



Fatigue among bus drivers in Ghana and Norway: Examining the influence of working conditions and national road safety culture

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Introduction

Fatigue has been identified as a significant contributing factor to a considerable number of accidents involving professional drivers in road transport (Nævestad et al., 2021; Phillips et al., 2015). Studies have reported that fatigue poses a risk factor in approximately 10-25% of all crashes. International research indicates that between 36 and 64% of professional drivers admit to having fallen asleep behind the wheel at some point (Sagberg & Bjørnskau, 2004). The prevalence of this issue is higher among professional drivers compared to private drivers (23-52%) due to the former's longer driving distances. To effectively implement measures to control this critical risk factor, it is crucial to develop a comprehensive understanding of the factors influencing driver fatigue.

Aim

The aim of the present study is to examine the factors influencing fatigue among professional drivers in Ghana and Norway, focusing on the role of national road safety culture and working conditions. Ghana and Norway are interesting countries to compare since the road safety record of the two countries differs significantly. The road fatality rate of Norway was the lowest in the world in the last seven years (15 fatalities per million population in 2021)(WHO, 2023b), the fatality rate in Ghana has been more than four times higher (88 fatalities per million population in 2020) (WHO, 2023a). Based on previous research of professional drivers in countries with differencing national road safety culture we hypothesize that 1) individual factors like driver age and years of experience to influence fatigue, 2) work-related variables such as work pressure, working hours or commission pay contributed significantly to bus driver fatigue, 3) a relationship between national road safety culture and fatigue. The assumed relationship between culture and fatigue is that bus drivers are more fatigued by a more aggressive national road safety culture, i.e. with higher levels of aggressive violations.

Method

In this study, we interviewed and distributed surveys to Ghanaian (n = 281) and Norwegian (n = 285) bus drivers, examine the factors influencing fatigue among professional drivers in Ghana and Norway, focusing on the role of national road safety culture and work pressure. In



the survey we measure national road safety culture as descriptive norms, reflecting bus drivers' perceptions of what other drivers in their country do. We included items to measure aggressive driving culture, stress and pressure on the job, safety management and safety culture in the bus companies. Fatigue was measured by means of the question: "Have you in the past three months experienced falling asleep (or dozed for a short moment) driving a bus?". To examine the factors influencing whether respondents had fallen asleep or dozed off, we employed hierarchical logistic regression analyses.

Results

We found that Norwegian bus drivers report considerably fewer incidents of dozing off or falling asleep during the past 3 months compared to the Ghanaian bus drivers. In Ghana, drivers affirmatively answered this question nearly five times as often as Norwegian drivers. The analysis revealed that aggressive driving culture, longer working hours, and having fixed pay were associated with increased fatigue. However, when controlling for country of residence, the associations diminished and were no longer statistically significant. Amongst drivers that are not self-employed, stress and pressure also played a considerable role in fatigue, while a higher company safety culture was associated with reduced fatigue.

The qualitative data indicates crucial differences in national framework conditions influencing fatigue bus drivers' work situation in is far less regulated in Ghana, with low regulation and enforcement of bus drivers' working hours, and a higher prevalence of pay based on the number of passengers, which motivates long working hours and speeding. Quantitative data indicates longer working hours among bus drivers in Ghana, and we should expect this to lead to higher levels of fatigue in Ghana. Surprisingly, multivariate analyses of the survey data do not show this.

Discussion and conclusions

Ultimately, country (i.e. Ghana vs Norway) had the most significant influence on the likelihood of drivers falling asleep or dozing off, with Norwegian drivers being considerably less likely to experience this. Surprisingly, few other variables were able to explain the difference between the two countries. We might suppose that the country variable is a proxy for the relatively unregulated nature of bus transport in Ghana, compared with Norway. Future research should examine this further.

Bus driving in Norway and Ghana are substantially different things. The buses are different, e.g. when it comes to size and the organization of public transport. In Norway, bus transport schedules and drivers' working conditions are strictly regulated. This is not the case in Ghana, where routes, schedules and working conditions are far more arbitrary. This creates different working conditions for bus drivers in the two countries, influencing fatigue. Our study shows that, generally, the Ghanaian bus companies have few formal safety measures in place. This indicates that working with safety commitment and focusing on drivers' driving style and seat belt use might be effective measures to reduce fatigue.

We discuss, however, whether it is sufficient for the Ghanaian bus companies to focus on organisational safety management, given the framework conditions that are negative to safety. In our qualitative data we found that the most important framework condition for bus drivers



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in Ghana is type of employer (commercial or institutional), which influence whether drivers have bonus wage arrangements (which lead to speeding, driving while tired), and which also influence rest rules, vehicle standard etc. The safety commitment of managers might not be sufficient, if the drivers need to maximize the bonus pay arrangement to earn their living.

Thus, we also point to authorities' responsibility to change these framework conditions. A policy implication of our research is to regulate the working conditions of bus drivers in Ghana more, e.g. with stricter regulation and enforcement of driving hours and work schedules. We see a connection between work stress and pressure and fatigue events, and a reasonable way of reducing driver stress is better working conditions. Our qualitative data indicates that arbitrary routes and working conditions, low enforcement of regulations, and speeding should be closer investigated. Which measures to implement and who should have the responsibility for following up on measures over time, like e.g. the Unions, the authorities or public bus operators should also be further discussed. Future research should examine this further and discern more clearly between public and private categories of bus drivers in Ghana.

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