



# Is the Barthel Index an Adequate Assessment Tool for Identifying a Risk Group in Elderly People Living at Home?

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# Functional Decline in Europe

## Facts & Strategies

- **Long-standing public health policy goal** <sup>[3]</sup>  
Health promotion and measures to prevent or reduce functional decline in elderly people in Europe
- **Identification of risk groups as an important strategy**  
Basis for assessing the need of care and assistance - especially in the domestic setting by district nurses

# Functional Decline

## Explanation & Consequences

- ... the loss of independence in self-care activities (ADLs) or a deterioration thereof [8].
- **Consequences** [9,10]
  - Prolonged hospital stays
  - Nursing home placement
  - Hospital readmissions
  - Increasing mortality



# Barthel Index

International View & Scientific Reputation

- **Internationally standardized ADL assessment tool worth over the past 50 years**
- **Translation into eight languages** [14]
- **Primarily used in acute care and in the rehabilitation of stroke patients** [15]
- **High Reliability & Validity**
  - Interrater reliability between two nurses in the total BI = Spearman  $r=.98$ ) & all individual activities = kappa higher to .89 [15]
  - Predicts outcomes of rehabilitation and progress [15], Scores found to agree with other measures of physical disability [11,12], Compared with other ADL assessment scores, Predicts discharge home [9,10]

# Barthel Index

## Explanation of the Term

- **Reflection of the functional status of 10 ADLs** [17]  
*10 activities of daily living* (feeding, grooming, bathing, dressing, bowel and bladder care, toilet use, ambulation, transfers, and stair climbing)
- **Expression of the degree of independence of a person by means of a total score (TC)** [18].
- **4 categories - Hamburg Classification Manual** [21]
  - Scale range: 0 (= total dependence) to 100 (= complete independence)** [22]
  - Category 1 - “dependent on care” (0 to 30 pts.)
  - Category 2 - “in need of care” (35 to 80 pts.)
  - Category 3 - “partly in need of care” (85 to 90 pts.)
  - Category 4 - “completely independent” (95 to 100 pts.)

# Identification of a Risk Group for Living at Home

## People Aged 70 (+)

“Dependent on Care” (0 to 30 points)

“In Need of Care” (35 to 80 points)

“Partly in Need of Care” (85 to 90 points)

“Completely Independent” (95 to 100 points)

**Non- Independent Group**  
(BI 0-80 pts.)



**Independent Group**  
(BI 85 – 100 pts.)

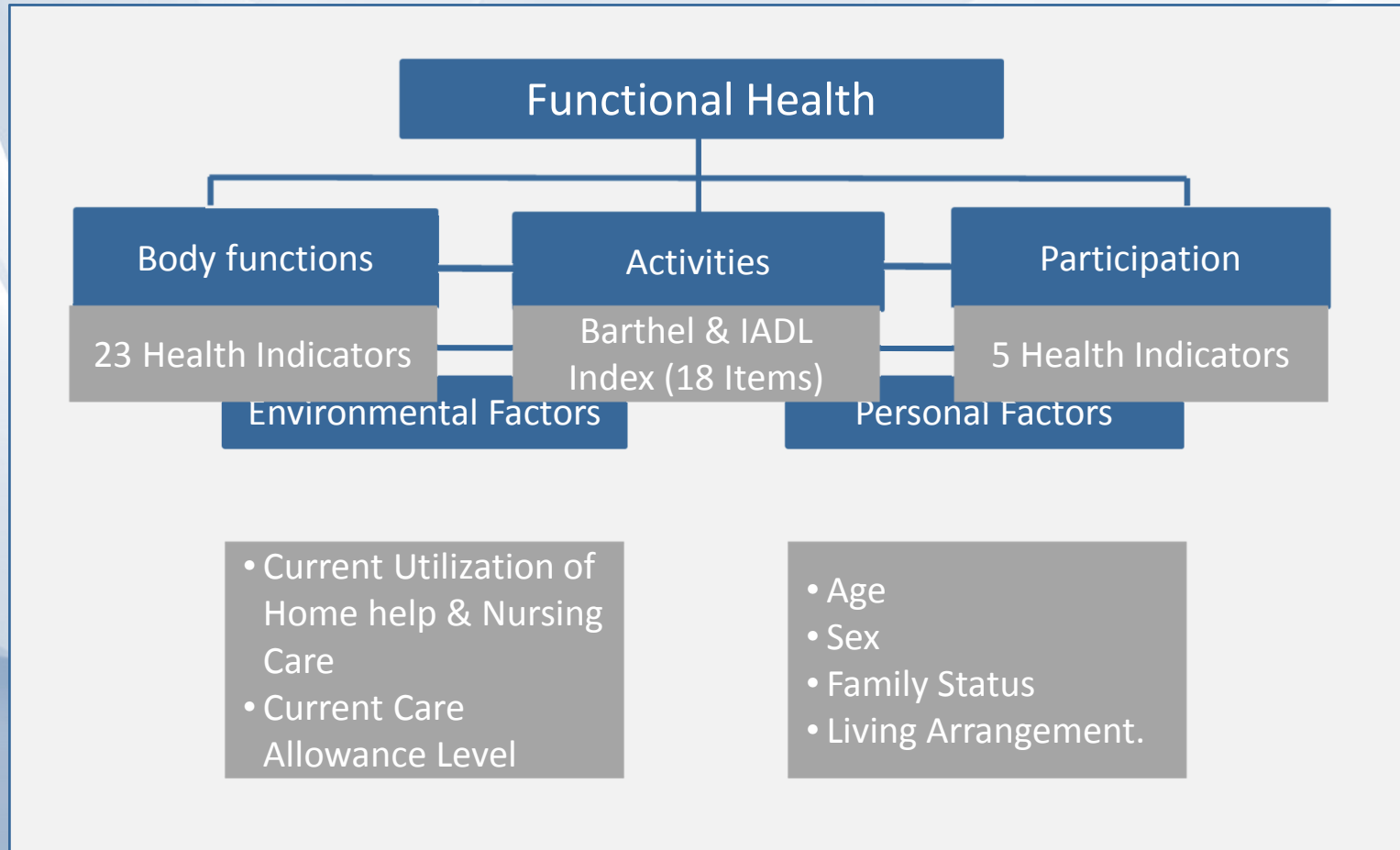
## Conduct of the Study

Study Design, Sampling and Data Collection

- **Secondary analysis**
- **Data of an explorative-quantitative cross-sectional study - “Preventive Senior Counselling in Tyrol”**
- **Period of implementation - 2011 to 2013**
- **Recruitment of a convenience sample of 345 people at home in Tyrol**
- **Inclusion criteria - age 70+, no cognitive impairments, a written declaration of consent, no legal care provider**

# Measurements and Variables

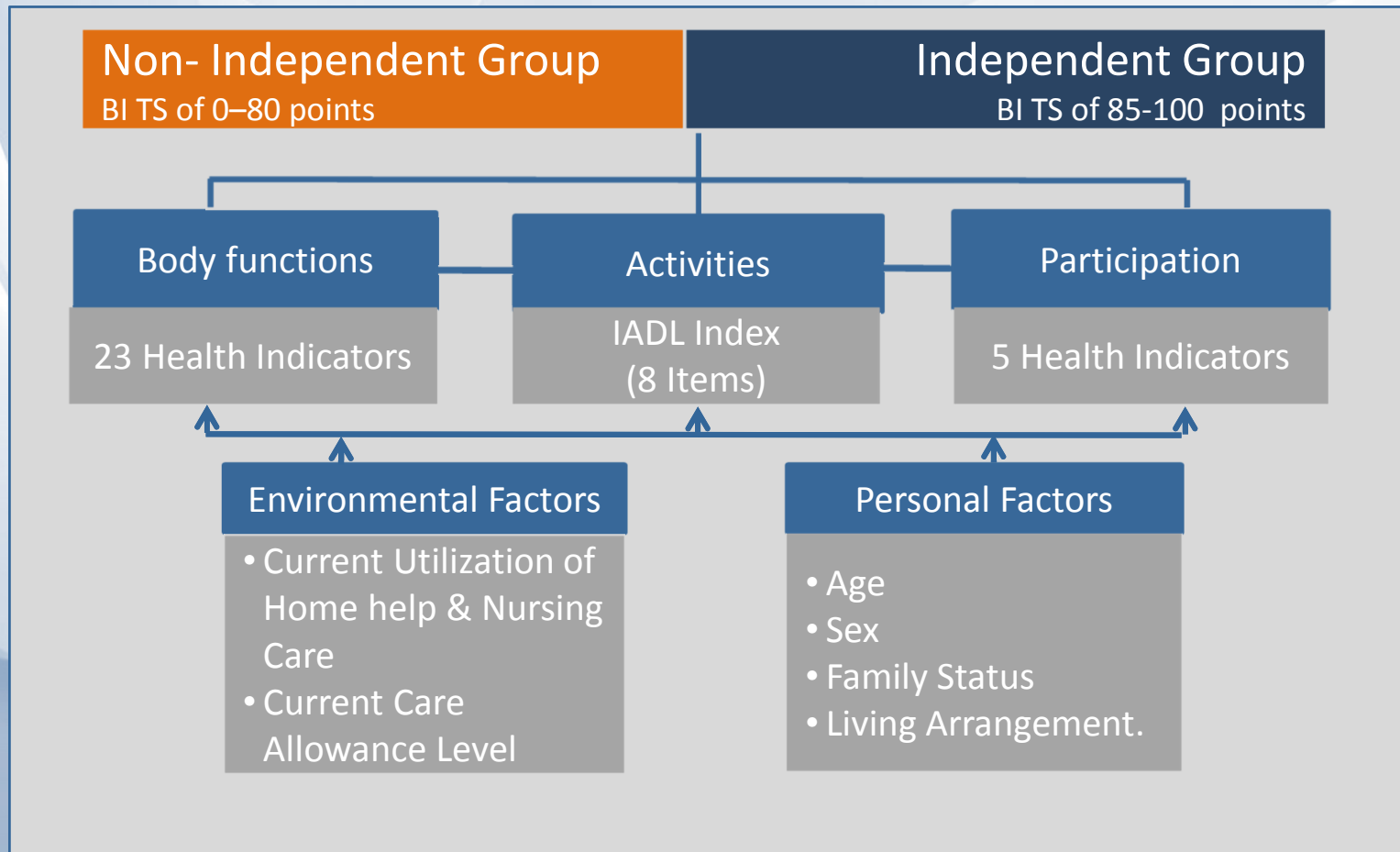
Based on the Theoretical Model of the WHO-ICF Classification (2001)





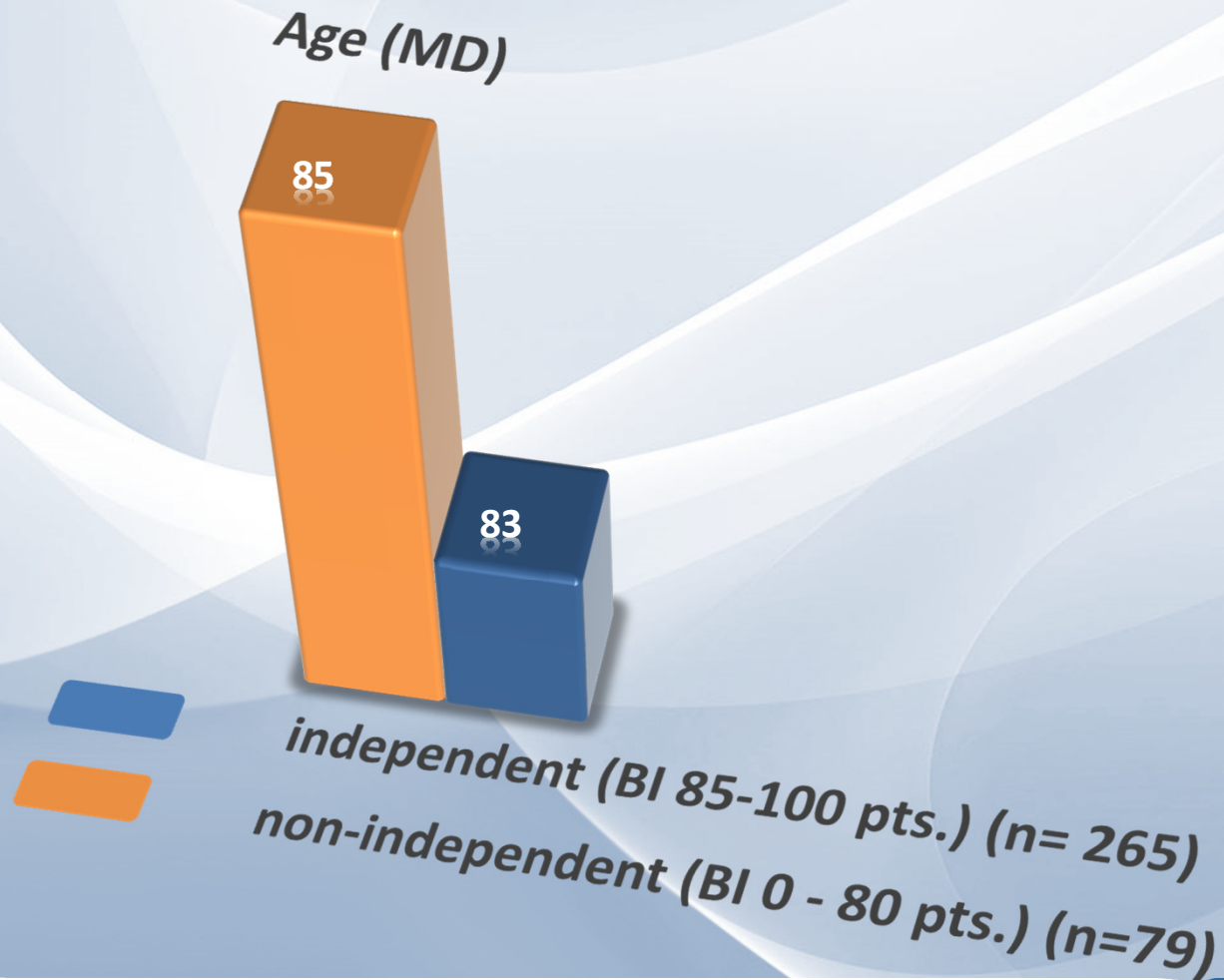
# Measurements and Variables

## Data Analysis



# Functionality of Non-Independent vs. Independent People

## Personal Factors



# Functionality of Non-Independent vs. Independent People

## Activities & Participation

**Not driving a car themselves**

(OR 10.3, 95% CI [2.46; 43.30])



**Not living alone**

(OR 2.8, 95% CI [1.63; 4.73])

**No communication with others (phone)**

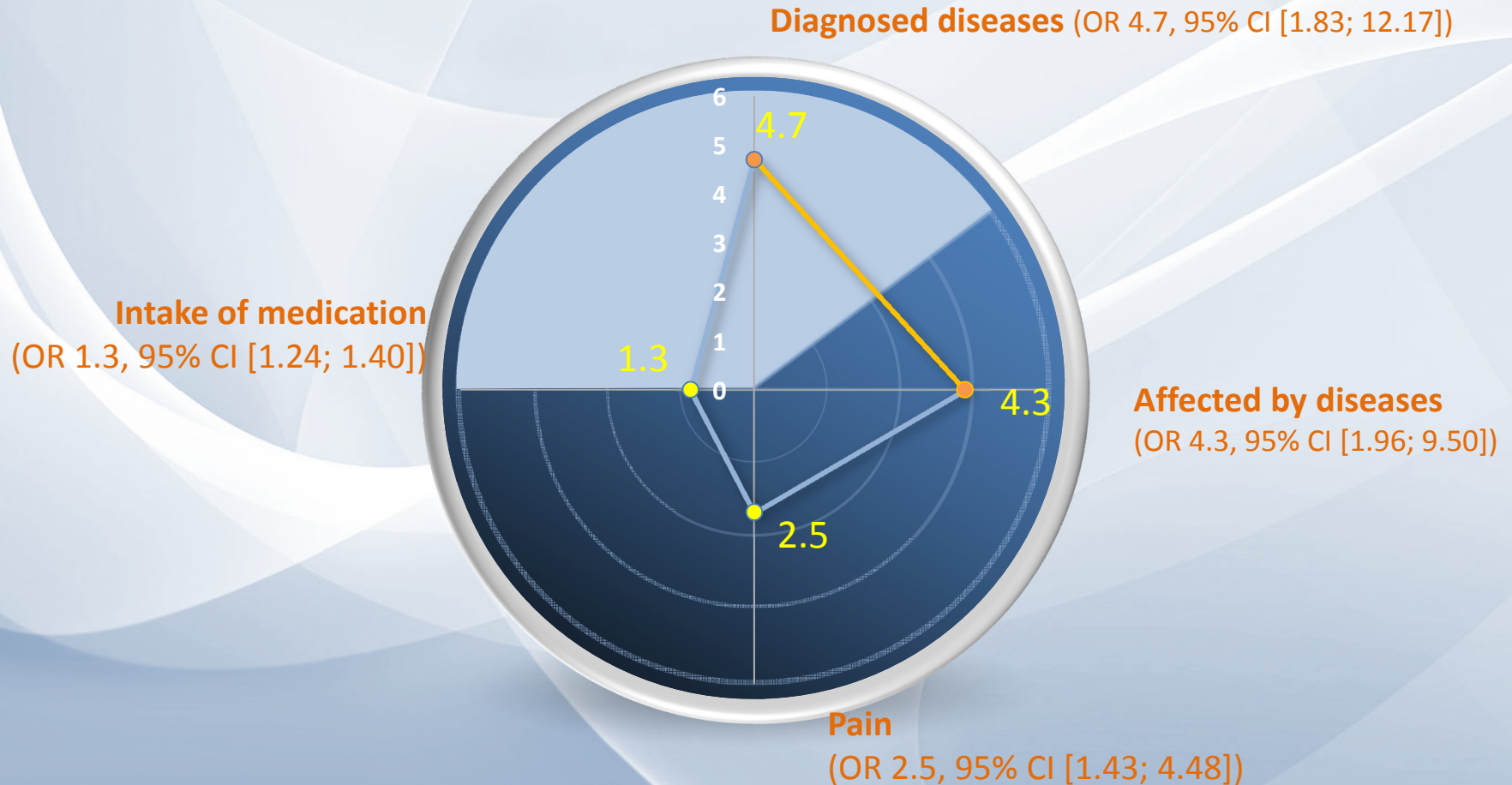
(OR 13.6, 95% CI [6.53; 28.38])

**Instrumental activities of daily living [TC 0-7 pts.]**

(OR 1.4 (95% CI [1.31; 1.53]))

# Functionality of Non-Independent vs. Independent People

## Body functions – Physical Health Status





# Functionality of Non-Independent vs. Independent People

## Body functions -Cognitive & Emotional Health Status

**Dissatisfaction with general health status**  
(OR 5.1, 95% CI [2.99; 8.71])

**Difficulties sleeping through the night**  
(OR 2.0, 95% CI [1.17; 3.38])

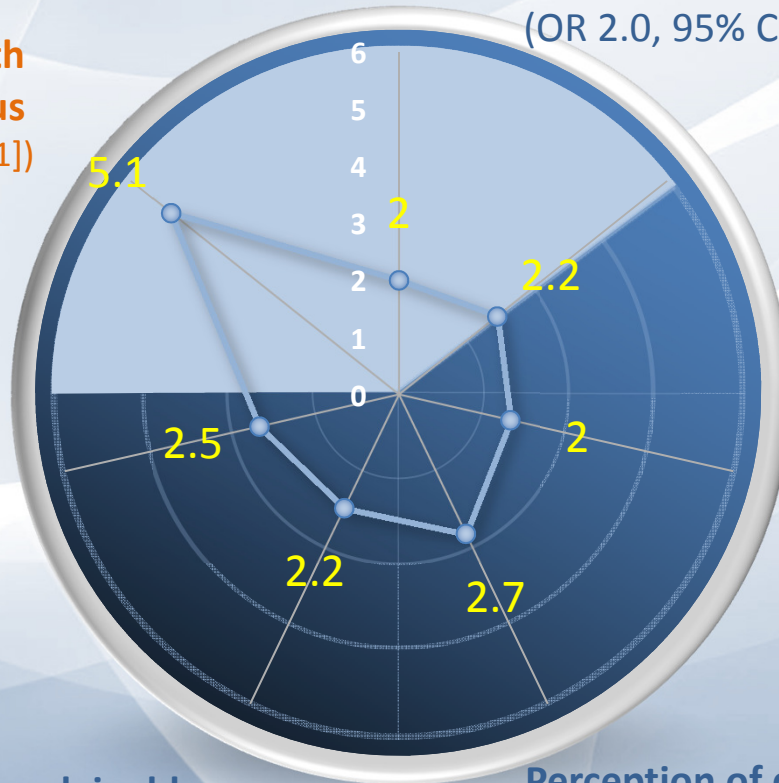
**Dyspnoea at night**  
(OR 2.2, 95% CI [1.02; 4.72])

**Dissatisfaction with life**  
(OR 2.5, 95% CI [1.12; 5.33])

**Fear** (OR 2.0, 95% CI [1.17; 3.43])

**Perception of unexplainable sadness or depression**  
(OR 2.2, 95% CI [1.25; 3.77])

**Perception of difficulties concentrating**  
(OR 2.7, 95% CI [1.62; 4.56])



# Functionality of Non-Independent vs. Independent people

## Body Functions - Motor Performance

**Difficulties in climbing stairs** (OR 18.6, 95% CI [6.62; 52.34])



**Dyspnoea at rest**  
(OR 2.4, 95% CI [1.24; 4.71])

**Insecurity when walking**  
(OR 7.5, 95% CI [3.14; 17.86])

**Falls during the last year**  
(OR 2.9, 95% CI [1.69; 4.88])

**Need of a walking aid**  
(OR 6.9, 95% CI [3.50; 13.68])

**Physical inactivity on a regular basis of 30 minutes at a time**  
(OR 6.6, 95% CI [3.83; 11.49])

# Environmental Factors of Non-Independent vs. Independent People

## Utilization of care

(OR 34.6 (95% CI [14.39; 83.03]))



## Care allowance level (1-6)

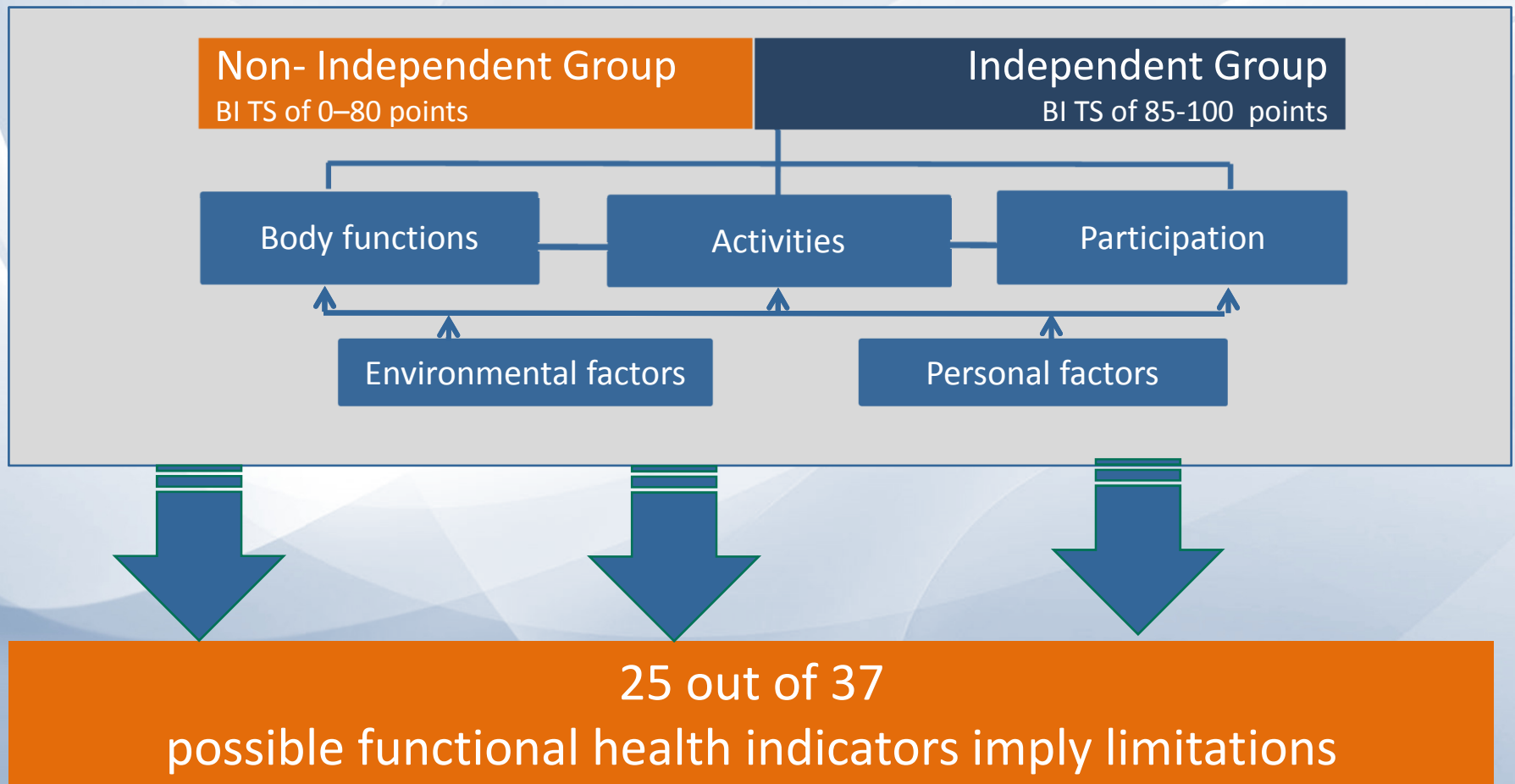
(OR 6.1 (95% CI [3.39; 11.05]))

## Utilization

## of home help

(OR 18.8 (95% CI [4.52; 78.4]))

## Summary of the Results





## Critical View

### Barthel Index Total Score

- Literature takes a critical view on the significance of the BI total score due to the ordinal scale [17, 26]
- **Recommendations**
  - For a basic tool or as a global parameter in the daily routine of district nurses [27]
  - *Barthel & Mahoney advised*: an analysis of the individual items should be conducted additionally to allow for a pinpoint identification of the deficits [13]



**Many thanks for your attention**  
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**Is the Barthel Index an Adequate Assessment Tool for Identifying a Risk Group in Elderly People Living at Home?**

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Open Access

**Abstract**

**Background:** The aim of this study was to determine whether or not the Barthel Index (BI) is an adequate basic assessment tool to identify a risk group in people aged 70+ living at home whose capacity for independent living is at risk.  
**Methods:** A multidimensional nursing assessment was performed on 344 people aged 70+ living at home in Austria, using the Barthel Index to rate activities of daily living and other functional health indicators. Instead of categorizing the total BI scores (TS) into four groups, the sample was divided into two groups: independent older people (TS 85-100 pts.) and non-independent older people (TS 0-80 pts.). The division into two groups is based on the assumption that independent living at home is virtually impossible with a TC of 0-80 pts. However, people aged 70+ who are completely independent or only partly in need of care are certainly able to live an independent life. The strength of the association between an independent or non-independent lifestyle and functional health impairments was measured by means of odds ratios with a 95% confidence interval.  
**Results:** The BI classified 76.8% of the 70+-year-olds (n=265) as independent. In comparison to the independent group, the non-independent group (n=79, 22.8%) had significantly more health-related problems in all assessed dimensions (e.g. TS of the IADL Index [0-7 pts.] (OR 1.4, 95% CI [1.31, 1.53]), dissatisfaction with general health status (OR 5.1, 95% CI [2.99, 8.71]), and falls during the last year (OR 2.9, 95% CI [1.69, 4.88]).  
**Conclusion:** Categorization of the BI was able to identify a risk group and can provide a solid basis for target-group-specific support planning in the field of home-based primary care in Austria under due consideration of biopsychosocial conditions.

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Functional decline, Independent living, Dependent living, Need of care, Self competence

**Introduction**

The rise in life expectancy is a great success of recent years and presumably the percentage of older people will further increase in many European countries [1]. Forecasts published by the European Commission show a wide margin of people being dependent on help in the longer term as the risk of functional decline is expected to rise from 30% to 100% by the year 2050 [2]. Health promotion and measures to prevent or reduce functional decline in elderly people in Europe are provided through a long-standing public health policy goal [3]. This makes the identification of risk groups an important strategy to establish the basis for setting the need of care and assistance, for example, in the domestic setting by district nurses.

In Austria, people's need for nursing care has been assessed based on the seven levels of care allowance since 1993. Care need is a demand for care and assistance which must amount to at least 65 hours per month and "will presumably last for at least six months" [4]. In 2014, a total of 5.3% of approx. 8 million Austrians were in one of the seven care levels and received care allowances amounting to a total sum of approx. 2.5 billion euros [5]. In Austria, the assessment of the care level is part of the care allowance assessment and to a body- and functionality-related, resulting in the fact that limitations and resources for preventing functional decline in the domestic setting are not recorded sufficiently in this context. An individual need for consultation and/or intervention, with a view towards health promotion and prevention and with the aim of influencing functional decline, cannot be deduced here sufficiently. To enable an effective approach of risk groups, WHO recommends [6] a combined identification which focuses on recording the resources as well as the deficits. This gives an essential role to people's subjective judgement and assessment of their own living situation since there is a correlation between functional decline and subjective quality of life [2]. One

important component of quality of life for elderly people, in particular, is the ability to perform activities of daily living independently [7]. Functional decline describes the loss of independence in self-care activities (ADLs) or a deterioration thereof [8]. The consequences of functional decline are prolonged hospital stays, nursing home placement, hospital readmissions, and increasing mortality [9,10]. Thus, the question arises how to assess or even measure functional decline in order to be able to identify the appropriate preventive measures.

Besides the Katz ADL scale [11], the Functional Independence Measure (FIM) [12], and the Ranking Score, the Barthel Index (BI) [13] is considered an internationally standardized ADL assessment tool which has proven its worth over the past 50 years. The index, which has been translated into eight languages [14], is primarily used in acute care and in the rehabilitation of stroke patients [15] since suffering a stroke is the main reason elderly people lose their independence in the ADLs [16]. This is why primarily stroke patients, and in particular people from outside the clinical setting, were used for the verification of the quality criteria instead of elderly people with other health problems [15].

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