



THE INFLUENCE OF THE AWARENESS AND KNOWLEDGE OF GLAUCOMA ON THE UPTAKE OF GLAUCOMA SCREENING SERVICES AMONG ADULTS AGED 40 YEARS AND ABOVE IN IMO STATE

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ABSTRACT

Glaucoma is an important public health problem, being the second leading cause of irreversible blindness worldwide after cataract. It is a disease characterized by atrophy of the optic nerve, elevated intraocular pressure associated with optic disc cupping and progressive loss of vision which is more prevalent among the population aged 40 years and above. Most patients present cases late when curative resection is impossible and in order to achieve higher success, improvement of knowledge and awareness not only for early symptoms but also for early detection methods and screening tools have been identified as essential. This study aimed to elucidate the influence of the awareness and knowledge of glaucoma on the uptake of glaucoma screening services among adults aged 40 years and above in Imo State, Nigeria. The sample of the study comprised of four hundred and eighty-two (482) adults drawn through a multistage sample selection process. A pre-tested semi-structured interview administered questionnaire was the main instrument of data collection. Statistical Package for social sciences (SPSS) Version 23 was used for analysis at 95%CI. Findings showed that respondents are aware of glaucoma (96.6%). Aging ($P=0.0027$), higher level of education ($P=0.0046$), more knowledge of glaucoma were all associated with greater uptake of glaucoma screening services, while marital status was not found to be associated with the uptake of glaucoma screening ($P= 0.128$). However, relevant educational and screening interventions are constantly required to promote early detection and management of glaucoma among adults in Imo State, Nigeria.

KEYWORDS: Glaucoma, Screening, Knowledge, Risk factors, Adults.

1. INTRODUCTION

Glaucoma is an important public health problem, being the second leading cause of irreversible blindness worldwide after cataract (Robertson, 2020). In Nigeria, glaucoma has been found to be responsible for sixteen percent (16%) of the blindness among the population aged 40 years and above (Kyari, 2015). Allison *et al.*, (2020) stated that about 80 million people have glaucoma worldwide in 2020, and this number is expected to increase to over 111 million by the year 2040.

One of the most prevalent forms of glaucoma is Primary Open Angle Glaucoma (POAG) accounting for up to

seventy-four percent (74%) of all glaucomas (Quigley & Broman, 2006). POAG has a serious impact on the quality of life of a large number of people around the world. POAG usually has an insidious onset, which may explain why most glaucoma patients present late. It has been estimated that more than half of glaucoma patients are already blind in at least one eye at presentation in Africa (Ogbonnaya, 2016).

Glaucoma is a disease characterized by atrophy of the optic nerve, elevated intraocular pressure associated with optic disc cupping and progressive loss of vision which is more prevalent among the population aged 40 years and above (Khurana, 2012, Robertson, 2020). Major risk

factors for glaucoma are intraocular pressure (IOP) and age (Hashemi *et al.*, 2018; Grzybowski *et al.*, 2020). Prevalence of glaucoma increases with age among the population older than fifty (50) years being particularly high in blacks. Other studied risk factors include race, gender and family history of the disease (Hashemi *et al.*, 2018).

Having knowledge about glaucoma and its risk factors will most likely motivate patients to present themselves early for screening and treatment. The World Health Organisation (WHO) has defined Screening as the use of simple tests across an apparently healthy population in order to identify individuals who have risk factors or early stages of disease, but do not yet have symptoms. Glaucoma screening is often done with tests that look at changes in the optic nerve, changes in the pressure of the fluid in the eye and changes in visual fields. The goal of screening is to identify early glaucoma that does not affect a person's vision but might suggest that he or she is at risk for losing vision in the future. This helps identify people who might benefit from treatment. Thus, if glaucoma prevention services are available, an informed public is more likely to take advantage of it before significant functional disability or irreversible vision loss occurs.

The uptake of glaucoma screening services and treatment-seeking behaviour among those aged forty years and above (who are considered the more vulnerable population) is usually affected by several factors like the awareness, knowledge and beliefs regarding glaucoma, socio-cultural and religious practices, as well as health service factors (Nwakuche *et al.*, 2019). It has been revealed that glaucoma is the second most common cause of visual impairment and blindness in Imo state (Achigbu and Ezeanosike, 2017). Yet, blindness from glaucoma is preventable if detected early and managed appropriately (Ogbonnaya, 2016).

Imo state is chosen for this study because of numerous eye clinics operating in the three geopolitical zones in the state (Owerri, Orlu and Okigwe), which offer glaucoma screening services. One cannot help but wonder why patients presented with glaucoma at its advanced stage as has been observed by the researcher on the field clinic in Imo state. This would not have been the case if these patients availed themselves of timely glaucoma screening services which of course would result to early detection of glaucoma, where present. It is based on this, that the researcher is motivated to conduct this research aimed at determining the factors that influence the uptake of glaucoma screening services among the more vulnerable population (adults aged forty years and above) in Imo state. The findings of this study will form useful input for policies, programmes and services that promote uptake of glaucoma screening in Imo state with the attendant benefits in eye health. The variables of interest include uptake of glaucoma screening services as the dependent variable and socio-economic

characteristics, level of knowledge of glaucoma and attitudes towards glaucoma and health service delivery.

Several studies have examined awareness and/or knowledge about glaucoma in general clinic or population based samples (Alqahtani *et al.*, 2021; Alemu *et al.*, 2017; Kizor-Akaraiwe, 2017). A study by Alqahtani *et al.* (2021) revealed low awareness and knowledge levels about glaucoma among the attendees of a local eye care hospital, in Saudi Arabia where several misconceptions about disease risk factors, clinical features and management were identified. A hospital-based study by Maharana *et al.* (2017) revealed a low level of awareness of glaucoma in India where awareness level was greater in individuals with higher education levels and those belonging to an upper socioeconomic class. Alemu *et al.* (2017), in their study, indicated higher level of awareness and knowledge about glaucoma in urban communities. In Nigeria, awareness, knowledge and proportion of people with glaucoma in a study population were 65.5%, 36.8% and 14.5% respectively in a Southeast Urban area of Nigeria (Kizor-Akaraiwe, 2017). A study of the knowledge of glaucoma amongst undergraduate students of University of Calabar, Nigeria revealed poor knowledge of glaucoma (Ogba *et al.*, 2020).

A study carried out by Monsudi *et al.* (2018) among health workers in a tertiary hospital in Birnin Kebbi, Nigeria indicate that the overall level of glaucoma awareness and knowledge were high among clinical health workers with a high level of education. The hospital seminars/lectures was a major source of information on glaucoma. Alqahtani *et al.* (2021) reported that the most frequently reported source of information about glaucoma was another person with glaucoma (28.2%), followed by Physicians (24.8%), TV (19.6%), friends (16.7%), magazine (7.8%), newspaper (4.4%) and finally radio (3.7%). Patients with a positive family history of glaucoma have been reported to have a higher level of awareness of the disease than others (Kizor-Akaraiwe, 2021).

2. MATERIALS AND METHODS

Study Design

A descriptive cross sectional study design was adopted for this study on the uptake of glaucoma screening services among adults aged 40 years and above in Imo State, Nigeria.

Area of study

The study area was the three senatorial zones of Imo State located in the South Eastern, Nigeria. Imo State is located in the South Eastern part of the Country with its Latitude and longitude coordinates as: 5.476310, 7.025853 with Owerri as its capital and the largest city in Imo state. Imo state has a population of 5,408,800 (National Population Commission 2022 projection) and the population density of 1,053 people per square kilometre. It was created in 1976 out of the old east

central state by the then regime of General Murtala Mohammed. Imo state is divided into three (3) zones of Owerri, Okigwe and Orlu. The zones are further divided into twenty-seven (27) Local Government Areas (LGA), where Orlu has 12 LGAs Owerri, 9LGAs and Okigwe has 6 LGAs. Within the twenty-seven (27) LGAs are six hundred and fifty-five (655) Autonomous communities.

There are several universities and colleges in the state such as Imo State University, Federal University of Technology Owerri, Federal Polytechnic Nekede and Alvan Ikoku College of Education. There are also some general and teaching hospitals in Imo state which offer eye care services. There are also some private ophthalmic clinics in the state which provide general eye care services. There are about ten (10) public eye care centres and 53 registered private eye clinics in Imo state (Ministry of Health, 2019).

The local language is Igbo and Christianity is the predominant religion. Igbo people constitute a majority of the population. The study area was sampled from the twenty-seven (27) Local Government Areas in Imo state Nigeria. The predominant occupation of the people here are farming and Civil service.

Study Population

The population of study included all adults aged forty years and above not diagnosed of glaucoma and are permanent residents (lived at least six months) in the study area. The population of study also excluded adults with mental disorder and hearing impairment that were not able to provide information that supported the study as well as the feeble elderly patients.

Sample Size and Sampling methods

The sample size was calculated using the Taro Yamane formula for sample size calculation for a given population, formulated by the statistician Taro Yamane in 1967. The mathematical illustration of the Taro Yamane formula is as follows.

$$n = N / 1 + N(e)^2$$

where

n is the sample size

N is the population under study

e is the marginal error

The population under study was calculated from the 2022 projected population according to National Population Commission (NPC). The population of adults aged 40 years and above as at 2022 has been obtained as 1,141,376 (NPC, 2022).

Therefore, to determine the sample size for the study, n using the formula.

$$n = N / 1 + N(e)^2 \quad \text{and substituting the figures appropriately,}$$

$$n = 1,141,376 \div (1 + 1,141,376 (0.05)^2)$$

$$n = 1,141,376 \div (1,141,377 \times 0.0025)$$

$$= 1,141,376 \div (2853.4)$$

$$= 400$$

The population size was increased by 30% to compensate for non response.

$$30\% \text{ of } 400 = 120$$

$$\text{Therefore } 400 + 120 = 520$$

Sample size to be made use of will be 520

This sample size was shared proportionally among the three senatorial zones according to the percentage contribution of the population of adults aged 40 years and above of each senatorial zone in Imo state.

Sampling Techniques

A multistage sampling technique was adopted for this study on the uptake of glaucoma screening among adults aged 40 yrs and above in Imo state. A probability based stratified sampling method was used to select the three senatorial zones of Imo state based on population. This was done to ensure that every zone in Imo state was represented on the sampling frame. The second stage involved the selection of 30% of the Local Governments Areas (L.G.As) in each senatorial zone using simple random sampling technique (balloting). Thus, 4 LGAs (namely; Oru east, Oguta, Nwagele, Isu) out of the 12 LGAs in Orlu were selected. The 3 LGAs (namely; Ikeduru, Ahiazu Mbaize and Owerri West) out of the 9LGAs in Owerri were selected and 2 LGAs (namely; Obowo and Mbanjo) out of the 6 LGAs in Okigwe were selected.

The researcher enlisted all the Communities (while differentiating the rural from the urban) in the selected LGAs on different ballot papers and randomly selected two communities out of them precisely one from the urban and one from the rural areas. This was done to ensure that every community had an equal chance of being selected. Following the stratification of each of two selected communities into urban and rural areas, the villages in each community was listed and balloting was done for a probability method of selection giving an equal chance of being selected from the selected villages. Five (5) villages were selected via simple random sampling in each of the selected community. This resulted to a total of 10 villages in each LGA.

A list of the streets and households at the villages was obtained by the researcher and systematic random sampling method was employed in selection of the streets and households where the study subjects were domiciled. This was done at an interval of two (2) for every household and street. This was done to ensure that every street and household had an equal chance of being selected. Following community entry and informed consent, purposive sampling was used to select the target population being adults aged 40 years and above who had resided in the study area for at least six months. Research Assistants were hired to get study population. Health Education as well as visual acuity screening test were used as incentives while complications were referred for treatment.

Instruments for Data Collection

- (i) A *pretested structured questionnaire* divided into five sections, A, B, C, D and E. Section A elicited information on respondents' socio-economic characteristics and Section B comprised of questions on the level of knowledge about glaucoma, while section C comprised of questions on attitudes and practices with regard to glaucoma screening, section D comprised of questions on health service factors with respect to uptake of glaucoma screening services and Section E comprised of questions on eye screening behaviour.
- (ii) A *visual Acuity Snellen Chart or illiterate E Chart* - Visual acuity of each respondent was also tested using a Snellen chart (for the literate subjects) or an Illiterate E chart, for the uneducated/illiterates (located 6m from the participant in a shaded open space in daylight; each eye was tested separately by asking the respondent to read the chart. The last line on the chart, which was read completely, was recorded as the respondent's visual acuity for the particular eye being tested. As a rule of thumb, eye care professionals always conduct what is called an "Entry Visual Acuity Assessment" on every patient before any other eye test procedure is carried out. This is to avoid cases of patients coming up with complaints of poorer vision after their visit to the eye doctor or better vision prior to their visit to the eye doctor. In such cases, the "Entry Visual Acuity Assessment" recorded by the doctor can exonerate him or her.
- (iii) A *Pen torch*- The pen torch was used to assess pupillary response in both eyes. It was used to ascertain light perception to ensure the subject is not blind in any of the eyes. If a torch was shone on the respondent's eye, and the pupil failed to constrict, then the respondent is blind in that particular eye.

Data Collection

The questionnaires were administered to the respondents by the trained research assistants after an informed consent was obtained. The literate respondents were allowed to fill the questionnaire themselves with the guidance of the researcher and research assistants while the non-literate respondents, had the questionnaire translated into Igbo language, the questions were read out for them by the research assistants and their answers ticked appropriately by the research assistants.

Data Analysis

The SPSS program, version 23.0 was used for data entry and analysis. Descriptive statistics, including frequencies, percentages and means were generated. Bivariate and multivariate analyses were performed. The hypothesis was analysed using Chi square.

3. RESULTS

A total of five hundred and twenty (520) copies of the questionnaire were distributed for the study and four hundred and eighty-two (482) copies of the questionnaire

were retrieved and they were properly filled and crosschecked for correctness and were used for the purpose of the analysis.

Knowledge of Glaucoma

Revealed in table 4.2 below are the results of glaucoma knowledge among the respondents. 96.6% (466) have heard of glaucoma (figure 1). Sources include television/radio (39.1%), social media (7.7%), family member/relative (14.2%), newspaper/fliers/posters (2.1%), health personnel (27.1%) and other sources not mentioned (9.8%). 76.4% (356) of the participants affirmed that glaucoma is an eye disease that can cause blindness, especially if the eye pressure is high (60.9%) while 23.6% did not agree to this. Over half of the respondents agreed to the possibility of glaucoma occurrences due to family genetics (55.2%). 63.1% (294) of the respondents declined when asked if glaucoma is a spiritual problem/curse, and 77.6% (362) of the participants agreed that people are more likely to get glaucoma if they were above 40 years of age. 66.3% of the respondents maintained that people with glaucoma maybe asymptomatic, stating that glaucoma resulted from pressure damage to the nerve of vision. However, 58.6% of these respondents disagreed that glaucoma can cause loss of peripheral vision. The participants (73.4%) agreed that vision lost from glaucoma cannot be restored, and that people with glaucoma need regular eye examination (79.6%). Over half (50.4%) of the respondents declined when asked if glaucoma management lasts throughout a person's life. Irreversible loss of vision was expressed as a consequence of untreated glaucoma according to the respondents (71.7%) and that glaucoma can be treated with eye drops that decrease eye pressure (65.7%). The respondents (73.8%) noted that one of the ways for early detection of glaucoma was regular eye check-ups, and majority (75.6%) of the respondents stated benefits of glaucoma screening to include health improvement, blindness prevention and vision protection. 52.7% (245) of the respondents agreed that glaucoma screening is often done with tests that look at the eye pressure.

Table 4.2: Knowledge of Glaucoma.

Variable	Frequency (n=482)	Percentage (%)
Have you ever heard of glaucoma?		
Yes	466	96.6
No	16	3.4
Total	482	100
What is your source of information if you have ever heard of glaucoma?		
Social Media	36	7.7
Television/Radio	182	39.1
Health Personnel	126	27.1
Family Member/Relative	66	14.2
Newspaper/fliers/posters	10	2.1
Others	46	9.8
Total	466	100
Glaucoma is an eye disease that can cause blindness?		
Yes	356	76.4
No	110	23.6
Total	466	100
Glaucoma is a disease that can occur if the eye pressure is high?		
Yes	284	60.9
No	182	39.1
Total	466	100
Glaucoma is an eye disease that can occur if someone in your family has or had glaucoma?		
Yes	257	55.2
No	209	44.8
Total	466	100
Glaucoma is a spiritual problem/curse?		
Yes	172	36.9
No	294	63.1
Total	466	100
You are more likely to get glaucoma if you are above 40 years?		
Yes	362	77.6
No	104	22.4
Total	466	100
You may not know you have glaucoma until you become blind in that eye (i.e glaucoma can be present without symptoms)?		
Yes	309	66.3
No	157	33.7
Total	466	100
Glaucoma results from Pressure damage to nerve of vision?		
Yes	289	62.0
No	177	38.0
Total	466	100
Glaucoma can cause Loss of peripheral/side vision		
Yes	193	41.4
No	273	58.6
Total	466	100
Vision lost from glaucoma cannot be restored		
Yes	342	73.4
No	124	26.6
Total	466	100

People with glaucoma need regular eye examination		
Yes	371	79.6
No	95	20.4
Total	466	100
Glaucoma management lasts throughout a person's life		
Yes	231	49.6
No	235	50.4
Total	466	100
The consequence of untreated glaucoma is slow, irreversible loss of vision		
Yes	334	71.7
No	132	28.3
Total	466	100
Glaucoma can be treated with eye drops that decrease eye pressure		
Yes	306	65.7
No	160	34.3
Total	466	100
One of the ways for early detection of glaucoma include regular eye check up		
Yes	344	73.8
No	122	26.2
Total	466	100
The benefits of glaucoma screening include health improvement, blindness prevention and vision protection		
Yes	352	75.6
No	114	24.3
Total	466	100
Glaucoma screening is often done with tests that look at the eye pressure		
Yes	245	52.7
No	221	47.3
Total	466	100

Relationship between the level of knowledge of glaucoma and the uptake of glaucoma screening services among adults aged 40 years and above in Imo state.

The table below showed the result for the test of a statistically significant relationship between the level of

knowledge of glaucoma and the uptake of glaucoma screening services among the adults aged 40 years and above in Imo state ($P=0.00421$)

Table 2: Relationship between the level of knowledge of glaucoma and the uptake of glaucoma screening services among adults aged 40 years and above in Imo state.

Uptake of glaucoma screening services	Level of knowledge of glaucoma		X^2 (Chi square)	P-value	Decision
	High (%)	Low(%)			
Yes	82.7%	17.3%	2.20	0.00421	Significant
No	17.3%	82.7%			

4. DISCUSSION

Glaucoma is an age-related eye disease that is one of the leading causes of blindness in older adults. As people age, their risk of developing glaucoma increases due to the gradual increase of eye pressure and the breakdown of the optic nerve. Symptoms of glaucoma can include blurred vision, blind spots, and tunnel vision. This study aimed to determine the influence of the awareness and

knowledge of glaucoma on the uptake of glaucoma screening services among adults aged 40 years and above in Imo State.

Influence of the Level of knowledge of Glaucoma on the uptake of glaucoma screening services

According to the results of the study, 96.6% of the respondents had heard of glaucoma. Major sources of

information noted were from television/radio (39.1%), and health personnel (27.1%). A study conducted by the National Eye Institute (NEI) that assessed the perceived knowledge of glaucoma among the elderly found that only 28% of the participants were aware of glaucoma and its risk factors, and only 11% reported having ever been tested for the condition (Hales *et al.*, 2012). Furthermore, the study found that most participants lacked the knowledge needed to adequately understand their risk of glaucoma, and their correct treatment options (Hales *et al.*, 2012). The study revealed that lack of knowledge could be attributed to several factors. First, older adults tend to be less likely to seek out preventive care and may be unaware of their risk for glaucoma (Johnson *et al.*, 2006).

This study showed an improved knowledge rate thus designating the impact of several sensitization programs and health outreach. Additionally, many elderly patients receive the necessary education from their primary care providers (27.1%) on the risk factors and preventive measures for glaucoma as corroborated by another study (Mizrahi *et al.*, 2011). This study reiterates the importance of healthcare providers recognizing the gaps in knowledge of glaucoma among the elderly. Providers should ensure that elderly patients receive accurate and up-to-date information on glaucoma and that they are aware of the risk factors and preventive measures they should take. This is supported by the findings of Johnson *et al.*, (2006). This study revealed that 76.4% of the participants affirmed that glaucoma is an eye disease that can cause blindness, especially if the eye pressure is high (60.8%).

The majority (77.6%) of the respondents in this study agreed that people are more likely to get glaucoma if they were above 40 years of age. This is in agreement with relevant findings and underscores the importance of regular eye examinations, especially for individuals over the age of 40 (Stalman & Rozema, 2011).

Lemij and Amoah, (2016) in their study suggested that it is important to note that glaucoma is often asymptomatic in elderly patients, meaning they may be unaware they have the condition. As a result, glaucoma can go unnoticed until it has caused significant damage to the optic nerve and irreversible vision loss as noticed in the findings of this study where the irreversible loss of vision was expressed as a consequence of untreated glaucoma according to the respondents (71.6%).

The respondents (66.3%) of this study correctly maintained that people with glaucoma maybe asymptomatic, stating that glaucoma results from pressure damage to the nerve of vision. According to this study, 63.1% of the respondents declined when asked if glaucoma is a spiritual problem/curse. Khaw and Foster, (2012) reported contrasting findings that glaucoma can also be associated with spiritual problems. For example, some individuals may experience guilt or shame as a

result of their vision loss (Khaw & Foster, 2012). This can lead to feelings of isolation and depression, as well as a sense of hopelessness. It is important to note that these feelings can be addressed through counseling and support from family and friends. Most participants (73.4%) in this study agreed that vision loss from glaucoma cannot be restored and that people with glaucoma need regular eye examinations (79.6%). The best way to prevent glaucoma is to have regular eye exams (Stalman & Rozema, 2011; Mizrahi *et al.*, 2011; Khaw & Foster, 2012), as early detection through regular eye check-ups was indicated by respondents (73.7%) as a way to mitigate the damage that it can cause. Additionally, people with a family history of glaucoma should be especially vigilant in monitoring their eye health, as they are more likely to develop the condition. Other preventive strategies include maintaining a healthy lifestyle, such as exercising regularly and eating a balanced diet, as well as reducing stress levels.

A recent study by Fang *et al.* (2020) reported that one of the key factors associated with glaucoma is elevated intraocular pressure (IOP). As such, treatment typically involves the use of medications, such as eye drops, to lower eye pressure and reduce the risk of further damage to the optic nerve (Fang *et al.*, 2020). Pressure-decreasing eye drops are one of the most common treatments for glaucoma (Yallapragada *et al.*, 2019). This is concurrent with this study's findings that glaucoma can be treated with eye drops that decrease eye pressure (65.6%). These medications typically contain either a prostaglandin analog, a beta-blocker, or a combination of both, which work by decreasing the production of aqueous humor, a fluid produced in the eye, to reduce eye pressure. Regular glaucoma screenings are also an important part of glaucoma prevention and management. This is particularly true for older adults, as the risk of developing glaucoma increases with age. During a glaucoma screening, a doctor will use a tonometer to measure the patient's IOP, as well as check for signs of optic nerve damage and visual field loss. If any of these tests reveal signs of glaucoma, further testing, and treatment may be necessary to prevent further damage (Yallapragada *et al.*, 2019). This is in line with the majority of the benefits of glaucoma screening stated by the respondents which include health improvement, blindness prevention, and vision protection.

5. CONCLUSION

In conclusion, glaucoma is a leading cause of blindness and is most common in individuals over the age of 40 in Imo State. It is associated with family genetics and can be asymptomatic in elderly patients. The awareness and level of knowledge of glaucoma influences the uptake of glaucoma screening services.

6. RECOMMENDATIONS

This study recommends the following:

1. Increase public awareness of the importance of glaucoma screening: Public health campaigns should be

conducted to ensure that adults aged 40 and above in Imo State are aware of the importance of glaucoma screening services and their associated benefits.

2. Improve access to glaucoma screening services: The government should ensure that there are sufficient facilities providing glaucoma screening services in Imo State and that these services are easily accessible to the population.

3. Make glaucoma screening services affordable: The government should make glaucoma screening services affordable and within the reach of the population in Imo State.

4. Train more health workers in the management of glaucoma: The government should ensure that more health workers are trained in the management of glaucoma so as to improve the capacity of health institutions to provide glaucoma screening services.

5. Introduce incentives to encourage glaucoma screening: The government should introduce incentives such as tax rebates or discounts to encourage adults in Imo State to take up glaucoma screening services.

6. Utilize existing health infrastructure: The government should utilize existing health infrastructure such as primary health care centers to provide glaucoma screening services for aged adults.

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