

Supplemental Digital Content

Table 1.

Participant characteristics are described per measurement interval (i.e. T0-T1 and T1-T2). Participants of the T0-T1 and T1-T2 interval were included in the longitudinal analyses on the development of tinnitus. The column “new-onset tinnitus” consists of participants who first reported tinnitus at T1 or T2. This is used for the cross-sectional analysis on tinnitus annoyance. The median with interquartile range is reported for non-normally distributed continuous variables. 4DSQ, four dimensional symptom questionnaire; N, number of participants; IQR, interquartile range; SRT, speech reception threshold; T0, baseline measurement; T1, 5-year follow-up measurement; T2, 10-year follow-up measurement.

Variable	T0 - T1 (N=734)	T1 – T2 (N=297)	<i>New-onset tinnitus (N = 137)</i>
Demographic variables			
Age N (%)			
18-30 Years	108 (14.7)	19 (6.4)	23 (16.8)
31-40 Years	121 (16.5)	36 (12.1)	
41-50 Years	169 (23.0)	62 (20.9)	18 (13.1)
51-60 Years	224 (30.5)	96 (32.3)	37 (27.0)
61-71 Years	112 (15.3)	84 (28.3)	59 (43.1)
Sex N (%)			
Male	240 (32.7)	116 (39.1)	54 (39.4)
Female	494 (67.3)	181 (60.9)	83 (60.7)
Living arrangement N (%)			
Living alone	171 (23.3)	65 (21.9)	36 (26.3)
Living with family	559 (76.2)	232 (78.1)	101 (73.7)
Missing	4 (0.5)	0	0
Educational level N (%)			
Low	105 (14.3)	36 (12.1)	22 (16.1)
Mid	222 (30.2)	72 (24.2)	37 (27.0)
High	406 (55.3)	189 (63.6)	78 (56.9)
Missing	1 (0.1)	0	0
Occupational noise exposure N (%)			
Almost never	211 (28.7)	88 (29.6)	27 (19.7)
Occasionally	145 (19.8)	64 (21.5)	31 (22.6)
Frequently	92 (12.5)	30 (10.1)	14 (10.2)
Almost always	19 (2.6)	7 (2.4)	5 (3.6)
Not applicable	267 (36.4)	108 (36.4)	60 (43.8)
Speech recognition ability in noise N (%)			
Good	430 (58.6)	178 (59.9)	79 (57.7)
Insufficient	153 (20.8)	51 (17.2)	22 (16.1)
Poor	151 (20.6)	68 (22.9)	36 (26.3)
Hyperacusis N (%)			

Yes	209 (28.5)	75 (25.3)	52 (38.0)
No	516 (70.3)	222 (74.7)	85 (62.0)
Missing	9 (1.2)	0	0
Life style and health variables			
History of tobacco smoking N (%)			
No history of smoking	327 (44.6)	144 (48.5)	54 (39.4)
History of smoking	407 (55.4)	153 (51.5)	83 (60.6)
Alcohol use N (%)			
No	167 (22.8)	74 (24.9)	34 (24.8)
Moderate	299 (40.7)	116 (39.1)	57 (41.6)
Above moderate	193 (26.3)	84 (28.3)	35 (25.5)
Heavy	55 (7.5)	21 (7.1)	9 (6.6)
Missing	20 (2.7)	2 (0.7)	2 (1.5)
Asthma N (%)			
Yes	91 (12.4)	36 (12.1)	15 (10.9)
No	642 (87.5)	261 (87.9)	122 (89.1)
Missing	1 (0.1)	0	0
Severe heart disease or myocardial infarction N (%)			
Yes	9 (1.2)	5 (1.7)	8 (5.8)
No	721 (98.2)	292 (98.3)	129 (94.2)
Missing	4 (0.5)	0	0
Hypertension N (%)			
Yes	105 (14.3)	50 (16.8)	27 (19.7)
No	628 (85.6)	247 (83.2)	110 (80.3)
Missing	1 (0.1)	0	0
History of stroke N (%)			
Yes	2 (0.3)	2 (0.7)	2 (1.5)
No	728 (99.2)	295 (99.3)	135 (98.5)
Missing	4 (0.5)	0	0
Diabetes mellitus N (%)			
Yes	16 (2.2)	11 (3.7)	7 (5.1)
No	708 (96.5)	286 (96.3)	130 (94.9)
Missing	10 (1.4)	0	0
Osteoarthritis N (%)			
Yes	93 (12.7)	62 (20.9)	32 (23.4)
No	640 (87.2)	235 (79.1)	105 (76.6)
Missing	1 (0.1)	0	0
Rheumatoid arthritis N (%)			
Yes	32 (4.4)	18 (6.1)	6 (4.4)
No	697 (95.0)	279 (93.9)	131 (95.6)
Missing	5 (0.7)	0	0
Epilepsy N (%)			
Yes	6 (0.8)	3 (1.0)	0
No	718 (97.8)	294 (99.0)	137 (100.0)

Missing	10 (1.4)	0	0
Multiple sclerosis N (%)			
Yes	1 (0.1)	1 (0.3)	0
No	731 (99.6)	296 (99.7)	137 (100.0)
Missing	2 (0.3)	0	0
Migraine N (%)			
Yes	27 (3.7)	41 (13.8)	17 (12.4)
No	701 (95.5)	256 (86.2)	120 (87.6)
Missing	6 (0.8)	0	0
Distress (4DSQ), median [IQR] (0-32 points scale)	6 [2-11]	5 [2-10]	6 [2-13]
Missing N (%)	1 (0.1)	0	0
Somatisation (4DSQ), median [IQR] (0-32 points scale)	5 [2-9]	4 [2-8]	8 [3-11]
Missing N (%)	2 (0.3)	0	0
Depression (4DSQ), median [IQR] (0-12 points scale)	0 [0-1]	0 [0-1]	0 [0-1]
Missing N (%)	3 (0.4)	0	0
Anxiety (4DSQ), median [IQR] (0-24 points scale)	0 [0-2]	0 [0-1]	1 [0-3]
Missing N (%)	1 (0.1)	0	0

Table 2. Univariable analysis for association with new-onset tinnitus. Note that occupational noise exposure was only analysed in participants who were employed at baseline. 4DSQ, four dimensional symptom questionnaire; CI, confidence interval; n.e., not estimable; OR, odds ratio.

¹Speech recognition ability was adjusted for transducer type (i.e. speakers or headphones)

²No participants affected by this variable developed tinnitus

Univariable analysis, generalized estimating equations			
Variables	OR	95% CI (for OR)	p
Age category			0.39
31-40 Years	1.2	0.6 to 2.7	
41-50 Years	1.3	0.6 to 2.7	
51-60 Years	1.7	0.9 to 3.4	
61-71 Years	1.7	0.9 to 3.6	
Sex (male)	1.3	0.9 to 1.9	0.20
Living arrangement (with family)	1.0	0.7 to 1.6	0.92
Education (high)			0.52
Mid	1.2	0.8 to 1.7	
Low	1.3	0.8 to 2.2	
Occupational noise exposure (Almost never)			0.64
Occasionally	1.0	0.6 to 1.7	
Frequently	1.4	0.8 to 2.6	
Almost always	1.2	0.4 to 3.9	
Speech recognition ability in noise¹ (good)			0.36
Insufficient	1.3	0.9 to 2.1	
Poor	0.9	0.6 to 1.6	
Hyperacusis	1.5	1.1 to 2.3	0.026
History of smoking	1.5	1.1 to 2.2	0.021
Alcohol (none)			
Mild	0.9	0.6 to 1.4	
Moderate	1.2	0.7 to 2.0	
Excessive	0.8	0.3 to 1.7	
Asthma	0.8	0.4 to 1.4	
Severe heart disease/myocardial infarction	0.5	0.1 to 3.9	0.50
Hypertension	1.1	0.7 to 1.8	0.72
Stroke	2.2	0.2 to 25.4	0.53
Diabetes mellitus	1.5	0.5 to 4.2	0.44
Osteoarthritis	1.2	0.8 to 2.0	0.37
Arthritis of hand or feet	1.3	0.6 to 2.8	0.56
Epilepsy²	n.e.		
Multiple sclerosis²	n.e.		
Migraine	2.0	1.1 to 3.6	0.030
Distress (4DSQ), 1st quartile (score 0-2)			0.45
2 nd quartile (score 3-5)	1.1	0.6 to 1.9	

3rd quartile (score 6-10)	1.2	0.7 to 1.9	
4 th quartile (score 11-32)	1.5	0.9 to 2.4	
Somatization (4DSQ), 1st quartile (score 0-2)			0.019
2 nd quartile (score 3-4)	1.0	0.6 to 1.8	
3rd quartile (score 5-8)	1.3	0.8 to 2.1	
4 th quartile, score 9-29	2.0	1.2 to 3.3	
Depression (4DSQ), score 0			0.40
Score 1-2	0.9	0.5 to 1.5	
Score 3-12	1.4	0.8 to 2.3	
Anxiety (4DSQ) (score 0)			0.76
Score 1	0.9	0.5 to 1.4	
Score 2-24	1.1	0.7 to 1.6	

Table 3. Factors analysed for association with tinnitus annoyance (0-100 scale). β Is the regression coefficient of the independent variable. 4DSQ = four dimensional symptom questionnaire; CI, confidence interval; n.e., not estimable.

¹Speech recognition ability was adjusted for transducer type (i.e. speakers or headphones)

²No participants affected by this variable developed tinnitus

Univariable linear regression			
Variables	β	95% CI (for β)	<i>p</i>
Male	1.6	-6.3 to 9.4	0.69
Age (18-40 years)			0.48
41-50 years	4.3	-9.8 to 18.4	
51-60 years	9.3	-2.6 to 21.1	
61-80 years	4.3	-6.7 to 15.3	
Living arrangement (with family)	1.5	-7.2 to 10.2	0.73
Education (high)			0.034
Mid	3.6	-5.2 to 12.3	
Low	14.1	3.5 to 24.6	
Occupational noise exposure (Almost never)			0.44
Occasionally	-1.6	-10.9 to 7.7	
Frequently	-10.8	-23.6 to 2.0	
Almost always	-9.6	-30.1 to 10.9	
Speech recognition ability in noise¹ (good)			0.008
Insufficient	-0.4	-10.9 to 10.1	
Poor	13.8	4.8 to 22.7	
Hyperacusis	6.7	-1.1 to 14.5	0.091
History of smoking	5.6	-5.4 to 10.4	0.52
Asthma	0.1	-12.2 to 12.3	0.99
Severe heart disease/myocardial infarction	-0.2	-16.5 to 16.1	0.98
Hypertension	-1.3	-10.9 to 8.3	0.79
Stroke	11.9	-19.9 to 4.7	0.46
Diabetes mellitus	2.2	-15.2 to 19.5	0.81
Osteoarthritis	10.5	1.6 to 19.3	0.021
Arthritis	-7.8	-26.4 to 10.8	0.41
Epilepsia²	n.e.		
Multiple sclerosis²	n.e.		
Migraine	10.6	-0.9 to 22.0	0.070
Distress (4DSQ), 1st quartile (score 0-2)			0.29
2 nd quartile (score 3-6)	0.7	-9.6 to 11.1	
3 rd quartile (score 7-13)	5.1	-5.9 to 16.2	
4 th quartile (score 14-32)	9.3	-1.5 to 20.1	
Somatization (4DSQ), 1st quartile (score 0-2)			0.039
2 nd quartile, (score 3-7)	-6.0	-16.7 to 4.6	
3 rd quartile (score 8-11)	2.9	-7.3 to 13.1	
4 th quartile (score 12-32)	10.0	-1.1 to 2.2	

Depression (4DSQ), score 0			0.43
Score 1-2	-2.8	-12.6 to 7.0	
Score 3-12	5.6	-5.2 to 16.4	
Anxiety (4DSQ) (score 0)			0.019
Score 1-2	11.2	1.8 to 20.5	
Score 3-24	10.3	1.4 to 19.2	