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Willingness to pay for mortality risk reduction for traffic accidents in Myanmar

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ABSTRACT

The dramatic increase in vehicle ownership in Myanmar over the past few years has resulted in an alarming increase in traffic accidents. Thus, road safety at the national level needs to be improved urgently in order to reduce the costs associated with traffic accidents and to assist policy makers in making economically efficient resource allocation decisions for road safety improvements. This research was conducted to determine the costs related to fatality risk reductions using a willingness to pay (WTP) approach for motorcyclists, car drivers, and bus passengers in Myanmar. Face-to-face interviews with contingent valuation (CV) and a payment card questionnaire approach was employed for the data collection; multiple linear regression analyses were conducted to determine the factors influencing WTP. The resulting median and mean for the value of statistical life (VSL) were found to be MMK 118.062 million (US$ 98,385) to MMK 162.854 million (US$ 135,712), respectively. Therefore, the total cost of death was estimated to range from MMK 594.681 billion (US$ 495.567 million) to MMK 820.296 billion (US$ 683.580 million) in 2015. In addition, the WTP was found to be significantly associated with age, family status, education, occupation, individual income, household income, the vehicle used, exposure to traffic, drunk driving, personal experiences, and the perceived risk of traffic accidents. This study might be helpful in prioritization of road safety related projects to get greatest benefit by choosing most cost effective projects. This study might assist the decision-making for road safety budget allocations and policy development.

1. Introduction

1.1. Background

Statistics published by the World Health Organization reveal that over 1.2 million people are killed and around 50 million people are injured annually due to road accidents, globally. Although the number of registered vehicles in low- and middle-income countries is only 54% of the world's registered vehicles, over 90% of the world's road traffic deaths occur in these countries. Road traffic deaths in high-income countries are therefore half to that of low-income countries, which has been attributed to the successful implementation of road safety improvement programs (WHO, 2015).

In Myanmar, similar to other low-income, developing countries, road accidents are one of the major causes of death. The number of vehicles on the roads increased dramatically after the relaxation of regulations regarding automobile imports in 2011. With this increase, there has been a commensurate rise in road accidents over the past five years. The 2015 statistics from the Road Transport Administration Department (RTAD) under the ministry of transport and communications in Myanmar state that the number of registered vehicles reached 5,541,361, i.e., more than double the registrations in 2011 (RTAD, 2016; CSO, 2016). Consequently, traffic accidents resulting in deaths and injuries have significantly increased, as shown in Fig. 1. In 2003, there were 5369 traffic accidents, which increased to 15,676 by 2015, thrice as that in 2003. In addition, the number of fatalities and injuries

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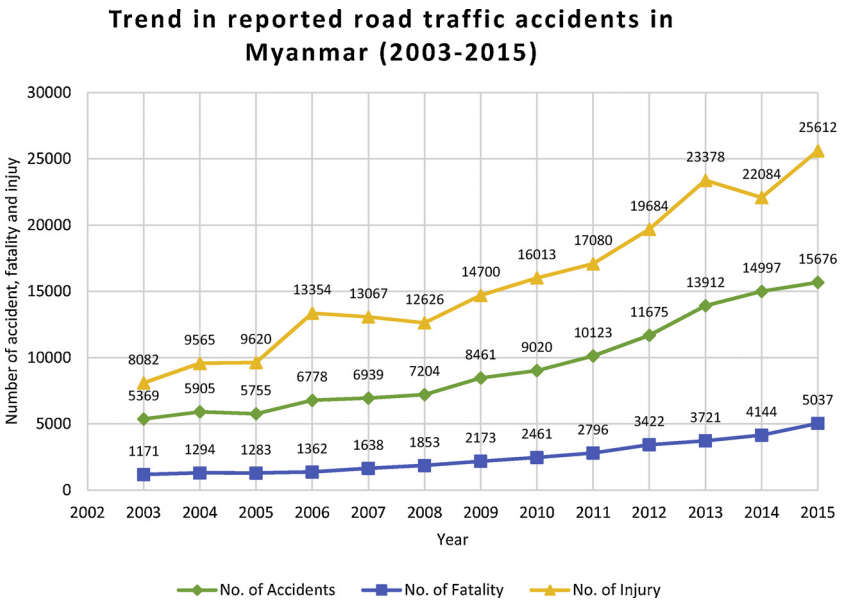

Fig. 1. Trends in reported road traffic accident in Myanmar (Road Transport Administration Department (RTAD) 2016).

was over three times higher, rising from 1172 and 8082 in 2003 to 5037 and 25,612 in 2015 (CSO, 2016).

Therefore, road safety has become a major concern in Myanmar, with experts from the Asian Development Bank estimating that fatalities could more than double over the next 5 to 10 years unless immediate action is taken. This indicates an urgent need to act upon road safety improvement (ADB, 2016).

Road accidents have serious consequences which include deaths, injuries, disabilities, material damages, pain, grief and suffering (Komba, 2006; Partheeban et al., 2008; Haddak et al., 2016). Therefore, traffic accidents have considerable negative economic and social impacts on the accident victims, their family, friends, as well as on the nation as a whole (Gopalakrishnan, 2012; Niroomand and Jenkins, 2016). Further, the increasing number of traffic accidents results in increasing economic burden on the country as well as on the victim's families (ADB, 2005; Haddak et al., 2016).

Road safety actions are difficult to justify without knowing the monetary benefits of road safety improvements (Bhattacharya et al., 2007). Therefore, as it is widely recognized that accident costs need to be estimated to perceive the scale of the existing problem, it is imperative to evaluate traffic accident costs for developing appropriate road safety policies (Jacobs, 1995; de Blaeij et al., 2003; Silcock, 2003).

Compared with other developing countries, in Myanmar, there has been little road safety research focusing on the true costs of road accidents. This has been mainly because of the lack of reliable data to assist decision makers in taking relevant actions. Therefore, determining the true costs of traffic accidents in Myanmar is essential: (1) to determine the overall economic losses associated with road accidents; (2) to perceive the scale of the problem and the benefits derived from prevention policies; and, (3) to examine the determinants for the willingness to pay (WTP) in order to support key stakeholders develop better road safety policies.

1.2. Road safety in Myanmar

Myanmar is the largest country in mainland Southeast Asia. It boarders Bangladesh, India, China, Lao People's Democratic Republic (Lao PDR), and Thailand. The country had a population of 52.449 million in 2015 (CSO, 2016) within 676,578 km^2. According to statistics from the World Bank for 2015, the annual per capita gross national income (GNI) of Myanmar was US$ 1190, and the gross domestic product (GDP) was US$ 59.687 billion (World Bank, 2017).

The main mode of long distance travel is road transportation, which accounts for 90% of freight and 86% of passenger transportation (ADB, 2016). The country's road network has a length of 151,298 km and only 39,076 km is paved (BCOC, 2017). Around 20 million people are living without basic road access. Moreover, road conditions in Myanmar are very poor, with deficient surface conditions, narrow widths, and a lack of safety features due to underinvestment in road infrastructure. Thus, maintenance or rehabilitation is urgently needed to retrofit the existing roads and improve safety (ADB, 2016). Due to poor road conditions in Myanmar, factors contributing to road crashes might be higher than those in other countries; however, no previous research exists regarding contributing factors in road crashes in Myanmar. According to data reported in the Myanmar Statistical Yearbook 2016, regarding causes of traffic accidents, factors contributing to road crashes included the following: (1) driver carelessness (65.7%); (2) traffic rule violations of pedestrians and passengers (7.5%); (3) vehicle defects (4.9%); (4) road defects (1.9%); and (5) other factors (20%).

Regarding vehicle conditions, most (about 90%) vehicles are secondhand and are imported from used vehicle markets in Japan. These are usually right-hand drive vehicles, even though Myanmar roads are suitable for left-hand drive vehicles. This creates more road crashes because drivers cannot see traffic coming from the opposite side while overtaking other vehicles. According to the RTAD report, more thanssss 80% of total registered vehicles are motorcycles, which cause more than half of total road crashes and around half of total road traffic deaths (ADB, 2016). Additionally, bicycles, motorcycles, and pedestrians accounted for nearly 60% of road traffic deaths. In 2013, one third of injured patients who were admitted to hospitals were victims of road crashes (ADB, 2016). Public Health Statistic (2017) also reported that road injuries were the third leading cause of premature death in 2016. Furthermore, road crashes were the first leading cause of death among 15–29-year-olds, and the road traffic mortality rate per 100,000 people increased more than doubled from 2010 to 2016 (MOHS, 2017).

Experts from ADB estimated that the economic loss due to road crashes was between 1% and 1.5% of the total GDP in Myanmar (though no detailed calculation or method was mentioned). The ADB recommended an increase in investments in the transport sector of 3%–4% of GDP, up from 1% to 1.5%, in line with other countries such as Thailand and Vietnam. Myanmar is in the initial stage of road safety awareness, and many deficiencies exist that should be addressed for improvement, such as the poor crash data system, shortcomings in relevant legislation, and the need for more safety management funding