown contradicting results on age as a predictive factor.⁽²³⁻²⁵⁾ Hence, similar research should be done on Singaporeans aged 60 years and above to better understand the influence of age on eye screening intention.

ACKNOWLEDGEMENTS

The authors are grateful to Chan Shu Hui, Lim Wei Hao and Nicole Ang Xin Pin for their invaluable assistance with literature review, data collection and preliminary data analysis.

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