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Non-Tolerance of Spectacle in an Optical Outlet in Gurgaon (Delhi NCR) - A Longitudinal Community Based Study

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Abstract: ***Aim: To find out non-tolerance to spectacle in a busy community Optometric practice, with single practitioner. Objective: (1) To the spectacle lenses are not dispensed as prescribed; (2) To estimate the type of spectacle lenses (spherical or spherocylindrical) are more often dispensed inaccurately. Methods: Spectacle non-tolerance was defined practically, as a patient who had collected spectacles from the practice and subsequently returned because they were either having problems with, or were unable to wear, their new spectacles. Patients over 16 years of age, who met the above definition of non-tolerance, were sequentially recruited over a 3 month period. Patients experiencing adaptation problems were first seen by a dispensing optician and any dispensing issues resolved. If the spectacle dispensing was felt to be correct, or if the non-tolerance persisted, then the patient was re-examined by an optometrist and the results analyzed. Results: Non-tolerance examinations accounted for 33 of the 165 (20%) eye examinations during the study period. Gender was not a factor in non-tolerance but age was the factor in non tolerance, presbyopes accounting for 31% and young adult accounting for 27%. The common reasons for non-tolerance were dispensing related (52%), prescription related (48%). Of prescription related errors major problem in over correction of myopia followed by under correction of hyperopia, convergence issue, inaccurate cylindrical axis, problems with the near/intermediate addition and binocular balancing. Conclusions: Spectacle prescription non-tolerance forms a small, but important, form of adverse reaction in optometry clinics. Most non-tolerances can be resolved by small changes, within 0.50 D, to the prescription.***

Keywords: adverse reaction, eyeglasses, non-tolerance, optical prescription, optometry, spectacles

1. Introduction

High patient satisfaction with the refractive correction is an important goal in practice because patient dissatisfaction can lead to a decrease in the quality of the Doctor-Patient relationship, which in turn leads to a decrease in patient compliance and the quality of the outcome[1]**.** The dissatisfied patient can also actively prevent other patients from seeking care from this practice[1]. There were hardly any studies reported in the literature on the frequency of failure of spectacle lens acceptance or the reasons for that failure. According to **Riffenburgh et al. (1983),** 2.3% of patients returned after refraction because of dissatisfaction with the spectacles[2]. In a study reported by **Mwanza and Kabasele (1998),** 2.8% of 432 patients returned after spectacles were prescribed[3].

The main objective of this study was to identify the most common reasons a patient could not be satisfied with his new spectacle. Dealing with intolerance to spectacle is a common everyday aspect for optometric practitioners. Basically, patients want to see as well as they also prefer to look as great as they can in their new fashionable eyewear. However, given the complex physical, physiological and psychological processes involved with the sense of sight it is not surprising that sometimes it goes wrong. Successfully managing non-tolerance issues requires the practitioner to take a considerate and empathetic approach, in order to resolve all concerns to the patient's complete satisfaction.
The role of the practitioner is to ensure that the patient is dispensed with an optical correction that provides maximum optical performance, functionality and wearing comfort, at the same time as also being cosmetically pleasing to the wearer. To achieve all of these aims the practitioner will be required to have comprehensive product knowledge, dispensing practical experience and effective communication skills.

When the expected optical performance, or final appearance of the spectacles, is not to the patient's complete satisfaction then the cause has to be identified and resolved in a form of prompt and professional manner. Otherwise the patient may lose confidence in their practitioner's ability, which could indirectly have a negative public relations impact on the practice. Conversely a happy resolution may win over the long-term loyalty of the patient, as well as their family and circle of friends to whom they recommend you.

In focus a non-tolerance patient is a symptomatic patient, with symptoms resulting from differential causes. It is necessary to understand yet that permanent symptoms may or may not be due to the new prescription dispensed. In general symptoms can broadly be categorized by way of their duration effect:

- **Temporary elimination:** the prescription has an initial placebo effect and the primary cause of the symptoms is unlikely to be due to the new spectacles.
- **Elimination replacement:** the new spectacles may have removed the original patient symptom and replaced this with another e.g. first single-vision reading correction

improves the near acuity whilst blurring intermediate-distance.

- **Symptom continuation:** the spectacles are not likely to be the cause, and other aspects of the patient's health, lifestyle, vocational demands, work environment etc. should be explored.
- **Intense continuation:** the new prescription has an aggravating effect on the symptom e.g. unwanted induced prism breaks down the fusion system by adversely disrupting a weak ocular motor balance.
- **Symptom production:** typically occurs when correcting astigmatism for the first time in adults who were previously asymptomatic.

Providentially, many of the causes for intolerance to spectacles can easily be prevented at the outset by careful management. The real skill in dispensing is to consider the potential optical, functional and cosmetic challenges before they ever develop into real concerns. At the initial dispensing the practitioner should always consider the optical and cosmetic challenges for the given prescription, in concert with the patient's lifestyle/vocational needs. Many of the common causes for non-tolerance can easily be prevented at the initial dispensing through clear and effective communication to establish specifically what the individual wants their spectacles for, making an appropriate recommendation, and accurate ordering. Checking the final order against the record when completed, setting up of the frames before collection, and giving clear instruction on the intended use of the spectacles will all help minimise the possibility of intolerance arising.

When intolerance to spectacles does arise it is important to keep an open mind, as dispensing error is not the only possible cause. The differential causes can easily be classified into one of five key categories; refraction, dispensing, communication, acute ocular disease and psychological.

Non-tolerance to spectacles can be divided into two categories **(Priest, 1979)[4]:**

1) **Dispensing non-tolerance:** Dispensing non-tolerance refers to glasses that a patient finds so hard to tolerate and they return to the practioner. An error is found either with the refraction process, the frame given, the lenses or the dispensing measurements taken. In general, these cases have been seen by a sales staff. The main causes are incorrect refraction, incorrect frame fitting, optical centration problems, cosmetic reasons and miss-communication.
2) **Prescription non-tolerance:** Prescription non- tolerance was defined as a patient who had collected new spectacle from the practice, agreed to try them in their usual environment, but then returned because they either had problems with them or could not wear their new spectacle.

Table 1: Major causes of non-tolerance to optical prescriptions

Optometrist orientated	• Dispensing errors and associated problems • Faulty refraction and prescription • Undetected eye diseases, systematic problem.
Patient orientated	• Adaptation problems • Psychology • Motivation; • expectation; • dissatisfaction
Optometrist/ patient relationship	• Attitudes; • personality patterns • Practice environment

2. Review of Literature

Riffenburgh et al. (1983), 2.3% of patients returned after refraction because of dissatisfaction with the spectacles[2]. In a study reported by **Mwanza and Kabasele (1998),** 2.8% of 432 patients returned after spectacles were prescribed[3]

Duke-Elder and Abrams, 1970 the aim of subjective refraction is "to provide the patient with the optical correction is ideal with which they sees best and is most comfortable[5]. The tolerances for spectacle lenses are different for different parameters and different power ranges. These tolerances vary from country to country.

In USA, the American National Standards Institute (ANSI) approved ophthalmic standards Z80 in 1964 and revised them from time to time[6, 7].

The most recently revised ANSI Z80.1-2010[7] approved the tolerances for spherical lens powers to ±0.13 diopters (D) for powers below ±6.50 D and ±2% for powers above ±6.50 D, the tolerances for cylindrical lens powers to ±0.13 D for powers ≤2.00 D, ±0.15 D for powers >2.00 to ≤4.50 D and ±4% for powers >4.50 D, and the tolerances for cylinder axis to ±14° for powers ≤0.25 D, ±7° for powers >0.25 D to ≤0.50 D, ±5° for powers >0.50 D to ≤0.75 D, ±3° for powers >0.75 D to ≤1.50 D and ±2° for powers >1.50 D.

In UK, the most recent Europe-approved international standard BS EN ISO 21987: 2009[6] has recommended spectacle lens tolerances which are different from those in the ANSI Z80.1-2010.

To the best of our knowledge, there are no spectacle lens tolerances in India.

3. Methodology

Study area: National Capital Region
Study Design: Community based longitudinal study.
Study Period: 3 months (July 2016-September 2016).

The project was based at a Gurgaon Delhi NCR based Optical outlet. The study design was to sequentially recruit patients from this practice. **The inclusion criteria of this study were age above 16 years old, gave informed**

consent, met realistic definition of non-tolerance & free from infection and inflammation.

Patients who met the above criteria were first seen by a sales staff and any dispensing issues resolved. Dispensing issues that would have been resolved by the sales staff are problems with: the fit of the frame, inappropriate type of lens (e.g. bifocal or progressive addition lens; PAL), and positioning of lens (e.g. bifocal at incorrect height).

If the non- tolerance persisted or the spectacle dispensing was felt to be correct, the patient was reserved for a re- test or " non- tolerance examination" with an optometrist. This was arranged with the initial prescriber where possible. The procedure is summarized in Figure 1

The data sheet asked the practitioner to specify the description of the problem, the old, new, and reissued prescriptions, and the optometrist's opinion of the cause of the problem. All data were collated anonymously and analysed at the end of the 3-month.

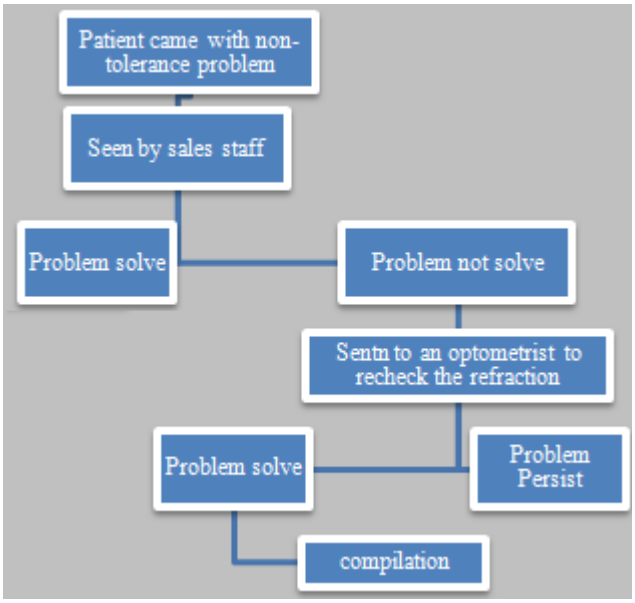

Figure 1: Flowchart on procedure dealing with spectacle intolerance

4. Results

A total of 165 eye examinations occurred during the 6 month study period. Of these, 33 were non tolerance examinations, which accounts for 20% of eye examinations. On the basis of patient's complaint and opinion of optometrist the reason of non tolerance was divided into 3 parts: Dispensing issue, prescription issue and binocular vision related issue. The major reason for non tolerance were dispensing related like there were inappropriate frame selection, incorrect facial and frame measurements, alignments problem etc. The contribution of dispensing non tolerances were 52% followed by prescription (33%) and binocular vision (15%) related issue (Fig 3).

Table 2: Complaint of patient and opinion of optometrist

Sr no	No of patients	Symptom	Reason of non tolerance
1	17	Side object is distorted, object look up and down, unable to wear	Dispensing issue PAL inappropriate fitting
2	11	Headache, watering Blur vision	prescription issue
3	5	Headache, not able to focus	Binocular vision related

Age range & Gender distribution

The age of patients attending for non-tolerance examinations ranged from 24–60 years of age. The highest number occurred in the 46-55 years age range. There was a fairly even distribution between the sexes (table 3).

Table 3: Age & gender distribution

Age group(yrs)	Male(23/110)=21%		Female (10/55)=18%	
	No	Percentage	No	Percentage
16-20 years	5	22%	0	0
21-25 years	3	13%	2	20%
26-30 years	5	22%	1	10%
31-35 years	1	4%	1	10%
36-40 years	1	4%	3	30%
41-45 years	1	4%	1	10%
46-50 years	2	9%	1	10%
51-55 years	3	13%	1	10%
56-65 years	2	9%	0	0

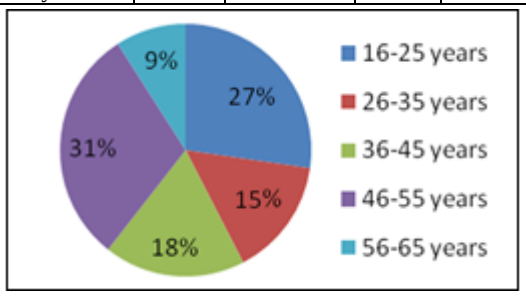

Figure 2: Age factor associated with non tolerance

Main reasons for non-tolerance examinations

On going through the data sheets, non-tolerances could be classified into 3 categories which were, in order of decreasing frequency: dispensing related, prescription related, and binocular vision. Each of these categories will now be investigated in more detail (Fig 3).

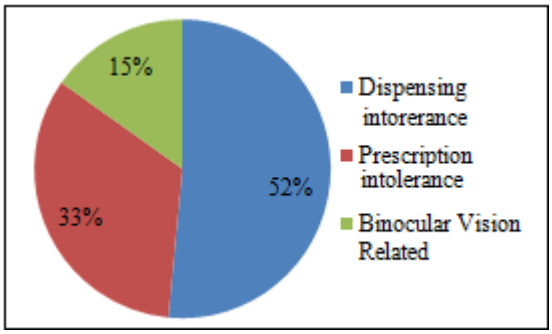

Figure 3: Main reasons for non- tolerance examination

Dispensing intolerance

Non-tolerances that were found to be related to dispensing

errors were 17 of the 33 or 52% of all non-tolerance examinations. The main reasons for these non-tolerances were, wrong frame and facial measurement by sales executive 59% and inappropriate frame selection 41%.

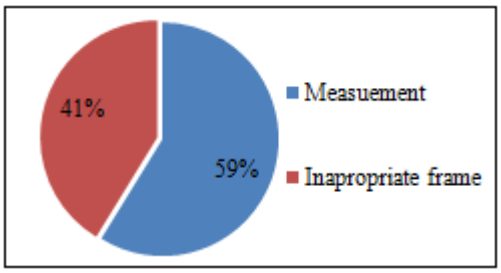

Figure 4: Contribution of different element in dispensing issue

Prescription intolerance

Errors related to the prescription accounted for 11 of the 33 or 33% of non-tolerance examinations. The main prescription related non-tolerances were, overcorrection of myopia, under correction of hyperopia, incorrect addition power and wrong cylindrical axis. The following criteria were used in sub-classifying non-tolerances within the prescription related group:

- If the only change in prescription was to the spherical part of the prescription the error was categorized as **spherical**. If the only change was to the cylindrical part of the prescription the error was categorized as **cylinder**.
- If the only change was to the addition (near or intermediate) part of the prescription the error was categorized as **near/intermediate addition**.
- If there was a change to both the sphere and cylindrical part of the prescription the error was categorized as **sphere/cylinder combined**.
- If the individual optometrist could find no change in prescription, regardless of the outcome (i.e. persevere with new prescription/modify back to old prescription), these were categorized as **adaptation**.

1) **Error measuring the sphere:** 7 of the 11 cases (63.6%). 4 out of 11(36.6%) was overcorrected negative power and 3 (27.2%) were under corrected positive power. All errors were within a Dioptre of the correct refraction, were within ±0.50 D.
2) **Errors measuring the cylinder:** 2 out of 11 (18%) were prescribed wrong axis. All were for errors with the cylinder axis (the range of amendments were between 5-20 degrees).
3) **Error measuring the near addition power:** 2 out of 11(18%) were prescribed wrong addition.

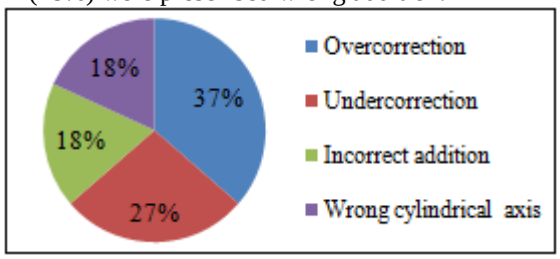

Figure 5: Contribution of different element in dispensing issue

Binocular vision problems: 5 of the 33 (15%) non tolerance examinations were attributable to a binocular vision anomaly. 3 out of 5 (60%) had convergence insufficiency problem and 2 (40%) had problem in binocular balancing.

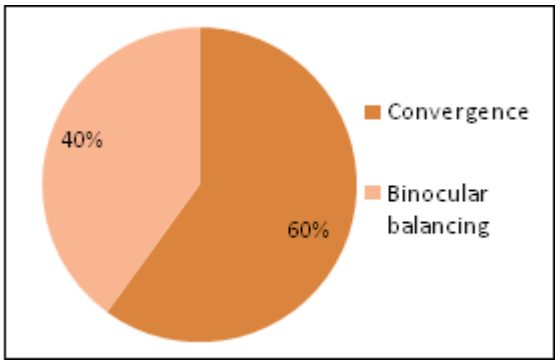

Figure 6: Binocular vision problem

5. Discussion

Unless a patient complains of non-tolerance to spectacles, the ophthalmologists presume that the spectacles the patient is wearing have been dispensed as prescribed. Also the patients while collecting spectacles from the optician often believe that the spectacles have been dispensed accurately and do not ask for verification. About one-third of our patients, who did not ask the optician to verify the dispensed spectacles, had inaccurate spectacles. They had more frequently an incorrect spherocylinder lens than the spherical and an error in the spherical element and cylindrical axis of the spherocylinders. The frequencies of inaccurate spectacles, incorrect spherocylinder lenses and an error in spherical element and cylinder axis of the spherocylinders decreased significantly in the patients who had asked the optician to verify whether their spectacles have been dispensed accurately. We assume that the opticians rectified the dispensing errors found in some spectacles on rechecking, and this resulted in a significant decrease in the frequencies of incorrect spectacles and dispensing errors in spherocylinder lenses.

After a dispensing optician has already dealt with any dispensing problems, two to three percent of the patients present with non-tolerance to spectacles[8, 9, 10]. Dispensing related problems account for it in about 25% of these patients[8, 9] . The older children and adults can state their non-tolerance to spectacles but young children are often unable to express that their spectacles are inaccurate[11]. As spectacles are often prescribed as a part of treatment for amblyopia in young children, incorrect spectacles may cause permanent visual loss. It is, therefore, important that in children, we should measure the spectacles shortly after dispensing to avoid the development of amblyopia due to inaccurate spectacles[13].

In India, majority of the opticians do not have personnel certification in spectacle dispensing. Most of the personnel employed for this job have learnt spectacle dispensing just from their seniors most of whom also do not have any certified training. There is a dire need for training and regulation of opticians' practice in spectacle dispensing.

A limitation of this study is that prisms were not considered in the dispensing tolerances. This can be especially significant in young children who have binocular vision problems.

We suggest that while prescribing spectacles to patients, they should be told about the possibility of inaccurate spectacle dispensing, especially if the prescription is for spherocylinder lenses. They should also be advised that while collecting spectacles, they should ask the optician to verify whether the spectacle lenses have been dispensed as prescribed. This would decrease the frequency of incorrect spectacles in India. The aim of this study was to investigate prescription non-tolerance in a busy practice in optical outlet. The protocol enabled the study to occur concurrently with routine practice work. Patients experiencing difficulties with new spectacles were seen first by a sales staff at the practice and an appointment was only arranged with an optometrist if the patient's problems could not be solved in the first instance by the sales staff. This is in line with usual practice in the Delhi NCR and the present research only investigated the cases that could not be satisfactorily resolved by the sales staff. **This means that trivial problems (e.g. patients unhappy with their choice of frame color or needing a simple frame adjustment) were excluded from the research.**

The highest number of non-tolerances in this study was for 46-55 year olds followed by 16-25 years. In this study there were minimum non-tolerances for patients between 56-65 years. There are several possible reasons why non-tolerances might be less common in older people. Specifically, older patients: might be less sensitive to detecting changes that would have caused a non-tolerance if they were younger; might accept symptoms such as blur as an inevitable effect of ageing; or they might be less likely to return to the practice because of mobility or health problems. There was an even distribution between men and women returning for non-tolerance examinations, demonstrating that gender does not appear to be a factor in prescription non-tolerance.

The main reasons for non-tolerance examinations were, in order of decreasing frequency, those related to the dispensing (52. %), those related to the prescription (33%), and binocular vision problems (15%).

Checking the prescription, the remaining problem was felt to be an error with the dispensing of the lens or spectacle frame. One possible reason for the higher value in this present study is that, lack of sales staff. Progressive addition lens (PALs) was the lens form that was most often not tolerated, followed by single vision lenses. The literature on dispensing non-tolerances describes more areas for errors in PAL lens dispensing compared with other lens forms. There were most common reason for a non-tolerance examination was for dispensing errors (52%). There were two main subcategories of dispensing intolerance: either inappropriate frame selection or measurement (facial) is inaccurate, especially for Progressive Addition Lenses (PALs) or high myopes and hyperopes. Due to improper centering it may lead to prismatic effect and resulting distorted image and headache. In case of PALs if centration is improper then displacement of various vision zone and eventually unclear distance, intermediate and near vision associated with various symptoms. If frame were not selected according to prescription it may lead minification and magnification of object and it also affect patients appeal. In case of high prescription, square and bigger size frame should be avoided.

Errors relating to the prescription accounted for the majority of non-tolerance examinations (33%). Measurements of the spherical part of the refractive error produced the most prescription errors, accounting for 63.6 % of all non-tolerance examinations. Hyperopic patients were more likely not to tolerate a prescription that was too strong (over-plussing). The quality of distance vision was the main factor in determining whether the spectacles were acceptable, however all the subjects were pre-presbyopic and would be expected to be able to accommodate for changes in near and intermediate vision. Myopic patients, in the present study, were more likely to return (36.6%) for a prescription that was overcorrection. In general, myopic patients are more likely to notice under-correction, especially during tasks at night, where night myopia occurs. Early presbyopes are the exception to this situation. This group of patients is more likely to notice an overcorrection, since this will lead to increasing problems with their near vision.

Binocular vision problems accounted for 5 out of 15 non-tolerance cases only (15%). This was a case of convergence insufficiency and binocular balancing. The management of the non-tolerance involved prescribing exercises that was recommended in case of convergence insufficiency and for binocular balancing it was suggested to change the lens.

6. Conclusion

In summary, non-tolerance examinations comprised a 20% of eye examinations. In a climate where clinical governance and auditing are increasingly important, an understanding of the norms for prescription non-tolerance can help optometrist to determine best practice. The majority of patients can be helped by either a small change to their prescription or their spectacles, in most cases 0.50 D or less. Sometimes, as is the case with adaptation problems and binocular vision anomalies related.

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