Accident risk, behaviour and habits of older cyclists

Carmen Hagemeister

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TECHNISCHE UNIVERSITÄT DRESDEN

Overview

- Aim of the study
- Pro and cons of cycling as an older person
- Participants
- Differences between cyclists with and without accident
- Risk factors for older cyclists

Aim

Why research on behaviour of older cyclists?

Pros of cycling:

Regular physical exercise keeps healthy

WHO recommendation for adults: at least 30 minutes of physical actictivity at least 3 days/week, better 7 days/week

but: only 10% of older persons in Germany have enough exercise

Cycling might a good means to be physically active

Cons of cycling:

In Germany in every second fatal cyclist accident the cyclist is 65 years or older - many more than expected from exposition

Is the cause only higher physical vulnerability?

Are there differences between older cyclists with and without accident?

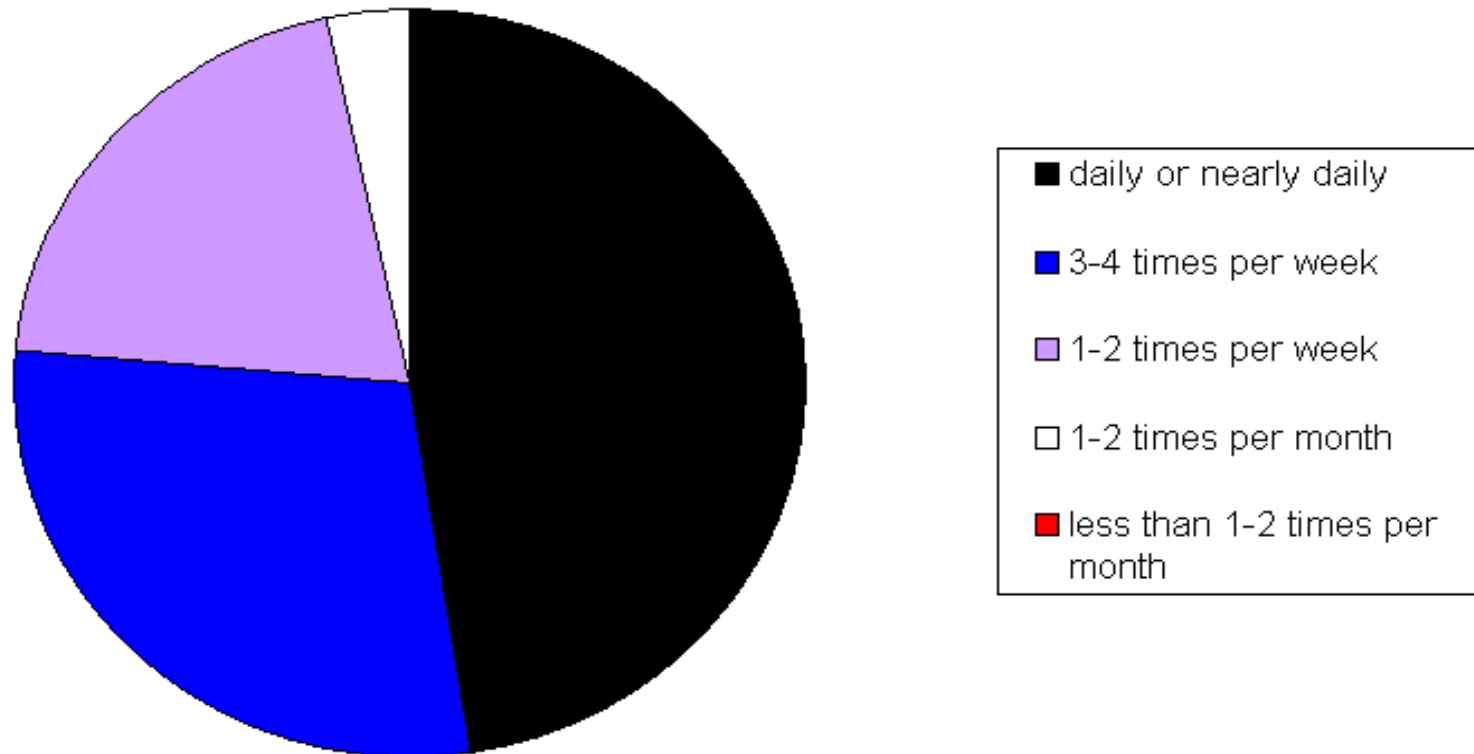How do physical difficulties which become more frequent with age contribute to this risk?

Participants of standardised interview
Age and place of residence

Age (years)	60-69	70-79	80-90	sum
City (Dresden, 500,000 inh.)	26	27	19	72
Hinterland / small and medium cities	26	26	13	65
Rural	27	28	15	70
Sum	79	81	47	207
Minimum	60	70	80	
Maximum	69	79	90	
Mean age	65.1	73.4	82.6	72.3
Median age	66	73	82	71
Standard deviation age	2.6	2.9	2.8	7.2

207 Participants of standardised interview
Frequency of cycling

- ■ daily or nearly daily
- ■ 3-4 times per week
- ■ 1-2 times per week
- □ 1-2 times per month
- ■ less than 1-2 times per month

Standardised Interview

Topics

Mobility habits

Behaviour in traffic

cycle where

feeling of safety

violations

Accident (including falls) after 59th birthday? If yes: details

Health / physical difficulties and their compensation

motility

cardiovascular system

neurological system

muscle strength

diabetes

vision

hearing

1 to 2 hours

Accidents after 59th birthday

No accident: 109 persons

At least one cycling accident: 97 persons

Last accident

    33 collisions

        15 car

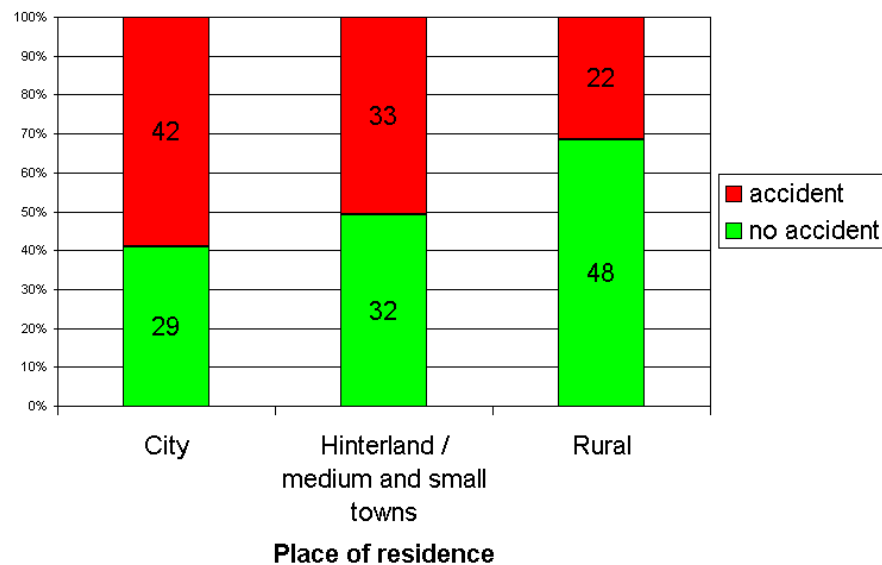   14 bike

         2 pedestrian
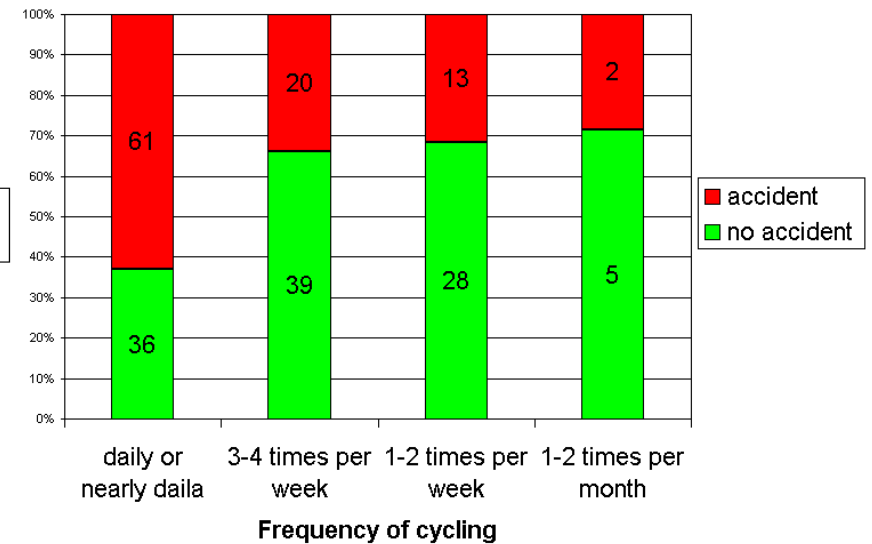
         1 motor assisted bike

         1 dog

    64 accidents without any other party

Differences between cyclists with and without accident: Exposition

Cyclists in more densely populated areas have more accidents ($p = .001$, chi-quare)

Persons cycling (nearly) daily have more accidents than persons cycling less ($p <= .001$, chi-square)

But: Persons cycle more often in the more densely populated areas

Partial correlations remain if other variable is partialed out

Differences between cyclists with and without accident

Cycling in unfriendly or any weather

Persons with accident cycle more often

    in the rain   ($r = .12$, $p =. 002$, $N = 206$)

    when it is wet   ($r = .15$, $p = .029$, $N = 206$)

No differences for

    wind   ($r = .13$, $p = .051$, $N = 206$)

    heat   ($r = .09$, $p = .183$, $N = 206$)

    fallen leaves   ($r = .08$, $p = .252$, $N = 206$)

    snow/ice   ($r = .05$, $p = .441$, $N = 206$)

    gloomy weather ($r = .05$, $p = .489$, $N = 206$)

Differences between cyclists with and without accident

Feeling of safety

Persons with accident feel safer

on cycle lane (p = .044, U-test) and

on minor road (p = .023, U-test)

No differences for safety on cycle path (separate, shared), main street, …

Helmet

Persons who own a helmet are more likely to have had an accident:

$r = .15$, $p = .031$, $N = 206$

No correlations with frequency of wearing the helmet.

No questions when and why they began to wear a helmet.

Differences between cyclists with and without accident

Violations:

Persons with more violations have more accidents

"I cycle according to the rules" (no/yes)	$r = -.31$ ($p <= .001$)
run red lights (no/yes)	$r = .31$ ($p <= .001$)
cycle on the footpath (no/yes)	$r = .24$ ($p <= .001$)
cycle on roads which are forbidden for all traffic	$r = .21$ ($p = .003$)
cycle in the wrong direction on the cycle path	$r = .18$ ($p = .012$)
run stop signs (no/yes)	$r = .14$ ($p = .046$)

Not:

one-way roads in wrong direction:	$r = .05$
pedestrian areas (only relevant for $N = 108$):	$r = .14$

Most relevant violations according to accident statistics: cycling on footpath and on cycle path on wrong side

Best predictor of accidents: running red lights

Differences between cyclists with and without accident

Reported physical problems:

No significant correlation with accident (1=no problem, 5=severe problems):

Motility	(rho = .07)
Cardiovascular system	(rho = .07)
Neurological	(rho = .07)
Muscle strength	(rho = -.01)
Diabetes	(rho = .05)
Vision	(rho = .04)
Hearing	(rho = .02)

and how much the physical problems impair the persons when cycling.

Correlation of accident and **maximum impairment** by any of these 7 problems:

$$rho = .15, p = .037, N = 206$$

"Because of my declined motilty I have problems getting on or off my bike" (no/yes): r = .28 (p = .011, N = 85 with motility problems)

Differences between cyclists with and without accident

Compensation of physical problems:

Some instances of insufficient compensation of physical problems are related to accidents:

- Problems with vision and NOT mainly taking familiar routes:
  $r = .24$, $p = .041$, $N = 74$ with problems with vision

- Having a hearing aid and switching if OFF when cycling:
  $r = .47$, $p = .031$, $N = 21$ with hearing aid

Discussion

Exposition:

Cycling more and cycling in denser traffic leads to more accidents

Cycling under "all" conditions.

Reasons:

- Instrumental: most practical means of transport?
- Emotional?
- Habit?

- "Bike captives"

Discussion

Violations:

Related to accidents – by one mechanism or more?

Statistics:

Dangers arise from cycling on the footpath and cycling on cycle paths on the wrong side where drivers do not expect cyclists.

Running red lights is not very dangerous (but very much in the focus of the media and the public). Does it show how a cyclists perceives risks?

Open question:

How do attitudes and behaviour towards rules change with age?

Discussion

Physical problems:

Limitation of the study: Rather healthy sample

No high correlation between accidents and (reported) physical problems which
    are related to aging

Candidates for further research:
-    Vision and self-restriction
-    Hearing aids: for all ages
-    Motility: getting on and off the bike

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Thanks

to you

for your attention

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