DIABETES surveillance

ROBERT KOCH INSTITUT

Hypertension

Field of action 3: Reducing the complications of diabetes

Adults

Background

Hypertension is an important risk factor for type 2 diabetes, but also for other diseases. Preventing and treating hypertension in people without diabetes, therefore, can help reduce their risk of developing type 2 diabetes. At the same time, high blood pressure in people with diabetes can often lead to micro- or macrovascular complications that are associated with increased mortality. Consequently, the National Health Care Guideline for type 2 diabetes includes a recommendation for lowering high blood pressures in people with type 2 diabetes [1].

Key facts

- In 2010, three quarters (76.4%) of 45- to 79-year-olds with known type 2 diabetes in Germany have hypertension.
- The prevalence of hypertension is two to three times higher among people with type 2 diabetes than among their peers without the condition.
- In the period from 1998 to 2010, no statistically significant increase in the prevalence of hypertension was observed in people with type 2 diabetes.

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

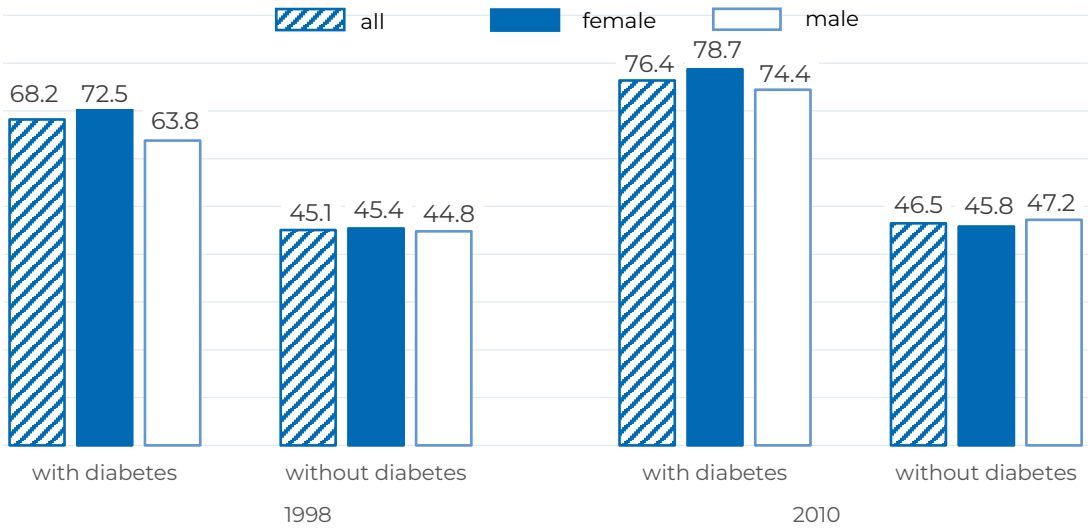


Figure 2: Prevalence of hypertension among adults (aged 45 to 79 years) with and without diabetes in % by age and sex in 2010.

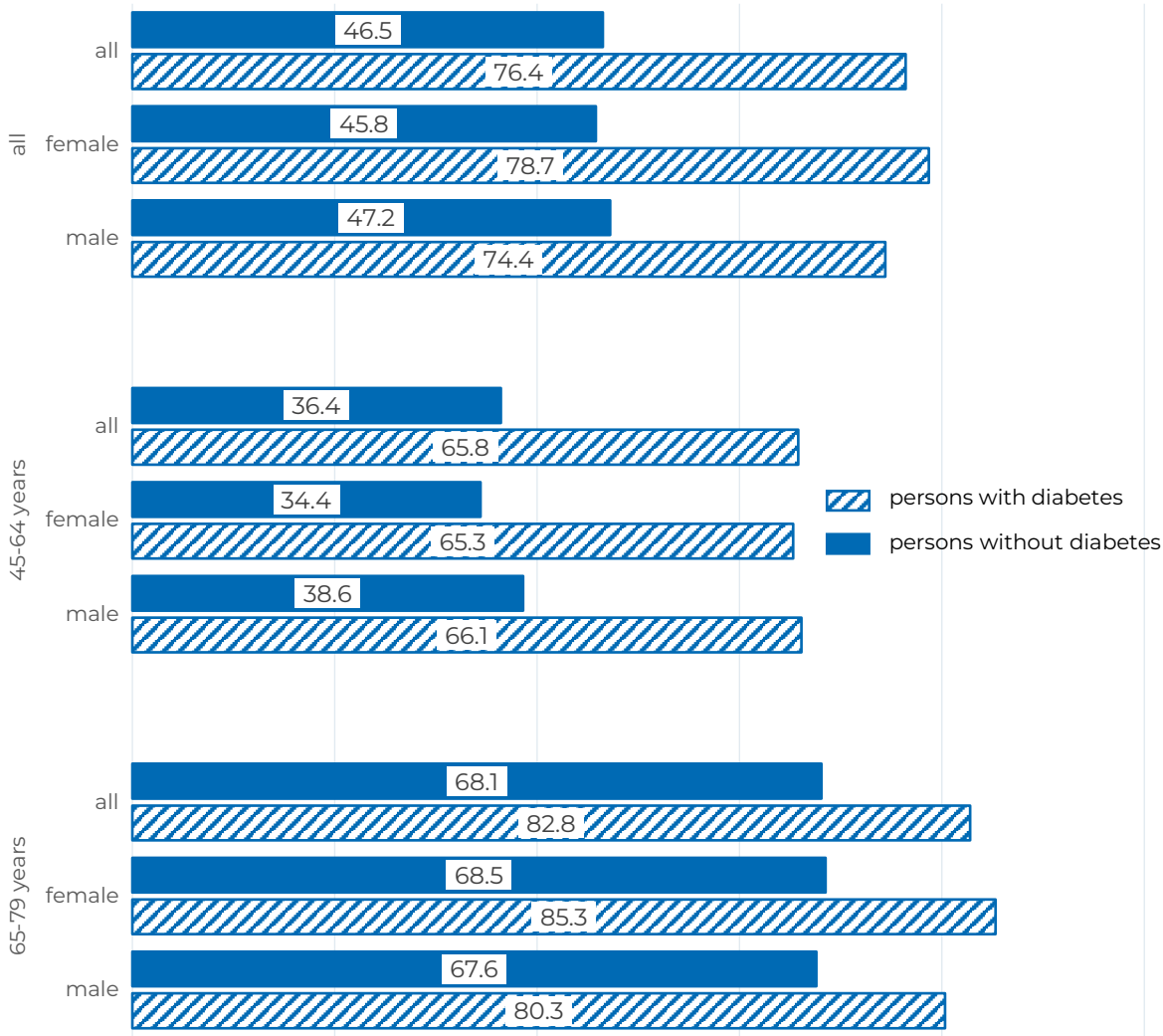
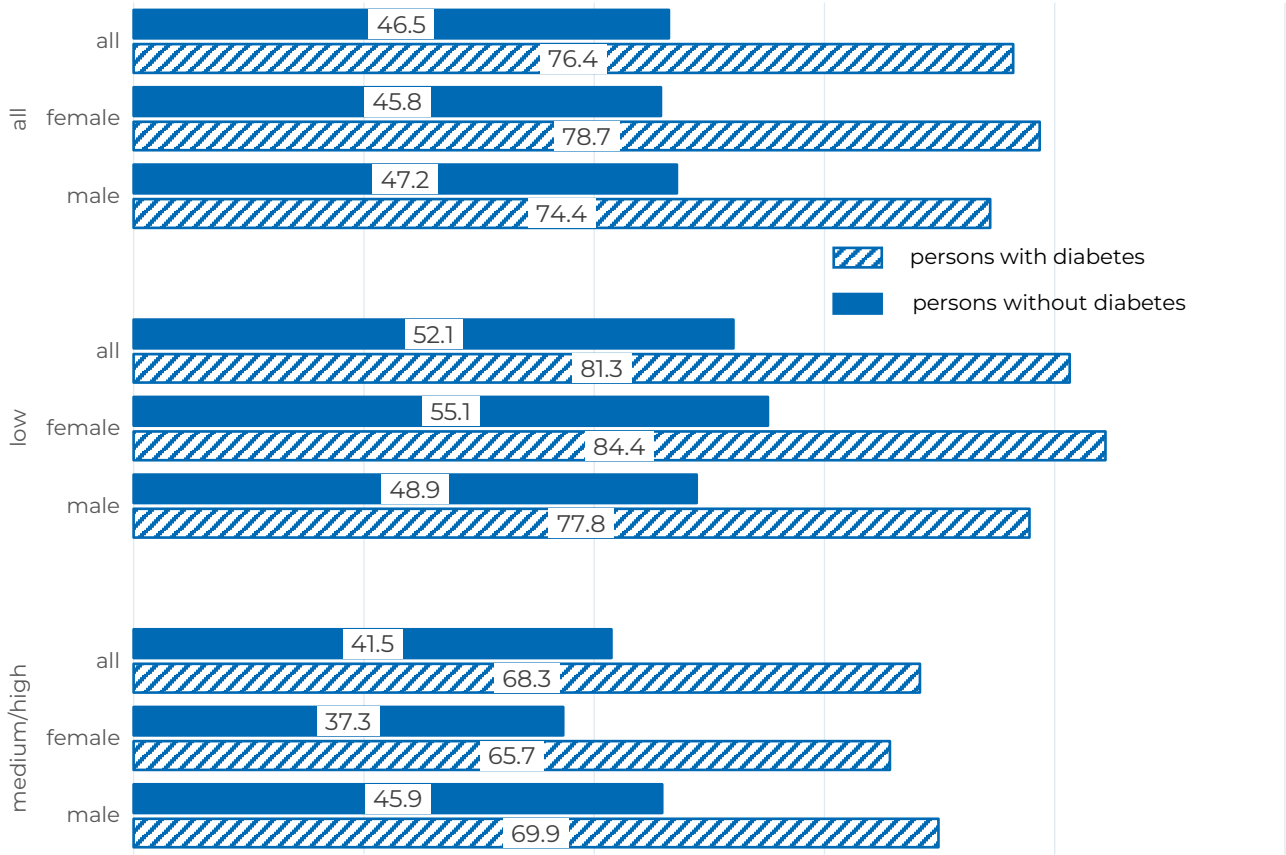


Figure 3: Prevalence of hypertension among adults (aged 45 to 79 years) with and without diabetes in % by education group and sex in 2010.



Results

In 2010, the prevalence of hypertension in people with known type 2 diabetes is 74.6% (women: 78.7%; men: 74.4%) and increases with age. Adjusted for age, both in 1998 and in 2010, hypertension affected people with type 2 diabetes two to three times more often than people without diabetes. In the period between 1998 and 2010, a tendency towards an increase in the prevalence of hypertension in people with type 2 diabetes can be observed, but this is not statistically significant when age-standardised.

Conclusion

In the period from 1998 to 2010, the prevalence of hypertension in people with type 2 diabetes aged 45 to 79 years did not change in a statistically significant way. In 2010, nearly 90% of men and women with known hypertension took antihypertensive medication [2]. This led a large percentage of people with type 2 diabetes to get to normal blood pressure values of <140/90 mmHg [3]. The significantly higher rate of hypertension among people with type 2 diabetes compared to those without the condition indicates a need for further measures to reduce hypertension in people with type 2 diabetes.

Methodology and data sources

Definition

The indicator hypertension is defined as the proportion of people with current high blood pressure in people with known type 2 diabetes in comparison to that in people without known diabetes. High blood pressure is defined as hypertonic blood pressure (systolic ≥ 140 or diastolic ≥ 90 mm Hg) or cases where antihypertensive medication is being taken for people with known hypertension.

Operationalisation

The following information was considered for the collection of data on hypertension:

- The mean systolic and diastolic pressure was determined auscultatorically in the German National Health Interview and Examination Survey in 1998 (GNHIES98) using a classic blood pressure monitor and oscillometrically in the German Health Interview and Examination Survey for Adults (DEGS1) in 2010 with an automatic blood pressure monitor (Datascope Accutorr Plus). The values taken for GNHIES98 and DEGS1 were cross-calibrated for comparability. Hypertension is defined as:
  - systolic blood pressure ≥ 140 mm Hg or
  - diastolic blood pressure ≥ 90 mm Hg

or

- **Known hypertension:** self-reported hypertension ever diagnosed by a doctor during a computer-assisted medical interview based on the question:
- In GNHIES98: “Have you ever been diagnosed by a doctor with one of the following illnesses or health disorders?” high blood pressure, hypertension,
  - Yes
  - No
- In DEGS1: "Have you ever been diagnosed by a doctor as having hypertension or high blood pressure?"
  - Yes
  - No
  - Don’t know

and

- Documentation of the **intake of antihypertensive drugs** within the last 7 days among people with known hypertension via automated medication recording program using the following ATC codes C03 (Diuretics), C07 (Beta blocking agents), C08 (Calcium channel blockers), C09 (ACEI and ARB), C02 (Antihypertensives).

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 among 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 1998, 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 = 3,263 people **without** known diabetes
- DEGS1: n = 7,115 (of which n = 2,923 had also participated in GNHIES98)
  - n = 523 people **with** known type 2 diabetes
  - n = 4,043 people **without** known diabetes

Data for the hypertension 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 ≤ 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 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 considered in the weighting.
- **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

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

1. Bundesärztekammer (BÄK), Kassenärztliche Bundesvereinigung (KBV), Arbeitsgemeinschaft der Wissenschaftlichen Medizinischen Fachgesellschaften (AWMF). Nationale VersorgungsLeitlinie Typ-2-Diabetes – Langfassung. Version 3.0. 2023 [cited 06.02.2025]. Available from: https://register.awmf.org/assets/guidelines/nvl-001l_S3_Typ-2-Diabetes_2024-12.pdf.
2. Du Y, Baumert J, Paprott R, Neuhauser H, Heidemann C, Scheidt-Nave C. Gender differences in cardiovascular risk profiles and diabetes care among adults with type 2 diabetes in Germany. Diabetes Metab. 2019;45(2):204-6. Epub 20180608. doi: 10.1016/j.diabet.2018.05.011.
3. Du Y, Heidemann C, Schaffrath Rosario A, Buttery A, Paprott R, Neuhauser H, et al. Changes in diabetes care indicators: findings from German National Health Interview and Examination Surveys 1997–1999 and 2008–2011. BMJ Open Diabetes Res Care. 2015;3(1):e000135. doi: 10.1136/bmjdrc-2015-000135.

External links

- Robert Koch Institute. Information on the German Health Interview and Examination Survey for Adults (DEGS1) [cited 30.01.2025]. Available from: https://www.rki.de/EN/Topics/Noncommunicable-diseases/Health-surveys/Studies/DEGS/degs_content.html?nn=16782096.https://www.rki.de/EN/Content/Health_Monitoring/HealthSurveys/Degs/degs_node.html

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