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Research

Early assessment of vision-related quality of life predicts long-term spectacle-wear compliance

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Abstract
Non-compliance with spectacle wear undermines global health initiatives aimed at eliminating uncorrected refractive error—a preventable cause of visual impairment—by providing free or affordable spectacles to underserved populations. Non-compliance, however, is often identified too late, delaying effective health promotion strategies. This study evaluates the association between early-assessed vision-related quality of life (QoL) following spectacle correction and long-term compliance in adults. A comprehensive eye examination was conducted on 3052 university students to identify those visually impaired (presenting acuity ≥ Snellen 6/12 in the better eye) due to uncorrected refractive error. After refractive correction, participants achieving a best-corrected visual acuity of Snellen 6/6 completed the National Eye Institute 25-item Visual Function Questionnaire (NEI-VFQ-25) at baseline and within the first week of correction. A 6-month follow-up assessed compliance with spectacle wear. The average baseline NEI-VFQ-25 score improved from 67.35 (± 13.53%) to 90.56 (± 8.45%) with spectacle correction ($P < 0.001$) in the first week, with individual changes ranging from 2 to 70%. After 6 months, only 54 (47%) out of the 115 eligible participants (58 females; ages 18 to 29) were compliant. Following the adjustment for covariates, the results revealed that gains in NEI-VFQ-25 score below 40 were significantly associated with reduced compliance over the 6-month period (OR: 0.39, 95% CI: 0.06–0.99, $P = 0.047$). This supports an association between early vision-related QoL and long-term compliance. Scheduling a short follow-up to assess vision-related QoL within the first week after dispensing spectacles may help identify potential non-compliant wearers early, allowing for timely interventions.

Keywords Compliance · Vision-related quality of life · Refractive error · Visual impairment · Health promotion

1 Introduction

Uncorrected refractive error remains a significant cause of preventable blindness, despite being highly prioritized among the targeted eye disorders by the global joint initiative, Vision 2020, launched by the World Health Organization and the International Agency for the Prevention of Blindness [1]. Vision 2020, which began in 1999, aimed to eliminate the primary causes of avoidable blindness, thereby granting all people worldwide the right to sight by the year 2020 [2]. Spectacle correction is the most common method for managing refractive error. However, numerous global health promotion programs, which aimed to intensify eye screening to identify individuals needing refractive correction and

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provide affordable or free spectacles, failed to reach their full potential [1, 2]. For example, the World Health Assembly Global Action Plan (WHA GAP), implemented from 2010 to 2019, aimed for a 25% global reduction in avoidable vision impairment caused by cataract and uncorrected refractive error. An appraisal of the success in a meta-analysis, however, noted up to 30% increase in the number of uncorrected refractive error cases and no changes in the crude prevalence [1].

Like many causes of lifelong disability, refractive errors typically require consistently continual use of spectacles or contact lenses, to achieve the desired outcome (i.e., improved vision) and to prevent amblyopia development [3]. Therefore, compliance with spectacle wear is crucial in reducing the burden of visual impairment and blindness. Non-compliance with spectacle wear has been identified as a significant obstacle in the fight against blindness across all ages, from schoolchildren to older adults. Reports show that about half or less of the population with refractive error who are provided with spectacle correction are non-compliant [4–6]. Recent data from systematic reviews revealed that long-term compliance with spectacle wear may be largely determined by factors related to the patient's uninformed beliefs and opinions about spectacles, or errors in the refractive prescription, which can be avoided [7, 8]. The problem, however, is that non-compliance with spectacle-wear is often realized too late, leading to the development of amblyopia, especially in children, and patient loss to follow-up for spectacle renewal over time. Therefore, identifying factors associated with spectacle-wear compliance behavior can lead to the early identification of individuals who are less likely to comply with spectacle-wear in the long term, for appropriate measures, including behavioral change interventions and replacement of incorrect lenses.

Multiple cross-sectional studies have observed that patients who were compliant in the long term to their prescribed treatment, including drugs, spectacles, and other wearable medical devices, also reported better quality of life (QoL), indicating an association between these two variables [9–11]. Self-reported QoL is used as a patient-centered approach to evaluate treatment outcomes and monitor the progression of a health condition [12]. The National Eye Institute 25-item Visual Function Questionnaire (NEI VFQ-25) is a reliable and valid tool used to assess the vision-related QoL in an array of eye disorders and treatment modalities, including refractive error corrections [13, 14]. In this study, we tested the hypothesis that early changes in self-reported vision-related QoL, following vision correction with spectacles, is a determinant of long-term spectacle-wear compliance behavior in university freshmen.

2 Methods

2.1 Study design and eligibility

The follow-up study assessed the relationship between early-assessed vision-related QoL following refractive correction and its impact on long-term spectacle-wear compliance. The study was approved by the University of Cape Coast Institutional Review Board (UCCIRB/CHAS/2015/045), and all participants provided written informed consent in accordance with the tenets of the Declaration of Helsinki, regarding the use of human subjects in research. Standard protocols, which ensured participant safety and conformed to national laws, were strictly adhered to.

This prospective study involved a comprehensive eye examination for all incoming students aged 18 years or above at the University of Cape Coast, Ghana, to identify individuals with visual impairment due to uncorrected refractive error. The university's optometry clinic, equipped with necessary diagnostic ophthalmic equipment and staffed by experienced professionals, conducted the examinations from August 2015 to May 2016. The eye examination included procedures such as presenting distance visual acuity (PVA), ocular motility, slit-lamp examination of the external eye, anterior segment and media, dilated fundus examination, and refractive correction. Uncorrected refractive error was diagnosed as the primary cause of visual impairment when the PVA was 0.3 LogMAR (equal to Snellen 6/12) or worse in the better eye and improved with pinhole acuity or the best spectacle-corrected visual acuity (BCVA) by at least two lines [15]. This criterion for assessing improvement in pinhole acuity or best spectacle-corrected visual acuity (BCVA) is based on the amount of change in visual acuity deemed clinically significant. This helps to rule out any variability in visual acuity testing due to repeated testing [16]. As the visual acuity through lens correction may influence vision-related quality and spectacle-wearing compliance, this factor was controlled by ensuring that only those with a BCVA of 6/6 were recruited.

Out of the 3,052 students examined, 178 were diagnosed with uncorrected refractive error and underwent refraction to determine the corrective lens power. They were then provided with affordable custom-made spectacles. After excluding 46 students, comprising individuals with BCVA worse than Snellen 6/6, or other ocular comorbidities, 132 students were recruited for our study. The selected students were administered the NEI VFQ-25 for vision-related QoL assessment at baseline and one week later, following the use of their spectacles. Six months later, their compliance

with spectacle-wear was evaluated. Participants who reported broken or misplaced spectacles as the reason for non-compliance, were excluded from the analysis (Fig. 1). Further details about the eye examination procedures and the questionnaires are described in the following sections.

Distance visual acuity was assessed in each eye at 6 m under standard lighting conditions using a LogMAR chart. If a participant was unable to read the 6/60 Snellen equivalent, the testing distance was reduced to 3 m. Testing began with the top 1.0 logMAR (Snellen 6/60) line and progressed to the next lower line if at least four of five optotypes on the current line were correctly identified. Participants were encouraged to guess the letters on the lowest line, with the test ending when they missed three or more letters [4].

To determine the needed lens prescription, non-cycloplegic refraction was performed by two experienced optometrists, using extended fogging with + 1.50 D lenses for 15 min to control accommodation in hyperopes [17, 18]. Prior to refraction, the + 1.50D plus-lens test was carried out to identify individuals with significant hyperopia, based on whether vision deteriorated by fewer than two lines compared to their unaided distance visual acuity. Objective refraction was

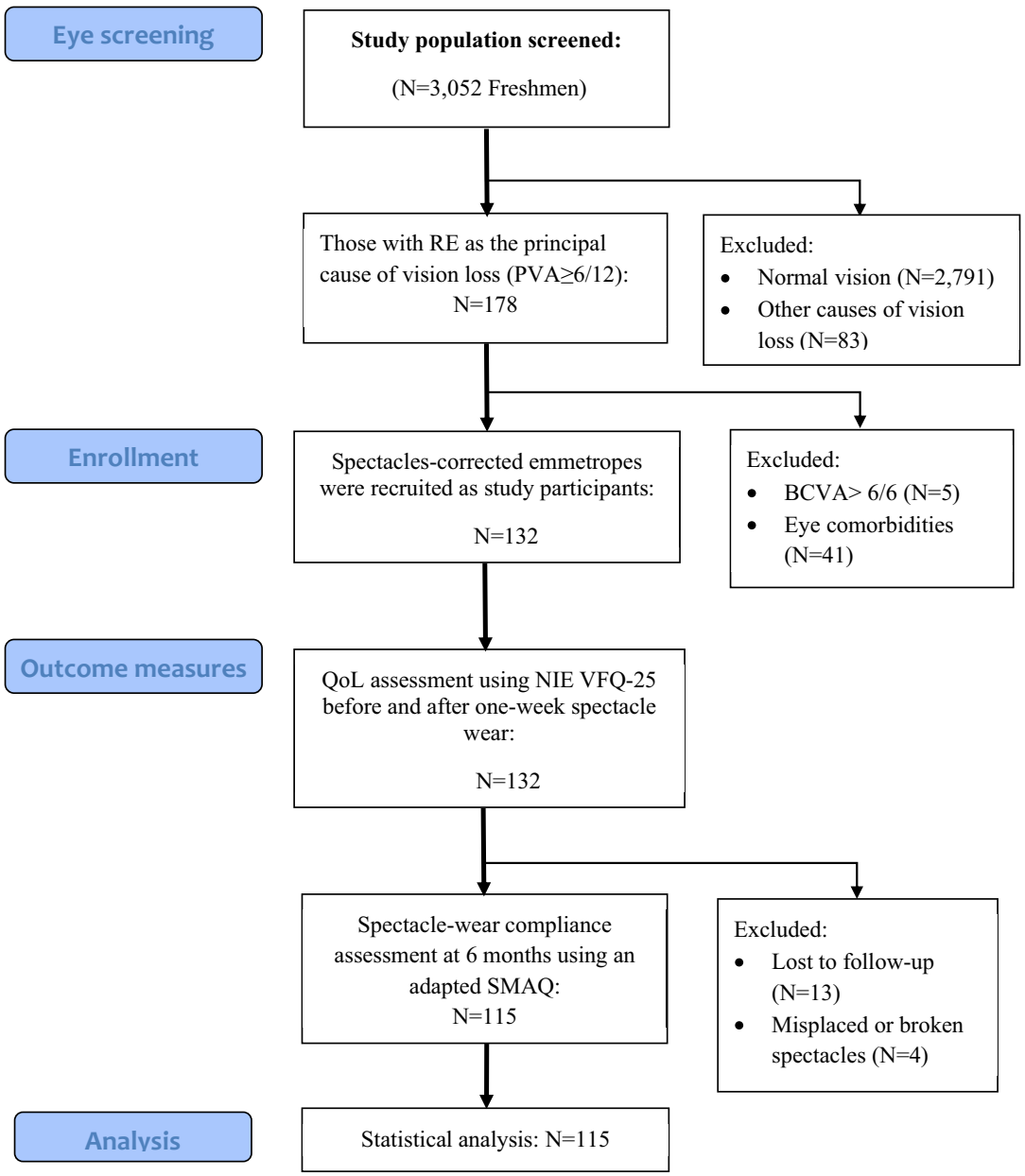

Fig. 1 Flowchart showing study design to investigate the association. BCVA denotes best-corrected visual acuity; PVA, presenting visual acuity; QoL, quality of life; RE, refractive error

conducted at 67 cm from subjects under + 1.50 D optical fog. While the subject focused on the largest letter 6 m away, the optometrist determined the refractive error by finding a combination of spherical and cylindrical lenses that neutralized the retinoscopy reflex. The lens powers found by retinoscopy for each eye served as the starting point for monocular subjective refraction (MSR) with the illuminated logMAR chart at 6 m. The endpoint of MSR was the least minus or maximum plus spherical lens that achieved the best visual acuity, followed by the Jackson cross-cylinder technique for refining the cylinder axis and power [19]. Finally, binocular balancing, by the alternate occlusion method, was performed to equalize the acuity between the two eyes. The spectacles dispensed to patients contained the appropriately determined refractive corrections.

For classification purposes, participants with a spherical equivalent refractive error (SE) of ≤ -0.50D in the better eye were classified as myopic, while those with a spherical error of ≥ 0.50D were classified as hyperopic. Additionally, if an individual's spectacle correction included a cylindrical power of ≥ 0.50 DC in the better eye, they were classified as astigmatic and assigned a "Yes"; otherwise, they were assigned a "No."

2.2 Main outcome measures

Vision-related QoL was assessed using the original English version of the NEI VFQ-25. We included only university students, with English as the medium of instruction at their institution, mitigating potential validity issues [20]. More importantly, the validity and reliability of the original English version has been demonstrated in previous studies in the low vision population in Ghana [21].The NEI VFQ-25 consists of twenty-five closed-ended items, generating twelve visual subscales. Eleven of these subscales measure specific aspects of visual functioning, while the twelfth is a general health rating scale. The NEI VFQ-25's effectiveness as an indicator of the impact of refractive error and spectacle correction on emotional well-being, social functioning, and performance of vision-related daily tasks has been demonstrated [15]. The NEI VFQ-25 subscales and composite scores were calculated using the standard scoring algorithm proposed by the developers [13]. Additional data collected from the participants included their age, sex, and lens prescription.

Compliance with spectacle-wearing was evaluated through self-reported measures, following methodologies similar to those employed in prior research, predominantly involving adult participants [22, 23]. An adapted version of the Simplified Medication Adherence Questionnaire (SMAQ) was interview-administered to assess compliance to spectacle wear (Table 1). SMAQ is a simple 6-item scale for assessing patient adherence to prescribed medications for chronic ailments [24]. Through expert consultations, the items were reformulated taking into context that refractive correction has to be worn by patients for daily activities. Item 6 was rephrased as "*Over the past 6 months, how many days have you not worn the spectacles*?". For assessing spectacle-wear non-compliance, a random follow-up visit was usually conducted after 6 months [5]. It was agreed that patient response to item 6 be categorized into two; less than half of the total number of days" versus "half of the total number of days or more. By the same scoring scheme of SMAQ, a respondent whose response to one item affirmed a non-adherent is considered non-adherent. Thus, the participant is considered

Table 1 The Spectacle-wear Compliance Questionnaire (SCQ) used in the 6-month follow-up

Question	Response
1 Do you sometimes forget to wear your spectacles?	Yes/No
2 Are you careless at times about wearing spectacles?	Yes/No
3 Sometimes if you feel uncomfortable in your spectacles, do you stop wearing them?	Yes/No
4. Thinking about the last week. How often have you not worn your spectacles?	(a) Never (b) 1—2 times (c) 3—5 times (d) 6 -10 times (e) > 10 times
5. Did you not wear your spectacles over the past weekend?	Yes/No
6. Over the past 6 months, how many days have you not worn the spectacles?	< Half of the total no. of days ≥ Half of the total no. of days

SCQ is adapted from the Simplified Medication Adherence Questionnaire (SMAQ, [24])

non-adherent if: a) they respond "Yes" to any of the qualitative questions (i.e., 1,2,3, 5); b), stated more than two times of non-wear over the past week (question 4), or c) over two days of total non-wear during the past 6 months.

In addition to expert consultation, the performance of the adapted SMAQ was evaluated through two primary methods: (i) criterion validity, by comparing it with an objective instrument for adherence assessment, and (ii) reliability, by assessing both internal consistency and reproducibility when administered to the same respondent by independent investigators. To evaluate criterion validity, pilot testing was conducted on 35 randomly selected students with a history of spectacle use. Using the conventional definition of non-compliance—any student not wearing their spectacles during the class visit—there was a high agreement rate (87%) and comparable rates of non-compliance with the adapted SMAQ. For shorter questionnaires with fewer items, assessing inter-examiner reliability is particularly useful. The adapted SMAQ demonstrated an internal reliability of 0.88, as measured by Cronbach's alpha.

2.3 Statistical analysis

Quantitative data was processed using the Statistical Package for Social Science (SPSS, version 21.0, SPSS Inc., Chicago, IL) and presented by EQUATOR guidelines. To determine the appropriate statistical tests, data were assessed for normality; nonparametric tests were employed when data distributions significantly deviated from the norm (Kolmogorov–Smirnov D tests, $P < 0.05$). Descriptive statistics, such as frequency (%), mean (± SD), or median, were used to present data related to patients' demographic information, refractive error, vision-related QoL, and compliance. The degree of improvement in each subscale and the composite scores derived from NEI VFQ-25 were calculated by comparing the baseline and spectacle-corrected vision-related QOL. As the NEI VFQ-25 scores were normally distributed, a paired student t-test was utilized to compare the baseline and spectacle-corrected QoL within the same population. A binary logistic regression model, adjusted for potential covariates including participant's sex, age group, type of refractive error (myopia versus hyperopia), and presence of astigmatic error [7], was used to ascertain the impact of improved QoL from spectacles on compliance. Associations were reported as odds ratios (OR) with 95% confidence intervals (CI). A p-value of ≤ 0.05 was considered statistically significant.

A minimum sample size of 90 participants was estimated as adequate, based on a level of significance (α) of 5%, power (1-β) of 80%, and an effect size of 0.3 determined from a previous study [15]. With a 20% adjustment for the loss to follow-up, a sample of 110 participants was needed.

3 Results

3.1 Characteristics of participants

Out of the 132 individuals identified as having visual impairment and eligible for the study, 17 were excluded (13 were lost during follow-up and 4 had broken or misplaced spectacles). Therefore, the analysis was conducted on data from 115 participants, 58 (50.4%) of whom were females. The participants' ages ranged from 18 to 29 years (mean age: 21.30 ± 2.17 years). Based on the spherical equivalent refractive error (SER), 100 (87.0%) participants were myopic and the remaining 15 (13.0%) were hyperopic. Additionally, 56 (48.7%) participants had spectacle prescriptions incorporating cylindrical correction. The mean and median SER were -1.74 (± 1.68 D) and -1.25D for myopes, respectively, compared to + 0.63 (± 0.24 D) and + 0.50D for hyperopes.

3.2 Quality of life

The overall participants' composite score for vision-related QoL significantly increased from 67.35 (± 13.53) at baseline to 90.56 (± 8.45) with spectacles ($P < 0.001$), although the magnitude of change ranged from 2 to 70% (mean change of 23.21 ± 12.14%). Forty-five (39.1%) of the participants reported ≤ 20 improvement in vision-related QoL with their spectacle correction. Table 2 shows the improvement in the NEI VFQ-25 subscales and composite scores with spectacle correction compared to the respective baseline scores in the participants. Out of the 12 subscales assessed at baseline, participants were more affected in 9 subscales, all of which had scores lower than 70. The remaining 3 subscales with baseline scores higher than 70 were near vision, color vision, and social functioning. Comparison of baseline scores with their respective spectacle-corrected scores for each subscale showed significant improvement in all subscales following

Table 2 Comparison between the NEI VFQ-25 subscale scores before and following refractive correction

Questionnaire subscale	initial administration	follow-up administration	Difference in score	P–value
General Health	64.13 ± 21.50	79.35 ± 19.66	15.22 ± 25.58	< 0.001
General Vision	62.09 ± 18.04	89.74 ± 11.04	27.65 ± 17.89	< 0.001
Ocular Pain	58.48 ± 23.03	77.17 ± 19.54	18.70 ± 21.86	< 0.001
Near Activities	72.75 ± 19.60	93.94 ± 10.00	21.19 ± 20.01	< 0.001
Distance Activities	61.96 ± 22.25	93.91 ± 9.45	31.96 ± 21.05	< 0.001
Social Functioning	86.20 ± 16.50	97.60 ± 5.95	11.41 ± 16.60	< 0.001
Mental Functioning	57.23 ± 22.53	82.77 ± 18.39	25.54 ± 20.25	< 0.001
Role Difficulties	53.59 ± 23.40	85.76 ± 19.86	32.17 ± 22.89	< 0.001
Dependency	64.49 ± 26.79	90.65 ± 15.14	26.16 ± 24.97	< 0.001
Driving (n = 11)	67.05 ± 17.53	90.91 ± 13.15	23.86 ± 17.09	0.005
Colour Vision	93.20 ± 15.34	99.56 ± 3.30	6.36 ± 14.80	< 0.001
Peripheral Vision	64.12 ± 25.78	94.74 ± 11.27	30.61 ± 26.69	< 0.001
Composite score	67.35 ± 13.53	90.56 ± 8.45	23.21 ± 12.14	< 0.001

Data are presented as mean ± standard deviation. Statistical analysis is performed using the paired *t-test*

refractive correction. Eight of the subscales improved to 90 or above following spectacle correction. Distance vision and role difficulties were the two most significantly improved subscales following spectacle correction.

3.3 Compliance and associated factors

Out of the 115 participants, all of whom had been given spectacles for refractive correction, only 54 (47%) were compliant with spectacle wear after 6 months. The proportion of those compliant with spectacle-wear was 28.6% for participants whose vision-related QoL improvement was ≤ 10 compared to 77.8% in their counterparts with vision-related QoL above 40. With binary logistic regression analysis adjusting for covariates, it was determined that those with vision-related QoL improvement in the range of 30–39 were associated with reduced spectacle-wear compliance (odds ratio: 0.39, 95% CI: 0.06–0.99, P = 0.047) compared to the subgroup with vision-related QoL improvement of ≥ 40 (Table 3).

4 Discussion

Refractive error correction with spectacles continues to be the most popular modality, possibly, due to the reduced risk of side effects compared to contact lenses, or refractive surgery, which are relatively invasive [25, 26]. Also, spectacle correction is less costly, does not require training on the part of the patients to wear them, and requires less rigorous training for service providers. However, while the literature studies support the distribution of self-adjustable or ready-made spectacles to help in reducing visual impairment attributable to uncorrected refractive error in developing countries [27–29], non-compliance to spectacle wear is a major challenge [4, 7]. The current study, therefore, uniquely demonstrates the potential usefulness of the vision-related QoL assessed in the first week of spectacle wear as an early indicator of spectacle wear compliance in the long term.

This study reveals two significant findings: firstly, only 47% of participants adhered to wearing spectacles after approximately six months of follow-up; secondly, the self-reported early QoL significantly determined the spectacle-wear compliance. Despite our unique method of assessing patients' compliance to spectacle wear, which involved using a questionnaire, our results align with a recent large meta-analysis that reported a 40.1% compliance rate among children [30]. This meta-analysis amalgamated studies that used either random visits or questionnaires to evaluate children's compliance with spectacle-wear. To date, spectacle-wear compliance has been extensively studied in schoolchildren due to the ease of conducting random follow-up visits in a controlled classroom setting. Researchers can easily observe and identify children who are either adhering to or neglecting their spectacle use while they are in the classroom. However, this approach is not feasible for university students, who typically are enrolled in a variety of subjects that are scheduled at different times throughout the week, and they are not confined to a single classroom. Thus, the variability in their schedules makes it a logistic challenge, if not impractical for researchers to encounter all study participants through a random

Table 3 Factors associated with spectacle-wear compliance

Factors	Total. participants (n = 115)	No. of wearers compliant (n = 54)	OR(95%CI)	*P*-value
Sex				
Female	58	24(41.4%)	1.40(0.61–3.21)	0.422
Male	57	30(52.6%)	1	
Age category (yr)				0.973
18–21	65	29(44.6%)	1.08(0.16–7.30)	0.936
22–25	45	23(51.1%)	1.18(0.17–8.28)	0.868
26–29	5	2(40.0%)	1	
Refractive error				
Myopia	100	50(50.0%)	1.83(0.46–7.23)	0.388
Hyperopia	15	4(26.7%)	1	
Astigmatism				
Yes	56	24(42.9%)	0.97(0.411–2.29)	0.945
No	59	30(50.8%)	1	
Baseline QoL				0.750
≤ 50.0	17	8(47.1%)	0.69(0.07–6.93)	0.863
51–60	17	10(58.8%)	1.21(0.19–7.61)	0.905
61–70	30	16(53.3%)	1.01(0.27–4.31)	0.741
71–80	33	13(39.4%)	0.81(0.23–2.85)	0.503
Above 80	18	7(38.9%)	1	
Post-correction QoL				0.158
< 80.0	12	2 (16.7%)	0.21(0.04–1.11)	0.064
80.0– 90.0	28	14(50.0%)	1.10(0.438–2.77)	0.839
Above 90.0	75	38(50.7%)	1	
Improvement in QoL				0.037*
≤ 10	14	4(28.6%)	0.04(0.00–0.58)	0.019*
11–19	31	11(35.5%)	0.07 (0.01–0.62)	0.018*
20–29	41	19(46.3%)	0.14 (0.02–1.07)	0.051
30–39	20	13(65.0%)	0.39 (0.06–0.99)	0.047*
≥ 40	9	7(77.8%)	1	

Data are presented as frequencies or proportions. Statistical analysis is by binary logistic regression with results presented as (odds ratios, OR with their 95% confidence interval, CI)). Vision-related QoL (quality of life); *P < 0.05

visit. In such instances, therefore, a standardized questionnaire, like the one used in our study, proves more effective [31]. The original SMAQ's widespread popularity as a tool for monitoring treatment compliance may encourage the adoption of our adapted version for assessing compliance to spectacle or contact lens wear. The high rate of non-compliance to spectacle wear among university students is particularly concerning, given the high visual demands of academic work.

Uncorrected refractive error significantly impairs overall vision-related QoL, yet participants reported minimal deterioration in near vision, color vision, and social functioning, with baseline subscale scores remaining at or above 70. This could be attributed to the population's characteristics, predominantly myopic (87%), rendering them less susceptible to issues related to near work [32]. Furthermore, the minimal impact on color vision and social functioning suggests these subscales are less affected by uncorrected refractive error, corroborating a recent report [33]. Post-correction, distance vision and role difficulties experienced the most significant improvements, likely due to myopia's impact on vision-related tasks integral to daily life [34]. This substantial enhancement in distance vision and role difficulties post-refractive correction underscores the detrimental effects of uncorrected refractive error on these parameters, reinforcing the necessity for spectacle provision for vision correction [14, 15, 35]. The improvement in vision-related QoL, as indicated by our participants' composite score of 23.2, surpasses that of studies conducted on older subjects, who may have additional ocular comorbidities affecting their vision [14, 35].

Our study found a significant association between the early improvement in vision-related QoL and spectacle-wear compliance, even after controlling for factors such as sex, age, and type of refractive error. A literature review revealed

only one study by Khandekar et al. that examined the relationship between vision-related QoL and spectacle-wear compliance, which found that compliant individuals reported higher vision-related QoL [11]. Due to the scarcity of relevant literature, we also compared our results to studies on patients receiving treatment for other chronic health conditions. For instance, a recent study found a positive relationship between medication adherence and QoL in heart failure patients [9], while another study on adolescent scoliosis patients revealed that non-compliant individuals experienced significantly less improvement in their QoL [10]. The strength of our study in validating this association lies in its prospective design, which measured quality of life well before assessing participants' compliance behaviour.

4.1 Limitations

Firstly, as with many observational studies, this study's primary limitation is that while the results suggest a significant association between improved early vision-related QoL following spectacle correction and long-term spectacle-wear compliance, these findings should be interpreted cautiously as they may not imply a cause-and-effect relationship. Secondly, the original NEI-VFQ-25 has known limitations in psychometric performance, particularly in targeting and item fit. To address these issues, the NEI VFQ-28R was developed in 2017. However, the original instrument may still be preferred for assessing QoL in refractive error studies due to its demonstrated high validity and reliability in previous research. Thirdly, while significant improvement was observed in all QoL domains, corroborating the literature on the burden of uncorrected refractive error, the fact that spectacles were not provided at a 50% discount means that not all students may have afforded or felt the need for them. This could have, therefore, influenced the high QoL scores, as those with a marked reduction in baseline QoL were more likely to obtain spectacles. Furthermore, spectacle-wear compliance may vary with the severity of visual impairment and refractive error. Most participants in our study had mild myopia (up to -1.50D), so those with moderate-to-high refractive error might show different compliance behaviours. This may be explained by the fact that, within the estimated 44.4% myopic population in Ghana, 37.2% had mild myopia [36]. Hence, the predominance of mild myopia among participants reflected the general refractive error distribution in this population [36], ensuring the findings are representative and enhancing the study's validity and generalizability.

4.2 Conclusion and implication

In conclusion, the study demonstrates that the NEI-VFQ-25 scores assessed following spectacle correction could serve as an indicator of spectacle-wear compliance behaviour in the long term. Thus, for practitioners and public organizations aiming to reduce the burden of spectacle non-compliance, early assessment of vision-related QoL could provide valuable information for timely interventions.

Author contributions Drs. Abokyi and Kwarteng had full access to all study data and took responsibility for its integrity and the accuracy of the data analysis. Dr. Abokyi developed the study concept and design. Data acquisition, analysis, and interpretation were performed by Drs. Abokyi, Kwarteng, Ntodie, Ayerakwah, Boadi-Kusi, Prof. Ilechie, and Prof. Mashige. Dr. Abokyi drafted the manuscript. Drs. Ntodie, Prof. Ilechie, Boadi-Kusi, and Prof. Mashige critically reviewed the manuscript for important intellectual content. Dr. Abokyi supervised the study.

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Data availability Data is available upon request from the corresponding author.

Declarations

Competing interests None.

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