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The Use of Ready-Made Glasses Among Presbyopes in Selected Local Government Areas of Edo State, Nigeria

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Abstract
The use of ready-made glasses (RMG) has been reported to be common in developing or poor resource countries. This cross-sectional questionnaire study was undertaken to determine the prevalence of use of ready-made glasses among presbyopes in selected Local Government Areas of Edo State. Over 2000 closed ended questionnaire were distributed among adult males and females in churches, schools, government offices and market places. One thousand six hundred were collected back. Properly completed 1496 forms were analyzed using percentages and correlation coefficient. Level of significance was set at $p < 0.05$. Male respondents made up 51.80% of the population while female respondents made up 48.20%. The mean age of respondents was 57 (±1.2) years. A total of 66.80% of them had bought RMG. While 41.60% felt it met their visual need, 52% on the other hand, said there could be problems associated with the use of RMG. Some of the respondents 52% said they would not advice others to buy RMG from the roadside. There was no statistical difference in the use of RMG between males and females ($p<0.05$). There was no statistically significant correlation between educational status and the use of RMG between the genders. There was also no statistically significant correlation between financial earnings and the use of RMG between the genders. The use of RMG appears to meet some of the need in eye care.

Keywords: Ready-made, glasses, refractive error, eyecare.

Introduction
Global estimate indicates that more than 2.3 billion people in the world suffers from poor vision due to refractive error and presbyopia out of which 670 million people are considered visually impaired because they do not have access to corrective treatment (WHO, 2014).

Refractive error is an error in the focusing of light by the eye and the frequent reason for reduced visual acuity. Uncorrected distance refractive error is the most common cause of visual impairment and the second most common cause of blindness in the world (Bekibele and Gureje, 2008). Uncorrected refractive errors and presbyopia can hinder performance at school, reduce employability, productivity and generally impair quality of life (Patel and West, 2007; Keay *et al.,* 2010; Ebeigbe and Obahiagbon, 2012). The correction of refractive errors with appropriate glasses is among the most cost-effective intervention in health care (Naidoo *et al*., 2006; Bourne, 2007).

In most developing countries, most of the health care centers, including eye clinics are located in urban areas. People who live in rural areas are forced to get care from the urban areas and this add to the cost of the spectacles (Brian *et al.,* 2006; Ebeigbe and Kio, 2010). Usually, the frame may not fit properly and the optical center may not be properly placed. This can cause headache or eye strain (Laviers *et al*., 2012). They are also made with the power in each eye as the same, and so are not ideal for people who have different prescriptions in each eye. Although they are frequently made for reading, prescription for myopia and hyperopia are sometimes found. None are made to correct astigmatism (Mahmoona *et al.,* 2016).

Christopher *et al.* (2012) reported that RMS are suitable for the majority of individuals with uncorrected refractive error. The study provided further evidence for the use of RMS where custom spectacles are inaccessible to those in need. Dandona *et al.* (2002) found that a significant proportion of people discontinued spectacle use due to reasons suggesting poor quality of refractive service.

Ready-made glasses have the advantages of been readily available and are inexpensive. However, the disadvantages are that the frames are mass produced and may not fit well. Manufacturers assume that the distance between the eyes is the same for all patients, so the lenses may not be correctly aligned with one's eyes. They contain a simple prescription, which is unlikely to be exactly right for one's eyes. They have the same lens for both eyes but many people require a slightly different lens for both eyes. Finally, they do not give as much comfort or better vision as custom made glasses (Brian *et al.,* 2006).

The purpose of this study was to determine the prevalence of use and the reasons for use of ready-made glasses among Presbyopes in selected local government areas of Edo south.

Materials And Method
This was a questionnaire-based study. Six Local Government Areas (LGAs) in Edo South Senatorial District were selected by convenient sampling. They are Orhionmwon, Oredo, Ikpoba-Okha, Uhunmwonde, Egor and Ovia North West. Over 2000 questionnaire were distributed among Presbyopes in different locations including Schools, Government Offices, Churches and Market places in these LGAs. The returned questionnaires were 1600, of which 1496 were completely and properly filled; these were the ones that were analyzed for the study. Inclusion criteria were adults from the age of 35 years and above as well as those who could communicate in English Language or Pidgin English. Informed consent was given by participants after the nature and purpose of the study was explained to them. Ethical approval was obtained from the Department of Optometry Research Ethics Committee. The returned questionnaires were analyzed using percentages and Spearman's correlation coefficient. The results are presented in tables and charts. A p-value ≤ 0.05 was considered to be statistically significant.

Results
There were 775 (51.80%) males and 721 (48.20%) females among the respondents. The mean age of the respondents was 57 (±1.2) years. Most of the respondents (36.36%), had secondary school

education as shown in Table 1. Responses to the questionnaires are presented in Figure 1. This shows that about 67% of them have had their eye examined in a clinic, majority of whom were females. About sixty-five percent of the sampled population had been recommended for glasses at one time or another. However, only 42.7% of them obtained their recommended glasses from the clinic.

Table 1: Demography of Respondents

Variables	Male		Female		Total	
	No	%	No	%	No	%
Sex	775	51.8	721	48.2	1496	100
Age Brackets						
35-40	30	3.87	49	6.80	79	5.28
41-45	76	9.81	70	9.71	146	9.76
46-50	200	25.81	88	12.21	288	19.25
51-55	199	25.67	193	26.76	392	26.20
56-60	200	25.71	207	28.71	407	27.21
61 and above	70	9.03	114	15.81	184	12.30
Educational status						
Primary	174	22.45	300	41.61	474	31.70
Secondary	323	41.68	221	30.65	544	36.36
Tertiary	278	35.87	200	27.74	478	31.93

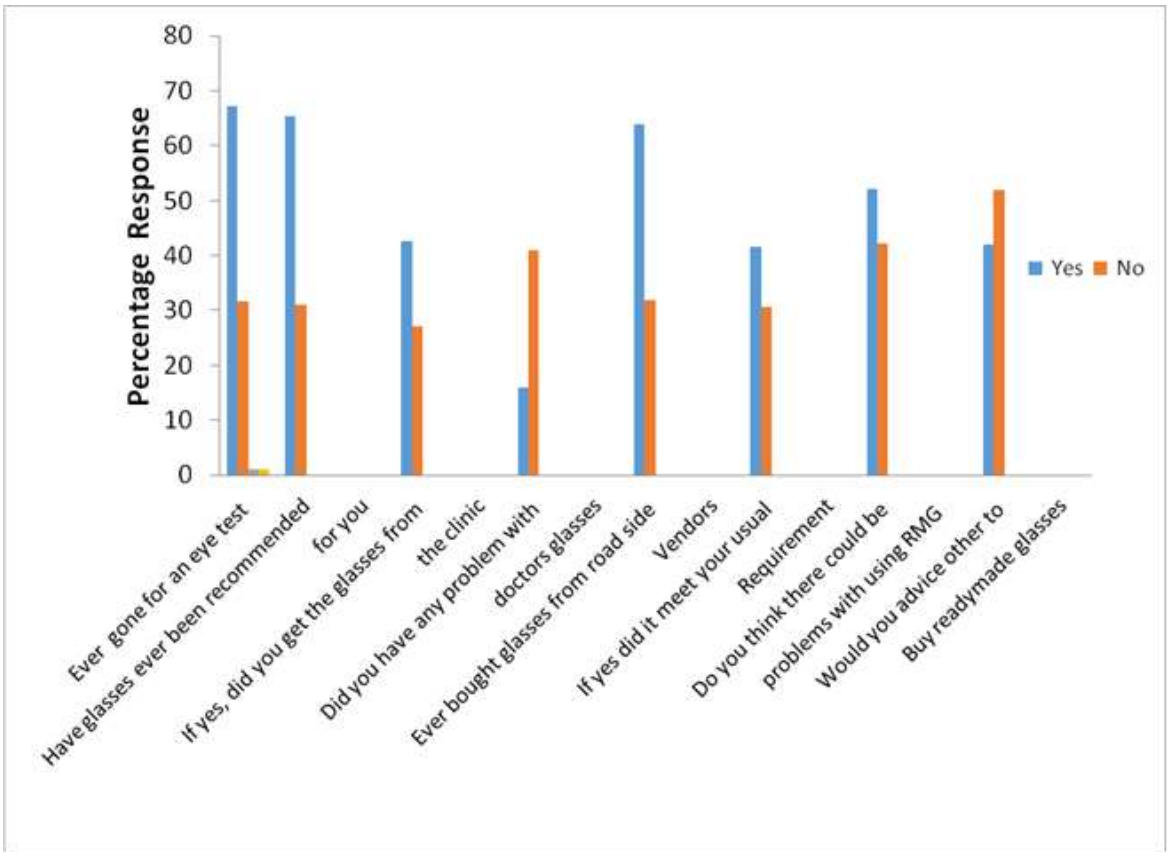

Figure 1: Participants' responses to questions asked

Among the respondents, 66.80% admitted to buying RMG from the road side. Some of them (41.60%), were of the opinion that the RMG met their visual requirement. Others (52%) were of the opinion that there could be problems associated with the use of RMG. Fifty- two percent (52%) of the respondents said they would not advice others to buy RMG from along the road side. Table 2 shows reasons given by the respondents for the use of RMG. The main reason being that it costs less than the custom-made glasses (48.32%); this was followed by time saved from waiting long at the clinic to see the doctor (25.20%) and the convenience of buying RMG from the roadside, (16.71%). Figure 2 shows the monthly financial earning capacity of the respondents. Some 33% of respondents, earned less than a hundred thousand naira while only 2% of them earned two hundred thousand naira and above. The difference between male and female use of RMG was not statistically significant $p > 0.05$. There was no statistically

significant correlation (r = -0.02, p=0.90) between the educational status and the use of RMG between the genders. Correlation between financial earning and use of RMG was also not statistically significant (r = -0.20, p = 0.24) between males and females.

Table 2: Reasons given for purchase of ready-made glasses

Reasons	Male		Female		Total	
	No	%	No	%	No	%
Convenience	129	16.65	121	16.78	250	16.71
Cost less	468	60.35	255	35.37	723	48.32
Avoid wait at clinic	112	14.45	265	36.75	377	25.20
Same as Doctor's prescription	66	8.52	80	11.10	146	9.76
Total	775	100	721	100	1496	100

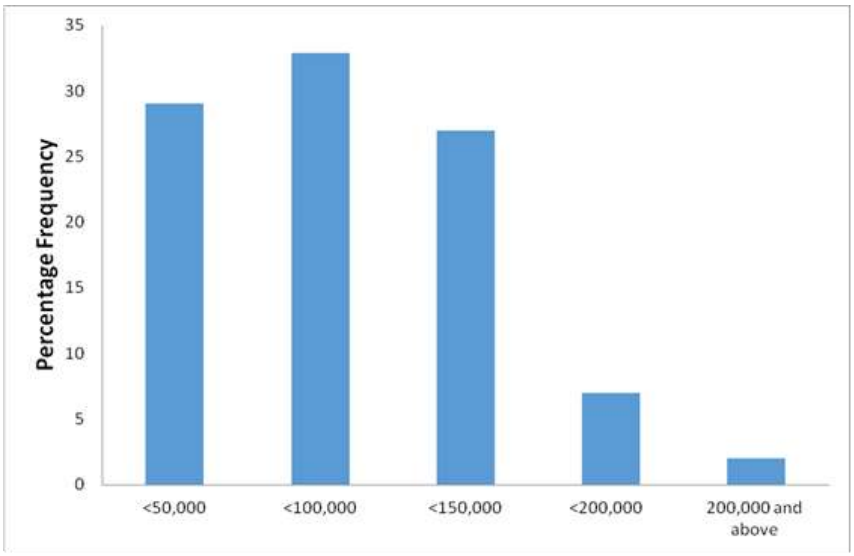

Figure 2: Monthly Financial earnings of the respondents

Discussion

Glasses are the most common means of correcting refractive errors. Glasses are usually prescribed and dispensed with corrective lenses that give the best vision and are comfortable. Custom made glasses are the gold standard. This is because they are made specifically to meet individual needs. Although they are more expensive, they are essential in certain cases when an individual requires different power of lenses in each eye or when a patient is astigmatic and needs cylinders in their lens prescription. However, those who do not have astigmatism or have a low level of it and have no difference or insignificant difference between the left and right eyes can be corrected with RMG. This could be the reason why a number of respondents reported that RMG met their visual needs.

Although a high proportion of respondents use RMG because they are cheaper than custom made gasses, there was no statistically significant correlation between financial earnings and use of RMG among the respondents.

The popular belief that only illiterate people or non-educated people buy RMG from the roadside is not supported by this study because, there was no statistically significant correlation between educational status and use of RMG among the respondents.

Generally, people are often pressed for time so, factors like convenience and avoidance of long wait at the doctor's office might be better motivation for use of RMG among individuals. Despite the reported disadvantages of RMG, which include being a "one size fits all", the frame not fitting properly, the optical center not being properly placed which can cause headache or eyestrain, they are also made so that the power in each eye is the same and so are not ideal for people who have different prescriptions in each eye, individuals still subscribe to the use of these glasses. However, studies in Cambodia and India have reported that up to 70-90% of children with uncorrected refractive errors could benefit from RMG (Ramke *et al.,* 2008) and (Priya *et al.,* 2016).

A number of studies have shown that women are more careful about their eye care than men. Fotouhi *et al.,* (2006) reported that women in Iran were more likely to seek eye care services than men. Similarly, Palagyi *et al.,* (2008*)* reported that women in Timor-Leste with either low vision or blindness were more likely to seek treatment than men. Schaumberg *et al.,* (2000), Morales *et al.,* (2010) and Bylsma *et al.,* (2004) also reported that women tended to have eye examinations more frequently than men. However, this study observed that gender did not influence the purchase of readymade spectacle as there was no correlation between the gender and the use of RMG.

Majority of the respondents gave cost as their reasons for buying readymade glasses. It can therefore be inferred that cost is the major reason why people buy readymade spectacle agreeing with (Wubben *et al.*, 2014) who reported that financial constraint is the most common barrier to accessing presbyopic care. Another study by (Robin *et al.,* 2004) stated that, in developing and developed

nations, finances can definitely influence the utilization of ophthalmic health care.

Although majority of the respondents fell between income earning levels of ₦50,000 and ₦100,000, there was no correlation between financial status and the use of RMG in this study. Other workers have reported a relationship between financial status and use of eyecare. Srinivas *et al.* (2009) stated that individuals with optional vision insurance and those with higher income levels were more likely to use eye care services. Another study by Robin *et al.* (2004) reported that the odds of using eye care increased significantly with higher the income of the subject. Similar study by Schaumberg *et al.* (2000) found that women with annual income exceeding US $50 000 were twice as likely to have an eye examination within two years when compared with women with lower income. Meanwhile, Priya *et al.* (2016) were of the opinion that affordability of optometric services should be considered within a broader context than the cost of the spectacle because, even a free pair of spectacles could prove to be unaffordable, if the patient has to return to the clinic many times in order to collect it.

Results from this study has shown that there was no significant correlation between educational status and use of RMG. In contrast a study carried out by Fotouhi *et al.* (2006), reported that the likelihood of seeking eye care in Iran was associated with higher levels of education. This relationship was attributed to greater knowledge and therefore more reasonable behavior. It was also presumed to be due to the fact that educated people are members of the higher socio-economic class, thus may have greater access to eye care services and also find them more affordable. Ramke *et al.* (2008) reported a positive association between education and eye care use; the higher the level of education, the more likely and timely eye examinations are performed, and the less likely that blindness will occur. In similar studies Orr *et al.* (1999) and Ramke *et al.* (2009) found that people with higher education were significantly more likely to seek eye care services and this was attributed to the fact that most people with higher education were higher earners and could afford health care services.

More than half of the respondents (52%) in this study were of the opinion that there could be problems arising from the use of RMG. This is in agreement with the study by Elliot and Green, (2012), where they reported a significant number of irregularities associated with the use of RMG. In a study to determine whether the optical quality of near-vision ready-made spectacle reached the quality assurance levels required by the international standard. Elliot and Green, (2012) reported that there was a large prevalence of significant amount of induced horizontal and vertical prisms in higher powered near-vision RMG such as +3.50DS. Given that the need for high powered RMG indicates the presence of hyperopia and/or age-related eye disease in addition to presbyopia, it may be appropriate to restrict the sale of RMG to optical powers of +1.00 to +2.50DS, which will contain much fewer errors.

Elliot and Green, (2012) also recommend that manufacturers use a centration distance for near-vision RMG that is similar to an average near (and not distance) inter-pupillary distance. In a similar study by Du Toit *et al.*, (2007) it was reported that most spectacle wearers would comfortably tolerate < or =0.5 delta vertical < o r= 1.0 delta base out or < or = 1.0 delta base in induce prism. From this study, a guide to the maximum inter-pupillary distance/optical center distance disparities likely to be comfortably tolerated with varying spectacle powers was formulated. It was concluded that power up to +/-1.50DS were unlikely to have sufficient lens de-centration to cause discomfort. The present study supports the feasibility of using readymade spectacles in low resource settings even though optical center distance may be different from the inter-pupillary distance of the user.

The advantages of RMG are that they are less expensive, can be dispensed immediately in clinics and require less time to dispense. However, the drawbacks to RMG are that they require a large inventory of frames in different sizes, colors and shapes, each with a range of power lenses. They are only suitable if the prescription in both eyes is the same and lenses are seldom available in powers of over ±3.50DS. Despite the disadvantages, some uses have been found for RMG especially in environments where access to custom made glasses is difficult or restricted by finance. However, whether RMG or custom-made glasses, both should only be dispensed by trained personnel, based on appropriate refractive technique undertaken by a competent eye care Practitioner.

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Conflict Of Interest: None.

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