Re-enforcing Cyclist Speed Restrictions on Shared Pedestrian Pathways Utilizing a New Creative Street Photographic Initiative

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Abstract

Purpose: *The International Safety Media Awards site [https://isma-awards.org/] awarded a cycling safety print design, an honourable mention award. This manuscript reports on the research regarding cycling and pedestrian collisions and justification factors pertaining to the rules and regulations around cycling where pedestrians may also walk. The methodology below is performed to determine from the public health literature what recommendations are reported to reduce cyclist speed on shared pedestrian pathways and hence if this gives credence and authority for instigating this photographic initiative. The research gap appears to be understanding the recommendations for speed limits where it specifically may apply to potential collisions between pedestrians and cyclists. This is opposed to just more general speed limits for cycling where e-bikes or pedal bikes may traverse or negotiate their way to a destination mingling with motor vehicles, but where pedestrians maybe less likely to walk.*

Methodology: *The MeSH (Medical Subject Headings) is the NLM controlled vocabulary thesaurus used for indexing articles for PubMed. https://www.ncbihttps://www.ncbi.nlm.nih.gov/mesh. These searches were carried out in Sep 2024. The 1st search; ("Bicycling"[Mesh]) AND "Accidents, Traffic"[Mesh]. Filter; Systematic review.*
2nd search string (("Bicycling"[Mesh]) AND "Pedestrians"[Mesh]) AND "Wounds and Injuries"[Mesh] for evidence that speed restrictions are preventative.

Results: *1st search; 12 retrievals. 2nd search; 48 retrievals.*

Discussion and Conclusion: *Various researchers report on speed limits being utilised in countries or in specific locations. These include the traffic-calming zone 30 policy or 20 mph [32 kmph] speed restrictions in urban environments on shared pathways to decrease collisions. This ensures the safety of both cyclists and pedestrians. More specifically a speed limit recommendation of <=12 km/h for bicyclists on narrow shared pedestrian paths and footpaths was recommended. Speed limits are advisable, having a significant positive influence on reducing fatal pedestrian crashes hence this creative street photograph showing a cyclist with signage 'thank you for cycling slowly' may re-enforce necessity messages to cyclists. The research findings also reiterate that the development of a culture of road safety amongst cyclists and other vehicles or pedestrians is of paramount importance. Hence this concretely backs up the importance of the usage of this awareness photograph on the International Safety Media Awards site, justifying how this may focus people's attention on safety awareness issues that they may not have previously comprehended or considered.*
Integration of this research with other mechanisms to enhance safety may involve increasing visibility with street lighting which enables drivers, cyclists and pedestrians to better detect potential injury risk plus visibility enhancing mitigation manoeuvring possibilities.

Keywords: Bicycling, Pedestrians, Injuries, Traffic Safety, Injury Prevention, Speed Limits.

Introduction

Hilton has previously utilised Mr Stephen Hilton's creative and realistic photographs in publications on climate change and communication messages, laughter therapy, motorcyclist road traffic safety and a water safety drowning prevention initiative (Hilton, 2020; Hilton 2021; Hilton, 2022; Hilton, 2023).

The International Safety Media Awards site [https://isma-awards.org/about-isma/] awarded the cyclist photograph taken by Stephen Hilton, an honourable mention award for the print injury prevention design created by Hilton [ISMA].

This design can be found on the website by utilising filters including; winners, the year 2024, then honourable mention, then print. It is listed under cycling safety/ bicycle safety. The first page shows a photograph with a cyclist with signage 'thank you for cycling slowly'. The 2nd page shows a clear message about the importance of cyclists in terms of remembering that they are sharing roads with traffic. In the case of cycle pathways they share the road with pedestrians. The cyclist on the last page of the print design, whom gave permission for this photograph to be utilised, said that he uses stud attachments to his bike tyres in the snow. In fact, in the ice and/or snow you can use a treaded tyre, a lightly knobbed mountain bike or studded bike tyres. This design with three photographs has only small text boxes with key pertinent, relevant findings that relate to the photograph put on each page. It deliberately includes only minimal text, so that the picture/ photograph becomes the focus for the viewer to convey the key message giving impact. There is a deliberate absence of copious amounts of text information, as posters need to be designed so that people passing by, can quickly ascertain the meaning and message that is being portrayed or delivered by the print design. Too much information on a print design will only deter people away. It is designed to have hit home messages utilising various visual photographs. The objective of the print design is to use creative action photography, plus still photography to create an eye catching, interest sparking, discussion promoting poster/ PDF document.

As a result of this print design being uploaded on the; The International Safety Media Awards site the organisers will be able to generate analytics to record the number of views, new views, repeat visitors, downloads and other relevant information. In addition, informal feedback and comments may also be sent to the site, which relate to the creation, formative evaluation or intended message.

Cyclists share space with pedestrians on off-road paths, while also sharing space with motor vehicles on roads which may or may not have dedicated cycling lanes.

A literature review on the importance of cycling for health is necessary to understand and ascertain benefits, while also considering the risks of accidents, injury and/or death so that judgement is used before making a decision to cycle depending upon the location.

The Victorian public health and wellbeing plan reports that only around half of Victorian adults meet the physical activity guidelines for sufficient physical activity (State of Victoria, Victorian Government, 2023). The plan also states that exercise is essential for preventing and managing diseases such as cardiovascular disease, diabetes and certain cancers. It also has a role for pain control in conditions such as arthritis or injury, which if effective then also has other advantages such as improved quality of life, therefore enhancing mental health and wellbeing. Active transport such as cycling also serves to mitigate climate change by decreasing traffic congestion thus improving air quality as a result of lowering carbon emissions. Hence the benefits are not only for ones health, but include economic and environmental advantages.

The Victorian Cycling Strategy 2018-28 states 60% of Victorians are curious about cycling but are deterred by real or perceived safety concerns (Transport for Victoria, 2017). The safe systems approach is recommended so that cyclists are a safe distance from pedestrians, bicycles and motor vehicles. This will work to reduce the number of avoidable injuries, so that people can strive to enjoy cycling participation safely so that this benefits their health. This safe system approach while considering the interaction between road users, will also ascertain safe speeds. The document stresses that while infrastructure is essentially important, dedicated cycling lanes are not possible on every street. Hence developing a culture of road safety amongst cyclists and other vehicles or pedestrians is also paramount. This will include making cyclists aware of who else maybe on the cycle path, what speed is recommended and other potential hazards. Pedestrians also must be alerted and aware.

This understanding is important, as a review of the literature has located a report by the World Health Organisation (WHO, 2020). It states that in 2018, 41́,000 cyclists die/year globally and this equals to 3% of global road traffic deaths.

Aside from purely cycling incident reports per say, there is research that more broadly encompasses

road traffic injury in general which may or may not include cycling and pedestrians, but focuses on motor vehicles also. This research includes that in developed and developing countries. Wells et al assessed pediatric emergency department [ED] visits for pedestrian injuries in relation to the enactment of Complete Streets policy (Wells et al. 2023). Forty children's hospitals within the Pediatric Health Information System (PHIS) from 2004 to 2014 were included and pedestrian injury-related emergency department visits were ascertained. Examples of these pedestrian collision injuries that may have occurred included those with railway vehicles, motor vehicles, pedaling cyclists and/or animals. The analysis showed that the complete streets policy enactment wasn't related to changes in ED visits for pedestrian related injuries.

Research on the effect of differing policies or environmental situations in low and middle income [LMIC] countries has been performed. One of these included an evaluation being a one-year impact of a multicomponent, street-level design intervention in Mexico City on pedestrian crashes: a quasi-experimental study (Cárdenas-Cárdenas et al. 2023). There are few studies in LMICs that have evaluated the effect of interventions to prevent pedestrian injuries and mortality at intersections that maybe hazardous. In Mexico City the Pasos Seguros programme was created. Various of the street-level design changes involved that to pedestrian crossings, sidewalks, refuge islands, lanes, pedestrian signals and traffic light timing changes. Walking safety thus was enhanced with a decrease in pedestrian crashes.

Another research study, in Mexico City from 2015-2019 found that a point penalty system was associated with an increase in collisions, whereas increased economic penalties for traffic offences resulted in a decrease in traffic mortality [Valverde, C. Q., 2023].

A further ecological study of urban landscape and street-design factors was performed in Latin America between 2010 and 2016 (SALURBAL) and the association with road-traffic mortality was assessed (Quistberg, 2022). Walkable street networks and public transport urban development policies are important strategies for decreasing road-traffic mortality in Latin America and elsewhere.

This manuscript is more focused on purely the research regarding cycling and pedestrian collisions and mitigation factors pertaining to the rules and regulations around cycling where pedestrians may also walk.

This specific scope is important and necessary as road safety literature in general that encompasses motor vehicle collisions is more all-encompassing, more generalised and has a focus on roads per say. While cyclists encounter collisions on roads, it is mostly with motor vehicles, and not routinely with pedestrians except if they were to wander onto the road or cross at a crossing without looking or against the lights, hence colliding with a cyclist. Hence, normally when the roadways are considered in terms of cyclist crashes, the collisions would be with a motor vehicle. The scope of this article is much more specific and narrower, as the location, the speed and the reasons behind the collisions are more focused on the particulars related to these scenarios. This includes the ability of pedestrians to manoeuvre quickly to avoid collisions if it is a shared cyclist pedestrian pathway. Alternatively, they may need to traverse a path to one side, hence allowing room for the cyclist to quickly overtake. Following rules about keeping to the left may also be relevant. These shared cycling and pedestrian pathways are common place, but focus on different rules, obstacles and potential collision impact zones. Mitigation factors including the reasoning behind such strategies also differ when compared to road safety design variables.

The methodology below is performed to determine from the public health literature what recommendations are reported to reduce cyclist speed on shared pedestrian pathways and hence if this gives credence and authority for instigating this photographic initiative. In addition the research is focusing upon what infrastructure changes result in reduced collision incidence.

Methodology

The MeSH (Medical Subject Headings) is the NLM controlled vocabulary thesaurus used for indexing articles for PubMed. https://www.ncbihttps://www.ncbi.nlm.nih.gov/mesh.

These searches were carried out in Sep 2024. The 1st search; ("Bicycling"[Mesh]) AND "Accidents, Traffic"[Mesh]

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2nd search string ((“Bicycling”[Mesh]) AND “Pedestrians”[Mesh]) AND “Wounds and Injuries”[Mesh] for evidence that speed restrictions are preventative.

Results

1st search; 12 retrievals. 2nd search; 48 retrievals.

Discussion

Cycling and Pedestrian Crash Liklihood Research

This research was done in preparation for the Safety 2024 conference in India. Those manuscripts identified that were of importance will be discussed. A Melbourne study [2019] investigated pedestrian and cyclist collision prevalence, analysing Victorian Injury Surveillance Unit (VISU) and Crash Stats data. Over a decade there wasn’t a substantial increase in collision numbers so active transport participation is still to be encouraged. More concerning was the number of pedestrian collisions with motor vehicles (O’Hern & Oxley, 2019).

Analysis of a self-reported survey being the characteristics of cyclist collisions in Ireland reported that the largest proportion of collisions [a little over half] were between cyclists and motorised vehicles while just under a third were single cyclist collisions and under one tenth were collisions with other cyclists and again under one tenth were collisions with other pedestrians (Gildea & Simms, 2021).

Cycling Speed Research

Various cities have introduced speed restrictions for preventative impact including Japan area-wide traffic-calming zone 30 policy (Inada et al, 2020). This zone 30 policy maybe appropriate if you give due attention to the fact that studies have investigated the average speed of cyclists. One particular study in Shanghai, China in 2020, focusing on cycling analysed 14 828 observations and average speed was 22.5km/hour [ebikes] and 13.4km/hour [bicycles] (Li et al, 2020). They stated that strengthening speed enforcement and passing legislation on mandatory helmet use for ebike users maybe helpful for safety.

A systematic review in the Cochrane Database by Mulvaney and colleagues on ‘Cycling infrastructure for reducing cycling injuries in cyclists’, reports that narrative data, found the use of 20 mph [32 kmph] speed restrictions in urban environments may reduce cyclist collision liklihood (Mulvaney et al, 2015). The authors also found that the cycle collision rate was not reduced as a result of cycle lanes (rate ratio 1.21, 95% CI 0.70 to 2.08). They also concluded there is a lack of high quality evidence to be able to draw firm conclusions as to the effect of cycling infrastructure on collision numbers. Other researchers have also found that 20 mph [32 kmph] speed zones may reduce crash incidence and injury risk to pedestrians and cyclists (Cook et al, 2020).

Research in Young Folk

Embree and colleagues performed a systematic review that included fourteen articles of children and adolescents that assessed risk factors for bicycling injuries (Embree et al. 2016). Bicycling injury was associated with lower socioeconomic status, riding in rural compared with urban areas and riding on the road and/or on the sidewalk. In young folk, the bicycling environment is a promising avenue for prevention with riding location being associated with bicycling injury. The severity of injuries increased when motor vehicle collisions occurred.

Other Topics Such as Visibility and Thematic Research

A systematic review assessed improvements to visibility in cyclists and pedestrians with four papers being included in the qualitative synthesis (Porchia et al. 2014). Increased visibility with street lighting and enablement of drivers to detect pedestrians and cyclists earlier was potentially improved as a result of visibility aids (fluorescent materials, lamps, flashing lights and retroreflective materials). Another systematic review that included 37 trials assessing the effect of visibility aids also stated similar conclusions to that just reported (Kwan, Mapstone et al. 2002). Bicycle skills training in a systematic review did not appear to decrease the injury rate even though it was equated with an increase in knowledge (Richmond et al. 2014).

Systematic literature review of 10 years of cyclist safety research analysed 1066 documents retrieved from Web of Science (WoS) between 2012 and 2021 (Scarano et al. 2023). They developed four themes;

motor, niche, emerging or declining themes, and basic themes. They continued to research the motor themes, being the main topics in the cyclist safety field and crash severity research which may guide strategies and future research.

Future Directions

The future research directions will certainly have a focus on the increasing utilisation of electric bicycles (e-bikes) (Transport for Victoria, 2017). Currently the research in this area is minimal and as this mode of transport becomes more popular there will be various areas of concern. Strategic cycling corridors, consideration of hilly terrain and longer distances which these specific e-bikes, mountain bikes or other off rode bikes can tackle, along with the fact that the ageing population may embrace this revolutionary mode of transport more so, preferring this automated cycling over pedal cycling. This though carries additional factors to consider such as risk hazards related to age such as declining vision, poorer balance plus rough dirt terrain.

Limitations

There are also practical implementation limitations or areas where recommendations maybe forthcoming and necessary for the future. One major focus area will be on the bicycle-share market and the emerging dockless bicycle technology. Some of these systems entail or encompass e-bikes, while others are pedal cycles. This marketplace allows customers to use a mobile device app in order to locate a nearby bicycle. After they pay or log in, it unlocks and they cycle. One major obstacle with this trend is the abandonment of these rented bikes in inappropriate public places, the loss of helmets and difficulty with organising maintenance so that these bicycles are safe for cyclists.

Hence, the limitations that are apparent span several areas of concern. Firstly, the speed limit considerations given the emergence of e-bikes and the difficulty with speed restrictions that may not encompass or consider these motorised vehicles. Secondly, the emergence of the cycle hire scheme with the issue of where the base stations are best located, and the rules and regulations around the safe usage of these bicycles, which includes trying to minimise the dumping of bikes in public places which can be hazardous if young folk then joy ride the bikes. Thirdly, my personal concern is that an over copious policy framework on where a person can ride may serve to inhibit uptake of physical activity, rather then promote. It can be negative in that community members may see it as too overly complicated, hence shy away from attempting to engage in physical activity if they see the system as regimented, laborious and restrictive. There were few rules when I cycled to school, whether it related to where you cycled, what speed you cycled at, let alone enforcement of wearing a sun hat or sunscreen. Along with the fact of less traffic, less rules made cycling a breeze and I was fortunate to be given many sporting opportunities when I was at school [ballet - [classical, jazz and tap], tennis, netball, squash and swimming] along with the fact of cycling to school each day for a very considerable distance regardless of whether it was rain, hail, sunshine or a lightening storm. I realise that my parents worked tirelessly to pay for sporting opportunities, which is probably something I took for granted at the time, but now I appreciate this incredibly more so as it did instill a sense of exercise importance. It also gives a person confidence to particate in physical activity if they are given opportunity when young as it becomes ingrained into a daily ritual. I know that many people were not so fortunate. I have a bicycle now, but certainly are intimidated by traffic speed and congestion as I age. If there were more safeguards such as appropriate speed limits and pathways cycling is more inticing.

Conclusion

In conclusion, an effective intervention package includes components of strengthening speed enforcement and improving the cycling infrastructure (protected bike lane installation) to reduce hazards. In fact, a recent research manuscript concludes in recommending a speed limit of not more than 12 km/h for bicyclists on narrow shared pedestrian paths and footpaths to reduce collision risk (Paudel et al. 2022). The research seems divided over the importance of cycling infrastructure to improve safety. Other authors have stated that the bicycling environment is a promising avenue

for prevention (Embree et al. 2016). In summary though, the research may not be of high enough quality to be conclusive as to the effects of cycling infrastructure (Mulvaney et al. 2015). There are also various emerging issues mentioned which include e-bikes and hire cycles. Speed limits are advisable, having a significant positive influence on reducing fatal pedestrian crashes hence this creative street photograph showing a cyclist with signage 'thank you for cycling slowly' may re-enforce messages to cyclists of this necessity.

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