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Evaluation of Spectacle Prescription Non-Tolerance and Its Management Strategies in A Tertiary Hospital in Bauchi, Bauchi State, Nigeria

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Abstract

Background: Despite widespread utilization of spectacle for vision improvement, many individuals experience discomforts while using it. This study tends to evaluate the causes of spectacles' prescription non-tolerance in a tertiary hospital in Bauchi State.

Method: Retrospective cross-sectional research design was employed in the study. The sample size consisted of thirty males and females' patients; aged 9 to 72 who returned to the Eye clinic of the Abubakar Tafawa Balewa University Teaching Hospital, Bauchi; within one month their spectacles were dispensed due to discomfort. Their mean age was 44.8 ± 12.4 years and 63.3% were females. The patients' demographics, spectacles non-tolerance complaints, reassessment, and management outcomes were drawn from their medical files. Pearson chi-square test was used to investigate associations between outcome variables and $p < 0.05$ was considered statistically significant at 95% confidence level.

Results: A total of 1860 spectacles were dispensed during the study period, with 1.61% spectacles non-tolerance prevalence and highest at age 41-57 years (43.3%). Dispensing errors (70%) were the main causes, common among presbyopes (66.7%). Age and causes of non-tolerance were insignificantly associated ($\chi^2_{cal} = 2.62 < \chi^2_{0.05(12)} = 21.026$, $p = 0.9976$).

Conclusion: There was minimal spectacles non-tolerance outcome. However, spectacle reverification before dispensing would go a long way in reducing the frequency of non-tolerance.

Keywords:

Spectacle, Non-tolerance, Dispensing, Refractive errors, Discomfort.

1.0 Introduction

Spectacles or eye glasses remains the most affordable, nonsurgical, and widely acceptable method of refractive errors correction, offering a high success rate in improving visual clarity and overall quality of life (Gebresellassie, et al., 2023; Onyeahiri, et al., 2024). It can also serve as a protective device, means to conceal eyes defects, fashion, and as a mark of dignity. (Mukhaiseer, et al., 2021; Onyeahiri, et al., 2024). These refractive errors include myopia, hyperopia, astigmatism, and presbyopia. Despite the importance and extensive utilization of spectacle for daily life engagements, a lot of folk's

experience discomfort or difficulty adapting to its use, and not much considerations have been given to comprehending the reasons behind the non-tolerance by concerned authorities (Mukherjee, et al., 2024). Like adverse drugs reactions, any adverse effect, discomfort, or difficulty experienced by any individual as a result of wearing or using their prescribed spectacles or glasses is known as spectacles prescription non-tolerance or spectacles intolerance. It is a significant issue affecting millions of people globally who rely on their eyeglasses for vision improvement. Without addressing this challenge critically, it can lead to patients' spectacles non-wearing or decrease wearing time which may significantly impact individuals' daily activities, quality of life, productivity, and overall well-being (Mukherjee, et al., 2024).

Doubtlessly, dispensing a spectacle to a patient is not the end of the matter; it may be the genesis of a problem for both the eye care practitioner and the patient. This entails the importance of a thorough quality check on the spectacle's parameters for precision before dispensing (Kalicheti, et al., 2023). Therefore, achieving high patient satisfaction with the refractive correction is a crucial objective in practice, as dissatisfaction can erode the Doctor-Patient relationship, leading to reduced patient compliance and prevention of others from seeking care from the practice (Kumari, et al., 2019; Mukherjee, et al., 2021).

Spectacle non-tolerance is characterized by eye strain, discomfort around the nose or ears, eye pain, headache, dizziness, fatigue, visual distortion, and adaptation difficulty. The condition may be temporary or chronic and may arise during the initial adjustment period to new glasses or persist over time. When spectacle non-tolerance occurs, it's crucial to handle the issue objectively as dispensing errors alone may not be the sole reason. Associated symptoms of spectacle non-tolerance can arise from various underlying factors, making it essential to conduct a thoroughly investigation to identify these associated causes. In a study on "Spectacles Under Utilization and Associated Factors Among Adults in Hawassa, South Ethiopia, June, 2022", discomfort with the spectacles (11.4%) and psychological believed that it was not necessary (14.9%), was the causes of patients returning for re-refraction after spectacles were dispensed (Gebresellassie, et al., 2023). This study reveals that multiple factors may have strong and significant association with spectacles non-tolerance which only strict objective investigation can unravel.

Spectacle prescription non-tolerance can be associated with factors such as: Refraction errors (which may occur as a result of incorrect prescription during eye examination); Dispensing errors (which constitute wrong lens marking, fixing, lens type, frame fit, lens material, and lens coating or tint); Communication gap; Acute ocular diseases; and psychological issues. Different types of lenses e.g., bifocals, trifocals, and progressives can create challenges for some wearers. The presence of demarcation line or multiple focal points may lead to image jump, or visual distortion, particularly for those not accustomed to such issues (Hwang, et al., 2019). Improperly or ill-fitting frame can cause pressure points on the nose or ears, leading to discomforts. Frames that are too tight or loose, or non-fashionable can affect alignment with the eyes, contributing to visual issues. The choice of lens material due to their weight, thickness, or optical properties, lens coating or tints can impact comfort causing visual disturbances, such as glare or reflection. Underlying ocular and health disease conditions such as dry eye syndrome, binocular vision disorder, refractive anomalies, diabetes, or hypertension may exacerbate spectacle non-tolerance. Psychological issue such as, individual's cognitive dissonance resulting from information or experience that contradicts existing belief or values encountered by such person, can give rise to spectacle non-tolerance. To resolve this discomfort, they may reject or devalue new information, leading to intolerance towards differing perspective or lifestyle. Other psychological issues may include, fear and anxiety, confirmation bias, and social learning. Spectacle non-tolerance is more common among first time wearers or those who have not worn glasses for a long time, particularly those who are dispensed with progressive lenses or cylindrical lenses. In Kalicheti, et al., study, 37% of recheck frequency was due to a change in cylindrical power (error) in prescription, also dispensing-related issues such as wrong pupillary distance, and frame type were major reasons for 58% of the intolerance in the study (Kalicheti, et al, 2023). Communication gap can also lead to spectacle non-tolerance through misinformation, lack of cordial Doctor-Patient interaction, as well as negative media sensation. A rise in non-tolerance cases within a clinical setting can impact a clinician's reputation and lead to extra expenses related to reassessment and replacement (Bist, et al., 2021). In a recent systematic review and meta-analysis of spectacle non-tolerance studies, (Bist, et al., 2021) reported a pooled prevalence of spectacle non-tolerance of 2.1% of eye examinations. This shows that in the United Kingdom (UK), approximately 473,340 (2.1% of 22.54 million)

rechecks were carried out yearly, and close to 500 thousand unsatisfied patients returned to clinics for reassessment with new spectacles dispensed at no cost to the patients. These patients may represent only a small portion of larger issues, as it's likely that many other patients who are dissatisfied with their spectacles also did not come back (Beesley, et al., 2022). In addition, (Kumari, et al., 2019), in their study revealed that spectacle non-tolerance reassessment comprised 33 of the 165 (20%), presbyopes 31%, and young adult 27% of eye examinations during the study period. Furthermore, dispensing errors (52%) and prescription errors (48%) were the cause of non-tolerance.

Clinically, Spectacle non-tolerance is seen as any discomforts, adverse effects, or adaptation difficulty experienced by a patient while using his or her newly dispensed spectacle prescribed by a qualified eye care practitioner in an eye clinic; and returned within one month of usage due to the discomfort. It can be broadly classified into two groups thus: Prescription related non-tolerance and dispensing related non-tolerance. Prescription related non-tolerance occurs as a result of incorrect spectacle prescription. The patients could not conveniently use the prescribed spectacle for their routine activities. It may arise from incorrect refraction values, or a mistake of omission in recording the refraction results. Dispensing related non-tolerance occurs when the patients could not comfortably use their dispensed spectacles for their routine activities as a result of fitting or glazing associated errors. It may arise from wrong marking of axis, improper segment height as in bifocals or varifocals, alteration of lens type and material, alteration of lens power, alternation of the eyes' prescription powers, optical centration problems, cosmetically ill-fitting frames, patient adaptation problems, and ineffective or lack of patient counselling. This kind of error is common with the dispensing optician and can be rectified with the optometrist's help.

Exhibiting essential dispensing skills involves proactively addressing potential optical, functional, and cosmetic issues. Practitioners should carefully assess both the optical and cosmetic aspect of the prescription, while also putting into cognizance the patient's lifestyle, hobbies, and work requirements when dispensing spectacles. Many common reasons for non-tolerance can be avoided from outset through effective communication, which helps clarify the specific purpose for which the patient needs their spectacles. This allows for suitable recommendations and accurate ordering (Kumari, et al., 2019). Additionally, verifying the final order against the records upon completion, preparing the frames prior to collection, and providing clear instructions on how to use the spectacles can significantly reduce the likelihood of non-tolerance and ensure patient satisfaction.

This study tends to evaluate the causes of patients' non-tolerance to their dispensed spectacle prescription, type of spectacle lenses (spherical or spherocylindrical) that were often dispensed inaccurately, and management strategies employed to remedy the challenges in a tertiary hospital in Bauchi, Bauchi State, Nigeria.

Spectacle non-tolerance is a common occurrence encountered in daily optometric practice and affects large number of people who rely on their glasses for optimal vision. This may likely be associated with the complex physical, physiological and psychological processes involved with the sense of sight. To achieve successful management of this process, practitioners must adopt a thoughtful, understanding, and compassionate attitude, ensuring that the entire patient's concern is thoroughly addressed and resolved to their utmost satisfaction (Kumari, et al., 2019). In this regard, the practitioner is to ensure that the patient is dispensed with an optical correction that provides optimum visual performance, wearing comfort, and cosmetically pleasing. Consequently, practitioners must have efficient clinical and dispensing proficiencies along with psychological insight and effective communication skills, to promptly address and resolve any concern patients may have. In fact, unprofessional handling of spectacle non-tolerance issues can erode patient trust in the practitioner, which could adversely affect the reputation of the practice (Mukherjee, et al., 2021). On the other hand, the opposite is the case on cordial resolution.

Furthermore, understanding patients' psychological traits regarding spectacle non-tolerance can help eye care professionals determine the best approach to addressing their challenges. This will lead to providing personalized care and recommendations that will culminate to increased patient satisfaction, loyalty, and retention (Cho, & Lee, 2017; Shappard, & Wolffsohn, 2018). It will also guide the practitioner to understand patients' needs which will help improve productivity and reduce the economic lost in spectacles replacement due to non-tolerance. Besides, there seem to be a significant association between patients' age and spectacle non-tolerance predisposing factors which might aggravate the non-tolerance. In fact, the little or non-regard given to comprehending the reasons behind the spectacle non-tolerance, and the sudden wave of complaints of discomforts by patients concerning their prescribed spectacles in the

eye complex of the tertiary hospital in Bauchi, Bauchi State, prompted the uptake of this study to ascertain the true position.

The evaluation of the study outcomes will help eye care practitioners regularly undertake accurate verification of their refraction outcome, lens markings, and ordered lenses against the record when received, as well as proper guidance of patients in frames selection and communicating clear instruction on the intended use of the spectacles which will cumulatively help in mitigating the occurrence of spectacle non-tolerance. (Kumari, et al., 2019; Mukherjee, et al., 2021). This approach ensures that patients receive eyewear that is not only comfortable and functional but also provides optimal vision, minimizes eye strain, and meets cosmetic expectations, ultimately offering excellent values for their investment. By doing so, it can enhance productivity and overall quality of life of individuals who wear them. Furthermore, by addressing spectacle non-tolerance, practitioners can proactively anticipate and prevent optical, functional, and cosmetic issues. This approach also promotes patient education on proper frame and lens selection, maintenance, and adaptation. Additionally, it will enable the identification of cost-effective solutions to addressing spectacle related discomfort and vision problems, ultimately reducing healthcare costs (Liu, et al., 2020). Effectively addressing spectacle non-tolerance issues can have numerous benefits, including enhanced professional reputation, improved work environment, and job satisfaction, increased patient loyalty and attraction, and ultimately, boost sales and revenue growth. The outcome can also facilitate interdisciplinary collaboration among optometrists, ophthalmologists, eye care consumables manufacturing engineers, and materials scientists, which can lead to innovative solutions and more comprehensive understanding of the complex factors that affect spectacle wearability (Shappard, & Wolffsohn, 2018; Liu, et al., 2020). Furthermore, it can drive innovation in eyewear technology, including lens materials, frame designs, and coatings, which can lead to the development of more comfortable, functional, and aesthetically pleasing eyewear (Wolffsohn, et al., 2018; Liu, et al., 2020).

2.0 Materials and Methods

2.1 Research Design

A retrospective descriptive cross-sectional research design was employed, in order to achieve the purpose of the study.

2.2 Research Setting

The study was carried out at the Eye Clinic of Abubakar Tafawa Balewa University Teaching Hospital, (ATBUTH), Bauchi, Bauchi State, Nigeria between July 20, 2025 and November 30, 2025. The hospital is among the tertiary hospitals in the state and it's located in the state capital. The facility has multi-specialty eye units that offer comprehensive eye care services to patients and other patients referred from other healthcare centres within and outside the state. It also has a standard optical service unit that provides quality services as per the optical needs of the patients.

2.3 Study Population, Sample Size and Sampling Technique

The study population consisted of 1,860 patients who were dispensed with spectacles out of the 4303 patients, male and female aged 9 to 72 years old, who underwent refraction (test for glasses) at the eye unit of the tertiary hospital, between July1, 2023 and December 31, 2024: according to the Records and Health Information Unit of the clinic. The sample size selected randomly without replacement and consisted of 30 patients (out of the 1,860 that were dispensed with spectacles) who returned to the clinic after one month their spectacles were dispensed due to discomfort and was reassessed with the reason for the discomfort noted in their medical file. The lower age limits of 9 was included because they had attained a middle school age and were able to express their non-tolerance effect of their spectacles as the adults could do, but younger children were often unable to do so. The inclusion criteria were that the patient must have undergone a refraction test and the spectacle dispensed from the clinic. In addition, the patients must have returned to the clinic with the spectacle within one month it was dispensed if found unsatisfactory to use. According to Strang, et al., 1998, the average time for spectacle adaptation is seven days (1 week) (Mukherjee,

et al., 2021), however, one-month grace criterion was given because some patients with spectacle non-tolerance might have unforeseen challenges that might have limited them from returning to the clinic on time.

The exclusion criteria were patients with developmental disorder such as Down syndrome, autism spectrum disorder, and Sensory Processing Disorder. Individuals with these personalities tend to be hyperactive and restless, with limited patience and adaptability, making it difficult for them to adjust to new situations or try novel experiences. In addition, patients with any systemic disease, ocular trauma, or ocular pathology such as diabetes mellitus or hypertension that can easily alter the refractive status of the eye if not effectively controlled and can lead to frequent change in spectacle power. Furthermore, those patients who transit on their own choice from one spectacle design to the other, such as changing form bifocal to progressive or vice versa, or from full rimmed frames to rimless frames as well as patients whose spectacles or their prescriptions were obtained from other eye clinics elsewhere were also excluded.

3.0 Data Collection and Analysis

In order to gain access to the patients’ files, research clearance permit was obtained from the Research and Ethics Committee of the ATBUTH, Bauchi, Bauchi State, before the commencement of the study. The demographics (age, gender) of the sample size (30 patients), their spectacles non-tolerance complaints, and reassessment and management outcomes were collected from their medical files; between July 20, 2025 and November 30, 2025. However, reassessment records without records for spectacle reassessment reasons were excluded.

Data analysis was performed using the Statistical Package for the Social Sciences (SPSS) version 23. The results were calculated in frequencies and percentages. Tables were used to present the results for easy appraisal. Descriptive statistics was used to compute the proportion of causes of patients’ spectacle non-tolerance and Pearson chi-square (χ^2) test was used to assess the significant associations between the outcome variables at appropriate degree of freedom and $P < 0.05$ was considered statistically significant at 95% confidence level.

3.1 Ethical Consideration

Research and Ethical Clearance for the study were obtained from the Research and Ethics Committee of the ATBUTH, Bauchi, Bauchi State. Confidentiality and anonymity were ensured with records and the information collected from the patients' file and they were used solely for the purpose of the study. The study was also performed in accordance with the tenets of the Declaration of Helsinki, 2013.

4.0 Results

Socio-demographic Characteristics

Table 1: Cross tabulation of age and gender distribution of the spectacle non-tolerance reassessment patients (n=30)

Age (years)	Male f(%)	Female f(%)	Total (%)
9 – 24	2(6.66%)	2(6.66%)	4(13.33%)
25 – 40	2(6.66%)	4(13.33%)	6(20.00%)
41 – 56	5(16.66%)	8(26.66%)	13(43.33%)
57 – 72	2(6.66%)	5(16.66%)	7(23.33%)
Total	11(36.64%)	19(63.31%)	100%

A total of 1,860 patients were dispensed with spectacles during the one-and-a-half-year study review. Out of these numbers, 30 were spectacle non-tolerance re-examination, which accounts for 1.61% prevalence. The genders distribution of the spectacle non-tolerance reassessment patients were 11(37.0%) males and 19(63.0%) females with age ranging from 9–72 years (mean age: 44.8±12.4). The age and gender distributions of the patients were as presented in (Table 1). There was unequal gender distribution of the patients which stood at male to female ratio of 1:1.7. The age group of 41–56 years (43.33%) had the highest number of patients followed by 57–72 years (23.3%), while 9–24

years' (13.3%) age group had the least. However, majority of the patients (86.6%) from both sexes were within the 25–40 years (20.0%), 41–56 years (43.3%), and 57–72 years (23.3%) age brackets, thereby substantiating the average age established.

4.1 Reasons or Factors Responsible for Spectacle Non-tolerance

The factors or reasons responsible for spectacle non-tolerance as were drawn from the reassessment records in the patients' file were categorized into five distinct parts: (1) wrong refraction results (spherical error $\geq 0.25DS$, cylindrical errors $\pm\geq 0.25DC$, and axis error $\geq 5^\circ$); (2) errors of documentation of refraction results; (3) errors of lens power transposition; (4) dispensing errors (wrong segment heights; incorrect inter-pupillary distance (IPD); ill-fitting frame size e.g. over-sized or under-sized frames; inappropriate lens type e.g. single vision bifocal or progressive addition lens, photochromic or plane, differences in prescribed lens powers (spherical and cylindrical errors $\geq \pm 0.25DS$ or $\pm 0.25DC$, axis error $\geq 5^\circ$); and (5) Adaptation problems (to bifocals or progressives lenses). The frequencies of their occurrences were as presented in table 2. Some of the patients' complaint or discomforts with their spectacle include: image jumping or disturbances of the demarcation line in bifocals, double vision, headaches, fatigue, objects distortion as in wrong cylindrical axis, blurry vision, tearing, object magnification, difficulty in using the glasses for extended time, lenses constantly falling of the frame, frame falling off the face on stooping down, and the ground looks slanting or up and down while walking the glasses.

Table 2: Factors responsible for patients' spectacle non-tolerance (n=30)

Reasons for spectacle non-tolerance	Frequency (f)	Percentage (%)
wrong refraction results	4	13.3
Errors of documentation of refraction results	5	16.7
Errors of lens power transposition	4	13.3
Dispensing errors	10	33.3
Adaptation problem	7	23.3
Total	30	100

From table 2, the major reasons for spectacle non-tolerance among the patients were both prescriptions related non-tolerance and dispensing related non-tolerance. The prescription related non-tolerance constituted 9 out of the 30 or 30.0% (wrong refraction results 13.3% and errors of documentation of refraction results 16.7%); while dispensing related non-tolerance constituted 21 out of the 30 or 70.0% (errors of lens power transposition 13.3%, dispensing errors 33.3%, and adaptation errors 23.3%) of the non-tolerance re-assessment patients.

The wrong refraction results came from hyperopia overcorrection 3(33.3%), presbyopia overcorrection 3(33.3%), and wrong cylindrical axis results 2(22.2%) with amendment range between 10-20 degrees. In addition, the hyperopia and presbyopia over-corrections were common among the age group higher than 40 years. Furthermore, errors of documentation of refraction results (16.7%) emanated from incorrect recording of reading addition 2(22.2%), incorrect spherical prescription recording 1(11.1%), and, omission of the axis of cylindrical prescription 2(22.2%).

Similarly, the errors of lens power transposition came from of wrong transposition of minus sphere combined with plus cylinder 3(14.3%) and wrong transposition of a plus sphere combined with a minus cylinder 1(4.8%). The dispensing errors came from wrong segment heights 4(19.0%), incorrect inter-pupillary distance (IPD) 2(9.5%); ill-fitting frame size (over-sized and under-sized frames) 2(9.5%), and incorrect lens type (fixing a bifocal against a progressive addition lens), 2(9.5%). These dispensing errors occurred as a result of the dispensing practitioner's failure to put into consideration the patient's daily activities, occupation, hobby, and eye symmetry before dispensing the spectacle. In addition, the adaptation problems come from problem of Progressive Addition Lens adaptation 3(14.3%), bifocal lens

adaptation problem 2(9.5%), high spherical lens power adaptation problem 2(9.5%). These adaptation problems occurred mainly among first time spectacle lens wearers and cuts across all age group, but most prominent in age group of 40 years and above.

Hypothesis Ho: There is no significant association between causes of spectacle non-tolerance and age of the patients.

Table 3: Influence of age distributions of the patients on causes of spectacle non-tolerance and the Pearson chi-square test results. df=12

Causes of spectacle non-tolerance	Age distribution (years)				X ²	p-value
	9-24 n=4 f	25-40 n=6 f	41-56 n=13 f	57-72 n=7 f		
wrong refraction results	0	1	2	1	0.61	0.9999
Errors of documentation of refraction results	1	1	2	1	0.18	0.9999
Errors of lens power transposition	1	1	1	1	0.85	0.9999
Dispensing errors	1	2	4	3	0.30	0.9999
Adaptation problems	1	1	4	1	0.68	0.9999
Grand value					2.62	0.9976

X²_{cal} = 2.62; X²_{0.05(3)} = 21.026; p-value = 0.9976; Hypothesis Accepted.

Table 3 showed the grand calculated Pearson chi-square (X²) value of 2.62 with the corresponding table value of 21.026 and a p-value of 0.9976. The hypothesis was accepted because the X²_{cal} = 2.62 < X²_{0.05(12)} = 21.026, p = 0.9976. This implies that there was no significant association between age of the patients and causes of spectacle non-tolerance in the optical unit of the Ophthalmology department of the tertiary hospitals in Bauchi, Bauchi State. The table further showed the calculated Pearson chi-square values of the components of age of the patients and causes of spectacle non-tolerance with their corresponding p-values, and all were statistically insignificant, indicating that age has no effect on the factors associated with spectacle non-tolerance.

5.0 Discussion

When individuals had challenge with their vision, especially those that has to do with the use of spectacles, the next point of call is the eye clinic for a solution. Majority of these patients always presume that since their spectacles were dispensed to them in the hospital particularly in teaching hospitals, it is error free and have no need for verification. However, dispensing a pair of spectacles to a patient does not signify its comfort; but may be the inception of challenges for the patient and the eye care practitioner. Besides, when patients did not return with a complaint of non-tolerance, the eye care practitioner will presume that the spectacles have been correctly dispensed. Like adverse drug reaction, any adverse effect or discomfort resulting from spectacle prescription usage is known as spectacle non-tolerance; and can lead to non-wearing or decrease wearing time which may significantly impact daily life activities, productivity, and overall well-being of an individual. It may also enhance the sustenance of amblyopia in young children, as it will blur their vision instead of improving it (Kumari, et al., 2019). This is why a complete quality check of the spectacle prior to dispensing is significant so as to reduce the frequency of non-tolerance as a result of incorrect spectacles dispensing.

The various spectacle non-tolerance reassessment rates revealed globally in various studies from the optometry and ophthalmology practice both in public and private settings ranges from 1.6% to 2.8% (Mukherjee, et al., 2024). However, the spectacle non-tolerance reassessment rate from a tertiary eye care centre, particularly in Bauchi, Bauchi State and the nation in extension has not been reported. In this study, the spectacle non-tolerance reassessment rate was found to be 1.61%, which was also in tandem with previous reviews elsewhere. In this study, the age group of 41–56years had the highest spectacle non-tolerance and reassessment cases 13(43.33%), followed by age group of 57–72years 7(23.33%); while the least non-tolerance occurred within the group of 9–24years 4(13.33%). This finding was in line with the studies carried out in India among patients experiencing spectacle non-tolerance seen at a Gurgaon Delhi NCR based Optical outlet particularly with age group of 41–56years; and at the optical department of the Biratnagar Eye Hospital (BEH), Biratnagar, Nepal, India (Kumari, et al., 2019; Mukherjee, et al., 2024). The likely reason behind the low spectacle non-tolerance cases among the young age group might be as a result of better adaptability. Young individuals are generally more adaptable and flexible to change in their vision as a result of their high intact accommodative ability and can adjust more easily to wearing their prescribed spectacles. They also exhibit better convergence ability which can help to compensate for spectacle related changes. On the other hand, the high spectacle non-tolerance cases among older age groups might be linked to their high sensitivity to slight changes that caused non-tolerance due to decrease accommodative ability associated with aging. However, spectacle non-tolerance might not be associated with gender, as the spectacle non-tolerant associated errors might occur by chance across both genders due the oversight function of the eye care practitioner. Also, the visual system's structure and function are similar between males and females, which might contribute to similar adaptation rates to spectacles. Besides, both males and females are exposed to similar environmental factors, and lifestyle habits such as screen time, reading, and outdoor activities, which can impact vision, spectacle non-tolerance, and adaptation equally.

Moreover, in this study, the associated factors for spectacle non-tolerance and reassessment were, in order of decreasing frequency: dispensing errors 10(33.3%), adaptation problems 7(23.3%), errors of documentation of refraction results 5(16.7%), errors of lens power transposition 4(13.3%), and wrong refraction 4(13.3%). These outcomes were in line with the study conducted at the optical department of the Biratnagar Eye Hospital (BEH), Biratnagar, Nepal, India, especially the dispensing errors (Mukherjee, et al., 2024), but contrary to the study conducted at a busy Community Optometric Practice in Eye Hospital, Delhi, India (Mukherjee, et al., 2021). In the study in Delhi, India, dispensing error was (11%), adaptation problems (36%), data entry error (11%), and change in refraction (42%). The differences in the values might be as a result of the number of patients involved, age range, and clinical efficiency of the practitioner. In this study, 9–72 years was the age range, with 30 patients involved while that of Delhi, India, 18–70 years was the age range with 47 patients were recruited.

The reasons for the non-tolerance as recorded in this study, mainly the dispensing errors might be related to non-consideration of patient's daily activities, occupational requirements, hobby, and ocular alignment by the dispensing optician before dispensing the spectacles. It might also be in conjunction with errors of lens power transposition, which might be associated with lack of acquisition of certification in spectacle dispensing by the dispensing opticians. A great number of them engaged in the job acquired the trade by trial-and-error method or from their senior colleagues, most of whom also do not have any fundamental training and certification. On the other hand, some might have acquired the necessary certification but has not been well grounded in the field. This calls for urgent need for functional training and regulation of dispensing opticians' practice in the country. Wrong refraction might be associated with inaccurate responses of the patient to the practitioner's questions during subjective refraction leading to erroneous refraction conclusion. Fatigue in both the practitioner and the patient as a result of physical (work) and mental exhaustion as well as longer time taken in refraction respectively might result in wrong refraction outcome and documentation. It might also be due to errors of omission resulting from unforeseen side distraction. Adaptation problem might be associated with first time spectacle wearers, mainly high-power single vision lenses. Also transition from bifocals to progressive lenses or vice versa as a result of image jump associated with bifocals and induced prisms of progressive lenses due to inaccurate IPD centration might also be a factor. This might result in image distortion, headache, and blurry vision. Besides, aging due to decrease in accommodative ability and convergence in-facility is not left out as a factor in adaptation problem.

According to Strang, et al., 1998, the average time for spectacle non-tolerance and adaptation is seven days (1 week) (Mukherjee, et al., 2021). However, in this study, ten patients returned within one week, four within two weeks and sixteen between three to four weeks due to discomforts with their dispensed spectacles. More presbyopes (patients above 40years old) 20(66.7%), returned for spectacle non-tolerance reassessment than pre-presbyopes (patients between 35-40years old), and non-presbyopes (patients below 35years old) combined 10(33.3%). This indicates that plus lenses were more inaccurately dispensed. This might be associated with decreased accommodative ability as a result of aging resulting in inability to read tiny prints clearly at close working distance. Without effectively considering the accommodative factor of the patient, the letters were made bolder and clearer to the patients with addition of more plus lens power, making the letters easily readable but at the expense of the patients' comfort. It could also be related to incorrect measurement parents' distance refractive errors which might result in an overly plus lens prescription in older patients as a result of insufficient accommodative ability or over accommodation as in younger patients. Other associated factors might be inadequate practitioners' clinical experience, as most of the clinicians were fresh graduates carrying out their internship and youth service programmes; lack of consideration of patients' needs (lifestyle, occupation, hobby, or visual demand), and patients' high accommodative convergence which could result in overcorrection with plus lenses.

Pearson Chi-square analysis showed statistically insignificant association ($X^2_{cal} = 2.62 < X^2_{0.05(12)} = 21.026$, $p=0.9976$) between age and factors responsible for spectacle non-tolerance among the patients who came back for reassessment because of discomforts with their spectacles. This study thus indicated that spectacle non-tolerance is not associated with patient's age, and might occur by chance across the age scale due the oversight function of the eye care practitioner. In addition, individuals' unique differences and visual system including their prescription, eye movement patterns, and visual processing, has a remarkable ability to compensate for changes in vision, including those caused by spectacles regardless of age, hence they play vital roles in determining adaption to spectacle. However, this study sample may not be representative of the broader population, which could limit the generalization of this finding.

6.0 Management Strategies

When patients returned with cases of spectacle intolerance, the first step to salvaging the challenge was to hear, understand, and note the patients' complaint by the dispensing optician, who then rechecked the spectacle to note the source of the discomfort. If dispensing errors were identified as the root cause, for instance: the fit of the frame, inappropriate type of lens (e.g. bifocal or progressive addition lens), or positioning of lens (e.g. bifocal incorrect segment heights); then the spectacle reassessment would be documented and the spectacle re-dispensed with the correct parameters at no cost to the patient. Besides, those who were using the glasses in the wrong way leading to the discomfort were counselled on the right way and were discharged. However, if the non-tolerance persisted even with new rectifications, the patients would be referred to the optometrist for further assessment to verify whether it was a prescription related error or pathological (ocular or systemic) issues. The patient would be re-examined by the optometrist and the new outcome (prescription) compared with the existing record for any discrepancy. Where discrepancies existed, then prescription non-tolerance was the cause and the new and comfortable prescription would be re-dispensed. On the other hand, where there was no difference, the patients were then counselled on spectacle adaptation time which is approximate four weeks.

However, where the patients were unable to adapt as in wearing bifocal due to image jump or disturbances of the demarcation line, they were advised to switch to progressive. In addition, those who were unable to adjust wearing bifocal or progressive (due to induced prisms subject to inaccurate IPD centration), they were advised to have the distance vision and reading segment separated into two spectacles, one for distance vision only and the other for reading only. Furthermore, with the help and advice of the eye care practitioner, those patients that presented with challenges in their frame size, were made to choose frames commiserate to their face as well as temple length. Binocular single vision was also maintained in patients experiencing double vision without any associated ocular pathology by issuing them with prism induced spectacle prescription for comfort. Patients were also assessed for systemic and ocular pathological issues. And when found, the patients were referred to the ophthalmologist, if it was

beyond the handling capacity of the optometrist or the medical outpatient department if systemic related issues like diabetes or hypertension were ascertained.

7.0 Conclusion

Spectacle non-tolerance is a common challenge affecting most individuals who wear corrective spectacles. The study result indicated a minimal spectacle non-tolerance outcome, indicating near optimal service delivery. However, the understanding of the factors that contribute to spectacle non-tolerance and patients' psychological dispositions can help eye care professionals provide more personalized care and recommendations on the best approach to addressing their challenges.

The following limitations should be taken into consideration in analysing the results of this study. The retrospective descriptive survey design nature of the study makes it impractical to generalization of the outcomes. Besides, difficulties may arise in accessing some of the sources due to sites upgrades or maintenance. The study only accounted for patients who returned to the hospital for reassessment, but did not consider those who sought second opinion elsewhere. It was presumed that patients who did not return for reassessment were satisfied with their dispensed glasses. In addition, insignificant issues such as patients' dissatisfaction with their choice of frame colour, or requiring a simple frame adjustment, or needing a change of simple frame to a designer's frame were excluded from the study. One of the strengths of this study was that the data was drawn from the files of males and females' patients from all walks of life (That is, young and elderly, of different educational, economic, professional and social background), without preferences. It also informed strategies to minimizing spectacle non-tolerance and accuracy in spectacle dispensing.

7.1 Recommendations

- Eye care practitioners should prioritize accurate spectacle prescription, proper lens fitting, reverification, and proper patients counselling on effective spectacle utilization before dispensing to reduce the likelihood of intolerance.
- Patients should also be informed to request that the optician double-check the prescription lenses against the original prescription when collecting their glasses to reduce the frequencies of incorrect spectacles dispensing.
- Individuals experiencing spectacle non-tolerance should consult with an eye care professional to determine the underlying causes and develop a management plan to tackle the challenge.
- Government and non-governmental organizations (NGOs) should make research grant available and accessible for further research into the causes and management strategies of spectacle non-tolerance, as well as to develop new technologies and materials for spectacles that could improve comfort and wearability.
- Functional training, certification and regulation of dispensing opticians' practice in the country should be instituted to reduce spectacle non-tolerance resulting from professional inefficiency or quackery.

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Authors Contributions

Onyehiri Collins designed the study and performed data analysis and interpretation. Anyanwu Chidera Sylvia and Isma'il I.Tumfafi coordinated and carried out the data extraction as well as Performed the drafting and critical revision of the manuscript. All authors read and approved the final version of the manuscript.

Conflict of Interest

We hereby declare having no conflict of interest.

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