

# Patients' Satisfaction with Ophthalmology Clinic Services in a Public Teaching Hospital

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**Purpose:** To evaluate patients' satisfaction with ophthalmology health services in a teaching clinic of a tertiary public hospital.

**Patients and Methods:** This was a cross-sectional study in ophthalmology clinic of Dr. Sardjito teaching hospital, Yogyakarta, Indonesia conducted in 2019. Patients were surveyed using the Patient Satisfaction Questionnaire-18 (PSQ-18). PSQ-18 subscale score was analyzed based on patients' characteristics. The main outcome was the odds of reaching top satisfaction score (TSS) of 4–5 from a Likert scale 1 to 5.

**Results:** Our study recorded 269 participants who consisted of 138 males (51.3%) and 131 females (48.7%) with median age of 52 (18–87) years old. Variables with higher odds of reaching TSS on "patient overall satisfaction" was public health insurance (OR: 7.959 [95% CI: 1.989–31.852],  $p=0.003$ ) while examination time (OR: 0.955 [95% CI: 0.923–0.988],  $p=0.008$ ) had lower odds. Examination waiting time (OR: 0.992 [95% CI: 0.985–0.999],  $p=0.027$ ) and examination time (OR: 0.941 [95% CI: 0.908–0.976],  $p=0.001$ ) had lower odds of reaching TSS in "general satisfaction". Family monthly income (OR: 1.829 [95% CI: 1.038–3.223],  $p=0.037$ ) had higher odds of reaching TSS in "technical quality" while examination time (OR: 0.961 [95% CI: 0.931–0.993],  $p=0.017$ ) and education (OR: 0.549 [95% CI: 0.322–0.934],  $p=0.027$ ) had lower odds. Comorbidities (OR: 0.533 [95% CI: 0.301–0.944],  $p=0.031$ ) had lower odds of reaching TSS in "financial aspects". Retina subspecialty clinic (OR: 3.436 [95% CI: 1.154–10.232],  $p=0.027$ ) had higher odds of reaching TSS in "time spent with doctor". Registrar as attending physician (OR: 0.427 [95% CI: 0.205–0.89],  $p=0.0230$ ) and examination time (OR: 0.957 [95% CI: 0.924–0.991],  $p=0.013$ ) had lower odds of reaching TSS in "accessibility-convenience".

**Conclusion:** Examination time and examination waiting time should be shortened, specialist doctors should always see the patients whenever possible, and registrars' technical and communication skill should be improved. Alternative funding for patients without health insurance also should be provided to increase satisfaction.

**Keywords:** Patient Satisfaction Questionnaire-18, PSQ-18, health service quality, examination time, health survey

## Introduction

There are approximately 3 million people (1.5% of population) living with blindness in Indonesia making it one of the biggest causes of social and economic burden within the society.<sup>1</sup> Accordingly, the quality of ophthalmology health service should be one of the main concerns in a health service institution. Patient's satisfaction is essential for improving the quality of healthcare and vice versa.<sup>2</sup> Patient's satisfaction is expected to lead to better compliance to treatment and therefore a better patient outcome.<sup>3</sup>

The Indonesian health care system is developing to resemble health system similar in European countries with the tax based public funding. However in 2017, public health care funding was only 37.8% while private funding, mainly out of pocket payment, contributed 62.2%.<sup>4</sup> Patients in Indonesia are also able to go to a specialist doctor in a private clinic or hospital directly without referral from a general practitioner. As a result, middle-upper income patients tend to go directly to the specialist. Scheduled doctor appointments are unusual resulting in longer time spent in any health service.

Patients' satisfaction has been studied in Indonesia on various settings but rarely in ophthalmology health service.<sup>5–10</sup> Previous studies in ophthalmology settings have been conducted around the globe with different instruments.<sup>3,11–14</sup> Ideally, a standardized tool that can be used across multi-disciplines is used to enable comparison among them. The Patient Satisfaction Questionnaire Short Form (PSQ-18) is a general and relatively short satisfaction questionnaire that can be used for this purpose and has been used in ophthalmology clinics previously.<sup>3,15,16</sup>

Given the different health care system of Indonesia compared to other countries, the aim of this study was to determine the patients' satisfaction toward health services quality in ophthalmology clinic in Indonesia using PSQ-18.

## Materials and Methods

### Design and Subjects

This was a cross-sectional study in the ophthalmology clinic of Dr. Sardjito teaching hospital, Yogyakarta, Indonesia conducted in July–September 2019. The Patient Satisfaction Questionnaire Short Form (PSQ-18) was translated into the Indonesian language by a certified English translator and approved by a consultant ophthalmologist (head of ophthalmology health service). Using Isaac and Michael table, the minimum number of samples needed to reach 5% error rate was 297.<sup>17</sup> This study followed the tenets of the Declaration of Helsinki and was approved by Medical and Health Research Ethical Committee of the Faculty of Medicine, Public Health and Nursing, Universitas Gadjah Mada, Yogyakarta, Indonesia. Simple randomization of the patients was done using [www.randomizer.org](http://www.randomizer.org) limited to 8 patients per day to avoid selection bias and achieve a ratio of participants similar with the usual patient distribution in our ophthalmology clinic based on subspecialty. Written informed consent for study participation and data publication was obtained from all study participants. Underage (<18 years old) participants consent form and questionnaire were completed by their guardians.

The study population was all established patients in the ophthalmology clinic. This population was chosen since the interviews could be conveniently done before their scheduled eye examination on the same day. Previous experience in our clinic showed that patients were reluctant to join a survey if it was done after their examination. The questionnaires' data were obtained by one trained data collector (medical doctor) after the patients had their blood pressure (BP) checked by a nurse. The completion of the forms was assisted by the interviewer, especially for the visually impaired participants. The participants then were given the forms to record BP waiting time, examination waiting time, examination time, and positive-negative feedback.

### Data Analysis

The PSQ-18 questionnaires consists of 18 questions with a Likert scale for answers ranging from 1–5. Scores from the 18 questions were divided into 7 subscales of PSQ-18 namely

General Satisfaction (2 questions), Technical Quality (4 questions), Interpersonal Manner (2 questions), Communication (2 questions), Financial Aspect (2 questions), Time Spent With Doctor (2 questions), and Accessibility-Convenience (4 questions)

and coded according to the development study by Marshall and Hays.<sup>18</sup> The scores from these 7 subscales were averaged into a new subscale called "Patient's overall satisfaction" to enable analysis consisting all the subscale. Score of 4–5 in was classified as reaching top satisfaction score (TSS) and described as a satisfied patient. Then the odds of reaching TSS on "patient's overall satisfaction" and satisfied score on each PSQ-18 subscales were analyzed using binary logistic regression analysis based on patients' demographic and health service characteristics (age, sex, ethnicities, education, occupation, marital status, family monthly income, health insurance, visual acuity (VA), comorbidities, subspecialty clinics, attending physicians, BP measurement waiting time, examination waiting time, examination time, and total time spent in clinic). BP measurement waiting time, examination waiting time, examination time, and total time spent in clinic were further analyzed using Independent-samples median test according to the subspecialty clinic. Internal reliability was tested using Cronbach's alpha. The English ([Supplemental Table 1](#)) and Indonesian ([Supplemental Table 4](#)) version of the questionnaires are available in the supplemental data with its coding ([Supplemental Table 2](#)) and scoring ([Supplemental Table 3](#)) instruction.

## Results

A total of 301 patients were asked to join the study with 1 patient who refused. Then it was decided to exclude non-adult participants from the PSQ-18 analysis to avoid bias since the form was completed by the guardians. As the result, a total of 269 participants were analysed consisting of 138 males (51.3%) and 131 females (48.7%) with median age of 52 years (18–87) (Table 1).

### PSQ-18 Internal Reliability

The Cronbach's alpha was 0.689. If deleted, "communication" subscale can improve the Cronbach's alpha to 0.721 (Table 2).

### PSQ-18 Scores

"Interpersonal manner" subscale had the highest average score with 4.56 (0.61) while "accessibility-convenience" had the lowest with 3.90 (0.51) (Table 2). Univariate analysis on "patient's overall satisfaction" found that age (OR: 1.027 [95% CI: 1.009–1.045],  $p=0.003$ ) and public health insurance (OR: 5.727 [95% CI: 1.67–19.644],  $p=0.006$ ) had higher odds of reaching TSS while not married marital status (OR: 0.296 [95% CI: 0.09–0.976],  $p=0.046$ ), examination time (OR: 0.954 [95% CI: 0.988–1],  $p=0.002$ ), and total time spent in clinic (OR: 0.994 [0.90–0.999],  $p=0.018$ ) had lower odds of reaching TSS.

Multivariate analysis on "patient's overall satisfaction" found that public health insurance (OR: 7.959 [95% CI: 1.989–31.852],  $p=0.003$ ) had higher odds of reaching TSS while examination time (OR: 0.955 [95% CI: 0.923–0.988],  $p=0.008$ ) had lower odds. Multivariate analysis was also done for each PSQ-18 subscales. Examination waiting time (OR: 0.992 [95% CI: 0.985–0.999],  $p=0.027$ ) and examination time (OR: 0.941 [95% CI: 0.908–0.976],  $p=0.001$ ) had lower odds of reaching TSS in "general satisfaction" subscale. Family monthly income (OR: 1.829 [95% CI: 1.038–3.223],  $p=0.037$ ) had higher odds of reaching TSS in "technical quality" subscale while examination time (OR: 0.961 [95% CI: 0.931–0.993],  $p=0.017$ ) and education (OR: 0.549 [95% CI: 0.322–0.934],  $p=0.027$ ) had lower odds. Comorbidities (OR: 0.533 [95% CI: 0.301–0.944],  $p=0.031$ ) had lower odds of reaching TSS in "financial aspects" subscale. Retina subspecialty clinic (OR: 3.436 [95% CI: 1.154–10.232],  $p=0.027$ ) had higher odds of reaching satisfied score in "time spent with doctor" subscale. Registrar as attending physician (OR: 0.427 [95% CI: 0.205–0.89],  $p=0.0230$ ) and examination time (OR: 0.957 [95% CI: 0.924–0.991],  $p=0.013$ ) had lower odds of reaching satisfied score in "accessibility-convenience" subscale (Table 3 and Figure 1).

### Examination and Waiting Time per Subspecialty

There was no significant difference in BP measurement waiting time and examination waiting time between subspecialty clinic. Significant differences were found in examination time and total time with  $p$  values of 0.012 and 0.042 respectively. Pairwise analyses found significant difference in examination time between Retina vs NO with  $p$  value of 0.005 (Table 4).

### Open Feedback

Positive and negative feedback forms were completed by 89 patients (33.1%) and 124 patients (46.1%), respectively. One hundred and six (106) positive feedbacks were obtained, revealing "Overall service" (63.2%) and "Staff's hospitality" (20.8%) as the most often mentioned (Table 5). One hundred and fifty eight (158) negative feedbacks were acquired, displaying "Waiting time" (53.2%) and "Staff's communication" (13.3%) as the most mentioned (Table 5). "Staff" was defined as all people working in the clinic including the doctor, nurse, and the administrator.

## Discussion

Measuring patients' satisfaction helps a medical service improve its business.<sup>19</sup> PSQ-18 is a robust patients' satisfaction instrument to be applied in multiple discipline and was developed using Cronbach's alpha to assess the internal reliability.<sup>15,18</sup> The overall Cronbach's alpha coefficient of 0.689 found in our study can be classified as adequate.<sup>20</sup>

**Table 1** Patient's Demographic and Health Service Characteristic

	<b>N</b>	<b>Percentage (%)</b>	<b>Median (Range)</b>
Age (years)			52 (18–87)
Sex			
Male	138	51.3	
Female	131	48.7	
Ethnicities			
Javanese	252	93.7	
Sundanese	6	2.2	
Batavian	2	0.7	
Chinese	7	2.6	
Malayan	2	0.7	
Education			
Primary or less	56	20.8	
Secondary	141	52.4	
Tertiary or more	72	26.8	
Occupation			
Not working	109	40.5	
Civil servant	34	12.6	
Private employee	24	8.9	
Entrepreneur	41	15.2	
Retiree	43	16.0	
Labour	18	6.7	
Marital status			
Not married	34	12.6	
Married	211	78.4	
Divorced	24	8.9	
Family monthly income			
<210 USD	152	56.5	
210–350 USD	96	35.7	
>350 USD	21	7.8	
Health insurance			
Public	255	94.8	
Private	2	0.7	
No health insurance	12	4.5	
VA			
Good vision	96	35.7	
Mild VI	40	14.9	
Moderate VI	92	34.2	
Severe VI	20	7.4	
Blindness	20	7.4	
Comorbidities			
0	133	49.4	
1	109	40.5	
2	24	8.9	
3	3	1.1	
Subspecialty clinic			
NO	13	4.8	
Retina	101	37.5	
Glaucoma	53	19.7	
RSI	48	17.8	

(Continued)

**Table 1** (Continued).

	<b>N</b>	<b>Percentage (%)</b>	<b>Median (Range)</b>
ROO	25	9.3	
POS	2	0.7	
Refraction	5	1.9	
EED	22	8.2	
Attending physician			
Registrar	179	66.5	
Specialist	39	14.5	
Both registrar and specialist	51	19.0	
BP measurement waiting time (minutes)			30 (5–210)
Examination waiting time (minutes)			60 (2–300)
Examination time (minutes)			25 (5–90)
Total time spent in clinic (minutes)			124 (20–375)

**Abbreviations:** BP, blood pressure; EED, external eye disease; NO, neuro-ophthalmology; NP, not performed; POS, pediatric ophthalmology and strabismus; ROO, reconstruction; oculoplasty and oncology; RSI, refractive surgery and immunology; VA, visual acuity, VI, visual impairment.

**Table 2** Average of PSQ-18 Subscales Score and Internal Reliability

<b>Subscale</b>	<b>Mean (SD)</b>	<b>Cronbach's Alpha if Item Deleted</b>
General satisfaction	3.96 (0.61)	0.631
Technical quality	4.28 (0.60)	0.605
Interpersonal manner	4.56 (0.61)	0.635
Communication	4.03 (0.73)	0.721
Financial aspects	4.49 (0.70)	0.675
Time spent with doctor	4.00 (0.80)	0.648
Accessibility-convenience	3.90 (0.51)	0.656

The English version of PSQ-18 gave a high coefficient in previous study,<sup>21</sup> while the translated ones had high coefficient for the Spanish translation<sup>22</sup> or low coefficient for the one in Hindi.<sup>23</sup> A possible cause of our low result was its translation into the Indonesian language. The Delphi method and agreement measurement can be viable options to address this problem in the future study.<sup>16</sup>

In this study, the overall highest satisfaction score is the “interpersonal manner” subscale while the lowest satisfaction score is the “accessibility-convenience” subscale. “Interpersonal manner” subscale also had the highest score in previous study in ophthalmology or other settings.<sup>16,24–26</sup> Another ophthalmology study also had “accessibility-convenience” subscale as the lowest.<sup>16</sup> “Financial aspects” subscale was the lowest in a previous study of combined public-private hospital.<sup>24</sup> Physician manner can be expressed by non-medical chat and patient’s opportunity to give feedback, which are related to higher satisfaction.<sup>27,28</sup> It was underlined from studying the National Health Services (NHS) of England that compassion, expressed in a physician manner, is an inherent aspect of health care.<sup>29</sup> On the other hand, low score on “accessibility-convenience” subscale found in our study might be attributed to the relatively long waiting time during visits in our teaching clinic.

Our participants preferred shorter examination time. It was reflected from “patient’s overall satisfaction”, “general satisfaction”, “technical quality”, and “accessibility-convenience” subscale. On the contrary, previous studies showed that longer time spent with physician correlated with higher patients’ satisfaction.<sup>11,27,28,30,31</sup> Further exploration needs to be done to answer this preference of shorter examination time. It might be due to the fact that the patients spent a relatively

**Table 3** Univariate and Multivariate Analyses of Patient's Demographic and Health Service Characteristic on Reaching TSS

Analyses	PSQ-18 Subscale	Patient and Health Service Characteristic	Odds Ratio (95% CI)	p value
Univariate analysis on "patient's overall satisfaction"		Age	1.027 (1.009–1.045)	0.003*
		Sex (male)	1.294 (0.758–2.207)	0.345
		Ethnicities		
		Javanese	2.549 (0.157–41.313)	0.51
		Batavian	1 (0.02–50.397)	1
		Chinese	2.5 (0.1–62.605)	0.577
		Education	0.979 (0.664–1.443)	0.915
		Occupation		
		Not working	0.868 (0.263–2.862)	0.816
		Civil servant	0.462 (0.125–1.709)	0.247
		Private employee	0.571 (0.141–2.313)	0.433
		Entrepreneur	0.615 (0.169–2.238)	0.461
		Retiree	0.943 (0.253–3.52)	0.93
		Marital status		
		Not married	0.296 (0.09–0.976)	0.046*
		Married	0.765 (0.272–2.149)	0.611
		Family monthly income	1.233 (0.801–1.899)	0.34
		Health insurance		
		Public	5.727 (1.67–19.644)	0.006*
		Private	2 (0.098–41.003)	0.653
		VA (LogMAR)	1.035 (0.89–1.205)	0.655
		Comorbidities	1.285 (0.861–1.919)	0.22
		Subspecialty clinic		
		NO	0.357 (0.087–1.471)	0.154
		Retina	2.177 (0.807–5.874)	0.125
		Glaucoma	1.321 (0.463–3.769)	0.602
		RSI	2.857 (0.901–9.056)	0.074
		ROO	0.857 (0.263–2.792)	0.798
		POS	0.571 (0.031–10.435)	0.706
		Refraction	0.381 (0.052–2.784)	0.342
		Attending physician		
Registrar	0.813 (0.401–1.649)	0.567		
Specialist	1.14 (0.43–3.025)	0.792		
BP measurement waiting time	0.996 (0.988–1.005)	0.378		
Examination waiting time	0.994 (0.988–1)	0.067		
Examination time	0.954 (0.926–0.983)	0.002*		
Total time spent in clinic	0.994 (0.99–0.999)	0.018*		
Multivariate analysis on "patient's overall satisfaction"		Examination time	0.955 (0.923–0.988)	0.008**
		Health insurance (public)	7.959 (1.989–31.852)	0.003**
		Health insurance (private)	1.41 (0.049–40.988)	0.841
		Family monthly income	1.366 (0.79–2.362)	0.264
		Attending physician	1.186 (0.809–1.738)	0.382
		Comorbidities	1.183 (0.731–1.914)	0.493
		Ethnicities	1.144 (0.795–1.645)	0.469
		Marital status	1.039 (0.439–2.46)	0.931
		VA (LogMAR)	1.03 (0.896–1.183)	0.678
		Age	1.024 (0.997–1.053)	0.085
		Education	1.005 (0.611–1.653)	0.984
		Subspecialty clinic	1.001 (0.847–1.184)	0.988
		BP measurement time	0.998 (0.988–1.007)	0.617
		Examination waiting time	0.994 (0.987–1.001)	0.115
		Occupation	0.957 (0.816–1.124)	0.593
		Sex	0.894 (0.466–1.715)	0.736

(Continued)

**Table 3** (Continued).

Analyses	PSQ-18 Subscale	Patient and Health Service Characteristic	Odds Ratio (95% CI)	p value
Multivariate analysis on PSQ-18 subscales	General satisfaction	Examination waiting time	0.992 (0.985–0.999)	0.027**
		Examination time	0.941 (0.908–0.976)	0.001**
	Technical quality	Examination time	0.961 (0.931–0.993)	0.017**
		Family monthly income	1.829 (1.038–3.223)	0.037**
		Education	0.549 (0.322–0.934)	0.027**
	Financial aspects	Comorbidities	0.533 (0.301–0.944)	0.031**
	Time spent with doctor	Subspecialty clinic (retina)	3.436 (1.154–10.232)	0.027**
	Accessibility-convenience	Attending physician (registrar)	0.427 (0.205–0.89)	0.023**
		Examination time	0.957 (0.924–0.991)	0.013**

**Notes:** \*Significant with binary logistic regression univariate analysis. \*\*Significant with binary logistic regression multivariate analysis.

**Abbreviations:** BP, blood pressure; NO, neuro-ophthalmology; NP, not performed; POS, pediatric ophthalmology and strabismus; PSQ, patient satisfaction questionnaire; ROO, reconstruction; oculoplasty and oncology; RSI, refractive surgery and immunology; TSS, top satisfaction score; VA, visual acuity.

long waiting time before the examination. Therefore, they want a quick examination since afterwards they also might need to go to other departments on the same day.

Compared to no health insurance, patients with public health insurance had higher odds of reaching satisfaction in “patient’s overall satisfaction”. Concordantly, a study in Ghana found a similar result.<sup>32</sup> Study by Bohm found that American patients with employer based insurance had a higher satisfaction than patients with Canadian national insurance.<sup>33</sup> On the other hand, insurance type did not affect satisfaction in previous studies in ophthalmology and other settings.<sup>8,12,34</sup> Alternative funding should be offered to address the unsatisfied patients with no insurance in our study.

Shorter examination waiting time was also preferred, reflected in the “general satisfaction” subscale. We also recorded more negative feedbacks than the positive one, mainly for the “waiting time” since at the time this study commenced, there was no time appointment system for the patients’ queue. Patients with scheduled appointment had a higher satisfaction compared to patients in walk-in clinic.<sup>35</sup> Waiting time was found as the main influence for patient satisfaction in the ophthalmology clinic.<sup>13</sup> On the other hand, perception towards waiting time and not the actual waiting time was found to have more influence on patient satisfaction.<sup>36</sup> Patients might accept the actual time as long as they are kept informed. Lean Six Sigma techniques derived from Toyota production system can be used to improve patients’ flow time.<sup>37</sup>

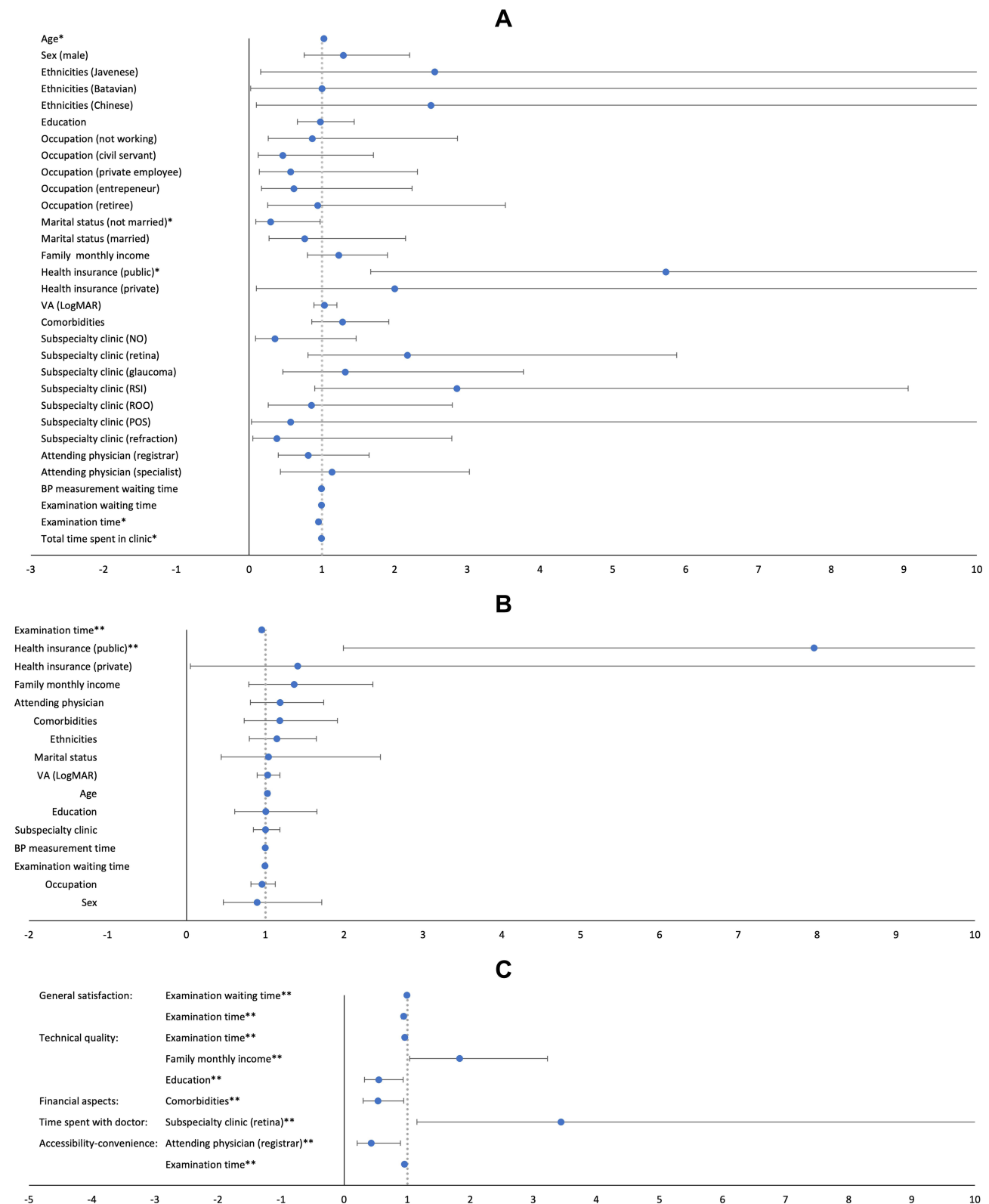
Family monthly income had higher odds of reaching satisfied patient in “technical quality”. Similarly, Detollenaere et al found that low income patients had lower satisfaction for their general practitioner<sup>38</sup> while no association found between income and satisfaction in previous study by Hall et al.<sup>39</sup> On the other hand, Ganasegaran et al found that higher income had lower satisfaction.<sup>21</sup> The income appears to gave different satisfaction results in different settings.

Increased education level had lower odds of reaching satisfied patient in “technical quality”. Previous studies in ophthalmology and other settings found similar findings<sup>3,9,21,39</sup> while other study found that education did not affect satisfaction.<sup>38</sup> We hypothesized that higher educated patients possibly read or study about their condition first before meeting the doctor. Consequently, they ask more questions and demanding more explanation.

Comorbidities was associated with lower odds of satisfied patients in the “financial aspects” subscale. More comorbidities led to low satisfaction score. Ezat et al found that comorbidities affected “interpersonal manner”, “time spent with doctor”, and “technical quality” subscales.<sup>40</sup> This findings is understandable since patients with more comorbidities probably need to spend more money for their overall condition and have more difficulty to work to earn money.

Retina subspecialty clinic had higher odds of satisfied patients in “time spent with doctor” subscale. Previous study found marital status, stage of disease, duration of the disease, comorbidities, and financial affected this subscale.<sup>40</sup>





**Figure 1** Forest plot of univariate and multivariate analyses of patient and health service characteristic on reaching TSS. **(A)** Univariate analysis on “patient’s overall satisfaction”. Reference group for marital status and health insurance were “divorced” and “no health insurance” respectively. **(B)** Multivariate analysis on “patient’s overall satisfaction”. Reference group for health insurance was “no health insurance”. **(C)** Multivariate analysis on each subscale of PSQ-18. Reference groups for subspecialty clinic and attending physician were “EED” and “both registrar and specialist” respectively. There was no significant multivariate analysis found on “interpersonal manner” and “communication” subscales.



**Table 4** Median and Range of BP Measurement Time, Examination Waiting Time, Examination Time, and Total Time Spent in Clinic Based on Subspecialty Clinic

	NO (n=13)	Retina (n=101)	Glaucoma (n=53)	RSI (n=48)	ROO (n=25)	POS (n=2)	Refraction (n=5)	EED (n=22)	p value	Adjusted p value
BP measurement time (minutes)	30 (10–150)	30 (5–150)	30 (5–120)	30 (5–120)	30 (5–210)	45 (30–60)	30 (10–45)	47.50 (15–180)	0.513	NP
Examination waiting time (minutes)	60 (20–180)	60 (2–300)	60 (20–150)	60 (10–180)	60 (5–180)	45 (30–60)	30 (5–30)	60 (15–120)	0.054	NP
Examination time (minutes)	20 (10–30)	15 (5–60)	15 (5–90)	15 (7–35)	15 (10–36)	16.5 (15–18)	11 (10–25)	14 (5–60)	0.012*	0.005** (retina vs NO)
Total time spent in clinic (minutes)	100 (55–290)	135 (40–375)	110 (55–240)	128.5 (55–255)	115 (20–360)	106.5 (78–135)	75 (25–86)	127 (45–253)	0.042*	Not found

**Notes:** \*Significant with independent samples median test. \*\*Significant values adjusted with Bonferroni correction.

**Abbreviations:** BP, blood pressure; EED, external eye disease; NO, neuro-ophthalmology; NP, not performed; POS, pediatric ophthalmology and strabismus; ROO, reconstruction; oculoplasty and oncology; RSI, refractive surgery and immunology.

**Table 5** Positive and Negative Feedbacks

<b>106 Positive Feedbacks from 89 Patients</b>	<b>N</b>	<b>%</b>
Overall service	67	63.2%
Staff's hospitality	22	20.8%
Administration	8	7.5%
Facilities and equipments	5	4.7%
Staff's communication	4	3.8%
<b>Total</b>	<b>106</b>	<b>100.0%</b>
<b>158 negative feedbacks from 124 patients</b>		
Waiting time	84	53.2%
Staff's communication	21	13.3%
Administration & queue number	15	9.5%
Staff's attitude	8	5.1%
Overall service	7	4.4%
Waiting room seats	6	3.8%
Others	17	10.8%
<b>Total</b>	<b>158</b>	<b>100.0%</b>

Vitreoretinal surgery department also increased the odds of satisfaction in the univariate analysis of Han et al but not in their multivariate analysis.<sup>12</sup> Interestingly, retina subspecialty clinic did not have the longest examination time in our study (Table 4). However, this was the only subspecialty clinic at the time of study that have a specialist doctor available every working day with full-time working hours and might be the reason for our specific finding suggesting the importance of specialist attendance.

Furthermore, registrar as attending physician had lower odds of satisfied patient in the “accessibility-convenience” subscale. On the contrary, using PSQ-18 adaptation Jagadeesan et al found that patients were generally satisfied with the service provided by registrar.<sup>41</sup> In emergency medicine setting, patients were more satisfied with the registrar compared with the supervising doctor.<sup>42</sup> Our finding suggested that a specialist doctor should always see the patients whenever possible to improve patients’ satisfaction as also reflected by our finding in the retina subspecialty clinic. Technical and communication skill of the registrar should also be improved to address this issue.

In the univariate analysis of this study, older age was associated with more satisfaction. On the contrary, previous studies in ophthalmology settings found that older age was related to less satisfaction.<sup>3,14</sup>

Examination waiting time, examination time, family monthly income, education, comorbidities, subspecialty clinic, and attending physician influenced patient’s satisfaction in our study. These significant associations were partly in concordance to the results of the previous meta-analysis study which found that satisfaction was significantly associated various characteristics such as age, education, marital status, and social status while no relationship was found with ethnicity, sex, income, and family size.<sup>39</sup> Sixma et al also found that patient’s demographic factors contributed to 90–95% of variance in satisfaction scores.<sup>43</sup> Patient’s satisfaction studies results were varied as the consequence of no single globally accepted instrument to measure satisfaction.<sup>44</sup> Patients with negatively framed survey had a significant lower satisfaction compared to patients with positively framed survey creating a potential bias.<sup>45</sup> However, PSQ-18 was designed with equal number of negative and positive framed survey questions.<sup>18</sup>

Patient centered health service is the ultimate goal as 70% of patients would not go back after dissatisfaction and 75% would tell at least 9 relatives not to go.<sup>46–48</sup> Although important, technical quality improvement alone does not directly translate into better patient-perceived quality care.<sup>49</sup> Healthcare providers should evaluate themselves through the patients’ eyes and improvement should be implemented as “work smarter rather than harder”.<sup>50,51</sup> This improvement also needs to be supported by the leaders of the healthcare through their policies.<sup>52</sup> Technology use, patient flow redesigning, and offering distractions could improve the actual wait time and the satisfaction itself.<sup>53</sup> In addition, big data

from social media could be the answer to assess healthcare quality because it can capture the candid experiences of the patients.<sup>54,55</sup>

There were some limitations of this study. Surveys were given in established patients before they had new health services in the day of surveying. Therefore, recall bias might affect the results of the survey. However, there was an evidence that satisfaction survey done after 2 weeks and 3 months had a higher satisfaction compared to immediately after visit.<sup>56</sup>

## Conclusions

Examination time and examination waiting time should be shortened, specialist doctors should always see the patients whenever possible, and registrars' technical and communication skill should be improved. Alternative funding for patient without health insurance also should be provided to increase satisfaction.

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## Disclosure

The authors report no conflicts of interest in this work.

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