

Digital Device Usage and Ocular Health Problems Among Non-Academic Staff of Tertiary Institutions in Owerri Imo State

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Abstract- Background: Workers in institutions of higher learning have become increasingly dependent on digital devices, due to their outstanding benefits. However, usage of these devices has been linked with various unintended ocular problems.

Objective: To ascertain digital device-related ocular problems among non-academic staff of tertiary institutions in Owerri Imo State.

Methods: A descriptive cross-sectional study was carried out, to sample 120 participants being 30% of total population of non-academic staff who constantly use digital device during their work hours in federal tertiary institutions located in Owerri (Federal University of Technology, Owerri (FUTO), Alvan Ikoku Federal College of Education, Owerri (AIFCE) and Federal Polytechnic Nekede, Owerri (FPNO)). Purposive random sampling technique was utilized for their selection, with all ethical requirements obtained. A pre-tested semi-structured interviewer-administered questionnaire and ocular examination were employed to obtain data from respondents aged less than 40 years and above, who consented and met inclusion criteria from July 2025 to December 2025. Data obtained was captured with SPSS version 23, analyzed using descriptive statistics. Chi square test was used to test the relationship between the variables and occurrence of ocular health problems at 5% level of significance.

Results: Prevalence of ocular problems among respondents was 54.2% (65). Ocular problems detected included digital-device vision syndrome (33: 27.5%), refractive anomalies (22: 18.3%) and dry eye syndrome (10: 8.3%). Ocular symptoms reported included headache (21.5%), teary eye (18.5%), blurred vision (15.4%),

dryness of eye (13.8%), eye fatigue (9.2%), eye irritation (7.7%), redness of eye (6.2%), sandy sensation (4.6%) and itchy eye (3.1%). Majority of respondents experienced ocular symptoms sometimes (28: 43.1%). Of the respondents that showed ocular problems, substantial proportion of them stayed off-work (38: 58.5%) for 3-5 days (17: 44.7%). Age ($\chi^2 = 21.56, P < 0.0001$) and years of digital device use ($\chi^2 = 15.04, P=0.001$) were significant demographic characteristics that influenced occurrence of ocular health problems among respondents. Significant digital device usage patterns associated with ocular health problems occurrence included daily device usage duration ($\chi^2 = 7.407, P=0.025$), non-observance of breaks during device usage ($\chi^2 = 7.025, P=0.008$), non-usage of device brightness/contrast adjustment ($\chi^2 = 7.025, P=0.008$), non-usage of anti glare ($\chi^2 = 7.394, P=0.007$), closer distance with device during usage ($\chi^2 = 6.520, P=0.038$). Prevalence of ocular problems was higher among respondents who stayed long hours on device (3-6hrs: 45.7%; ≥ 6 hrs: 65.6%), who do not observe breaks during digital device use (60.6%), who do not use device brightness/contrast adjustment (67.3%), who do not use anti-glare device (66.1%) and who stay at closer distance to digital device during usage ($< 30\text{cm}$: 73.9%; 30 - 50cm: 54.7%).

Conclusion: Non-academic staff in tertiary institutions in Owerri, Imo State are faced with high prevalence of ocular health problems. Computer vision syndrome, dry eye syndrome, and vision problems (e.g, myopia, hyperopia, astigmatism and presbyopia) were found among workers who constantly used digital devices during their working hours. Age and years of digital device use were factors found to have influenced occurrence of ocular issues, while long hours on digital devices, non-observance of breaks during device usage,

non-usage of device brightness/contrast adjustment, non-usage anti glare, closer distance with device during usage were digital device usage patterns that associated with ocular problems. Ergonomic modifications of work environment, sensitization through awareness creation, health education and periodic eye examination/care were recommended as intervention strategies for ameliorating digital device-related ocular problems among workers in tertiary institutions.

Index Terms- Digital Device Usage, Ocular Problems, Tertiary Institutions, Workers, Imo State

I. INTRODUCTION

Digital devices such as computers (laptops, desktops), smartphones, e-book readers, tablets and other high-resolution digital displays have become an integral part of modern life, as they connect the users to the world instantly, increasing access to information and enabling inter-connectivity with others (Altaihi et al., 2020). Great number of disparate and adequately varied mental, physical, and social activities, involving writing, typing, in-person meetings, and filings, have been achieved with the aid of these devices (Al-Atawi, 2023). Digital devices have revolutionized work-outflow in many sectors particularly in education, leading to enhanced productivity, efficiency and overall work experience among workers in tertiary institutions.

Non-academic staff especially in institutions of higher learning have become increasingly dependent on digital devices, due to their outstanding benefits. However, usage of these devices have been linked with unintended ocular problems, often among workers who constantly use them. Individuals who spend long hours on digital device have intense accommodation and extra-ocular muscle strains, with complaints of eye irritation, burning sensation, discomfort, tearing, eye ache, eye strain, feeling of eye dryness and at times vision disturbances (Skoblina et al., 2020). Eye issues such as computer vision syndrome, dry eye syndrome, vision problems (e.g, myopia, presbyopia) have been reported among digital device users. These ocular problems manifest from routine and prolonged use of digital devices. And may lead to work inaccuracies, reduced efficiency, decreased productivity and contribute to

poor quality of life among workers (Jadeja et al., 2024; Sheppard & Wolffsohn, 2018).

As reported by Alatawi et al. (2022), digital eye syndrome (computer vision syndrome) affected an estimated 60 million people globally, with a higher prevalence among populations that are occupationally reliant on them (Alatawi et al., 2022). Multiple internal and external factors were found to be responsible for these ocular problems. The internal risk factors were mostly due to existence of untreated refractive errors, such as astigmatism, far or near nearsightedness, and poor accommodation (Moon et al., 2016; Portello et al., 2012), while the external risk factor were related to ergonomic practices, including workstation situations, uncomfortable position, prolonged viewing of digital screens, improper lighting conditions, uncommon blinking, glare, and incorrect distance between the eye and the devices (Al-Atawi, 2023).

Several studies have been carried out on the impacts of digital device usage on ocular health. A study carried out by National Institute of Occupational Safety and Health (NIOSH) in Malaysia showed that 70.6% of workers who used computers in their workplace, complained of eye strain (Altaihi et al., 2020). Similar study conducted among bank workers in Onitsha, Nigeria, revealed 29.3% prevalence of computer vision syndrome among the participants. 103 (68.7%) of the participants reported digital device-related ocular problems, with headache (45.4%), itching (38.6%), photophobia (38.0%), blurry vision (37.3%) and eye pain (28.0%) as the commonest symptoms (Uba-Obiano et al., 2022).

Of these studies, only few have been carried out among tertiary institution workers, hence this study aimed to ascertain digital device usage and ocular health problems among tertiary institution workers in Imo State. Findings of this study will not only aid the development of evidence-based guidelines for safe digital device use, but will also help in informing workplace safety and health policies, as well as identify intervention strategies that may mitigate digital device-related ocular health risks among workers in tertiary institutions in Nigeria.

II. MATERIALS AND METHODS

A descriptive cross-sectional design was adopted for the study. One hundred and twenty (120) respondents who consented and met inclusion criteria, participated in the study. Their selection was via purposive random sampling technique. A set of detailed validated questions which formed the semi-structured questionnaire was administered through face-to-face direct contact to the respondents aged less than 40 years and above, who had worked at the administrative section of the institutions (FUTO, AIFCE and FPNO) for not less than two years and had consistently used digital devices during working hours.

Ocular health conditions of respondents were assessed using ocular examination tests/tools. Visual acuity test, was performed using far and near snellen charts to determine the extent each respondent sees both at far and near without aid. External structures of the eye was examined with pen touch, to detect the presence of deviations from normal. Ophthalmoscopy test was performed with a hand-held ophthalmoscope, to assess the internal structures of the eye. Auto-refractometry test was conducted to assess the visual condition of the respondents' eyes and to detect anomalies of vision or refractive errors. Trial lens kit was utilized to test-run the lens power needed for refractive error(s) correction, while schirmer test checked extent of tear production among respondents using schirmer strips.

Digital device-related ocular health problems among workers was ascertained on the basis of critical markers such as prevalence of ocular symptoms and ocular health problem occurrence, factors influencing occurrence of ocular problems and relationship between device usage patterns and occurrence of ocular health problems. The study lasted from July to December 2025. In the administration of questionnaire, the rate of incomplete and "wrong" responses due to poorly understood questions were drastically reduced as clarification sought were given in the process.

The informed consent of the respondents was obtained before actual administration of the questionnaire. Each question took about 3-5 minutes

to be completed. Data obtained was captured with SPSS version 23 and presented in tables, descriptive statistics for preliminary data analysis while chi square test at $P < 0.05$ was analytical method utilized.

III. RESULTS

Table 1: Socio-Demographic Characteristics of Respondents

Socio-Demographic Characteristics	Tertiary Institution Workers (n = 120)	
	Freq (n)	Percent (%)
Sex		
Male	48	40.0
Female	72	60.0
Total	120	100.0
Age		
< 40	27	22.5
40 – 49	44	36.7
50 - 59	39	32.5
60 +	10	8.3
Total	120	100.0
Marital status		
Married	48	40.0
Single	62	51.7
Others (e.g separated)	10	8.3
Total	120	100.0
Years of digital device use		
< 5 years	16	13.3
5 - 10years	52	43.3
>10years	52	43.3
Total	120	100.0

Table 2: Prevalence of Digital Device-Related Ocular Problems Among Respondents

	Tertiary Institution Workers (n = 120)
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Prevalence of Digital Device-Related Ocular Problems		Freq (n)	Percent (%)
Do you experience any ocular symptom(s) while using digital devices?			
Yes			
No		65	54.2
Total		55	45.8
What common ocular symptom(s) do you experience while using digital devices?			
		12	100.0
Eye irritation		0	
Eye fatigue			
Headache			7.7
Tearful eye		5	9.2
Redness of eye		6	21.5
Itchy eye		14	18.5
Dry eye		12	6.2
Sandy sensation		4	3.1
Blurred vision		2	13.8
Total		9	4.6
How often do you experience the symptom(s)?			
Every time		3	15.4
Sometimes		10	100.0
Once in a while			27.7
Rarely		18	43.1
Total		28	16.9
Occurrence of Ocular Problems			
Yes		1	12.3
Digital-device vision syndrome			100.0
Dry eye syndrome		65	8
Refractive anomalies			54.2
i. Myopia			27.5
ii. Hyperopia		65	8.3
iii. Astigmatism		33	18.3
v. Presbyopia		10	5.8
None		22	2.5
Total		7	1.7
Have you stayed off-work due to above ocular health problem(s)?			
Yes		3	8.3
No		2	45.8
Total		10	100.0
How long did you stay off-work?			
1 - 2 days		120	
3 -5 days			58.5
Above 5 days			41.5
Total		38	100.0

	27	
	65	23.7
		44.7
	9	31.6
	17	100.0
	12	
	38	

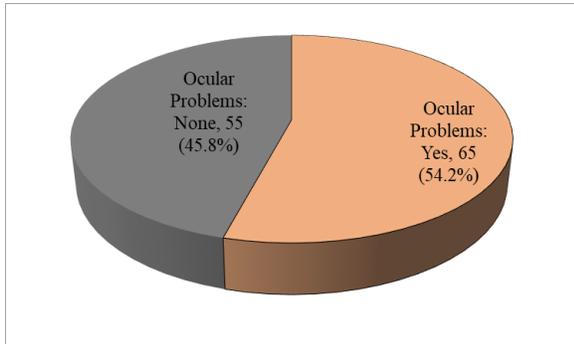


Fig. 1: Prevalence of Ocular Health Problems Among Respondents

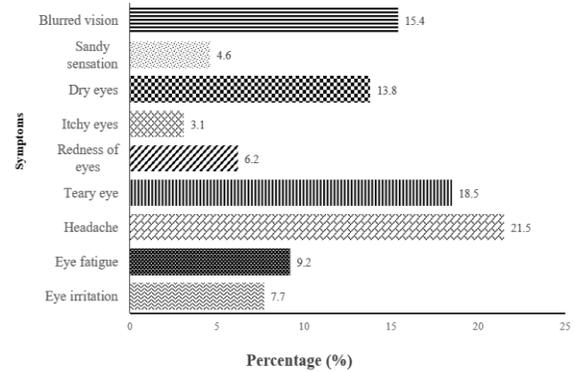


Fig 2: Common Reported Ocular Symptoms Among Respondents

Table 3: Socio-Demographic Characteristics and Occurrence of Ocular Health Problems Among Respondents

Socio-Demographic Characteristics	Presence of Ocular Health Problems					Chi-square	
	Total	None	%	Yes	%	(χ^2)	P value
Sex							
Male	48	23	47.9	25	52.1		
Female	72	32	44.4	40	55.6		
Total	120	55	45.8	65	54.2	0.140	0.708
Age							
< 40	27	21	77.8	6	22.2		
40 – 49	44	22	50.0	22	50.0		
50 - 59	39	11	28.2	28	71.8		
60 +	10	1	10.0	9	90.0		
Total	120	55	45.8	65	54.2	21.56	0.0001
Marital status							
Married	48	20	41.7	28	58.3		
Single	62	30	48.4	32	51.6		
Others (e.g separated)	10	5	50.0	5	50.0		
Total	120	55	45.8	65	54.2	0.568	0.753
Years of digital device use							
< 5 years	16	12	75.0	4	25.0		
5 - 10years	52	29	55.8	23	44.2		

>10years	52	14	26.9	38	73.1		
Total	120	55	45.8	65	54.2	15.04	0.001

Table 4: Digital Device Usage Patterns and the Occurrence of Ocular Health Problems Among Respondents

Digital Device Usage patterns	Total	Presence of Ocular Health Issues				Chi-square	
		None	%	Yes	%	(χ^2)	P value
Duration of daily digital device use							
< 3 hours	13	9	69.2	4	30.8		
3 - 6 hours	46	25	54.3	21	45.7		
> 6 hours	61	21	34.4	40	65.6		
Total	120	55	45.8	65	54.2	7.407	0.025
Observing breaks during digital device use							
Yes	74	41	55.4	33	44.6		
No	46	14	30.4	32	69.6		
Total	120	55	45.8	65	54.2	7.025	0.008
Break duration during digital device use							
< 20 minutes	41	20	48.8	21	51.2		
> 20 minutes	33	21	63.6	12	36.4		
Total	74	41	55.4	33	44.6	1.633	0.201
Voluntary blink during digital device use							
Yes	57	25	43.9	32	56.1		
No	63	30	47.6	33	52.4		
Total	120	55	45.8	65	54.2	0.170	0.680
Digital device brightness/contrast adjustment							
Yes	65	37	56.9	28	43.1		
No	55	18	32.7	37	67.3		
Total	120	55	45.8	65	54.2	7.025	0.008
Anti glare device use							
Yes	58	34	58.6	24	41.4		
No	62	21	33.9	41	66.1		
Total	120	55	45.8	65	54.2	7.394	0.007
Digital device usage distance							
< 30cm	23	6	26.1	17	73.9		
30 - 50cm	64	29	45.3	35	54.7		
> 50cm	33	20	60.6	13	39.4		
Total	120	55	45.8	65	54.2	6.520	0.038

IV. DISCUSSION

Socio-demographically, majority of administrative staff in tertiary institutions in Imo State were married female, aged 40 years and above. Greater proportion of them have used digital devices for more than five years (Table 1).

The overall prevalence of ocular health problem was 54.2% (65) among the respondents. As shown in figure 1, out of 120 respondents, 65 showed ocular health problems, while the remaining 55 (45.8%) showed none.

Findings agreed with reports given by Alatawi et al. (2022) and Almuqrashi et al. (2025), which showed a higher prevalence of ocular issues among populations occupationally reliant on computers.

Ocular problems detected included digital device (computer) vision syndrome, refractive anomalies and dry eye syndrome. Digital device (computer) vision syndrome was the most prevalent, followed by refractive anomalies and dry eye syndrome (as presented in Table 2). The findings supported a similar study by Almuqrashi et al. (2025), which revealed high prevalence of computer vision syndrome among university students in Oman. Similar studies by Okeke et al. (2023) and Dasheyta et al. (2024), also supported the findings of this study. Of the respondents that showed refractive anomalies, the majority were found with presbyopia, followed by myopia and astigmatism. The findings tallied with the reports of Sheppard & Wolffsohn, 2018 and Jadeja et al. (2024), which showed that prolonged use of digital devices affect the normal functioning of vision mechanism, resulting in ocular health issues. The findings also supported age characteristic of this study (as seen table 1), which showed that the majority of respondents were aged 40 years and above. Presbyopia usually manifests at age 40 and above. This may be the reason the prevalence of presbyopia was high among workers with refractive anomalies. The findings also lend credence to Portello et al. (2012) and Moon et al. (2016) reports which showed that risk factors of digital device-related ocular problems were mostly due to existence of untreated refractive errors, such as astigmatism, far or near nearsightedness, and poor accommodation.

Common reported ocular symptoms among respondents included headache, teary eye, blurred vision, eye fatigue, eye dryness, eye irritation, itchy eye, redness of eye and sandy sensation. Headache, teary eye and blurred vision were the commonest (as shown in Table 2). This may be due to intense accommodation, extra-ocular muscle strains and vision disturbances, resulting from long hours of device use as opined by Skoblina et al. (2020). The findings agreed with a similar study carried out by Uba-Obiano (2022) among bankers at Onitsha Anambra State, which listed headache, itching, blurry vision among the commonest symptoms detected. The findings also supported a related study by Owunna et al. (2020) in Owerri, Imo State and Kolawale et al. (2024) at Oshogbo, Soth-Western Nigeria, which revealed headache and blurry vision as ocular issues among respondents.

Age and years of digital device use were the significant factors that influenced occurrence of ocular health problems among respondents. Respondents aged 60 years and above were more affected with ocular health issues, while the under-40s were the least affected. Those who have used digital devices for over 10 years recorded the highest prevalence of ocular health problems (table 4). This is true as physiological changes occurs with age, leading to alterations in health conditions including the ocular. As shown in the findings, ocular issues occurred more among the female and married respondents, though sex and marital status were not found significant. The findings were in tandem with the results of demographic characteristics of the respondents (as presented in Table 1), which revealed that majority of tertiary institution workers were married female. This agreed with the study carried out by Shantakumari et al. (2014), which showed that female were at higher risk of ocular problems among the respondents used in the study.

Significant digital device usage patterns that influenced ocular problems occurrence included prolonged daily duration on digital devices, not observing breaks during digital device use, not using of digital device brightness/contrast adjustment, not usage of anti-glare, and closer distance between user and device. This showed that respondents' patterns of digital device usage affected their ocular health

condition and need to be mitigated against so as to avoid work inaccuracies, reduced efficiency, decreased productivity and poor quality of life as posited by Sheppard & Wolffsohn (2018) and Jadeja et al. (2024).

V. CONCLUSION

Administrative staff in tertiary institutions in Owerri are faced with high prevalence of ocular health problems. Digital device (computer) vision syndrome, dry eye syndrome, and refractive anomalies (e.g, myopia, hyperopia, astigmatism and presbyopia) were found among staff who constantly used digital devices for long hours in their work activities. Risk factors of digital device usage included non-observance of break, non-usage of digital device brightness/contrast adjustment, non-usage of anti-glare, and closer distance between user and device. Ergonomic modifications of work environment, sensitization through awareness creation, health education and periodic eye examination/care were recommended as intervention strategies for ameliorating digital device-related ocular problems among staff in tertiary institutions

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