



Patterns of motorcycle helmet use – A naturalistic observation study in Myanmar



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ABSTRACT

Developing countries are subject to increased motorization, particularly in the number of motorcycles. As helmet use is critical to the safety of motorcycle riders, the goal of this study was to identify observable patterns of helmet use, which allow a more accurate assessment of helmet use in developing countries. In a video based observation study, 124,784 motorcycle riders were observed at seven observation sites throughout Myanmar. Recorded videos were coded for helmet use, number of riders on the motorcycle, rider position, gender, and time of day. Generally, motorcycle helmet use in Myanmar was found to be low with only 51.5% percent of riders wearing a helmet. Helmet use was highest for drivers (68.1%) and decreased for every additional passenger. It was lowest for children standing on the floorboard of the motorcycle (11.3%). During the day, helmet use followed a unimodal distribution, with the highest use observed during the late morning and lowest use observed in the early morning and late afternoon. Helmet use varied significantly between observation sites, ranging from 74.8% in Mandalay to 26.9% in Pakokku. In Mandalay, female riders had a higher helmet use than male riders, and helmet use decreased drastically on a national holiday in the city. Helmet use of motorcycle riders in Myanmar follows distinct patterns. Knowledge of these patterns can be used to design more precise helmet use evaluations and guide traffic law policy and police enforcement measures. Video based observation proved to be an efficient tool to collect helmet use data.

1. Introduction

Road traffic crashes cause 1.2 million fatalities and more than 75 million non-fatal injuries each year and are the leading cause of death for young people between 15 and 29 years (Vos et al., 2017; World Health Organization, 2015). A disproportionately high share of road traffic fatalities occurs in low- and middle-income countries, an imbalance that is even more striking in the light of their relatively small number of registered motorized vehicles compared to high-income countries (World Health Organization, 2015). An increasing motorization in developing countries is projected to aggravate this problem (Nantulya and Reich, 2002; Peden, 2004; Vos et al., 2017). To engage this global road safety challenge, the United Nations have proclaimed the *Decade of Action for Road Safety* and established the *Sustainable Development Goals*, to support measures that can reduce road traffic related fatalities and injuries (United Nations, 2010, 2015). The World

Health Organization (WHO) is actively supporting this process by tracking key factors of progress in the Decade of Action for Road Safety through the publication of the Global Status Report on Road Safety (GSRRS) (World Health Organization, 2015). One of the factors contributing to the high number of road traffic fatalities in low- and middle- income countries is their high share of so called vulnerable road users (VRU), i.e. pedestrians, bicyclists, and motorcyclists who lack an “outer protective cell” and are therefore vulnerable in case of a collision (Otte et al., 2012; World Health Organization, 2015).

Motorcyclists represent an especially vulnerable subgroup of VRU, as they sustain the most severe injuries due to their relatively high speed. However, this prevalence for severe injuries can be mitigated by using motorcycle helmets (Otte et al., 2012; World Health Organization, 2006, 2017). Helmets can lower the risk of fatal injuries of riders by 42% and reduce the risk of head injury by 69% (Liu et al., 2004). It is therefore of great importance to collect detailed data about

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