



Towards Changing Over Speeding Behaviour Among Young Drivers in Cameroon; A Behaviour- Based Intervention

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Abstract: Like many low- and middle-income countries, road fatalities in Cameroon resulting from over speeding keep increasing at an alarming rate especially among young drivers. This has over the years pose a significant adverse effect on the country's economy because the victims of these crashes are the most economically active youthful population. As a panacea to this problem, the government has adopted several countermeasures, but these have however, mainly focused on the environment and the vehicles while neglecting human factors. Some of these measures include speed bumps and raised pedestrian surfaces. The famous Safe System Approach advocates for a holistic view of the road system in solving fatal and serious injuries for all road users and in the case of Cameroon, the speeding and road user behavior pillars have been neglected. The aim of this paper is to apply an Intervention Mapping Protocol which is a planning process aimed at developing a systematic theory and evidence-based health promotion interventions, to the buildout of an intervention to promote safe driving speed among young drivers in Cameroon. The Intervention Mapping Protocol consists of six steps; Needs assessment, objectives of the program, methods and applications, program development, program implementation planning, and program evaluation. The study concludes that the application of Intervention Mapping may help to shape the behavior of young drivers in Cameroon from over speeding to respecting the stipulated speed limits.

Key words: Intervention Mapping, Speeding, Fatalities, Safe System, Cameroon.

1. Introduction

About 90% of the World's Road fatalities occur in low- and middle-income countries (WHO, 2019). Road traffic injuries constitute a prominent health and development problem in Africa especially in Cameroon. There has been stabilization in death rates relative to the world's population in recent years (WHO, 2018). This is however not the case in Cameroon which presents an increase in the number of road fatalities and severe injuries (World Health Rankings [WHR], 2022). The causes of road crashes are classified into environmental, automotive, and human factors. According to Deme (2019), human factors are the most prominent cause of traffic deaths, ranging from distraction, overtaking, over speeding etc. There is a body of scientific evidence (Deme, 2019; Elvik, Christensen & Amundsen, 2004) proving that over speeding is the main contributing factor to accident severity, fatality, and collisions of motor vehicles. The national strategy for road accident prevention and safety revealed that 70% of road accidents were the result of over speeding

and this costs the Cameroon economy 1 billion FCFA yearly, representing 1% of the GDP at that time (Ministry of Transport, 2009).

Most policy efforts to reduce over speeding in Cameroon have focused more on vertical deflections including speed humps, raised pedestrian surface, and variation in ride surface. These are more or less infrastructural measures which are only one of the pillars of road safety. Addressing deficiencies in the other pillars will be key in attaining safer mobility. The introduction of the Tempocam III speed enforcement camera system by the government in 2021 to reduce over speeding was a technological intervention measure. However, changing people's behaviour may also significantly reduce the rate of over speeding in Cameroon. The central objective of this paper is to introduce Intervention Mapping which is an existing planning method for the systematic development of health promotion interventions and apply it to road safety in Cameroon. The current speed limit in Cameroon is 60km/h for urban roads, and 110km/h for rural roads, which is higher than the recommended safe system speed of 30km/h for urban roads and 90km/h for rural roads respectively (WHO, 2018) According to Bartholomew et al., (2016), Intervention Mapping can be used for any kind of intervention that incorporates behaviour and for interventions where behavioural change is desirable. Even though the field of health promotion and road safety are different, they all advocate for change in personal, economic, and social impediments of desirable behaviours and therefore the Intervention Mapping Protocol can be used to promote safe driving behaviour.

1. Literature review

In this section, we review the literature on interventions that aim at changing speeding behaviour among drivers. A study conducted by Ben-Ari et al, (2000) examined speeding in 55 young male drivers aged 15-21 in the Israeli army. Terror Management theory was used as the theoretical framework in their study. The theory posits that when mortality is made more salient, we tend to engage in activities to enhance our self-esteem. The participants were randomly allocated to watch either a road trauma film or a control film. The road trauma film showed a young man describing a car accident he had once experienced and contained scenes of firemen trying to rescue the driver, with lots of blood and screaming. The Participants were also assessed as having a low or high driving significance to self-esteem. Drivers with a higher driving significance to self-esteem who had viewed the trauma video drove faster than those who had viewed the control film in a driving simulator. Drivers with low driving significance to self-esteem who had viewed the trauma video drove slower than those who had viewed the control film.

Stead et al. (2005) reported on the results of the Foolspeed project for the Scottish Executive in 2002. The target group was the general driving population in Scotland, but particularly focused on males aged 25–44. The study was a 4-year longitudinal cohort study conducted as part of the Scottish Road Safety Campaign (Foolspeed) 1999– 2001, with data collected at four time points. At baseline, 550 participants were recruited, of which 287 remained in the study throughout. The theoretical framework of the intervention was the Theory of Planned Behaviour. The development of the adverts was informed by previous research and focus groups that explored beliefs and norms, and feelings about road safety advertising. The focus group results indicated that credibility and empathy with driving difficulties would be the optimal approach. The interventions were through TV/cinema adverts targeting attitude, subjective norms etc. The major outcome measures were

intention to speed, and self-reported speeding. The results showed that awareness of the campaign was not a significant predictor of intention to speed or reported speeding. Only 20–33% of participants recalled the adverts. The Theory of Planned Behaviour predicted 47–53% of variation in intention to speed and 33–40% of variation in self-reported speeding on 30 mph roads.

Therefore, the adoption of Intervention Mapping may improve interventions to speeding in young drivers in Cameroon by providing more detail and guidance for the planning process and the logic of change. Intervention Mapping helps to clarify the program theory and components to those who search to improve the quality of interventions so that adoption decisions are based on adequate information about an intervention. The remainder of this paper will describe the theory and evidence-based intervention development processes for changing speeding behaviour.

2. Intervention Mapping Protocol (IM)

The Intervention Mapping Protocol represents a planning framework for the development of theory and evidence-based behaviour change programs (Bartholomew et al., 2006, Bartholomew et al., 2011). It requires that interventionists should identify change objectives and effectively specific behaviour change methods that have been proven effective to bring about these planned changes. By basing such decisions on previous evidence and documenting the way in which intervention materials are designed, interventionists can then communicate clearly about the intervention content, which facilitates the replication and subsequent intervention development and improvement (Abraham et al., 2011).

3. Intervention Mapping Step 1: Needs Assessment

The first step in Intervention Mapping is the analysis of the problem, its consequences, the behaviours that are related to the problem, and the relevant environmental conditions. The seriousness of the problem is decided based on scientific evidence and consensus among experts. In the case of driving behaviour and specifically over speeding in Cameroon, there is a clear justification for intervening because the national strategy for road accident prevention and safety revealed that 70% of road accidents in Cameroon were the result of over speeding (Ministry of Transport, 2009). In spite of this evidence, the speed-accident relation is very complex since it is influenced and modulated by diverse factors, without forgetting the partially random nature of accidents (Swov Factsheet, 2009).

The speeding behaviour related to this stage depends on the environmental conditions (type of road, traffic condition), the personal characteristics of the target population (age, gender, driving experience, etc), and psychological factors (beliefs, attitudes, driving habits, emotions etc). The culmination of step 1 results in a list of personal, psychological, and environmental conditions that have been shown to contribute to the problem and this functions as a starting point for the systematic development of an intervention to reduce speeding behaviour in young drivers in Cameroon.

4. Intervention Mapping Step 2: Program Objectives

This step entails translating the identified problem (negative) behaviours and environmental causation factors to positive behaviours and environmental conditions that are desirable. Here, emphasis is on changing risky behaviours which encourages over speeding among young drivers in Cameroon. Also, organisational, and societal practices which contribute to influencing speeding are equally translated to positive practices that would rather discourage over speeding among young drivers.

At the organisational level, the entities/stakeholders considered are drivers' unions and the ministry of transport which is responsible for traffic management and law enforcement while road users (passengers, pedestrians etc) are elements that make up the society and play a vital role in speeding behaviours of young Cameroonian drivers.

The possible performance objectives for over speeding at the individual level are exactly what planners want young drivers to do in order to change their behaviour.

- Respecting the appropriate speed limits.
- Taking other road users into consideration while driving.

Also, the environmental level requires the establishment of performance objectives so that they answer the question “*What* is exactly the behaviour that planners want the environmental agents *to do*?” For example, the Ministry of Transport could effectively monitor traffic conditions in order to mitigate inappropriate driving behaviour. The government could also enact and reinforce regulations that meet international speed limit standards. The *Why* question then follows by asking for the determinants of the specific performance objectives of individuals and environmental agents. Most interventions in the literature primarily focus on deliberate behavioural tendencies whereas not all behaviour is deliberately executed. Some behaviour is impulsive (Hofmann et al., 2009) while some behaviour is habitual (Hassin et al., 2005). There is a high probability that people will change their behaviour provided that the behaviour is deliberately carried out based on the following conditions according to the Institute of Medicine (2002).

- A very strong positive intention emanating from perceived social norms, perceived self-efficacy etc.
- Absence of environmental constraints.
- Availability of necessary skills.

TABLE 1: Key Determinants and their Associated Performance Objectives

	Determinants		
Performance objectives	Risk perception	Knowledge	Self-efficacy
Respect speed limits	Acknowledge personal risk of being involved in an accident	State the importance of driving at appropriate speed limits	Express confidence in ability to drive slowly
Consider other road users when driving	Deny their ability to prevent other road users from being injured in a crash	Regard other road users as important as themselves	Express confidence in slowing down when a pedestrian is crossing the road, even when the pedestrian does not have priority

TABLE 2: Determinants and Change Objectives of Over -speeding

	Determinants		
Performance objectives	Attitude	Knowledge	Self-efficacy
effectively monitor traffic conditions	Express positive feeling in efficiently monitoring traffic	Describe the importance of effectively monitoring traffic	Express confidence about monitoring traffic even when drivers seem to drive slowly
enact and reinforce regulations that meet international standards	Express positive feeling towards enacting and reinforcing regulations of international standards	List some regulations of international standards with evidence of their effectiveness	Express confidence about enforcing regulations of international standards even when opposition arise

6. Intervention Mapping Step 3: Methods and Applications

Literature (Albarracin et al., 2005; Van Achtenberg et al., 2010) holds that the effectiveness of interventions in changing behaviour increases by using appropriate theory-based methods. In this light, step 3 of this intervention program adopts methods and techniques which are proven adequate enough to practically change the underlying determinants of the problem behaviours, in order to meet the program objectives.

Persuasive communication, discussions, goal setting, self-re-evaluation and scenario-based risk information are methods adopted for application by this intervention program.

TABLE 3: Change Methods and Applications

Determinant	Method	Application	Reference
Knowledge	Discussion	Listening to the learner to ensure that the correct schemas are activated	Likelihood model (Petty et al., 2009).
Attitude	Self-revaluation	Stimulation of cognitive and affective appraisal of self-image.	Trans-Theoretical Model (Prochaska et al., 2015).
Self-Efficacy	Goal Setting	Commitment to the goals even if difficult but attainable	Goal-Setting Theory; Theory of Self-Regulation (Latham & Locke, 2007).
Risk Perception	Scenario-based risk information. Persuasive communication	Plausible scenario with a cause and an outcome; imagery and fear appeal	Precaution-Adoption Process Model (Mevisen et al., 2009).

Starting with risk perception, the methods and strategies are intended to provide the target group (young drivers) information that will aid the construction of images which reveal the circumstances of the occurrence of a crash, and the inherent future loss (adverse effects). This can be done through Persuasive communication, and scenario-based risk information methods. Providing multiple scenarios with a cause (over speeding) and an outcome (fatal crash) using imagery (fear appeal) will not only trigger a feeling of fear in young drivers, but it equally proposes a solution to control the danger by avoiding risky behaviour which is over speeding (Mevisen et al., 2009).

Regarding discussion as a method to change education, the aim is to encourage considering a topic such as 'do not speed when driving' in an open and informal debate by young drivers. This will be applied by interactive listening to the learner (young drivers) to ensure that the correct schemas are activated (Petty et al., 2009).

Self-revaluation is a method used to change attitudes by encouraging a combination of affective and cognitive assessments of one's self-image with and without unhealthy behaviour. This is applicable by stimulating both the cognitive and affective appraisal of young Cameroonian drivers' self-image (Prochaska et al., 2015).

Scientific evidence by Kelder et al., (2015) opines that Self efficacy is influenced by goal setting (goal-setting theory; theories of self-regulation). This holds that, prompting planning of what the person (target group) will do, as well as defining goal-directed behaviours will result in the desired target behaviour. This entails committing to the predefined goals though may be difficult, but however available within the individual's skill level are attainable (Kelder et al., 2015).

These methods and applications, having proven to be effective by scientific literature, will of course be efficient in this intervention to change over speeding behaviour among young Cameroonian drivers.

7. Intervention Mapping Step 4: Program Development

At this stage, components of the intervention program are put together for pretesting and subsequent implementation. The chosen applications are integrated in a defined structure, themes, and channels of the program. This is done while working with different stakeholders involved in the intervention who pilot test the program elements for their effectiveness using experimental research designs (Whittingham et al., 2008). Regarding this study, internet tailored-based informative communications will be used to reach and change the behaviour (over speeding) of young drivers in Cameroon. Theory-oriented methods of information, motivation, goal setting and task assignment and control are employed to complement the practical activities of the intervention. In this light, information will entail persuasive communications on the dangers of over speeding and the need for reduced driving speeds, while motivations will be done through radio and TV broadcast of best behaved drivers with respect to the goals and tasks (respect of speed limits) assigned to drivers by the program will be monitored by traffic enforcement agencies (prevention routier of Cameroon) which will provide the program with feedback on speed-related drivers' behaviour for performance reinforcement and sustenance.

Kok et al., (2007) explains that the internet has a huge impact on the possibilities of behavioural changes for a large audience through mass tailored communication.

8. Intervention Mapping Step 5: Planning for Program Implementation

An effective intervention program demands correct implementation for appropriate change of behaviour. This is achieved by involving and integrating the program implementers and adopters in the intervention program (Paulussen et al., 1995). In this case, the program implementer is the Cameroon ministry of transport, while the adopters are young Cameroonian drivers. These entities of stakeholders are assigned different objectives by the program, which are objectives for implementation presented in the step 2 matrix (performance objectives, change objectives, determinants).

9. Intervention Mapping step 6: Planning for Evaluation

Evaluation commences with anticipation from the planning phase through the intervention and to the implementation. This is to assess the effectiveness of the intervention (Bartholomew et al., 2016). To achieve this, measurable indicators are used (performance objectives and program objectives). Performance objectives are used to evaluate behavioural changes in individual and environmental agents while the program objectives are used for changes in determinants from which an evaluation plan is obtained (Bartholomew et al., 2016). Regarding evaluation in this study, prior to implementation, the problem was over speeding among young Cameroon drivers. An evaluation of the intervention effectiveness will be possible only after implementation through the monitoring of speed-related driving behaviour of the target group (young drivers).

5. Limitations of the Research

Generally, behavioural interventions and health issues are complex and changing behaviours of especially young novice drivers are tough. Advancing an intervention is often expensive, recruitment is laborious and time intensive, especially when the researcher desires an appropriate change in behaviour. Also, the study did not collect primary data about the perceptions of young novice drivers as to why they overspeed and possible ways they could stop it. Rather, the study only evaluated over speeding in Cameroon with regards to the steps of intervention mapping as proposed by Bartholomew et al., (2016). Future research could incorporate surveys, focus groups and interviews to get first-hand info from these young novice drivers.

6. Conclusion

The aim of this paper was to present a systemic planning process for intervention in behaviour change and to apply this process to over speeding behaviour interventions. As suggested, the behavioural intervention mapping approach as proposed by Bartholomew et al., (2016) was exciting in evaluating over speeding in young novice drivers in Cameroon, nevertheless it was complex, and it does not involve less than one simple design or singular test of an intervention. It needs thoughts and understanding of a broad variety of problems which will impact the intervention and its delivery (Bartholomew et al., 2016). Young novice drivers in Cameroon as already discussed tend to have contrasting behaviours, while some acquired licence through driving school. Others simply learn driving from mechanic workshops. To be able to adequately investigate over speeding it will be imperative to get a view from these drivers themselves and an intervention mapping approach. However, applying the Intervention Mapping Protocol to Over speeding amongst young drivers in Cameroon may provide a framework for more behavioural change interventions in the country.

7. References

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