

Assessment of the Knowledge and Attitude Regarding Diabetic Retinopathy Amongst Diabetic Patients in Suleja Local Government Area of Niger State.

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Abstract- *This study assessed the knowledge, attitudes, and adherence to diabetic retinopathy screening guidelines among diabetic patients in Suleja Local Government Area of Niger State, Nigeria. Using a cross-sectional survey, data were collected from diabetic patients through structured questionnaires, focusing on their awareness of diabetic retinopathy, attitudes towards regular eye screenings, and compliance with recommended screening practices. The results revealed that 55.2% of respondents had heard of diabetic retinopathy, but only 34.3% correctly identified it as an eye condition, with 57.0% aware of the risk of blindness if left untreated. While 69.8% recognized that diabetes could affect their eyes, knowledge about screening frequency was mixed, with 31.4% believing screenings should occur only when experiencing vision problems. In terms of attitudes, 51.1% agreed that regular eye screenings are essential, but a significant proportion remained undecided or disagreed. Furthermore, only 49.4% had undergone an eye screening in the past 12 months, and 52.9% did not regularly attend scheduled screenings. Barriers such as perceived time commitment and affordability were identified, with 40% finding screenings too time-consuming and 41.2% viewing them as unaffordable. Despite these challenges, 68.0% of respondents believed that attending regular eye screenings would improve diabetes management, and 71.5% had received information from healthcare providers about diabetic retinopathy. The study concluded that while awareness and understanding of diabetic retinopathy are moderate, adherence to screening guidelines remains suboptimal. Efforts to improve patient education, address barriers to access, and enhance healthcare provider engagement are crucial for increasing screening compliance and preventing vision complications among diabetic patients in the region.*

Keywords: *Diabetic Retinopathy, Eye Screening, Diabetes Management, Knowledge, Adherence, Suleja, Nigeria.*

I. INTRODUCTION

Diabetes Mellitus (DM) is a persistent metabolic condition characterised by heightened blood sugar

levels due to deficiencies in insulin secretion, function, or both. The prevalence of diabetes mellitus is escalating on a global scale, evolving into a significant health concern. Recent estimates indicate that in 2022, approximately 828 million adults worldwide were living with diabetes, with projections suggesting this number could rise to 1.3 billion by 2050, underscoring the urgent need for effective prevention and management strategies (NCD Risk Factor Collaboration [NCD-RisC], 2023).

The pervasive impact of diabetes on global health, affecting over 422 million individuals (Zhou, 1980; IDF, 2015), underscores its continued significance as a public health challenge. This disease poses a threat not only through macrovascular complications, such as cardiovascular disease, but also through microvascular complications, including diabetic retinopathy (DR) (Forbes, 2013). The escalating prevalence of diabetes (Shaw *et al.*, 2010) has elevated DR to a leading cause of preventable vision impairment and blindness worldwide (Sabanayagam *et al.*, 2016).

The World Health Organization (WHO) has advised its member nations to incorporate a program-based strategy for addressing Diabetic Retinopathy into their efforts to prevent blindness. In developed countries, the prevalence of diabetic retinopathy is significant, making it the primary cause of blindness. However, rapidly growing economies and urban centres in developing countries are also grappling with a rising epidemic of diabetic retinopathy (WHO, 2020).

This study holds significant importance to public health concerns relative to diabetes patients. The study has the potential to empower patients with knowledge, increase awareness about diabetic retinopathy and its associated risks, and, hence,

motivate patients to take ownership of their eye health and actively seek preventive care.

This study seeks to investigate the extent of knowledge, attitudes, and patient awareness regarding eye health, particularly diabetic retinopathy screening, among diabetic patients in Suleja Local Government Area of Niger State, Nigeria, to inform targeted interventions.

The specific objectives are as follows:

- i. To evaluate the level of Knowledge among diabetic patients regarding diabetic retinopathy.
- ii. To assess the attitude of diabetic patients towards the importance of regular eye screening for diabetic retinopathy.
- iii. To identify any existing barriers or challenges hindering diabetic patients from accessing retinopathy screening and care.
- iv. To assess the level of adherence to recommended retinopathy screening guidelines among diabetic patients.
- v. To explore the association between demographic factors (such as age, gender, education level, and duration of diabetes) and the knowledge regarding diabetic retinopathy services among diabetic patients in the Suleja Local Government Area.
- vi. To explore the association between demographic factors (such as age, gender, education level, and duration of diabetes) and the attitude regarding diabetic retinopathy services among diabetic patients in the Suleja Local Government Area.

II. METHODS

Study design:

This study utilized both quantitative and qualitative methods (Mixed method) to collate data for the study. This study also adopted the cross-sectional descriptive survey design to evaluate the knowledge and attitude regarding diabetic retinopathy screening among diabetic patients attending a general hospital, in Suleja, Niger state.

Setting:

Suleja LGA is a major trading city and a busy metropolis in Niger State. The LGA consists of ten wards and has an area of 2,980 square kilometres. According to the 2006 census, Suleja had a population of 215,075, which was projected to be approximately 368,900 in 2023 (City Population,

2023b). The city is situated just north of Abuja, the Federal Capital Territory (FCT), with some parts of Suleja extending into the FCT boundaries. Healthcare services in Suleja include the General Hospital Suleja and several private hospitals, which provide secondary healthcare services. Additionally, there are about 21 primary healthcare centres in the area, serving the growing population.

Study Population:

The population for this study consisted of 185 diabetic patients attending the Diabetic Clinic in the public hospital, Suleja General Hospital in the Suleja Local Government Area.

Inclusion criteria:

The following was the criteria for the choice of participants for this study:

Diabetic patients aged 18 years and above who reside in the Suleja Local Government area are willing to take part in the research study.

Exclusion criteria:

- i. Cognitive impairment or other conditions that prevent informed consent or participation in the study.
- ii. Participation in another research study that may interfere with the current investigation.

Sample Size Determination:

The minimum sample size was determined using the Kish formula. The statistical formula for calculating sample size is given below;

$$n = \frac{Z^2 pq}{e^2}$$

Where n = the sample size

z = confidence limit at 95%, which is equivalent to 1.96 standard deviate

p = being a proportion of respondents with good knowledge of ocular complications of diabetes and are willing to take up Eyecare services from a previous similar study $87.5\% = 0.875$

$$q = 1 - p = 1 - 0.875 = 0.125$$

e = margin of error acceptable for the study = $5\% = 0.05$

Therefore,

$$n = \frac{(1.96)^2 (0.875)(0.125)}{(0.05)^2}$$

$$n = \frac{(1.96)^2 \times (0.875)(0.125)}{0.0025}$$

$$n = \frac{(3.8416)(0.109375)}{0.0025}$$

$$n = 0.420175 / 0.0025$$

$$n = 168.07 = 168$$

Allowing for attrition and poorly filled questionnaires, a 10% of the sample size will be added = $168 + 17 = 185$
Therefore, the sample is $n = 185$.

Sampling Techniques:

This study employed both qualitative and quantitative sampling methods to achieve a comprehensive understanding of the research problem.

For the qualitative arm, it typically focuses on in-depth exploration and understanding of participants' experiences, perceptions, and behaviors

For the quantitative arm, it utilized a systematic sampling method, a probability-based approach, we set a KK at 10 allowing us to systematically include every 10th patient.

Data collection:

A structured survey questionnaire was the primary tool for collecting quantitative data. This questionnaire was adopted and adapted from the *Diabetic Retinopathy Knowledge and Attitudes (DRKA) Questionnaire* developed by Fenwick et al. (2020). The tool was designed to assess patients' knowledge and attitudes towards diabetic retinopathy (DR) and diabetic macular edema (DME).

Qualitative data were collected through Focus Group Discussions (FGDs) and Key Informant Interviews (KIIs) to capture in-depth insights into the factors affecting diabetic retinopathy screening.

Validity of the Research Instrument:

To ensure validity:

- The questionnaire was reviewed and verified by a supervisor from the Department of Public Health. This questionnaire was adapted and adopted
- Necessary amendments were made to improve the clarity and relevance of the questions.

Data Analysis:

Quantitative data were checked, entered into Microsoft Excel, and analyzed using SPSS version

20. Descriptive statistics were presented as frequencies and percentages. Chi-square and binary logistic regression analyses were performed, with statistical significance set at $p \leq 0.05$.

Qualitative data were transcribed and analyzed. Overarching themes and patterns from the coded data were identified and analyzed. These themes served as central concepts that helped answer the research questions. Nvivo software was used for qualitative data analysis to facilitate systematic coding and thematic categorization.

Ethical Considerations and Informed Consent:

This study was conducted in accordance with ethical research standards to ensure the protection of participants' rights and well-being. Ethical approval was obtained from the Institutional Review Board of Bingham University before commencing the research. Additionally, permission was sought from the Medical Director and other relevant authorities to conduct the study within the selected healthcare facilities. Informed written consent was obtained from all participants after explaining the study objectives, procedures, risks, and benefits. Confidentiality and anonymity were assured, and participation was voluntary with the option to withdraw at any stage.

III. RESULTS

Out of the 185 questionnaires administered, a total of 172 were retrieved accounting for 92.9% response rate. However, 13 questionnaires were not returned, representing 7.1% of the total distribution. This high response rate indicates strong participant engagement and data reliability for the study.

Socio-demographic Characteristics of Respondents

The data in Table 1 above presents the socio-demographic characteristics of the respondents demonstrating a diverse representation across various parameters, including age, gender, education, employment status, and marital status.

Table 1: *Socio-Demographic Distribution of Respondents*

Socio-demographic data of respondents	No. of respondents	Percentage (%)
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Age group		
18-30 years	45	26.2
31-45 years	48	27.9
46-60 years	54	31.4
Above 60 years	25	14.5
Gender	77	44.8
Female	95	55.2
Male		
Highest level of education	32	18.7
No formal education	29	16.9
Primary school	48	27.9
Secondary school	63	36.6
Tertiary education		
Current employment status	50	29.1
Employed full-time	35	20.3
Employed part-time	17	9.9
Retired	35	20.3
Self-employed	35	20.3
Unemployed		
	32	18.6
Marital status	78	45.3
Divorced/Separated	29	16.9
Married	33	19.2
Single		
Widowed		

Level of knowledge among diabetic patients regarding diabetic retinopathy:

The Figure 1 displays the overall knowledge levels regarding diabetic retinopathy among diabetic patients in Suleja Local Government Area. It categorizes knowledge into three segments: Good Knowledge (35%), representing respondents with a high understanding of diabetic retinopathy; Fair

Knowledge (40%), indicating partial awareness or moderate understanding; and Poor Knowledge (25%), representing those with limited or incorrect knowledge. This distribution highlights that while a significant portion of the patients possess some awareness, there remains a need to improve understanding across the board, particularly for those with fair to poor knowledge.

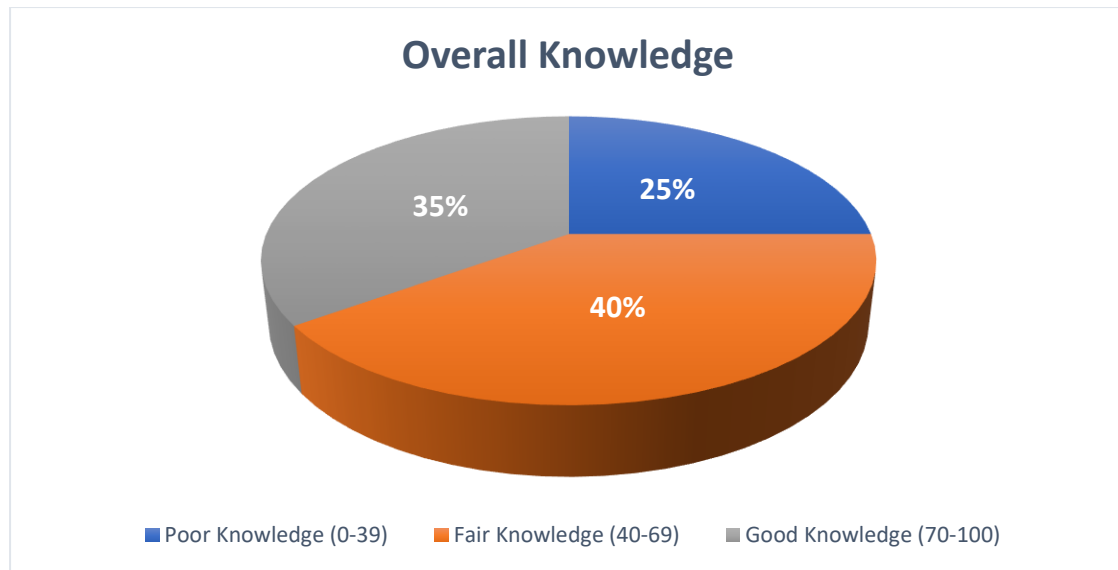


Figure 1: Overall Knowledge of diabetic retinopathy

Source: Field Work (2024)

Perceptions of Diabetic Patients on the Importance of Regular Eye Screenings for Diabetic Retinopathy

The data in Table 4 provides insights into the respondents' willingness and attitudes toward eye screenings for diabetic retinopathy.

Table 2: Perceptions of Diabetic Patients on the Importance of Regular Eye Screenings for Diabetic Retinopathy

S/N	Statement	SA	A	U	D	SD	Total
1	I believe that regular eye screenings are essential for managing diabetic retinopathy.	54 (31.4%)	34 (19.7%)	31 (18.1%)	30 (17.4%)	23 (13.4%)	172 (100%)
2	I am willing to attend regular eye checks to screen my eyes for diabetic retinopathy.	44 (25.6%)	33 (19.2%)	31 (18.0%)	28 (16.3%)	36 (20.9%)	172 (100%)
3	I think eye screenings should be included as part of my regular diabetes care routine.	43 (25.0%)	30 (17.5%)	25 (14.6%)	36 (20.9%)	38 (22.1%)	172 (100%)
4	I feel that regular eye screenings are too time-consuming for me	34 (19.7%)	35 (20.3%)	36 (20.9%)	27 (15.7%)	40 (23.2%)	172 (100%)
5	I think eye screenings for diabetic retinopathy are affordable for me	30 (17.4%)	36 (20.9%)	35 (20.3%)	30 (17.4%)	41 (23.8%)	172 (100%)
6	I am comfortable attending eye screenings even when I do not have any visible eye symptoms	41 (23.9%)	25 (14.6%)	30 (17.4%)	36 (20.9%)	40 (23.3%)	172 (100%)
7	I trust the results of regular eye screenings for diabetic retinopathy	33 (19.2%)	35 (20.3%)	43 (25.0%)	28 (16.3%)	33 (19.2%)	172 (100%)

8	I feel comfortable discussing eye health with my healthcare provider	41 (23.8%)	37 (21.5%)	33 (19.2%)	36 (20.9%)	25 (14.5%)	172 (100%)
9	I am confident in my ability to manage my diabetes to prevent eye complications	41 (23.8%)	27 (15.7%)	37 (21.5%)	34 (19.8%)	33 (19.2%)	172 (100%)
10	I think it is important to educate others about the benefits of regular eye screenings	55 (41.0%)	34 (19.7%)	27 (15.7%)	33 (19.2%)	23 (13.4%)	172 (100%)

SA-Strongly Agree, A-Agree, D-Disagree, SD- Strongly Disagree, U-Undecided

Source: Field Work (2024)

Adherence of Diabetic Patients to Recommended Retinopathy Screening Guidelines
The data in Table 3 highlights respondents' behaviours and attitudes toward eye screenings for

diabetic retinopathy over the past year. The study revealed that a total of 733 (53.3%) of the respondents do adhere to recommended retinopathy screening guidelines while 643 (46.7%) do not.

Table 3: *Adherence of Diabetic Patients to Recommended Retinopathy Screening Guidelines*

S/N	Statement	Yes	No	Total
1	Have you had an eye screening for diabetic retinopathy in the last 12 months?	85 (49.4%)	87 (50.6%)	172 (100%)
2	Do you regularly attend scheduled eye screenings for diabetic retinopathy?	81 (47.1%)	91 (52.9%)	172 (100%)
3	Do you follow your doctor's recommendations for regular eye screenings?	100 (58.1%)	72 (41.9%)	172 (100%)
4	Are you aware of the recommended frequency for diabetic retinopathy screenings? Recommendations	86 (50.0%)	86 (50.0%)	172 (100%)
5	Do you attend eye screenings even when you have no vision problems?	71 (41.3%)	101 (58.7%)	172 (100%)
6	Have you ever missed a scheduled eye screening for diabetic retinopathy?	103 (59.9%)	69 (40.1%)	172 (100%)
7	Do you inform your doctor if you miss an eye screening appointment?	90 (52.3%)	82 (47.7%)	172 (100%)
8	Do you believe that attending regular eye screenings will help manage your diabetes better?	117 (68.0%)	55 (32.05)	172 (100%)
		733 (53.3%)	643 (46.7%)	1376 (100%)

Source: Field Work (2024)

Test of Research Hypotheses

The study tested its hypotheses at a 5% significance level ($p < 0.05$) using Chi-square to assess associations.

Association between Sociodemographic Factors and Knowledge of Diabetic Retinopathy

The study reveals as shown in Table 4, that of the sociodemographic factors, only age ($P=0.031$), educational level ($p=0.021$) and marital status ($p=0.001$) were statistically significant. Which implies that there is an association between age, education level, marital status and the knowledge of diabetic retinopathy.

Table 4: Association between Sociodemographic Factors and Knowledge of Diabetic Retinopathy

Sociodemographic data	Group		χ^2
	Good Knowledge	Poor Knowledge	
Age			
18-30 years	15	30	4.63 *(0.031)
31-45 years	18	30	
46-60 years	20	34	
Above 60 years	6	19	
Gender			
Female	29	48	4.631
Male	30	65	
Educational level			
No formal education	10	22	5.21 *(0.021)
Primary school	8	21	
Secondary school	15	33	
Tertiary education	12	51	
University/Polytechnic	14	49	
Employment status			
Employed full-time	20	30	5.305
Employed part-time	8	27	
Retired	3	14	
Self-employed	13	22	
Unemployed	15	20	
Marital Status			
Divorced/Separated	10	22	5.798 *(0.001)
Married	28	50	
Single	9	20	
Widowed	12	21	

* Indicate significant at $p<0.05$

Association between Socio-demographic Factors and attitude of respondents regarding Diabetic Retinopathy

The table 5 presents the association between various sociodemographic factors and the attitudes of respondents regarding diabetic retinopathy. Out of

the sociodemographic factors considered in this study, only age ($p=0.021$), gender ($p=0.031$), educational level ($p=0.043$) and marital status ($p=0.013$) were statistically significant at p -value of 0.05.

Table 5: Association between Socio-demographic Factors and attitude of respondents regarding Diabetic Retinopathy

Sociodemographic data	Group		χ^2
	Positive Attitude	Negative Attitude	
Age	25	20	

18-30 years	28	20	4.11
31-45 years	32	22	*(0.021)
46-60 years	10	15	
Above 60 years			
Gender	35	42	3.23
Female	45	50	*(0.031)
Male			
Educational level			
No formal education	15	17	4.58
Primary school	12	17	*(0.043)
Secondary school	22	26	
Tertiary education	20	28	
University/Polytechnic	24	39	
Employment status			
Employed full-time	25	25	
Employed part-time	15	20	5.305
Retired	8	9	
Self-employed	20	15	
Unemployed	12	23	
Marital Status			
Divorced/Separated	12	20	
Married	40	38	
Single	15	14	3.498
Widowed	10	23	*(0.013)

IV. DISCUSSION

The findings of the study on the level of knowledge among diabetic patients in Suleja Local Government Area of Niger State, Nigeria, highlight several critical insights regarding awareness and understanding of diabetic retinopathy. A notable 95 (55.2%) of respondents had heard of diabetic retinopathy, but a significant 44.8% were not aware of the condition. This aligns with findings from a study in Ethiopia, where 79.1% of diabetic patients knew that diabetes could affect the eyes, but only 39.5% had good knowledge of DR itself⁸⁰. A similar study in Nigeria by Azeez *et al.* (2021), revealed that 68.6% of respondents were aware that diabetes increases the risk of DR, supporting the finding that 68.6% of Suleja respondents were aware of this risk.

The second objective of the study, which examined the attitude of diabetic patients in Suleja Local Government Area of Niger State, Nigeria, towards the importance of regular eye screenings for diabetic retinopathy, reveals a range of perspectives, with both positive and negative attitudes observed. The

data indicates that 54 (31.4%) of respondents strongly agreed that regular eye screenings are essential, and 34 (19.7%) agreed, making it clear that over half of the participants recognise the importance of these screenings. However, a notable portion remained undecided 31 (18.1%), while 30 (17.4%) disagreed and 23 (13.4%) strongly disagreed. A study in Kano, Nigeria, found that while 84.3% of patients were aware of DR, only 15.7% had undergone screenings (Mohammed & Waziri, 2009), highlighting the gap between knowledge and practice.

The third objective on the level of adherence to recommended retinopathy screening guidelines among diabetic patients in Suleja Local Government Area of Niger State, Nigeria, provides a comprehensive view of patient behaviours and attitudes toward regular eye screenings for diabetic retinopathy. The result reveals a nearly even split in actual screening behaviour, with 85 (49.4%) of respondents reporting that they had an eye screening in the last 12 months, while 87 (50.6%) had not. This indicates that while half of the respondents adhere to

annual screening recommendations, the other half do not, suggesting a gap in compliance that may hinder early detection and management of diabetic retinopathy. This level of non-adherence aligns with findings from a study in Southwestern Nigeria, which reported that only 28.9% of diabetics had undergone a previous dilated eye examination, primarily due to the absence of symptoms or lack of referrals from healthcare providers (Onakpoya *et al.*, 2010). In a U.S. study, only 33.9% of low-income patients adhered to diabetic retinopathy screening within two years (Kuo *et al.*, 2020).

From the focus group discussion, the study revealed moderate awareness of diabetic retinopathy (DR) among participants, though many had limited knowledge. Gaps in awareness were attributed to poor emphasis from healthcare providers, the absence of early symptoms, and inadequate community-level education. Participants identified healthcare providers, community programs, and self-research as key information sources, stressing the importance of early detection in preventing vision loss.

Attitudes toward regular eye screenings were mixed. While many acknowledged their importance, barriers such as cost, time constraints, distance, and fear of diagnosis hindered attendance. Some patients only sought screenings when symptomatic, reflecting a reactive rather than preventive approach.

Barriers to accessing DR care included high costs, lack of insurance, transportation difficulties—especially in rural areas—and insufficient information. Suggested improvements included subsidised or affordable screenings, mobile clinics, and stronger education campaigns.

Adherence to screening guidelines was inconsistent, with financial constraints, work commitments, and misconceptions about symptom-driven care being major obstacles. Despite this, participants agreed that regular screenings are crucial for managing DR. They recommended increased healthcare provider engagement, reminders, community-based education, and improved accessibility to encourage adherence.

V. CONCLUSION AND RECOMMENDATION:

The study assessed knowledge, attitudes, and adherence to diabetic retinopathy (DR) screening among diabetic patients in Suleja, Niger State. Findings show moderate awareness of DR but significant gaps in knowledge of symptoms and risk factors. While patients recognise the importance of screenings, adherence is inconsistent, with nearly half missing screenings in the past year and many only attending when vision problems occur. Barriers include cost, time, lack of awareness of screening frequency, and missed appointments. Strengthening patient education, reinforcing guidelines through healthcare providers, and addressing affordability and access challenges are essential to improve early detection, prevent vision loss, and enhance patients' quality of life.

Recommendations

To improve diabetic retinopathy (DR) management in Suleja, the government should fund awareness campaigns, integrate eye screenings into routine diabetes care, and address misconceptions about DR through accurate education. Collaboration with NGOs and healthcare providers is needed to expand access, particularly in underserved areas, through mobile units, subsidized/free services, and local clinics. Healthcare workers should receive training to counsel patients, provide regular reminders, and reinforce adherence to screening guidelines. National reminder systems (e.g., SMS/calls) should be established to reduce missed appointments. Finally, future research should explore barriers such as cost, time, transport, and cultural beliefs to inform effective interventions.

DECLARATIONS

Consent for publication

Consent was approved by my co-author for this publication.

Availability of data and materials

The datasets generated and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

Funding

This research received no external funding. It was conducted as part of academic and professional obligations.

Authors' contributions

- Dr Ebeogu Ogochukwu Nkechi Wisdom: Conceptualisation, study design, data collection, data analysis, manuscript drafting.
- Assoc. Prof. Kingsley C. Okafor: Supervision, methodology guidance, validation, and critical review of the manuscript. All authors read and approved the final manuscript.

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