An Unhelmeted Motorcyclist Not Holding Both Handlebars - A Photographic Idea for Education Presented as an Initial Scoping Study

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Abstract

Introduction: *Road safety campaigns in Australia typically have simple, hit home messages with captions overlaid on photos. The Australian stop, revive, survive campaign is well-known, with accompanying photos displaying red fatigued eyes with the words; tired eyes, yawning, driver fatigue: wake up to the signs. Otherwise, the stop, revive, survive is shown with a windy road ahead viewed through a dashboard.*

Objectives: *The aim of this project was to create a helmet safety message utilising a photograph along with several text words alongside.*

Methods: *A photograph taken by Stephen Hilton of a motorcyclist with no helmet, holding one handlebar, was utilised with the words;'Helmet, Handlebars, Headlights' overlaid above along with arrows. This safety design was shown to forty persons, in order to obtain brief feedback and comments on whether this had the potential to convey the message about the need for a helmet in particular. The comments were gathered, collated and then common themes were identified.*

Results and Discussion: *Five emerging themes were identified that included; The message is simple and straight to the point, cultural awareness is required, the need to enforce it as law, motor cycle riders think they are invincible and finally respondents were unsure whether it would work. A word cloud was created capturing and highlighting the main words stated in larger font, while words used infrequently were displayed in smaller font.*

Conclusion: *More than half of the respondents questioned thought the idea was simple, straight to the point and hence should work.*

Keywords: Accidents, Traffic, Motorcycles, Head protective devices

Introduction / Review of the Literature

The incidence, morbidity and mortality from road traffic accidents has been documented and globally is a significant public health dilemma. Various authors have quantified the extent of the carnage.

A manuscript published in the Australian and New Zealand Journal of Public Health in 2004 by Ozanne-Smith reported that in 2000, 1.26 million deaths resulted from road traffic injury (RTI) with 10 times this number injured (Ozanne-Smith, 2004). They state that high income countries have the knowledge, expertise and responsibility for assisting lower income countries to counter the growing burden of RTI.

A manuscript published in 2018 by Franklin & Sleet in the Health Promotion Journal of Australia reports that every day, almost 16000 people die from an injury worldwide and one quarter of these deaths are the result of road traffic crashes (Franklin and Sleet, 2018). Almost twice as many men than women die from injuries with traffic accidents the main cause for young men worldwide.

Franklin and Leggat published a chapter in 2015 titled; 'Basic epidemiology of non-infectious diseases' (Franklin and Leggat, 2015). They report on non-infectious causes of death among travelers, with road injury & drowning the most common injury related causes.

More specifically, if you consider helmet usage and safety aspects, studies have documented injury rates and helmet type.

A manuscript by Pym and colleagues in 2013, titled; 'Unregulated and unsafe: The impact of motorcycle trauma on Queensland children', was a population based study of motorcycle related child (0-15 years) trauma in Queensland from 2007-2009 (Pym et al., 2013). Of the ten child fatalities recorded, nine fatalities were related to head injury and of these, five wore inadequate head protection. The results emphasized the need for children to use full protective equipment, especially helmets.

Chaichan et al published a paper titled; Are full-face helmets the most effective in preventing head and neck injury in motorcycle accidents? A meta-analysis (Chaichan et al., 2020). It states that motorcycles are the most common type of vehicle involved in traffic deaths in developing countries. The search included; PubMed, Scopus, and Web of Science databases and also compared full-face helmets with other types of helmet with regard to head and neck injury prevention in road accidents involving motorcyclists. Six studies with a total of 6,529 participants were included and the findings were that full face helmets are best for reducing the likelihood of head and neck injuries. Policy makers should therefore recommend that motorcyclists use full face helmets.

According to the Thailand Law Forum motorbike drivers and their passengers are required by law to wear helmets (Patin, 2011). However, the author observed and noted that in Thailand when she visited in 2019, few motorcyclists wore helmets.

Merali and colleagues report that the majority of Thailand's road traffic deaths occur on motorised two-wheeled or three-wheeled vehicles (Merali et al., 2020). The authors developed a novel method of estimating motorcycle helmet wearing utilising Google Maps in Bangkok. 3000 intersections were randomly selected. The 12000 images obtained were processed in Amazon Mechanical Turk using crowd sourcing to identify motorcycle images. The remaining images were manually sorted to identify helmet usage. The authors calculated the overall helmet wearing rate to be 66.7 % (95% CI 62.6 % to 71.0 %).

Siebert and colleagues reported on the patterns of motorcycle helmet use in Myanmar (Siebert et al., 2019). Myanmar is bordered by Bangladesh and India to its northwest, China to its northeast, Laos and Thailand to its east and southeast. Video observations were made at seven observation sites throughout Myanmar which included 124,784 motor cycle riders. Helmet usage was low as only 51.5% of riders were wearing a helmet. They also reported large variations between observation sites, with the highest reported usage rate in Mandalay (74.8%) to a low usage rate in Pakokku (26.9%).

A further manuscript was published titled; 'Detecting motorcycle helmet use with deep learning' (Siebert and Lin, 2020). The authors developed an algorithm for the automated counting of motorcycle helmet usage from video data. This method utilised a deep learning approach. By analysing 91,000 annotated frames of video data, across observation sites in 7 cities in Myanmar, the algorithm detected motorcycles, helmet usage plus number of riders and they also compared the video algorithm with human observer counts. The algorithm registered motorcycle helmet use rates with an accuracy of -4.4% and +2.1% in comparison to a human observer.

Fletcher and colleagues when discussing road safety campaigns that are targeted towards preventing driver fatigue mention that consideration needs to be given to the demographics of the population, along with the strategic voice of the campaign and whether the viewer will be emotionally affected by the message (Fletcher et al., 2005). Aspects mentioned include education which is targeted towards specific populations, encouraging personal responsibility to address risks and challenge beliefs. Campaigns in Australia according to Fletcher and colleagues include those developed by the Australian Transport Safety Bureau and numerous state transport authorities. A Victorian television campaign on the topic of napping, states "a 15-minute nap could save your life!" which is designed to reinforce the power

nap message. This is displayed on billboards, in magazines on a full page and in newspaper notices. Another Western Australian campaign uses an emotive response. A fatigued driver is shown saying "I can make it". After crashing, an ambulance officer is then seen telling a police officer that "the driver didn't make it". Following that there are three 15 sec commercials with solutions to help combat fatigue which include a 15-minute nap, a stop for coffee, and sharing the drive.

Other campaigns in Australia typically have simple, hit home messages with captions overlaid on photos. (Stop, Revive, Survive) is well-known, with accompanying photos displaying red fatigued eyes with the words; tired eyes, yawning, driver fatigue: wake up to the signs (NSW Government, 2019). Otherwise, the stop, revive, survive is shown with a windy road ahead viewed through a dashboard.

The author's aims of this project was to create as per the campaigns mentioned for preventing fatigue, a simple educational emotive awareness message for motorcyclists about helmet safety. The author created a simple picture and slogan message based on motorcycles and the need to wear a helmet.

Methods

Photographs were selected from an array taken by Mr Stephen Hilton, whom won the 2019 Asia Pacific Academic Consortium for Public Health early career network photo competition (Hilton, 2020). The photograph chosen was that of a gentleman, a motorcyclist with no helmet, holding one handlebar, while smoking a cigarette with the other hand, and this photo was utilised with words overlaid above the image including; Helmet, Handlebars, Headlights, and arrows pointing out these safety features. This is just an initial scoping study, and there is no evidence base behind choosing this photograph, it is purely a subjective opinion of the author that this photograph clearly shows that the motorcyclist is not wearing a helmet, nor holding both handlebars, hence this poses risk.

The initial idea was to show this flyer design to potential travellers being mostly young folk planning travel to Thailand, Bali, Vietnam or Indonesia. Their comments were to be gathered and collated with common themes to be identified. However, given the implications of the pandemic in Australia in that most travel agencies were shut during 2020, the anonymous survey participants were sourced alternatively from; the general community, booking agents working in travel agencies once they re-opened, workers in bicycle shops or motorcycle / car repair shops. Forty anonymous people were shown the idea and asked for brief comments.

This is obviously not ideal, nor based upon a systematic sample whereby sample size has been calculated. The sample size is small, with this scoping study primarily being designed to gain a few initial ideas. Nor is it based upon a validated structured questionnaire, or any previous work that is identical in idea and thought. As mentioned, this is not a properly calculated sample size which may in fact have been difficult to calculate anyway in a questionnaire study such as this. In addition, there is not a select targeted interview group as it could not be conducted as originally planned due to the coronavirus pandemic whereby travel agencies were shut, hence potential travellers could not be sourced. Hence the project aim is to gain a few simple ideas and thoughts around the photographic idea and should there be a consensus majority vote that the idea could be useful the questionnaire could certainly be refined, developed and modified, then instigated more carefully in future projects with a more rigorous, systematic and scientific methodology. This project also is unfunded, hence the requirement for an initial assessment of replies prior to further work, which if it is decided that this is required, then funding sources would be sought.

The author, after giving a brief introduction of her background and research work,stated that she noted when she went to Thailand in 2019, that few motorcyclists wore helmets. The author then stated that she selected this photograph from one that Mr Stephen Hilton took and overlaid the words (helmet, handlebars and headlights) above the photo

with arrows pointing these safety features out. She showed the respondents some campaign flyers from Australia, including the Stop Revive Survive campaign (NSW Government, 2019). She then asked respondents if they thought this idea of pointing out the helmet, handlebars and headlights would work to convey safety messages to motorbike riders in countries such as Thailand.

Any comments that were made were collected on whether this had the potential to convey the message about the need for a helmet in particular. The comments were gathered, collated and then common emerging themes were identified with theme analysis.

Comments were further categorized with the main words identified. Words were grouped according to how many times they were listed. A word cloud creator was used to build a word cloud, with the words used most often in progressively larger font, while words used more infrequently are in progressively smaller font.

Image 1: Photograph of a Motorcyclist with No Helmet (Holding only One Handlebar)

Results

The results and details of this study have been previously presented as an abstract and rapid-fire presentation at the Virtual Pre-Conference Global Injury Prevention Showcase (Hilton, 2021a and Hilton, 2021b).

Thematic Analysis

Five emerging themes were identified with thematic analysis.

Of the 40 replies, some people's comments fitted into two themes.

1. Yes - should work to get the message across, it is simple. Twenty-two comments mostly related to the fact they liked the idea and it should work, in theory being simple and to the point.

Note; samples of comments in italics are truncated sentences.

'Yes, nice & simple, to the point'; 'in theory it sounds good'; 'it should if it is reinforced enough'; 'I think it would work, it is a great idea, pointing to the handlebars & helmet'; 'it increases awareness'; 'it goes with stop, revive, survive'.

2. Culture - the need for ideas to speak to the culture. Seven comments mentioned the word culture.

'needs to speak to cultures and morals'; 'it is a cultural thing that they are set in their ways'; 'as it needs a cultural change'.

3. Law - the need for it to be made illegal, to change the law. Five comments were directly related to this point.

'unless it is law you can't do anything about it, unless it is made illegal'; 'it maybe will work but without enforced law I don't think they will change'; 'work with government to create change'.

4. Invincible - motor cycle riders think they are indestructible so messages need to have scare tactics or consequences described. Five comments directly related to this construct.

'any sort of advocation for identifying consequences supports people wanting to be safe'; 'some form of scare tactic'; 'to give them reason'.

5. No idea - respondents were unsure of whether it would work. Nine comments indicated they were unsure whether it would work (with one of these saying no they didn't think it would work).

'I've got no idea, I know nothing about Thailand, I've never been to Thailand'; 'hard to say'; 'not sure'.

Word Cloud

The word cloud that was created with the 'word it out cloud creator' is displayed below as image 2 (Word it Out).

Image 2: The word cloud

Discussion

Injury prevention has a strong scientific basis and many approaches are cost-effective (Franklin and Sleet, 2018). There must also be an appreciation of the multiple determinants of health that include; individual behaviours, the physical environment and access to health services. If you consider these determinants of health, people as individuals have to make the decision to purchase and wear a helmet after they are given information and education about the potential dangers and implications of not wearing one. If you consider the physical environment, the author noted that despite apparently it being law to wear a helmet that this was not enforced (Patin, 2011). On one occasion the author noted a number of police officers standing on a corner near a pedestrian crossing, where school children were crossing and most motorcyclists were not only not wearing helmets, but they were ignoring traffic signs and signals and the police did nothing but were chatting amongst themselves. If change is going to occur, there needs to be strengthened legislation and enforcement of existing laws.

Fletcher and colleagues (Fletcher et al., 2005), report that numerous studies have shown that the effectiveness of road safety campaigns rely upon the need for increased public knowledge of personal responsibility. They also state it is important to disseminate clear information of enforcement, penalties and traffic offences. Success of road safety campaigns occurs if viewers realise from the advert that they are breaking the law.

Brown and colleagues also report on child car restraint use for children aged 2-5 years after introduction of mandatory child restraint laws (Brown et al., 2013). They found that the odds of children being appropriately restrained post-legislation were 2.3 times higher than in the pre-legislation sample. This demonstrates again the importance of laws.

Ehiri and colleagues (Ehiri et al., 2006), performed a systematic review titled; 'Interventions for promoting booster seat use in four to eight-year-olds travelling in motor vehicles. Booster seats are recommended in motor vehicles for children aged four to eight years by public health and traffic safety agencies. This systemic review was done to determine the effectiveness of these interventions. The analysis included five studies involving 3,070 persons, and all interventions had a positive effect (relative risk (RR) 1.43; 95% confidence intervals (CI) 1.05 to 1.96) including incentives combined with education (RR 1.32, 95% CI 1.12 to 1.55; n = 1,898), distribution of free booster seats combined with education (RR 2.34; 95% CI 1.50 to 3.63; n = 380) or education only interventions (RR 1.32; 95% CI 1.16 to 1.49; n = 563). The authors concluded that combining incentives (discount coupons or gift certificates) or distribution of free booster seats in combination with education benefited outcomes. Uncontrolled before and after studies, which were not included in this meta-analysis which looked at legislation also had some benefit on outcomes.

In the introduction, measuring helmet usage was discussed, and estimation can occur via-naturalistic observation, self-reports in questionnaire surveys, hospital-based surveys and video capture (Siebert et al., 2018). Siebert and colleagues reported that in Tanzania, self-reported helmet use in questionnaire surveys was significantly higher than observed rates (Siebert et al., 2018). Questionnaire surveys are biased towards higher helmet reporting, probably due to social desirability of participants' responses.

Merali and colleague's street imagery study using google maps has been previously referred to in the introduction and further analysis of the data was done according to motorcyclist category and whether the streets were residential or not (Merali et al., 2020).

Taxi drivers had a higher rate of helmet usage 88.4% (95% CI 78.4% to 94.9%), compared with non-taxi drivers, 62.8% (95% CI 57.9% to 67.6%). Helmet use on residential roads was lower 58.5% (95% CI 52.8% to 64.1%) then non-residential roads, 85.2% (95% CI 78.1 % to 90.7%). The results they obtained are similar to that obtained with traditional methods, yet the time & cost of street imagery is less.

In a combined observational and questionnaire survey in Nepal, data was collected at seven sites throughout the country (Pant et al., 2021). While driver helmet usage was high (98%), less than 1% of observed passengers used a helmet which the authors described as critically low.

There are various continuing and future options and strategies available to enhance helmet wearing. This could include improved education or awareness as a result of ideas such as that which is presented in this manuscript, or improving law enforcement, increasing fines for non-compliance or making helmets more affordable and less cost to purchase. Merali and colleagues mention that street imagery in the future maybe automated via machine learning (Merali et al., 2020). That hence may facilitate the ease of capturing and/ or re-capturing data, analysis and re-analysis to monitor helmet usage rates in the future while also assessing and monitoring change. Video capture is a method that collects accurate and detailed data on helmet usage rates (Siebert et al., 2018).

Should an accident occur, the motorbike rider may require transport to hospital. There are publications on the Thailand healthcare system. The last determinant of health mentioned by Franklin and Sleet is access to health services (Franklin and Sleet, 2018). There is information in the scientific literature available should the reader want information on accessibility of the Thailand hospital system (Suriyawongpaisal et al., 2018). Suriyawongpaisal and colleagues discuss the lessons learnt for policymakers in low-and-middle income countries attempting to close the equity gap of access to private hospital emergency departments.

Research Gap and Conclusion

This manuscript describes a simple health promotion initiative that includes an image with three text words for education. Just over half of the people surveyed made comments to the effect that they thought the idea should work in that it was simple and straight to the point, while other comments related to the need to improve law enforcement, the need to point out consequences of not wearing a helmet, and the need to have a cultural understanding when creating a message. Measurement of helmet usage wearing rates may help identify whether ideas such as an image with text influence behaviour and practice, however it would be difficult and complex to ascertain and differentiate change as a result of this initiative if there are also other concurrent programs occurring such as improved law enforcement, more hefty fines, making helmets more affordable, providing helmets for free or at discounted cost via the usage of incentives or discount vouchers or other health promotion ideas that increase education or understanding. Regardless of measuring effectiveness, the idea is low cost and simple in that uploading this image with the text words to a website or a facebook page that is widely utilised is almost negligible cost and effort, so it maybe certainly worthwhile given the respondent's comments obtained that are stated in this report. There is a need to further refine the questionnaire, develop a more structured interview schedule with a properly calculated sample size in order to more correctly evaluate the health promotion initiative. Regardless of this, these initial comments gathered are helpful.

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