Disability and Pedestrian Road Traffic Injury: A Scoping Review of the Literature

Naomi Schwartz PhD
Postdoctoral Fellow
School of Occupational and Public Health
Toronto Metropolitan University

Linda Rothman PhD
Assistant Professor
School of Occupational and Public Health

Ron Buliung PhD
Professor
Department of Geography & Planning
University of Toronto, Mississauga

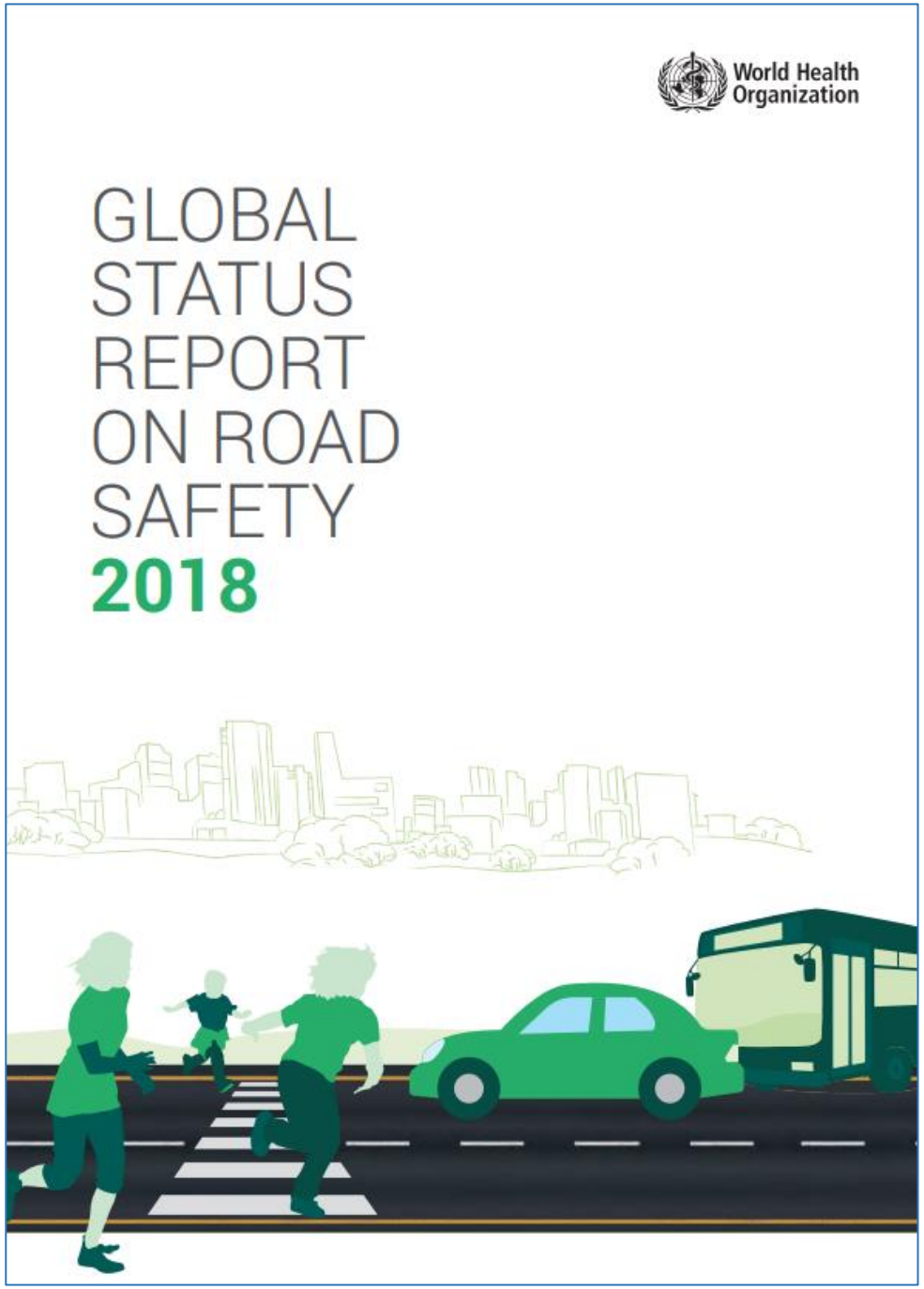
Toronto Metropolitan University

June 20, 2022

UNIVERSITY OF TORONTO MISSISSAUGA

Road Injuries

- 1.3 million deaths worldwide per year
- Pedestrians identified as vulnerable road users
- WHO considers at risk on the road
  - Children
  - Older Adults
  - People with Disabilities



Toronto Metropolitan University

Disability

- The World Health Organization (WHO) estimates that over one billion people worldwide experience disability.[1]
  - About 15% of the world's population
  - Increasing due to demographic trends, increases in chronic health
- Similar estimates in Canada[2]
  - 22% with a disability
- Large population whose needs on the road must be understood

Toronto Metropolitan University

1. WHO, Disability & Health, 2021
2. Statistics Canada. Canadian Survey on Disability. 2017

Disability and Injury

Review by Yung et al. (2014)[1]

- Disability associated with higher risk of injury
- Only one study examined risk of pedestrian motor vehicle collisions
  - Found far higher risk of having been in a pedestrian-motor vehicle collisions
  - Odds Ratio: 5.53
    (95% Confidence Interval (1.43 - 21.41)

[1]Yung et al., Accid Anal Prev., 2014

Toronto Metropolitan University

Disability – Social Model

Disability vs. Impairments[1]

- Impairment as bodily differences-for example difficulty walking
- Disability is the discrimination imposed on people with impairments
  - Environments that exclude people
  - Social discrimination against inclusion
- Focus on eliminating barriers to participation

https://humanrightseducationaustralia.com/wp-content/uploads/2018/11/Social-Model-of-Disability.png

[1]Oliver, Macmillan, 1990

Toronto Metropolitan University

Scoping Review of the Literature

Objectives

1. What is known regarding the association between disability and risk of pedestrian motor vehicle collisions, injuries, and fatalities?
2. What are the risk factors for pedestrian road injury among disabled people?

Toronto Metropolitan University

Methods – Search Strategy

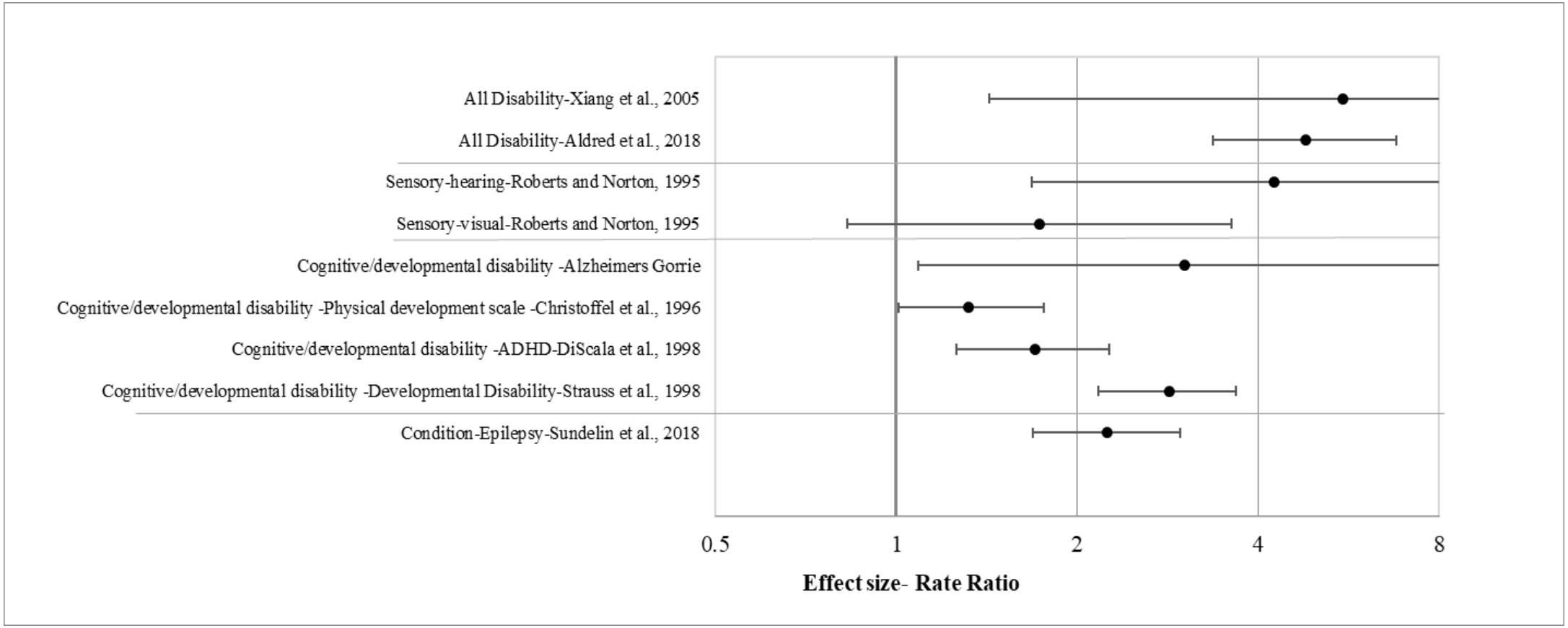
Review of 5 databases

- 62 studies
  - 13 Risk of pedestria collisions/injury/fatalities
  - 51 Risk factors for injury
- Academic fields, including medicine, rehabilitation sciences, epidemiology, urban planning, and social sciences
- Inclusion criteria:
  - English-language,
  - Quantitative studies – studies that examined:
    - Pedestrian road traffic collisions, injuries, and fatalities among disabled people
    - Severity of injury in collisions.
    - Quality assessed and strength of evidence rated high, medium or low.
      - included adequate sample size, proper identification of disability, use of appropriate control groups, controlled for age and sex, and whether disability and pedestrian road injury was the primary association studied

Toronto Metropolitan University

Results – 1. Disability and Collisions

- All were in high income countries
- Higher risk of collisions among people with disabilities
- Mixed results for risk of greater injury severity
- Studies often low- medium quality, disability not always reported in traffic databases



2. Risk Factors

- Individual
  - Sociodemographic
  - Individualized
- Socio-relational
  - Social attitudes and behaviours
  - Education/training (social) programs
- Socio-environmental
  - Built environments associated with higher risk
  - Policies

Toronto Metropolitan University

Individual Risk Factors

- Sociodemographic - higher risk among males with disabilities
- Individualized Risk Factors (n = 25)
    - Slower crossing speeds
    - Crossing decisions
  - Indicates different ways people move in the road environment
  - However, frames increased risk as individual problem
    - >60% of collisions, disabled person is not at-fault

Toronto Metropolitan University

Socio-Relational Risk Factors

- Driver yielding behaviour
  - More yielding for individuals with visual symbols of disability (white cane symbolling blindness)
  - Less yielding for wheelchair users
    - Particularly related to visibility
- Education programs
  - Mostly in children with intellectual disability
  - Training improved learning
  - However, education is not associated with greater safety

Socio-Environmental Risk Factors

Environments associated with risk

- Fast moving traffic
- Wider roads
- Two-way traffic
- Also related to areas lacking curbs
- Lacking audible pedestrian signals
- Roundabouts (unclear)

Policies

- Rarely evaluated
- Lack of traffic planning/consumer protection
- Lack of training for motorized mobility scooters/power wheelchairs

Toronto Metropolitan University

Summary

- People with disabilities at a higher risk of pedestrian road injury
  - Important population inequality
  - Very few high quality studies
  - Need for better measures of disability in traffic data
- Risk factors
  - Often understood at the individual level – related to slower walking speeds/crossing decisions of disabled people
  - Social-relational/environmental risk factors are less examined
  - Environmental risk factors include high speed, wide, high volume roads
    - Need for accessible features including curb cuts, audible pedestrian signals
- There a paucity of research in low-income countries

Toronto Metropolitan University

Implications

- Disabled pedestrians experience increased risk on the road
- Need for improved data collection on disability and road injury
- Ensure disability is accounted for in designs and operations of road environments
  - Accessibility enhancements
  - Universally and inclusively designed streets




Questions?

Toronto Metropolitan University