

Original Research Article

Evaluation of the visual aptitude of public transport drivers on National Roads 6 (Bamako- Ségou) and 30 (Fana- Dioila) in the Reference Health Centre of Fana

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Abstract: Summary: In Mali, the increase in the number of road accidents is proportional to the increase in the number of cars in circulation. A study of public transport drivers revealed that 23.1% of the drivers surveyed were unfit to drive out of a sample of 385 drivers. The objective of this study was to assess the visual aptitude for driving of inter-urban public transport drivers on the RN 6 and RN 30 in Fana. Results: The study involved 150 collective transport drivers, the majority of whom were in the 30-39 age group, representing 46.7% (n=70) with extremes of 20 and 68 years, the average age being 35.81±9.66 years. A total of 14.7% (n=22) of the drivers surveyed were unfit to drive and the causes of reduced visual acuity among unfit drivers were cataracts with 36.36% (n=8), followed by optic neuropathies with 22.73% (n=5) and ametropias with 18.19% (n=4). With regard to the relationship between the age of the drivers and visual aptitude for driving, the study revealed that 46.15% (n=6) of the drivers aged over 50 years were unfit. **Conclusion:** The results of this study show the need to make the ophthalmological examination compulsory when issuing and renewing a driving licence throughout Mali.

Keywords: Visual ability, public transport drivers, RN 6 and RN 30 roads, Fana.

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1. INTRODUCTION

Roads are the main access routes to the various localities (town and country) in Mali. The evolution of the overall road network in Mali has varied from 24852 km in 2014 to 25770 km in 2018 and asphalt roads were 6743 km in the same year. The number of cars registered per year rose from 23,451 in 2014 to 32,693 in 2018 (Instat-mali, 2020). This high number of vehicles corresponds to the same number of drivers or more and the number of road accidents in Mali continues to rise. This number was estimated at 9,309 traffic accidents with 622 deaths and 8,231 injuries in 2020 (Ahmed, 2021). The town of Fana on the RN 6 receives more than 3,000 vehicles per day with an accident rate of 31.53% of the national total, i.e. 367 rural accidents for the regions of Koulikoro and Ségou in 2011 (ANASER, 2011)

In Mali, driving a vehicle is conditional on obtaining a driving licence and the issue or renewal of this requires medical aptitude criteria, including an ophthalmological assessment (Official Gazette, 2003). However, a study carried out at the CHU IOTA in 2014 among intra-urban transporters found that 23.1% of the drivers surveyed were unfit to drive a car out of a sample of 385 drivers. According to the same study, ametropia was the main cause of visual alterations (Diallo O, Traoré L, Traoré F, Simaga A, Thera JP, Coulibaly B, *et al.*, 2017).

Routine assessment of drivers' visual ability is therefore necessary in general and specifically on the RN 6 and RN 30 Fana-Dioila, which are very busy. As public transport is much more heavily used by passengers, these drivers are an essential target for monitoring visual aptitude. This justifies the interest in

conducting a survey on visual aptitude for driving among public transport drivers in this zone.

2. METHOD

2.1. Frame:

The health district of Fana straddles Bamako, Ségou and Diola on the RN6 and RN, i.e. 110 km from Bamako, 110 km from Ségou and 45 km from Dioila respectively. The District has a reference health centre with an ophthalmology unit. This unit has the following staff: an ophthalmologist, a medical assistant in ophthalmology. The infrastructure is equipped and consists of a consultation room, a room used for care, anaesthesia, an operating theatre, and a warehouse for storing consumables.

2.2. Type: The study was a cross-sectional, descriptive study that spanned 12 months, from June 2017 to May 2018, and involved collective transport drivers using the Bamako-Segou National Road 6 and the Fana-Dioila RN 30.

2.3. Population: the study concerned collective transport drivers working on the RN6 and RN30 between Bamako and Ségou; Fana and Dioila.

2.3.1. Inclusion criteria:

- Be a public transport driver working on the Bamako-Fana-Ségou and Fana-Dioila routes;
- Be active at the time of the study ;
- Take all the assessment tests;

2.3.2. Non-inclusion criteria:

- Refusal to participate in the study;

2.4. Sampling: The sampling was exhaustive, including all drivers who met the inclusion criteria.

2.5. Data collection:

Data were collected on individual survey forms in two stages:

Using direct interviews:

- Socio-demographic characteristics,
- Medical and ophthalmological history.
- With the help of ophthalmological

examinations, namely

- Measurement of distance visual acuity using a Monoyer scale placed at a distance of 5 metres from the patient and near visual acuity (in drivers aged 40 years and over) using a Parinaud scale,
- The external examination to assess oculomotricity in the 9 gaze positions,
- Slit lamp examination of the adnexa and anterior segment,
- Fundus examination using a Volk or direct ophthalmoscopes.

The visual acuity standards set by Inter-ministerial Order N°01-0008/MICT-MS-SG of 09 January 2001 were used to determine visual ability (Mali, 2001) [7]. Thus, unfit drivers were those for whom the sum of the visual acuity of the two eyes is less than 13/10, the visual acuity of the weaker eye being at least equal to 4/10 with the best optical correction.

Data entry and analysis: Data were entered and analysed on IBM SPSS Statistics version 25 software. The construction of tables, graphs and writing was done using Word and Excel 2016.

2.6. Ethical considerations:

In order to carry out this study, we requested and obtained the verbal agreement of the union leaders. The drivers surveyed participated on a voluntary basis, after receiving information on the survey process and its objectives.

Anonymity was respected and there were no physical risks for the respondents. The only inconveniences were the time taken to answer the questions and visual disturbances after pupillary dilation.

3. RESULTS

3.1 Socio-demographic aspects:

Distribution of cases by age group:

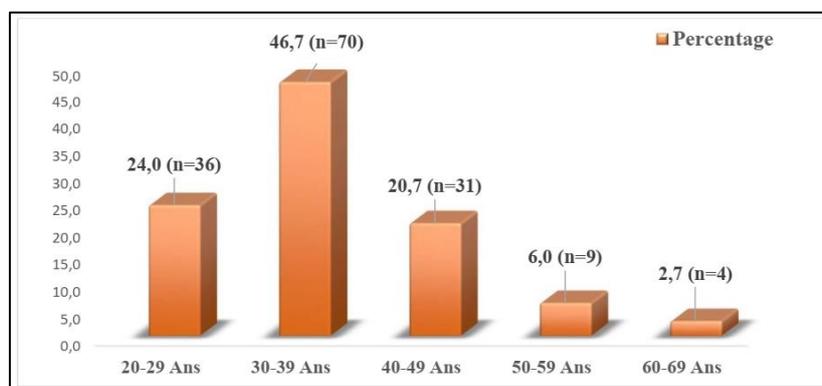


Figure 1: Distribution of drivers according to age.

46.7% (n=70) of the drivers were in the 30-39 age range with extremes of 20 and 68 years. The

average age was 35.81 years with a standard deviation of 9.66 years.

Table I: Distribution of drivers according to education level

Level of education	Workforce	Percentage (%)
Secondary	12	8
Primary	66	44
Literate	20	13,3
Non-literate	52	34,7
Total	150	100

44% (n=66) of the drivers had primary education.

Table II: Distribution of drivers according to type of driving licence

Category of licence	Workforce	Percentage (%)
BC	21	14
BCD	117	78
BCDE	12	8
Total	150	100

78% (n=117) of the drivers held a BCD licence category. Distribution of drivers according to transport vehicle:

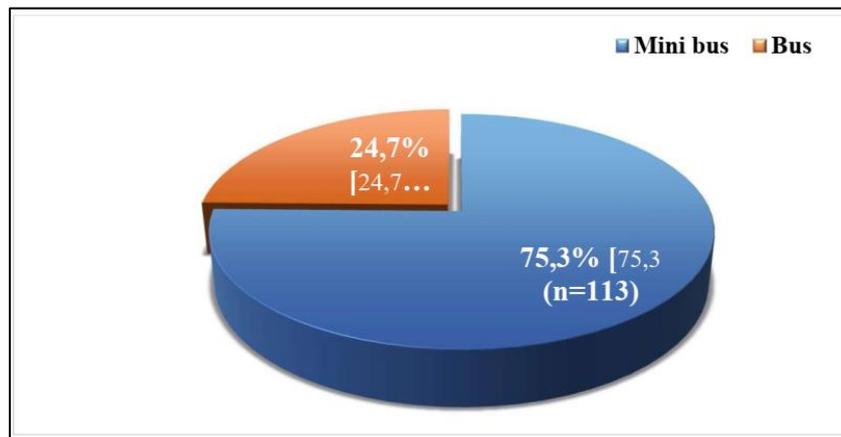


Chart 2

Table III: Distribution of drivers according to year of licensing

Year of licensing	Workforce	Percentage (%)
1971-1980	5	3,3
1981-1990	7	4,7
1991-2000	28	18,7
2001-2010	65	43,3
2011-2017	45	30,0
Total	150	100

43.3% (n=65) of the drivers surveyed obtained their licences between 2001 and 2010.

3.2. Clinical aspects:

Table IV: Distribution of cases according to previous ophthalmological consultation at the time of licence renewal

Ophthalmological consultation when renewing your licence	Workforce	Percentage (%)
Made	24	21,8
Not done	86	78,2
Total	110	100

78.2% (n=86) of the drivers who renewed their licence had not received an ophthalmological consultation at the time of renewal.

Table V: Distribution of drivers according to the sum of visual acuity before optical correction

Sum of visual acuity	Workforce	Percentage (%)
Less than 13/10	22	14,7
Greater than 13/10	128	85,3
Total	150	100

14.7% (n=22) of the drivers surveyed had a sum of visual acuity below 13/10 before optical correction.

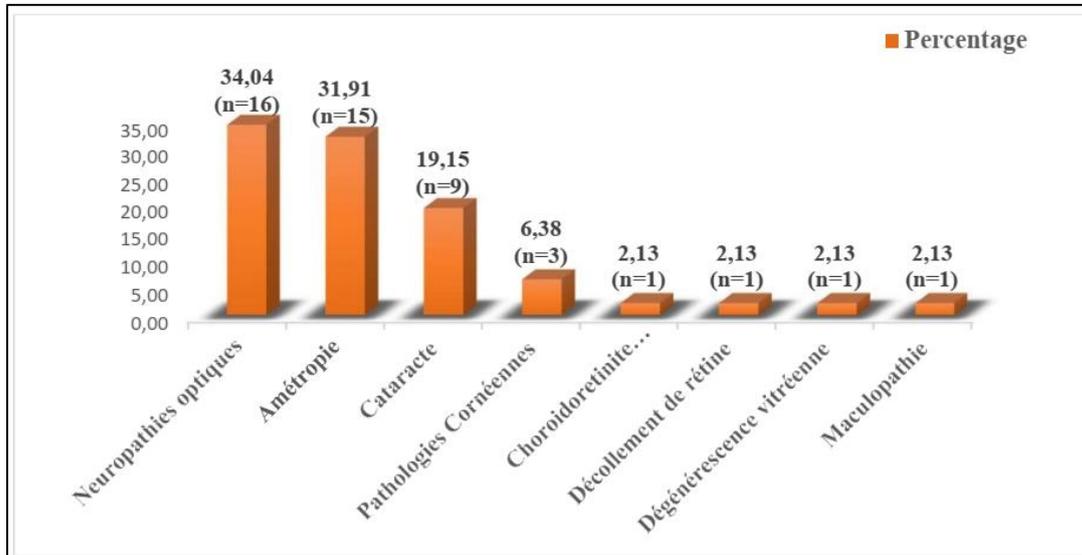


Figure 3: Distribution of cases according to vision disorders

A total of 31.33% (n=47) of the drivers had a visual impairment.

Optic neuropathies accounted for 34.04% (n=16 of which 14 cases of glaucoma and 2 cases of optic atrophy) of the causes of visual impairment overall.

Cataract was the most common cause of visual impairment in unfit drivers with 36.36% (n=8). Fisher's exact test=17.001 (P: 0.002).

NB: There were 16 cases of optic neuropathy including 14 cases of glaucoma and 2 cases of optic atrophy.

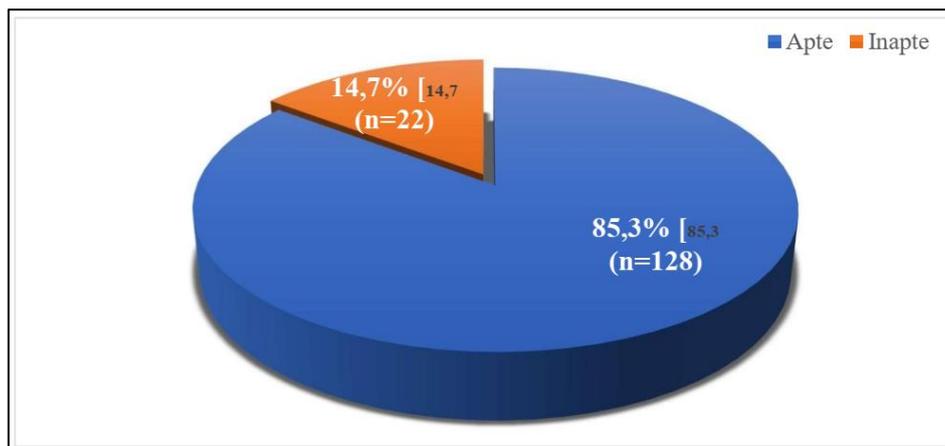


Figure 4: Distribution of cases according to driving ability before correction

14.7% (n=22) of the drivers surveyed were unfit to drive.

Table VI: Distribution of cases according to age and visual ability

Age group	Visual ability		Total
	Suitable	Unfit	
20-29 years	32 (25%)	4 (18,2%)	36 (24%)
30-39 years old	65 (50,8%)	5 (22,7%)	70 (46,7%)

40-49 years old	24 (18,8%)	7 (31,8%)	31 (20,7%)
50-59 years	6 (4,7%)	3 (13,6%)	9 (6%)
60-69 years	1 (0,8%)	3 (13,6%)	4 (2,7%)
Total	128 (100%)	22 (100%)	150 (100%)

31.8% (n=7) of unfit drivers were in the 40-49 age group. 50.8% (n=65) of fit drivers were in the 30-39 age group. Fisher's exact test=15.625 (P: 0.002).

4. DISCUSSION

4.1. Socio-demographic aspects:

The study involved 150 drivers on the Bamako-Fana-Ségou (RN 6) and Fana-Dioila (RN 30) routes. The most represented age group was 30-39 years, i.e. 46.7% (n=70) with extremes of 20 and 68 years, the average age was 35.81±9.66 years. This result was higher than that of the work of Oussa G *et al.*, in Cotonou in 1997 who reported 38.4% for the same age group (Oussa G, Doutetien C, Sylla S, Deguenon J. 1997).

In the sample, 44% (n=66) of the drivers had primary education; 43.3% (n=65) had obtained their licences between the years 2001 and 2010 and 86% (n=129) were holders of categories of licences that were compliant with collective transport (BCD and BCDE). This result was lower than the work of Diallo O *et al.*, in Bamako in 2014 who found 99.2% for the same permit categories [9]. The most represented type of public transport was the mini bus with 75.3% (n=113).

4.2. Clinical aspects:

Taking clinical aspects into account, 14.7% (n=22) of the drivers had a sum of visual acuity below 13/10 which made them unfit to drive public transport vehicles. This result was lower than that revealed by the study of Diallo O *et al.*, in Bamako in 2014, who reported that 23.1% of drivers were unfit (Diallo O *et al.*, 2017). This difference could be explained by the fact that in their study visual ability was determined not only by the sum of acuity but also by visual field assessment.

With regard to the causes of reduced visual acuity, cataracts were the most common condition among unfit drivers with 36.36% (n=8), followed by optic neuropathy and ametropia with 22.73% (n=5) and 18.19% (n=4) respectively; the difference observed was statistically significant (P=0.002). This result corroborates the work of Latham K and Misson G in the United Kingdom in 1997, who established that cataracts are the most frequent reason for consulting a specialist doctor with regard to driving (Latham K, Misson G. 1997). In contrast to this study, Oussa G *et al.*, found that the most frequent pathologies among unfit drivers were: maculopathy 31.81%; cataract 27.28% and glaucoma 22.72% (Oussa G, Doutetien C, Sylla S, Deguenon J. 1997).

According to Diallo O *et al.*, the main pathologies found in drivers were: ametropia, cataract and optic neuropathy with respectively 48.54%, 25.15% and 17.5% [9]; it should be noted that here, the authors had not established a relationship between visual unfitness for driving and the pathologies found.

In relation to the relationship between driver age and visual ability to drive, the study found that 46.15% (n=6) of drivers over the age of 50 were unfit. This result is higher than that of Diallo O *et al.*, who reported that 42.5% of drivers in the same age group were unfit.

CONCLUSION

Vision is an essential and indispensable sense for safe driving. In our study, 14.7% (n=22) of the drivers were unfit to drive public transport vehicles; 59.3% (n=89) had not undergone ophthalmological examinations when obtaining their driving licence. These results show us the need to make the ophthalmological examination compulsory when issuing and renewing driving licences throughout the country.

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