

Cardiovascular diseases



Field of action 3: Reducing the complications of diabetes

Background

People with diabetes have an increased risk of developing cardiovascular comorbidities, which in turn can contribute to increased mortality [1].

Key facts

- ▶ The prevalence of cardiovascular comorbidities is significantly higher in 45- to 79-year-olds with type 2 diabetes than in people of the same age without diabetes.
- ▶ In particular, the proportion of women aged 45-79 years with type 2 diabetes suffering from cardiovascular diseases decreased between 1998 and 2010.

Figure 1: Temporal comparison of the prevalence of cardiovascular diseases among adults aged 45 – 79 years with and without diabetes in % by sex between 1998 and 2010 (age-standardised).

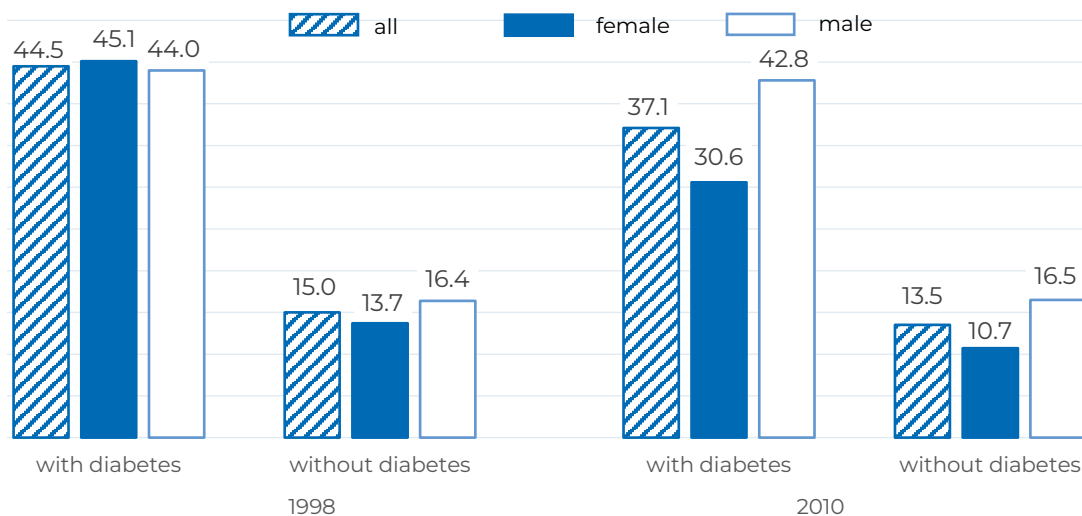


Figure 2: Prevalence of cardiovascular diseases among adults aged 45 – 79 years with and without diabetes in % by age and sex in 2010.

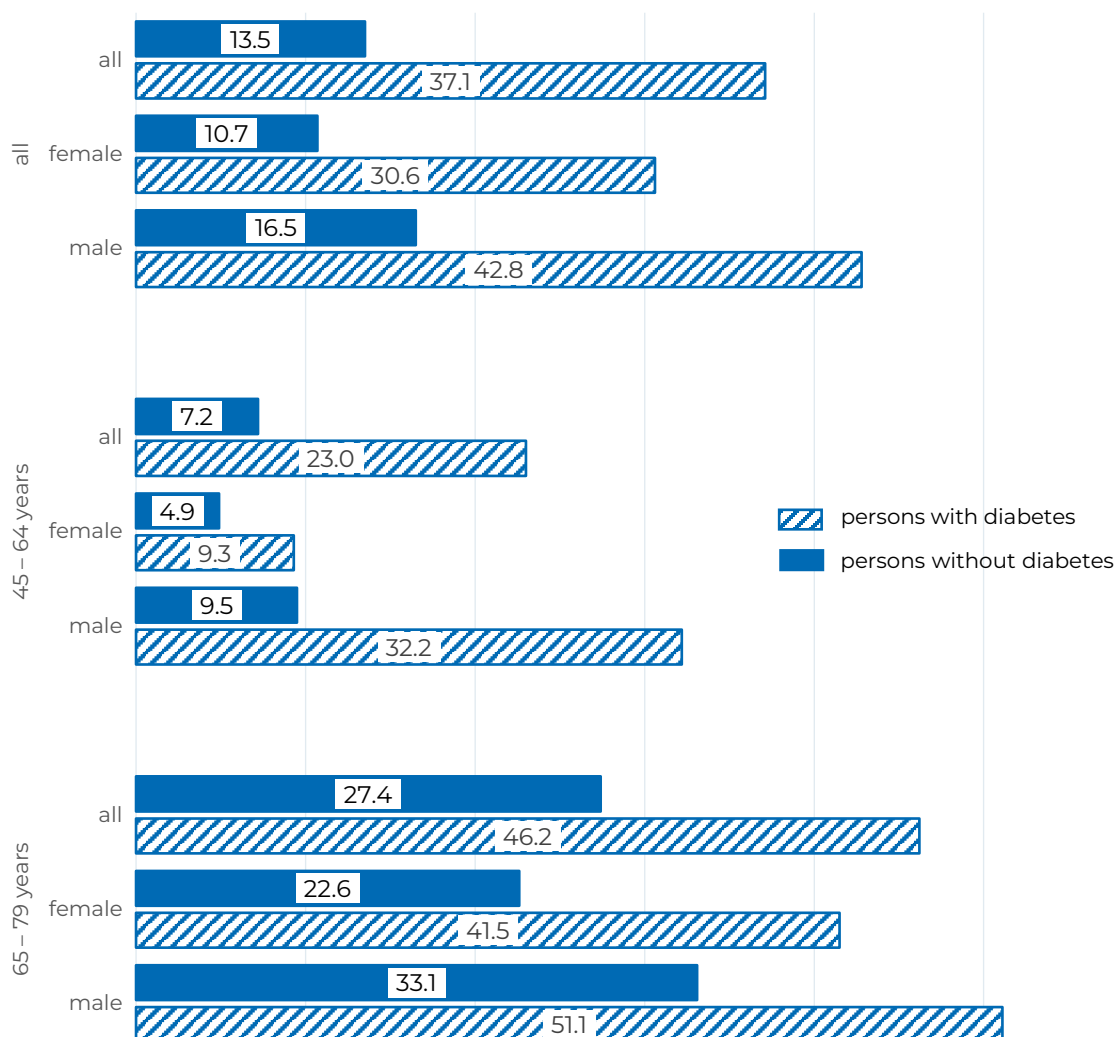
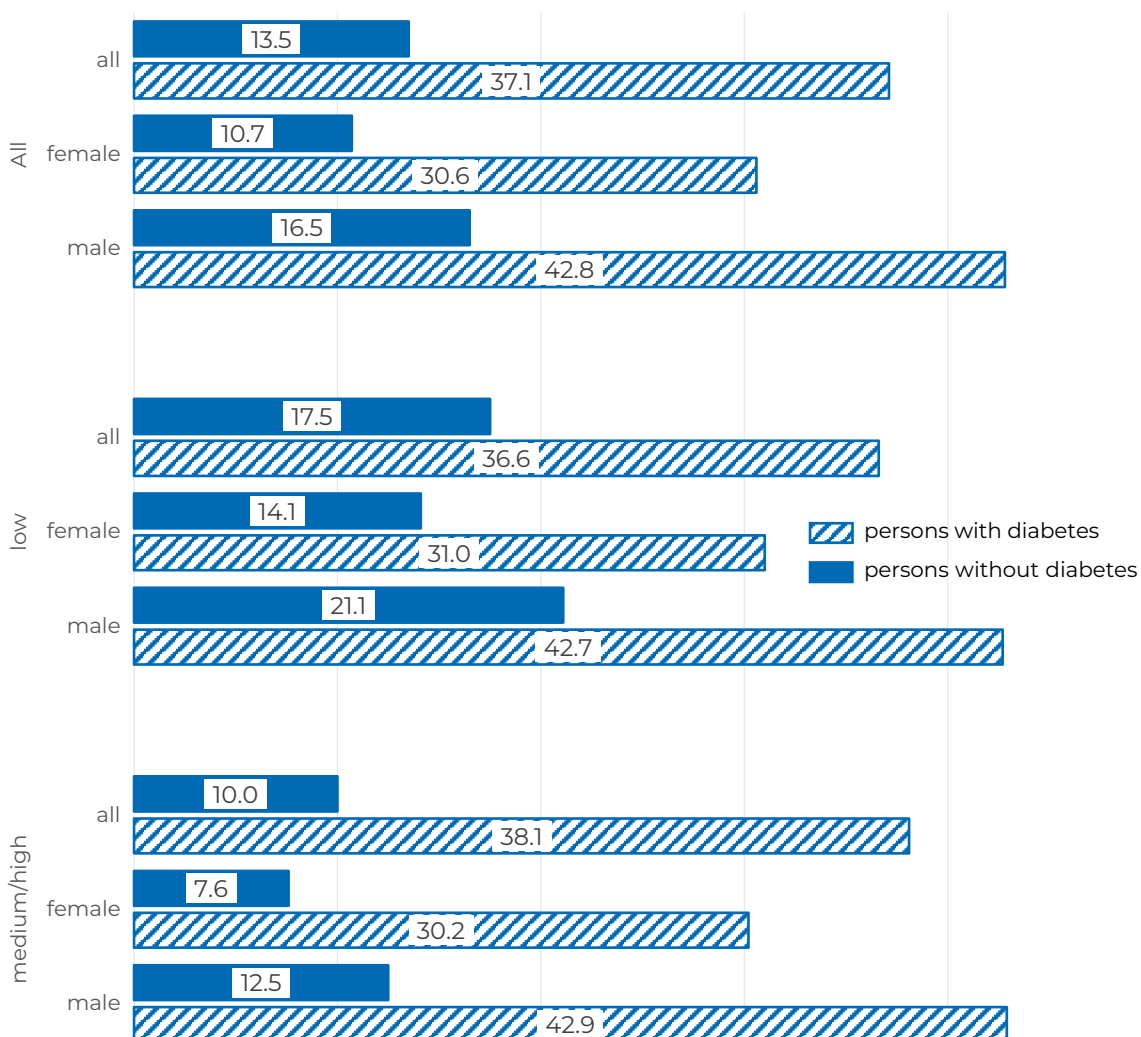


Figure 3: Prevalence of cardiovascular diseases among adults aged 45 – 79 years with and without diabetes in % by education group and sex in 2010.



Results

In 2010, the proportion of adults with cardiovascular diseases was 37.1% for people with type 2 diabetes, and was significantly lower for women (30.6%) than for men (42.8%). The difference between the sexes was especially pronounced in the 45- to 64-year-old age group. Between 1998 and 2010, the proportion of adults with type 2 diabetes presenting with cardiovascular comorbidities fell from 42.5% to 37.1%. This reduction is only statistically significant for women. After adjusting for age, both men and women with type 2 diabetes were twice as likely to present with cardiovascular comorbidities as their counterparts without diabetes in 2010.

Conclusion

Results of nationwide Robert Koch Institute (RKI) surveys on the proportion of people with diabetes presenting with cardiovascular comorbidities and on the possible sex differences should be closely monitored. Analysis of possible sex differences in the temporal development of cardiovascular comorbidities also requires incidence data, which is so far only available at a regional level and only for heart attacks [2]. Recurrent analyses of statutory health insurance (SHI) data would be extremely valuable in this respect and should be implemented for this purpose.

Methodology and data sources

Definition

The indicator cardiovascular diseases is defined as the presence of selected cardiovascular comorbidities in individuals with known type 2 diabetes compared to individuals without known diabetes.

Operationalisation

- ▶ In order to determine cardiovascular disease, information provided by the respondents was gathered via a computer-assisted medical interview that posed the following questions:
 1. *'Have you ever been diagnosed by a doctor with an impaired blood supply to the heart, narrowing of the coronary arteries, or angina pectoris?'*
 2. *'Have you ever been diagnosed by a doctor as having had a myocardial infarction?'*
 3. *'Have you ever been diagnosed by a doctor as having had heart failure or cardiac insufficiency?'*
 4. *'Have you ever been diagnosed by a doctor as having had a stroke?'*
 - Answer options in each case:
 - Yes
 - No
 - I do not know
 - Cardiovascular disease was identified if at least one of the four questions was answered affirmatively; if all four questions were answered in the negative, the participant was assumed not to have cardiovascular disease.
- ▶ Indicators depicted separately for people with known type 2 diabetes and without known diabetes.

- ▶ In order to focus on known type 2 diabetes, those who may have type 1 diabetes were identified and excluded from participants with known diabetes using an algorithm (age at diabetes diagnosis < 30 years AND insulin treatment immediately after diagnosis AND current insulin treatment).

Reference population

Resident population in Germany with known type 2 diabetes and without known diabetes, aged 45 to 79 years.

Data source

Nationwide interview and examination surveys 1997 – 1999 (German National Health Interview and Examination Survey, GNHIES98) and 2008 – 2011 (German Health Interview and Examination Survey for Adults, DEGS1) of the Robert Koch Institute (RKI) based on a population registry sample and self-completed questionnaire, medical interview, automated medication recording program, and examination.

Number of cases

- GNHIES98: n = 7,124
 - n = 333 people with known type 2 diabetes
 - n = 3,270 people without known diabetes
- DEGS1: n = 7,115 (of which n = 2,923 had also participated in GNHIES98)
 - n = 501 people with known type 2 diabetes
 - n = 3,954 people without known diabetes

Data for the cardiovascular diseases indicator were collected completely among people aged 45 – 79 years.

Calculation

- ▶ **Description:** For the indicator, the figures for total, women and men are provided and are stratified by age group, residential area and education as far as the number of cases available for the figure is ≥ 5 and the statistical uncertainty in the estimate of the indicator is not considered too large (a coefficient of variation $\leq 33.5\%$).
- ▶ **Stratification:** The geographical classification of the residence of the participating person was carried out by east and west (east = former East Germany, including all of Berlin; west = former West Germany, not including West Berlin). Educational status was determined using the Comparative Analysis of Social Mobility in Industrial Nations (CASMIN) index, which takes information on both school and vocational training into account and allows a categorisation into a low, medium and high education group.
- ▶ **Weighting:** In order to correct for deviations from the underlying reference population due to different participation rates or sampling probabilities, weighting factors were used when calculating the indicator. These adjust the surveys to the population structure of the reference population with regard to sex, age, federal state, German citizenship (yes / no), community type and education as of 31 December 1997 (GNHIES98) and 31 December 2010 (DEGS1). In DEGS1, the different participation probability of re-participants from GNHIES98 was also taken into account in the weighting.
- ▶ **Absolute values:** Number of persons with cardiovascular diseases in the population aged 45 – 79 years with type 2 diabetes (reference population), determined by extrapolating the number in the sample to the number in the reference population.

- **Age standardisation:** Age standardisation and trend weighting was carried out by calculating the weighting factor in GNHIES98 using the age, sex and federal state structure of the reference population as of 31 December 2010.

Data quality

Robert Koch Institute (RKI) interview and examination surveys provide representative results for the 18- to 79-year-old resident population of Germany. The population aged 80 years and over will only be included in future survey waves. As is the case in all population-based studies, underrepresentation of the seriously ill and those living in institutions must be assumed.

Data download

Robert Koch Institute. (2024). Results of the National Diabetes Surveillance 2015 – 2024 [Data set]. Zenodo. <https://doi.org/10.5281/zenodo.14935276> (in German)

References

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External links

- Robert Koch Institute. Information on the German Health Interview and Examination Survey for Adults (DEGS) 2013 [cited 30.01.2025]. Available from: https://www.rki.de/EN/Topics/Noncommunicable-diseases/Health-surveys/Studies/DEGS/degs_content.html?nn=16782096.
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