Disease and care prevalence of people with migration history: results of the 6th German Oral Health Study (DMS • 6)

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Objectives: As part of the 6th German Oral Health Study (DMS • 6), the migration history of the study participants was determined at the population level for the first time. **Method and materials:** The evaluation and presentation of migration-related indicators, oral health behavior, and oral diseases were carried out separately for 12-year-olds, 35- to 44-year-olds, and 65- to 74-year-olds. **Results:** When considering the prevalence of disease and care, differences were found between people with and without migration history in all three age groups. The first group had higher prevalences of oral diseases as well as a more complaint-oriented utilization of dental services. **Conclusion:** The data on the prevalence of oral diseases, oral health behavior, and dental service utilization provide evidence that people with migration history do not seem to benefit in the same way from group and individual prophylaxis services as people without migration history. *(Quintessence Int 2025;56(Suppl):S120–S125; doi: 10.3290/j.qi.b5981982)*

Keywords: dental care, dentists, DMS 6, health behavior, human migration, oral health

Germany is a country of immigration that has been shaped by various migration movements in the past and in the present. According to the latest figures of the Federal Statistical Office, people with a history of migration (PwM) made up a quarter of the total population of Germany in 2023, at around 21.2 million people.[1] The term "people with migration history" includes all people who were not born in Germany themselves (immigrants) and/or of whom both parents were not born in Germany (direct descendants of immigrants).[2] Studies on migration and health show that health status and behavior vary depending on migration-related determinants. In terms of oral health, differences can be observed in oral diseases and in the dental service utilization of PwM and people without migration history (PwoM).[3-5]

Looking at social indicators (eg, education, income, profession), the data from the Fifth German Oral Health Study (DMS V) showed social inequalities with regard to the burden of caries and periodontitis in Germany.[6] As part of the 6th German Oral Health Study (DMS • 6), the migration history of the study participants was determined for the first time. To describe health inequalities and identify specific needs of PwM, a differentiated consideration of migration-related and social determinants is essential. Against this background, the present article aimed to present and compare the oral health behavior, the dental service utilization, and the prevalence of oral diseases and care for PwM and PwoM.

Method and materials

The general methodology of the study is presented in separate articles.[7,8] The DMS • 6 has been approved by the Institutional Review Board (IRB) of the Witten/Herdecke University, Witten, Germany (registration number S-249/2021). The present study is registered at the German Clinical Trials Register (registration number DRKS00028701).

Sample

The analysis group consisted of all study participants who met the inclusion criteria in the DMS • 6 analysis set and for whom valid information on the migration history characteristic was available. In total, data from 896 younger adolescents (12-year-olds), 863 younger adults (35- to 44-year-olds), and 753 younger seniors (65- to 74-year-olds) were included in the analysis.

Definition of the variable "migration history"

For migration-sensitive health monitoring, the basic set of indicators was used to record migration-related determinants.[9] For the identification of PwM and PwoM, the items related to their own place of birth ("Which country were you born in?") and that of their parents ("Which country were your parents born in?") were evaluated. PwM are defined as study participants who were not born in Germany or whose parents were not born in Germany.

Statistical analysis

The evaluations were carried out separately for younger adolescents, younger adults, and younger seniors, stratified by migration history (yes/no). For the epidemiologic description of oral diseases, prevalences and means with associated 95% confidence intervals (CIs) were calculated using a weighted dataset. The aim was to compensate for different probabilities in the selection of subjects and differences in gender, age, and region compared to the population in Germany by using the weighted dataset. Descriptive analyses of sociodemographic and migration-related indicators were not weighted.

Numbers (n) are provided without weighting. Detailed information on data handling and statistical methods is described previously.[10]

Results

Sociodemographic and migration-related indicators

Table 1 shows the characteristics of the study participants by migration history for the individual age groups. Among the 12-year-olds (n = 896), 220 younger adolescents (24.6%) had a migration history, of whom 57.7% immigrated themselves (first generation) and 42.3% were direct descendants of immigrants (second generation). Among the 35- to 44-year-olds (n = 863), the proportion of PwM was 23.3% (90.5% first generation, and 9.5% second generation), and among the 65- to 74-year-olds (n = 753), the proportion was 14.0% (69.5% first generation, and 30.5% second generation).

The gender distributions of the two groups were very similar in all age categories. On the other hand, differences were found between PwM and PwoM with respect to education status. The proportion with a low education status was four times higher among 12-year-olds with migration history than among their peers without migration history (22.2% vs 5.2%). The proportion of younger adults with migration history with a low education status was 14.1%, while the proportion of those without migration history was 7.8%. In contrast, among the 65- to 74-year-olds, a lower proportion of people with a low education status (13.5% vs 22.0%) was observed, and instead there was a higher proportion with a medium education status (58.7% vs 47.1%).

The average length of stay of the immigrants was 5.7 years, 16.1 years, and 38.9 years for younger adolescents, younger adults, and younger seniors, respectively. While more than half (53.9%) spoke German plus another language at home, 42.9% of younger adolescents with migration history spoke a different language than German at home. Two thirds of younger adults (66.4%) and younger seniors (66.0%) said they had good to very good German language skills.

Oral hygiene and dental service utilization

The proportion of people with a complaint-oriented dental service utilization was higher for PwM across all age groups (17.9% vs 1.8% for 12-year-olds; 25.1% vs 9.1% for 35- to 44-year-olds; and 24.8% vs 10.7% for 65- to 74-year-olds). PwM also stated more frequently that they had never had their teeth professionally cleaned before (27.8% vs 19.5% for 35- to 44-year-olds; and 27.2% vs 19.4% for 65- to 74-year-olds). In terms of tooth brushing frequency, there was a higher proportion of younger adolescents with migration history, in comparison to PwoM, who brushed their teeth less than twice a day (28.6% vs 11.3%).

Epidemiologic description of oral diseases

The epidemiologic descriptions of oral diseases by migration history are presented in Tables 2 to 4. In the group of 12-year-olds and 35- to 44-year-olds, PwM had more decayed teeth (DT) than PwoM (0.4 vs 0.1 for 12-year-olds; 0.8 vs 0.3 for 35- to 44-year-olds), and a lower degree of restoration of coronal caries (68.1% vs 77.2% for 12-year-olds; 86.6% vs 95.5% for 35- to 44-year-olds). Among the 65- to 74-year-olds, PwM presented fewer DT (0.3 vs 0.4), a higher prevalence of edentulism (9.1% vs 3.8%), more missing teeth (MT) (9.8 vs 8.3), and fewer filled teeth (FT) (7.9 vs 8.9) than PwoM. For the modified Marginal Plaque Index (mMPI), there were higher prevalences among PwM in all age groups compared to PwoM (61.9% vs 47.5% for 12-year-olds; 48.7% vs 41.3% for 35- to 44-year-olds; and 48.5% vs 43.0% for the 65- to 74-year-olds). In addition, there were higher prevalences of bleeding on probing (BOP) and clinical attachment loss (CAL) ≥ 3 mm in the 35- to 44-year-old PwM (19.2% vs 11.8% BOP; 84.2% vs 77.9% CAL ≥ 3 mm) and 65- to 74-year-old PwM (24.2% vs 19.2% BOP; 98.7% vs 94.9% CAL ≥ 3 mm).

Table 1 Baseline characteristics of study participants by migration history in younger adolescents (12-year-olds), younger adults (35- to 44-year-olds), and younger seniors (65- to 74-year-olds)

Variable		12-year-olds		35- to 44-year-olds		65- to 74-year-olds	
		PwM	PwoM	PwM	PwoM	PwM	PwoM
No. of participants (n)		220	676	201	662	105	648
Age, years		12.8 ± 0.5	12.7 ± 0.5	40.2 ± 3.1	40.0 ± 2.9	69.7 ± 2.8	69.8 ± 2.8
Gender	Male	111 (50.5%)	335 (49.6%)	101 (50.2%)	328 (49.5%)	54 (51.4%)	299 (46.1%)
	Female	109 (49.5%)	340 (50.3%)	100 (49.8%)	333 (50.3%)	51 (48.6%)	349 (53.9%)
	Diverse	0 (0.0%)	1 (0.1%)	0 (0.0%)	1 (0.2%)	0 (0.0%)	0 (0.0%)
Education group	Low	47 (22.2%)	35 (5.2%)	28 (14.1%)	51 (7.8%)	14 (13.5%)	142 (22.0%)
	Medium	107 (50.5%)	310 (46.3%)	82 (41.4%)	319 (48.5%)	61 (58.7%)	304 (47.1%)
	High	58 (27.4%)	324 (48.4%)	88 (44.4%)	288 (43.8%)	29 (27.9%)	199 (30.9%)
Monthly net equivalent Income, Euro		1,214 ± 741	2,296 ± 1,059	2,112 ± 1,452	2,530 ± 1,382	1,819 ± 990	2,029 ± 1,049
Migration history	1st generation (immigrated to Germany themselves)	127 (57.7%)	NA	182 (90.5%)	NA	73 (69.5%)	NA
	2nd generation (both parents born outside Germany)	93 (42.3%)	NA	19 (9.5%)	NA	32 (30.5%)	NA
Length of stay, years		5.7 ± 3.1	NA	16.1 ± 10.7	NA	38.9 ± 16.0	NA
Language spoken at home	German	7 (3.2%)	605 (89.8%)	NA	NA	NA	NA
	Other	94 (42.9%)	1 (0.1%)	NA	NA	NA	NA
	German + other	118 (53.9%)	68 (10.1%)	NA	NA	NA	NA
Self-assessment of German language skills	Very good	NA	NA	63 (37.7%)	NA	10 (21.3%)	NA
	Good	NA	NA	48 (28.7%)	NA	21 (44.7%)	NA
	Moderate	NA	NA	32 (19.2%)	NA	7 (14.9%)	NA
	Limited	NA	NA	20 (12.0%)	NA	6 (12.8%)	NA
	None	NA	NA	4 (2.4%)	NA	3 (6.4%)	NA
Smoking status	Current smoker	NA	NA	57 (28.6%)	163 (24.6%)	14 (13.3%)	96 (14.8%)
	Former smoker	NA	NA	33 (16.6%)	138 (20.8%)	46 (43.8%)	239 (36.9%)
	Never smoked	NA	NA	109 (54.8%)	361 (54.5%)	45 (42.9%)	313 (48.3%)
Self-assessment of oral health status	Very good/good	146 (67.0%)	548 (81.3%)	126 (63.6%)	507 (76.8%)	64 (61.0%)	417 (64.5%)
	Moderate/poor/very poor	72 (33.0%)	126 (18.7%)	72 (36.4%)	153 (23.2%)	41 (39.0%)	230 (35.5%)
Dental service utilization	Control-oriented	179 (82.1%)	662 (98.2%)	149 (74.9%)	602 (90.9%)	79 (75.2%)	578 (89.3%)
	Complaint-oriented	39 (17.9%)	12 (1.8%)	50 (25.1%)	60 (9.1%)	26 (24.8%)	69 (10.7%)
Professional tooth cleaning (utilization)	Yes	NA	NA	139 (71.6%)	532 (80.5%)	73 (70.9%)	519 (80.5%)
	No	NA	NA	54 (27.8%)	129 (19.5%)	28 (27.2%)	125 (19.4%)
Tooth brushing (frequency)	≥ 2 times daily	157 (71.4%)	599 (88.7%)	147 (73.9%)	563 (85.1%)	78 (81.3%)	512 (83.8%)
	< 2 times daily	63 (28.6%)	76 (11.3%)	52 (26.1%)	99 (14.9%)	18 (18.8%)	99 (16.2%)
Interdental cleaning (frequency)	≥ once daily	32 (14.5%)	103 (15.3%)	59 (29.6%)	156 (23.6%)	28 (29.2%)	244 (40.0%)
	< once daily	188 (85.5%)	572 (84.7%)	140 (70.4%)	505 (76.4%)	68 (70.8%)	366 (60.0%)

Data are presented as number (percentage) or mean ± standard deviation based on unweighted data.
NA, not available; PwM, people with migration history; PwoM, people without migration history.

Discussion

Differences in disease and care prevalence between PwM and PwoM were found in all three age groups. PwM had higher prevalences of oral diseases as well as a more complaint-oriented utilization of dental services. These are the first nationwide representative survey results in Germany.

There are few studies on oral health among younger adolescents with migration history. In a cross-sectional study among 12-year-old pupils with migration history from secondary schools in Heidelberg, data on caries experience comparable to that of the DMS • 6 were obtained.[11] In this case, the younger adolescents with migration history had an average DMFT (decayed, missing, filled teeth) value of 1.3 and a DT of 0.4.[11] Looking at the 12-year-olds without migration history, however, the younger adolescents with a DMFT of 0.9 and a DT of 0.1 had significantly higher values than their peers of the DMS • 6. The higher values could be due to differences in education status,

since the pupils from Heidelberg were recruited exclusively in low-income areas. In addition, the data from the study date back to 2004 and are therefore older. Data from the DMS indicate a continuous decline in caries in 12-year-olds (DMS IV: 0.7 DMFT, 0.2 DT; DMS V: 0.5 DMFT, 0.1 DT; DMS • 6: 0.2 DMFT, 0.1 DT), which could explain the differences.[6,12] In another study on dental health of 12-year-old pupils from the Ennepe-Ruhr district, hardly any changes in the DMFT values and the proportion of caries-free dentition occurred among pupils with a Turkish migration history between 1993 and 2003.[13] In contrast, there was a demonstrable increase in the proportion of caries-free dentition among pupils without migration history. Significant differences in the caries experience between younger adolescents with and without migration history can be observed in further studies.[14-16] The available studies provide evidence that the caries prevalence among 12-year-olds in Germany is declining; this does not apply equally to younger adolescents with migration history. However, direct comparisons to the DMS • 6 are difficult due to differences in age groups, regional limitations, and different operationalizations of migrant groups.

The data of the DMS • 6 also indicate that there is a persistent increase in the risk of inadequate dental service utilization and inadequate tooth brushing frequency in younger adolescents with migration history. The proportion of younger adolescents with migration history who brush their teeth less than twice a day is 2.5 times higher than that of younger adolescents without migration history. Similar trends can also be observed in the data from the KiGGS study.[17,18] Here, the proportion of participants with migration history with an inadequate tooth brushing frequency is almost twice as high as those without migration history, whereby persons between the ages of 0 to 17 were included.

The available data on the oral health of middle-aged and older people with a history of migration in Germany are insufficient to date. Initial study results among seniors and adults with migration history report significantly higher DMFT values, more plaque, higher BOP values, and lower dental service utilization compared to PwoM.[5,19-21] In the Hamburg-based MuMi study, PwM (average age 38.7 years) had an Approximal Plaque Index (API) of 52.5 and a degree of caries restoration of 81.7%.[5] In contrast, PwoM (mean age 44.0 years) performed significantly better, with an API of 38.3 and a degree of caries restoration of 93.8%. The differences between PwoM and PwM are somewhat more pronounced in the MuMi study in contrast to the 35- to 44-year-olds of the DMS • 6. In comparison to the DMS • 6, the subjects of the MuMi study were preferentially recruited in districts with a high proportion of migrants. International studies also indicate poorer dental health in migrant populations.[4,22]

Table 2 Epidemiologic description and treatment of oral diseases in younger adolescents (12-year-olds) by migration history

Variable	PwM	PwoM
Caries-free (prevalence, DMFT = 0)	52.2% (46.5; 58.2)	87.9% (85.1; 90.3)
DMFT	1.3 (1.1; 1.5)	0.2 (0.2; 0.3)
DT	0.4 (0.3; 0.5)	0.1 (0.0; 0.1)
MT	0.0 (0.0; 0.0)	0.0 (0.0; 0.0)
FT	0.9 (0.7; 1.0)	0.2 (0.1; 0.2)
Degree of restoration of coronal caries (%)	68.1 (60.9; 75.3)	77.2 (67.9; 86.5)
MIH (prevalence)	9.2% (6.2; 13.1)	16.4% (13.6; 19.6)
mMPI (% segments with plaque)	61.9 (58.9; 64.9)	47.5 (45.3; 49.6)

Data are presented as weighted percentages or weighted means (with 95% confidence intervals). DMFT, decayed, missing, filled teeth; DT, decayed teeth; FT, filled teeth; MIH, molar incisor hypomineralization; mMPI, modified Marginal Plaque Index; MT, missing teeth; PwM, people with migration history; PwoM, people without migration history.

Table 3 Epidemiologic description and treatment of oral diseases in younger adults (35-44-year-olds) by migration history

Variable	PwM	PwoM
No. of teeth	26.1 (25.8; 26.4)	26.8 (26.7; 27.0)
Edentulism (prevalence)	0.0% (NA)	0.1% (0.0; 0.8)
Caries-free (prevalence, DMFT = 0)	3.8% (1.8; 6.5)	8.4% (6.4; 10.8)
DMFT	8.7 (8.0; 9.3)	8.0 (7.6; 8.5)
DT	0.8 (0.6; 1.0)	0.3 (0.3; 0.4)
MT	1.6 (1.3; 1.9)	0.7 (0.6; 0.9)
FT	6.3 (5.7; 6.8)	7.0 (6.6; 7.3)
FST	25.3 (24.9; 25.7)	26.5 (26.3; 26.7)
ST	19.0 (18.4; 19.7)	19.5 (19.1; 20.0)
Degree of restoration of coronal caries (%)	86.6 (83.1; 90.1)	95.5 (94.4; 96.5)
Root caries (prevalence)	12.5% (8.8; 17.0)	13.5% (10.9; 16.3)
mMPI (% segments with plaque)	48.7 (45.7; 51.7)	41.3 (39.4; 43.2)
BOP (% sites)	19.2 (16.5; 21.8)	11.8 (10.7; 13.0)
Mean PD (mm)	2.3 (2.2; 2.4)	2.0 (2.0; 2.1)
Mean CAL (mm)	1.2 (1.1; 1.4)	1.0 (1.0; 1.1)
CAL ≥ 3 mm (prevalence)	84.2% (79.3; 88.5)	77.9% (74.5; 81.1)

Data are presented as weighted percentages or weighted means (with 95% confidence intervals). BOP, bleeding on probing; CAL, clinical attachment level; DMFT, decayed, missing, filled teeth; DT, decayed teeth; FST, filled and sound teeth; FT, filled teeth; mMPI, modified Marginal Plaque Index; MT, missing teeth; NA, not available; PD, probing depth; PwM, people with migration history; PwoM, people without migration history; ST, sound teeth.

Conclusion

The higher prevalence of oral diseases among PwM and the less frequent utilization of dental services provide evidence that PwM do not benefit from group and individual prophylaxis ser-

Table 4 Epidemiologic description and treatment of oral diseases by migration history in younger seniors (65–74-year-olds)

Variable	PwM	PwoM
No. of teeth	18.1 (16.6; 19.7)	19.5 (18.9; 20.2)
Edentulism (prevalence)	9.1% (5.1; 15.1)	3.8% (2.6; 5.6)
Caries-free (prevalence, DMFT = 0)	0.0% (NA)	0.0% (NA)
DMFT	17.9 (16.8; 19.0)	17.6 (17.2; 18.1)
DT	0.3 (0.1; 0.4)	0.4 (0.3; 0.5)
MT	9.8 (8.2; 11.4)	8.3 (7.7; 8.9)
FT	7.9 (6.8; 8.9)	8.9 (8.5; 9.4)
FST	17.8 (16.3; 19.4)	19.1 (18.4; 19.7)
ST	10.0 (8.9; 11.1)	10.2 (9.8; 10.6)
Degree of restoration of coronal caries (%)	94.6 (91.5; 97.7)	93.2 (91.7; 94.8)
Root caries (prevalence)	56.0% (47.6; 64.5)	59.8% (55.9; 63.6)
mMPI (% segments with plaque)	48.5 (43.0; 53.9)	43.0 (40.7; 45.2)
BOP (% sites)	24.2 (20.1; 28.3)	19.2 (17.6; 20.9)
Mean PD (mm)	2.7 (2.6; 2.9)	2.6 (2.5; 2.7)
Mean CAL (mm)	2.4 (2.2; 2.7)	2.4 (2.3; 2.5)
CAL≥ 3 mm (prevalence)	98.7% (95.5; 99.9)	94.9% (92.6; 96.4)

Data are presented as weighted percentages or weighted means (with 95% confidence intervals). BOP, bleeding on probing; CAL, clinical attachment level; DMFT, decayed, missing, filled teeth; DT, decayed teeth; FST, filled and sound teeth; FT, filled teeth; mMPI, modified Marginal Plaque Index; MT, missing teeth; NA, not available; PD, probing depth; PwM, people with migration history; PwoM, people without migration history; ST, sound teeth.

vices in the same way as PwoM. Background information on potential barriers to access and migration-related factors influencing oral health (length of stay, origin, circumstances of migration, language skills) must be included in future analyses. This would also make it possible to better reflect the diversity of PwM.[9,23] For example, studies on the oral health of younger adolescents with migration history show differences in caries experience when differentiated by country of origin,[14,16,24] which have not yet been considered here.

Due to the increase in the number of immigrants in Germany, it can be assumed that dental practices will be faced with an additional need for treatment. To improve the dental care of PwM in Germany, more structural and individual attention is needed to promote equal access to preventive measures.

Disclosure

KK and ARJ are employed by the National Association of Statutory Health Insurance Dentists (KZBV). The authors declare that there is no conflict of interests according to the Uniform Requirements for Manuscripts Submitted to Biomedical Journals. The interpretation of data and presentation of information is not influenced by any personal or financial relationship with any individual or organization.

Author contributions

All authors listed in the paper have contributed sufficiently to fulfill the criteria for authorship according to Recommendations for the Conduct, Reporting, Editing and Publication of Scholarly Work in Medical Journals (ICMJE Recommendations). All authors read and approved the final manuscript. GA is a member of the scientific advisory board of the DMS • 6 and the author of the manuscript. LS is a member of the scientific advisory board of the DMS • 6 and was co-responsible for the conceptualization of the manuscript. KK is the deputy principal investigator of the DMS • 6, responsible for the data analysis, and a co-author of the manuscript. KB is co-responsible for the preparation of the analysis plan. ARJ is the principal investigator of the DMS • 6, responsible for developing the clinical examinations, and a co-author of the manuscript. BL is a co-author of the manuscript.

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