

Catastrophic dental expenditure across age groups and associated factors: results of the 6th German Oral Health Study (DMS • 6). Online Appendix

AUTHORS

Schulz, Simón, MSc

Jordan, A. Rainer, Prof Dr med dent, MSc

Kuhr, Kathrin, Dr rer medic

Listl, Stefan, Prof Dr Dr med dent, MSc, MSc

ABSTRACT

Objectives: Although health care services should be accessible, their use should not impose expenditures that put individuals and families at financial risk. This study aimed to identify the prevalence and determinants of catastrophic dental expenditure (CDE) among 12-year-olds, 35- to 44-year-olds, and 65- to 74-year-olds living in Germany.

Method and Materials: Using dental expenditure data from the 6th German Oral Health Study (DMS • 6) and annual household cost-of-living information from the German Federal Statistical Office, the extent and determinants of CDE, defined as out-of-pocket spending on dental or orthodontic treatments > 40% of an individual's equivalent capacity to pay over a 1-year period, were examined. Descriptive analyses for sociodemographic variables were performed, and regression analysis was used to clarify the associations of age, gender, type of insurance, geographic region, socioeconomic status (SES), and comorbidities with CDE.

Results: The prevalence of CDE among 12-year-olds, 35-to 44-year-olds, and 65- to 74-year-olds in Germany was 0.4% (95% confidence interval [CI], 0.1–1.8%), 0.7% (95% CI, 0.2–1.9%), and 0.4% (95% CI, 0.2–1.2%), respectively. Among the independent variables, only SES and age were significantly associated with CDE ($P < .05$). The risk of CDE was higher in the low-SES group than in the middle- and high-SES groups and higher in older individuals.

Conclusion: Among all age groups, prevalence of CDE was the highest in the 35-to-44-year-olds. Careful consideration of these findings is warranted to better understand the underlying mechanisms and derive potential policy recommendations.

KEYWORDS: catastrophic dental expenditure, cross-sectional studies, dental care, dental health surveys, dentists, DMS 6, epidemiology, Germany, health equity, health expenditure, logistic regression, oral health, prevalence

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Appendix 1

Table A1: Sensitivity analysis showing prevalence of catastrophic dental expenditure (CDE) under different approaches for calculating CDE.

| Age groups | CDE definition | | | | |
|----------------------------|--------------------|-----------------------------------------------|----------------------------------------------------------------------|------------------------|--------------------|
| | SDG 3.8.2 | Capacity-to-pay | | | |
| | 20% of income | Subsistence needs: normative spending on food | Subsistence needs: normative spending on food, housing and utilities | | |
| 40% of capacity-to-pay | | 40% of capacity-to-pay | 30% of capacity-to-pay | 20% of capacity-to-pay | |
| 12-year-old | 0.2% (0.0; 1.5) | 0.0% (0.0; 0.0) | 0.4% (0.1; 1.8) | 1.1% (0.5; 2.6) | 1.3% (0.6; 2.7) |
| 35- to 44-year-olds | 0.6% (0.2; 1.8) | 0.1% (0.0; 0.8) | 0.7% (0.2; 1.9) | 0.9% (0.4; 2.1) | 1.2% (0.6; 2.6) |
| 65- to 74-year-olds | 0.9% (0.4; 1.9) | 0.3% (0.1; 0.9) | 0.4% (0.2; 1.2) | 1.0% (0.4; 2.1) | 2.0% (1.1; 3.4) |

Data are presented as weighted percentages (with 95% confidence intervals).

CDE; catastrophic dental expenditures; SDG; Sustainable Development Goal

Appendix 2

Table A2: Sensitivity analysis showing regression results for the association between exposure variables and catastrophic dental expenditure (CDE) under different approaches for calculation CDE (fully adjusted logistic models with dependent variable CDE, coded as yes/no)

| Variables | | CDE definition | | | | | | | | | |
|------------------------------------------------------------------------|------------------------------------------------------|----------------|---------|-----------------------------------------------|---------|----------------------------------------------------------------------|---------|------------------------|---------|------------------------|---------|
| | | SDG 3.8.3 | | Capacity-to-pay | | | | | | | |
| | | 20% of income | | Subsistence needs: normative spending on food | | Subsistence needs: Normative spending on food, housing and utilities | | | | | |
| | | | | 40% of capacity-to-pay | | 40% of capacity-to-pay | | 30% of capacity-to-pay | | 20% of capacity-to-pay | |
| | | Adjusted OR | P-value | Adjusted OR | P-value | Adjusted OR | P-value | Adjusted OR | P-value | Adjusted OR | P-value |
| Age, years | | 1.32 | 0.010* | 1.08 | 0.010* | 1.05 | 0.022* | 1.05 | 0.004* | 1.03 | 0.030* |
| Gender ¹ (ref. male) | Female | 1.32 | 0.849 | 2.49 | 0.502 | 1.51 | 0.741 | 1.01 | 0.983 | 1.21 | 0.816 |
| Socioeconomic status (ref. low) | Medium | 0.51 | 0.483 | 0.34 | 0.131 | 0.43 | 0.022* | 0.51 | 0.157 | 0.76 | 0.379 |
| | High | 0.58 | | 0.00 | | 0.00 | | 0.30 | | 0.43 | |
| Region ² (ref. north) | South | 0.85 | 0.185 | 1.35 | 0.516 | 3.16 | 0.683 | 0.80 | 0.327 | 0.97 | 0.561 |
| | East | 1.30 | | 2.02 | | 2.92 | | 1.63 | | 1.25 | |
| | West | 0.28 | | 0.45 | | 2.48 | | 0.30 | | 0.70 | |
| Health insurance status ¹ (ref. statutory health insurance) | Statutory health insurance + supplementary insurance | 1.21 | 0.388 | 0.94 | 0.957 | 2.38 | 0.379 | 1.97 | 0.112 | 1.12 | 0.116 |
| Comorbidities ^{1,3} (ref. no) | Yes | 0.93 | 0.507 | 0.49 | 0.467 | 0.74 | 0.316 | 0.89 | 0.08 | 1.72 | 0.171 |

*Statistically significant ($P < .05$).

¹All covariate categories were retained in the regression models to avoid casewise exclusion. Categories with insufficient sample size or not collected values (e.g., 'diverse' gender; 'private/other/no health insurance'; 'not collected/age ineligible' for comorbidities; 'high socioeconomic status') could not be reliably estimated and are therefore not reported.

² Geographic regions: South (Baden-Wuerttemberg, Bavaria); West (North Rhine-Westphalia, Hesse, Rhineland-Palatinate, Saarland); North (Schleswig-Holstein, Hamburg, Lower Saxony, Bremen, Mecklenburg-Western Pomerania); East (Berlin, Brandenburg, Saxony-Anhalt, Thuringia, Saxony).

³ Comorbidities include diabetes mellitus, hypertension, hypercholesterolemia, myocardial infarction, angina pectoris, cardiac insufficiency, cardiac arrhythmias, intermittent claudication or peripheral arterial disease, and stroke. Not collected for adolescents.

Abbreviations: CDE, catastrophic dental expenditure, CI, confidence interval; OR, odds ratio; SDG; Sustainable Development Goal

AUTHORS

Simón Schulz, MSc

Section for Oral Health, Heidelberg Institute of Global Health, Heidelberg University Hospital, Germany

Prof Dr med dent.A. Rainer Jordan, MSc

Institut der Deutschen Zahnärzte (IDZ), Cologne, Germany

Dr rer medic Kathrin Kuhr

Institut der Deutschen Zahnärzte (IDZ), Cologne, Germany

Prof Dr Dr med dent Stefan Listl, MSc, MSc

Section for Oral Health, Heidelberg Institute of Global Health, Heidelberg University Hospital, Germany

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EDITORIAL OFFICE

Prof. Dr. A. Rainer Jordan
Institute Of German Dentists
Universitätsstraße 73
50931 Cologne

Phone: +49 221 4001-142

Fax: +49 221 4001-152

Web: www.idz.institute

E-Mail: dms6@idz-institute

