



# Awareness and Response of Undergraduate Spectacle Wearers to Contact Lens Usage

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## Abstract

The purpose of this study was to assess the awareness and response of undergraduate spectacle wearers to contact lens usage in the correction of refractive errors. This descriptive, cross-sectional study involved 120 undergraduate spectacle wearers from the Kwame Nkrumah University of Science and Technology (KNUST) in Kumasi, Ghana. A self-administered questionnaire was used for the collection of data. Data collected was analysed using Statistical Package for Social Sciences version 20.0 and the level of significance was set at a p-value of 5%. The study participants comprised forty-eight males and seventy-two females representing 40% and 60% respectively of the total study population. The study on awareness revealed that one hundred and fifteen (95.8%) of the interviewees were cognisant of contact lenses. Forty-two (35%) of the participants were privy to some benefits of contact lenses while seventy-eight (65%) of the sampled population had no knowledge of the benefits of contact lenses. Furthermore, seventy-six (63.3%) respondents had knowledge of the possible complications of contact lens usage as against forty-four (36.7%) respondents who were oblivious of the potential complications of contact lens usage. It was noted that duration of spectacle wear had no statistically significant association with awareness on contact lenses ( $p$  value = 0.437). The investigation further revealed that fifteen (12.5%) males and thirty-four (28.3%) females would opt for contact lenses if they were available. Twenty-nine participants cited aesthetic factors as the rationale that would underpin their choice of contact lenses over spectacles as a means of addressing refractive errors if they were available. The commonest reason given by almost half of the participants for non-usage of contact lenses was the fear of potential contact lenses complications. It was also discovered that the print or electronic media was the major source of information on contact lenses according to majority (45.3%) of the participants. It is therefore recommended that the Ministry of Health and the Ghana Optometric Association should be at the forefront of contact lens education to the populace.

**Keywords:** Awareness; Response; Refractive Errors; Spectacles; Contact Lens

## Introduction

Refractive errors arise from the eye's inability to clearly focus light rays from optical infinity onto the retinal plane. This culminates in a perception of blur images when the light rays are focused anterior to the retina (myopia), posterior to the retina (hyperopia) or when the light rays from the different meridians are brought to different foci (astigmatism) [1]. Relief from refractive error associated blurred or distorted vision is attainable with the use of prescribed spectacles and contact lenses, and more recently, refractive surgery. Despite the foregoing options, the predominance of refractive errors coupled with the cost of refractive correction, has made refractive errors a global public health concern and an economic challenge [2].

The most prevalent form of eye disorders that brought about poor vision and presented grave social and economic implications were refractive errors. In 2012, global estimates revealed that over 2.3 billion people were suffering from refractive error related poor vision. However, it is interesting to note that a refractive error can simply be detected, diagnosed, measured and consequently, corrected using optical corrective approaches and devices such as spectacles and contact lenses or by surgical procedures. According to global research, a greater majority of people with uncorrected refractive errors are situated in rural and low-income countries, most of which are in Africa [3].

Following epidemiological studies that had highlighted the escalating estimates of refractive error pervasiveness, the VISION 2020: Right to Sight global initiative which aimed at eliminating avoidable blindness by the year 2020, incorporated refractive errors into one of its five priority eye diseases. Despite this laudable initiative, an estimated 670 million people worldwide do not have spectacles or have inadequate correction of refractive errors; 517 million have near vision impairment and 153 million have distance vision impairment. Of the 517 million people without spectacles for near vision correction, 410 million are prevented from performing near vision tasks and activities [4].

Regardless of age, sex, and ethnicity, refractive errors, if uncorrected, resulted in an impaired or decreased quality of life for millions of people worldwide. A number of studies had asserted that uncorrected refractive errors had become a dominant issue in society as a result of harsh socioeconomic factors. Likewise, uncorrected refractive errors, which have eaten into the public health fibre of many low and middle-income countries, may to a large extent, influence the learning abilities of children [3].

The mainstay treatment modality for refractive error is spectacle correction because spectacles remain the commonest and relatively cheapest form of refractive error correction [5]. Spectacles are optical appliances consisting of a pair of ophthalmic lenses mounted in a frame, resting on the nose and held in place by sides extending towards or over the ears and positioned approximately 12 mm from the eyes.

A side spectacle, contact lenses can also be used to correct refractive errors. Contact lenses are thin, curved lenses placed on the film of tears that cover the surface of the eye. The lens itself is naturally transparent but often times an insignificant tinge of colour is added to make them easier for wearers to handle. Contact lenses have evolved from glass lenses to plastic scleral contact lenses and then to Polymethylmethacrylate (PMMA) lenses. Subsequently, corneal contact lenses have emerged as rigid gas permeable (RGP), to soft contact lens and silicon hydrogel lenses in recent times [6]. Contact lenses are considered more expensive and intricate to use relative to spectacles but the use of contact lenses have quite an avalanche of benefits that spectacle usage fails to provide.

Most studies had shown that there is a relatively high awareness but low willingness to use alternatives to corrective spectacles seen among spectacle wearers. Education on the various alternatives to corrective spectacles, allaying fears on their complications, and making them more affordable could enhance awareness and create a more positive attitude towards these alternatives to corrective spectacles [7, 8]. A study reported a high prevalence of contact lens use by female university students and cosmetic purposes was largely the necessitating factor for contact lens usage among this group of students [9].

A number of studies had highlighted the potential advantages of contact lenses in children. Using a paediatric quality-of-life survey tool known as the 'Paediatric Refractive Error Profile', it was demonstrated that contact lens wear dramatically improved how children and teenagers felt about their appearance and participation in activities, leading to greater satisfaction with their refractive error correction. Children were found to achieve longer wearing times and also benefited from contact lenses through an enhancement of a variety of self-perceptions such as physical appearance, athletic competence, and social acceptance [10-12].

In considering the prescription of any medication or medical device for everyone and for that matter minors, it was important to take into account its safety. Concerns in this regard had been raised in reports where contact lenses accounted for most medical device-associated adverse events (23%) in the paediatric population in emergency hospital department visits in the United States [13]. This finding indicated that contact lens was a safe medical device which could be used as means of correcting refractive error for different age groups but required supervision just as with any other medical device when prescribed or used by children.

The need to undertake this study was reinforced by a preliminary observation, which revealed that most students of the Kwame Nkrumah University of Science and Technology (KNUST) in Ghana wore spectacles rather than contact lenses to address their refractive errors. Further probing also revealed that the optometry department of the institution had not collected any data on contact lens wear among students. It was therefore appropriate to investigate why more students wore spectacles than contact lenses.

The current study aimed to assess the awareness and response of undergraduate spectacle wearers towards contact lens usage in the correction of refractive errors.

## **Methodology**

### **Study Participants**

The participants for this descriptive cross sectional study were undergraduate students of the Kwame Nkrumah

University of Science and Technology in Kumasi, Ghana who had refractive errors and wore spectacle corrections. Students without refractive errors who wore spectacles for cosmetic reasons were exempted from the present study. Lecturers and other workers of the university community who wore spectacles were also excluded from this study.

**Sampling**

Purposive sampling was used to select 120 undergraduate spectacle wearers from a total of 305 undergraduate spectacle wearers. The spectacle wearers wear sampled from a total of 2512 students who were simple randomly drawn form 55 classes in the institution.

**Data Collection Procedures**

A pre-tested self-administered questionnaire was the major instrument for the collection of data in this study. The questionnaire contained both closed and open-ended questions. The questionnaires were distributed to participants, filled and returned on the same day.

**Ethical Consideration**

The principal investigator obtained an informed verbal consent from all participants prior to their participation in the study. All participants were guaranteed of anonymity and confidentiality of the information obtained. Again, participants were assured that data collected was to be used solely for academic purposes.

**Data Analysis**

The data was analysed using the Statistical Package for the Social Sciences (SPSS) version 20.0. Descriptive statistics was computed and Chi-squared ( $\chi^2$ ) tests were done at a 5% significance level to assess statistical significance of associations obtained.

**Results**

**Demographics of Participants**

A total of 120 undergraduate spectacle wearers comprising forty-eight males (40%) and seventy-two females (60%) participated in this study. Out of this number, seventy-four (61.7%) of the participants were between the ages of 21-25 years, forty-four participants (36.7%) were between 16-20 years and only two participants (1.7%) were above 25 years as illustrated in Table 1 below.

Demographics		Number (%)
Gender	Male	48(40)
	Female	72(60)
Age group (years)	16-20	44(36.6)
	21-25	74(61.7)
	Above 25	2(1.7)

**Table 1:** Demographics of Participants

**Participants’ Awareness of Contact Lens Use with its Benefits and Complication**

Participants’ responses were solicited on whether or not they have heard of the use of contact lens in correcting vision problems. A majority of one hundred and fifteen (95.8%) interviewees indicated they had heard about contact lenses while a minority of five (4.2%) of the surveyed students said they had not heard about contact lenses.

Out of the total participants surveyed, forty-two of them (35%) knew some benefits of contact lenses while seventy-eight of them (65%) were totally clueless of the benefits of contact lenses. In addition, some seventy-six participants representing 63.3% of the sampled population were fairly acquainted with the complications of contact lenses while the remaining forty-four participants (36.7%) were uninformed of the complications that could arise from contact lens usage. A summary of participants’ awareness of contact lenses has been presented in Table 2 below.

Contact Lens Awareness	Number of Participants and Percentage		
	Aware	Not Aware	Total
Cognisance	115(95.8%)	5(4.2%)	120(100%)
Benefits	42(35%)	78(65%)	120(100%)
Complications	76(63.3%)	44(36.7%)	120(100%)

**Table 2:** Awareness of Contact Lens among Participants

### Participants’ Awareness of Contact Lens Use vis-à-vis Duration of Spectacle Wearing

The number of participants who were cognisant of contact lens use in correcting refractive errors was computed on the basis of how long they have been wearing their spectacle correction. The specificities of this have been outlined in Table 3 below.

Duration of Spectacle Wear	Participants Awareness of Contact Lens Use		
	Aware N (%)	Not aware N (%)	Total N (%)
Less than 2 years	20(16.7)	2(1.7)	22(18.3)
2-5 years	33(27.5)	2(1.7)	35(29.2)
6-10 years	47(39.2)	1(0.8%)	48(40.0)
More than 10 years	15(12.5)	0(0.0)	15(12.5)
<b>Total</b>	115(95.8)	5(4.2)	120(100)

**Table 3:** Participants’ Awareness of Contact Lens Use vis-à-vis Duration of Spectacle Wear

### Participants’ Response to the Choice of Contact Lenses as Alternative to Spectacles

Participants were asked if they would choose contact lenses as a substitute to address their refractive errors. Fifteen males (12.5%) and thirty-four females (28.3%) responded in the affirmative whereas thirty-three (27.5%) males and thirty-eight (31.7%) females responded in the negative. In total, forty-nine (40.8%) participants from the sampled population indicated the choice of contact lenses as an alternative to spectacles in correcting their refractive errors while seventy-one (59.2%) participants objected to contact lenses as an alternative to spectacles. Table 4 below provides an overview of the participants’ response to contact lenses as alternative to spectacles.

Gender	Response to choice of contact lenses		
	N (Yes)	N (No)	Total
Male	15(12.5)	33(27.5)	48(40)
Female	34 (28.3)	38 (31.7)	48(40)
<b>Total</b>	49 (40.8)	71 (59.2)	120(100)

**Table 4:** Contact Lenses as Alternative to Spectacles

### Participants’ Satisfaction with Spectacles and Preference for Contact Lenses

A comparison between participants’ satisfaction with spectacles and their preference for contact lenses was made. In all, ninety-four participants were satisfied with their spectacle correction and forty-nine indicated their preference for contact lenses if they were available. A detailed illustration of this can be seen in Table 5 below.

Spectacle Satisfaction	Preference for Contact Lenses if Available			
	GENDER	N (YES)	N (NO)	TOTAL
<b>SATISFIED</b>	M	11	25	36
	F	25	33	58
<b>NOT SATISFIED</b>	M	4	8	12
	F	9	5	14
<b>TOTAL</b>		49	71	120

**Table 5:** Spectacle Satisfaction Versus Contact Lens Preference

### Participants’ Reasons for the Preference of Contact Lenses if Available

Out of the forty-nine participants who indicated their choice for contact lenses if available, the decision of twenty-six (53.1%) participants was informed by cosmetic reasons while sixteen participants (32.6%) registered their dissatisfaction with spectacles. The decision of the remaining seven participants was merely adventure-driven as they sought to compare the two optical devices can be seen in Table 6 below.

Reason for choice	Spectacle Wearers who would Prefer Contact Lenses if Available	
	Number	Percentage
Dissatisfied with spectacles	16	32.6%
Cosmetic reasons	26	53.1%

	Spectacle Wearers who would Prefer Contact Lenses if Available	
Means of Comparison with contact lenses	7	14.3%
<b>Total</b>	49	100.0%

**Table 6:** Reasons for the Choice of Contact Lenses if Available

### Reasons for Non-usage of Contact Lenses by Participants

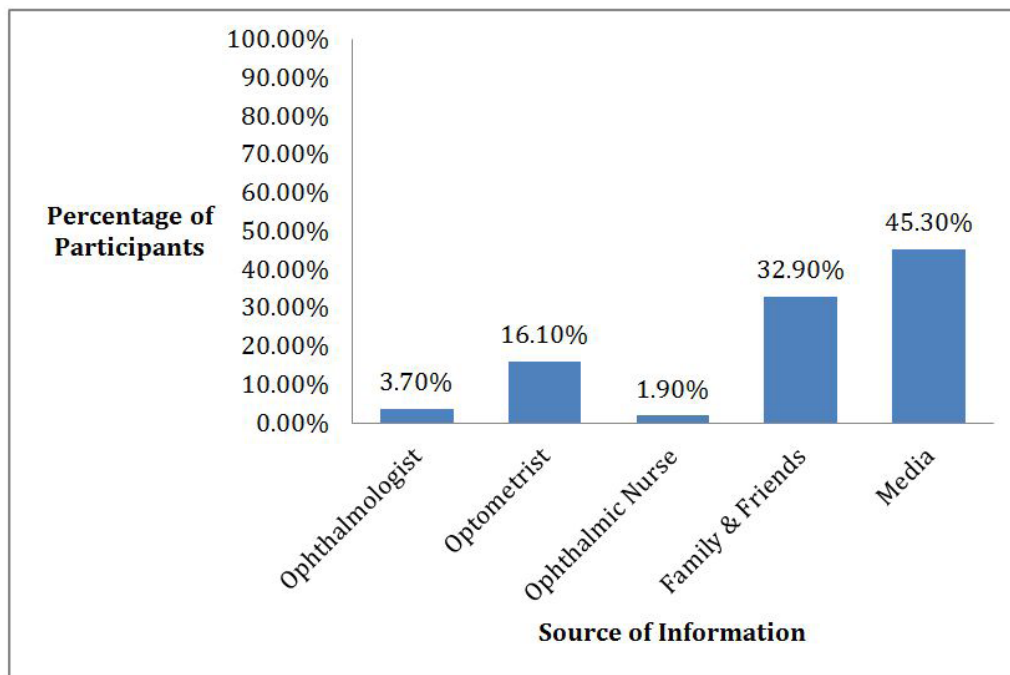
A greater majority of 47.5% of the participating students mentioned fear of side effects as the reason for their detachment from contact lens usage. Some 18.3% of the participants were satisfied with their spectacle correction and another 18.3% simply lacked the needed information that would stimulate them to go in for contact lenses. High cost of contact lenses was the major obstacle to 12.5% of the participants who had affinity for spectacles. Table 7 below represents the trend in participants’ reasons for non-usage of contact lenses.

Reason for Non-usage of Contact Lenses	Spectacle Wearers	
	Number	Percentage
Lack of Information	22	18.3%
High Cost	15	12.5%
Fear of Side effect	57	47.5%
Non-availability of Contact Lens Service Providers	2	1.7%
Satisfied with spectacles	22	18.3%
Not Interested	2	1.7%
<b>Total</b>	120	100.0%

**Table 7:** Reasons for Non-usage of Contact Lenses by Participants

### Participants’ Sources of Information On Contact Lenses

The source from which participants obtained their information on contact lenses was investigated and the result has been graphically illustrated in Figure 1 below.



**Figure 1:** Participants’ Sources of Information on Contact Lenses

## Discussion

### Demographics of Participants

A total of 120 undergraduate spectacle wearers willingly partook of this study. Forty-eight (40%) were males and



seventy-two (60%) were females: a male to female ratio of 2:3. A higher number of females as compared to males had been recorded in previous related studies [7,12]. For instance, in Ayanniyi et al's study, 56.5% females and 43.5% males were recorded. This higher female participation was attributed to the prevailing cosmetic use of contact lenses among this group [11]. The higher number of females in the present study could emanate from the fact that more females than males wore spectacles in the institution.

In line with the present study, a preponderance of seventy-four (61.7%) of the participants were between the ages of twenty-one and twenty-five years. This presents a stark contrast in relation to other studies in which younger contact lens wearers aged 10 and 14 years and relatively older wearers aged 33 years were recorded [12,14]. Such disparity clearly stems from differences in the sampled population and the overarching purpose of these studies.

### **Participants' Awareness of Contact Lens Use with its Benefits and Complication**

The response of participants on awareness of contact lenses revealed that a majority of one hundred and fifteen (95.8%) interviewees had some knowledge on contact lenses while only five (4.2%) of the surveyed students were ignorant of this optical device. This trend is evident in other studies where spectacle wearers were very much aware of alternatives to spectacle correction [7].

Despite participants' consciousness of contact lenses, only a few of them (35%) knew some benefits of contact lens usage. Most participants (65%) exposed their obliviousness of the benefits of contact lens usage. This disconnects between awareness of contact lenses and the awareness of the benefits thereof, can be attributed to poor education and advocacy on the subject matter by the relevant stakeholders.

Nevertheless, quite a number of the participants (63.3%) in the present study indicated they had some knowledge of the potential complications of contact lens usage. This was contrary to a study where 84% of the participants had no knowledge on contact lens complications [8].

### **Participants' Awareness of Contact Lens Use vis-à-vis Duration of Spectacle Wearing**

In the present study, it was found out that majority of participants were aware of contact lenses irrespective of how many years they had worn their spectacle prescription. The chi-square computation for participants' awareness of contact lenses and the duration of spectacle wearing showed no statistically significant association ( $p$ -value = 0.437). This result is consistent with a study where usage of spectacles was not significantly associated with participants' awareness of contact lenses [7].

### **Participants' Satisfaction with Spectacles and Preference for Contact Lenses**

Out of the 120 spectacle wearers who participated in the present study, ninety-four participants (78%) were satisfied with their spectacle correction while 26 participants (22%) were not. It can be seen that majority of the participants were satisfied with their spectacle correction just as seen in a previous study [15]. Hence, it is not surprising that seventy-one participants (59%) would not opt for contact lenses as an alternative to spectacles. It is interesting to note however that, only 22% of the participants were unfulfilled with spectacle correction, yet 41% of them were willing to use contact lenses if available. The chi-square test for gender and 'preference for contact lenses' and 'participant satisfaction' showed no statistically significant association ( $p$  = 0.058 and  $p$  = 0.191 respectively).

### **Reasons for Preference for Contact Lenses as Alternative to Spectacles**

A greater percentage of 53% of the sampled population cited aesthetic reasons for their decision to opt for contact lenses while a third of the participants would want to try contact lenses because they were not satisfied with the use of spectacles. This finding gives credence to Abahussin *et al*'s study where a high prevalence of contact lens use for cosmetic reasons by female university students in Saudi Arabia was reported [9].

### **Reasons for Non-usage of Contact Lenses by Participants**

A greater majority of 47.5% of the participating students mentioned fear of side effects as the reason for their detachment from contact lens usage. The potential complications of contact lenses were principally cited as the reason for non-usage in most studies [16,17]. The high cost of contact lenses and the inadequacy of information on this optical device also discouraged many others from patronising it [18].

### **Participants' Sources of Information on Contact Lenses**

In assessing the role of eye care professionals in contact lens usage, the source from which participants obtained information on contact lens usage was investigated.

From the data collected, it was discovered that the print or electronic media was the major source of information on contact lenses according to the majority (45.3%) of the participants. Some 16.1% of the total study participants had their information from optometrists while ophthalmologists were reported to have passed information on contact lenses to a small number (3.7%) of the respondents. In fact, ophthalmic nurses had provided information on contact lenses to the least number (1.9%) of participants in the survey. This clearly shows that eye care professionals had not been at the forefront of contact lens education.

The “Social Marketing Potential Qualitative Cost-free-to-patient Eye Care Programme in Nigerian community” gathered that getting consumers informed about available services could enhance positive attitudes to such services [18].

## Conclusion

This research sought to investigate the awareness and response of undergraduate spectacle wearers to contact lens usage. Whilst most of the study participants were cognisant of contact lenses, only few of them were aware of its benefits and potential complications. The Ghana Optometric Association and the Ministry of Health should organize in-service training for eye care professionals especially optometrists, to help intensify the dissemination of information on contact lenses as an alternative refractive error correction. It is recommended that the Ministry of Health and the Ghana Optometric Association should be at the forefront of contact lens education.

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