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The Irish Longitudinal
Study on Ageing



**Impact of hearing loss and hearing aid use on
psychosocial health and well-being and healthcare cover
in the older population in Ireland**

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Impact of hearing loss and hearing aid use on psychosocial health and well-being and healthcare cover in the older population in Ireland

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On behalf of the TILDA team

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Key Findings

- Self-reported hearing loss increased from 40% to 46% in men and from 32% to 39% in women between Waves 2 and 5. It was most commonly reported in those aged 75 and over, with 58% of men and 54% of women in this age group reporting a hearing loss in Wave 5.
- Overall, 11% of the older population wore hearing aids at Wave 5; however, 21% of women and 28% of men aged 75 years and older who wear hearing aids report fair/poor hearing, highlighting the high level of ineffective treatment and unmet need in this group.
- Social participation and social integration are lower for women who report poor self-rated hearing without hearing aids, but there is no difference in social engagement in either men or women who wear hearing aids, regardless of how they rate their hearing.
- Poor self-rated hearing without hearing aids is associated with higher depressive symptoms, higher loneliness and lower quality of life; hearing aid use is however associated with better psychosocial health and well-being scores.
- 13% of adults who rated their hearing as fair/poor with an aid indicated that they needed hearing services but did not access them, highlighting the scope for further assessment and intervention to improve hearing function. Men are less likely to seek additional support for hearing or hearing aid related problems.
- Given the high prevalence, but largely modifiable nature, of hearing impairment, improving audiology screening and addressing the barriers to hearing aid use would have significant public health implications and would improve the ageing experience for many.



1. Introduction

The ultimate goal of healthy ageing is sustaining well-being by maintaining functional ability and enabling those with lower physical and mental capacity to still do the things that are important to them (1). In the ageing population, both functional and sensory disability increase with age and negatively affect health and well-being. Hearing loss ranks as the second most common impairment, affecting an estimated 1.33 billion people worldwide, with over 90% of hearing loss classified as age-related (2). Hearing loss can adversely affect an individual's quality of life and ability to function independently, and has been associated with increased risks of falls, hospitalisations, social isolation and impaired cognition (3-5).

Research has established the importance of social participation and social engagement in maintaining physical and mental health and well-being (6, 7) and increasing survival (6, 8) in older people. The World Health Organisation (WHO) has defined social participation as one of the three cornerstones of active ageing alongside health and security (1). Similarly, the Department of Health (DoH) in Ireland has produced a strategy which promotes the health, well-being and quality of life of people as they age and has highlighted participation and ageing in place as National Goals (9).

However, many factors can prevent social participation and access to health care services for people living with disability. While research has established the link between social participation, health service access and health, less is known about the determinants for those living with hearing loss, particularly in an Irish context. It is important that older adults with hearing loss have equal access to and use of all social and healthcare services enabling them to maintain a socially engaged and independent lifestyle. Access to and use of hearing aids that meet an individual's specific needs is hugely important to reduce social isolation.

In Ireland, there are four ways that an individual can acquire a hearing aid (10).

1. Individuals with a medical card can access free hearing aids through the Health Service Executive (HSE)'s Community Audiology Service.
2. The Department of Employment Affairs and Social Protection will pay half of hearing

aid costs from particular suppliers, up to a maximum of €500 for each hearing aid, every four years, if an individual is eligible for the Treatment Benefit Scheme which is dependent on social insurance contributions. Half of the cost of repairs are also paid. Some people are eligible for both the HSE Audiology Service and the Treatment Benefit Scheme.

3. Hearing aids may be covered under private health insurance policies; however, this is unusual and only typically included on comprehensive policies.
4. If an individual is not eligible for the Treatment Benefit Scheme and does not have cover under private health insurance, they can purchase hearing aids and obtain tax relief through the tax system.

In this report, we estimate the proportion of older adults in Ireland with hearing loss, whether they wear hearing aids, how they rate their hearing with and without hearing aids and whether this has changed over time between 2012 and 2018. As hearing difficulty can affect social participation and well-being, we then characterise the population by their self-rated hearing (with and without hearing aids) at Wave 5 and examine associations with age, sex, educational attainment, area of residence, mental health and well-being, social participation, and social networks. Finally, we examine how healthcare cover affects hearing aid use and access to hearing services.

1.1 Data and Methods

This report uses data collected in Waves 2-5 of The Irish Longitudinal Study on Ageing (TILDA), a prospective study of 8,174 community-dwelling adults aged 50 years and older in Ireland. Since 2009, TILDA has collected information about the health, wealth and social circumstances of participants using a comprehensive Computer Assisted Personal Interview (CAPI) conducted by social interviewers who visited the participants in their own homes every 2 years (11). This includes detailed questions on socio-demographics, living circumstances, income and wealth, physical, mental, and behavioural health, health care utilisation and social participation. Participants were also asked to fill out a self-completion questionnaire (SCQ) which includes more sensitive questions about relationships and experiences of growing older. For this report, cross-sectional analysis was conducted on participants in Wave 2 (n=7,281), Wave 3 (n=6,618), Wave 4 (n=5,942) and Wave 5 (n=5,206).



1.2 Statistical methods and weighting

In this report, the percentage of respondents classified into different groups or average scores (means) on the different outcome scales are presented. Most estimates are provided with a 95% confidence interval. This can be interpreted as a 95% chance that the sampled confidence interval includes the true population value. All estimates are weighted to account for age, sex, educational attainment, and urban/rural residence in the 2011 Census, and to reflect the probability that participants returned a completed SCQ, ensuring that these estimates are representative of the whole population aged 52 years and over in Ireland.



2. Prevalence of hearing loss and hearing aid use in the older population in Ireland

2.1 Characteristics of sample

Basic demographic indicators (age, sex, educational status) were obtained during the CAPI. Educational status was defined as primary, secondary or tertiary, corresponding to ≤ 8 , 9-13 and >13 years of education respectively. Marital status (married, single, separated/divorced, widowed) and local area (Dublin city or county, another town/city, rural area) were also obtained.

Descriptive characteristics of the 7,455 participants aged 52 years and over who provided information in Wave 2 are shown in Table 1. Three fifths (57%) were aged between 52 and 64 years, while almost one in six (15%) were 75 years or over. Sixty-seven per cent of the population aged 52 and over were women and a majority of the population was married (67%). Over one in four (26%) lived in Dublin city or county while two fifths lived in rural areas (44%). It can be noted that, as the TILDA cohort has aged, there are proportionately less in the 50-64 years age group, and more in the 65-74 and 75 years and over age groups. Similarly, the proportion of married participants decreased slightly between Wave 2 and Wave 5, while the proportion who were widowed increased.

Table 2.1. Descriptive characteristics of adults aged 52 years and over in Ireland (Wave 2-Wave 5)

	Wave 2	Wave 3	Wave 4	Wave 5
	7281	6618	5942	5206
	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)
Age				
50-64 years	57 (55-59)	48 (46-50)	39 (37-41)	31 (29-33)
65-74 years	28 (26-30)	33 (31-34)	37 (35-38)	39 (37-40)
≥75 years	15 (14-16)	20 (18-21)	24 (23-26)	31 (29-32)
Education				
Primary level	28 (26-30)	28 (26-30)	28 (26-29)	27 (26-29)
Secondary level	47 (45-48)	46 (44-48)	46 (44-48)	45 (44-47)
Tertiary level	26 (24-27)	26 (25-28)	27 (25-28)	27 (26-29)
Marital status				
Married	67 (65-69)	65 (64-67)	64 (62-66)	63 (61-65)
Single	12 (11-13)	12 (11-13)	12 (11-13)	12 (10-13)
Separated/divorced	9 (8-10)	9 (8-10)	9 (8-10)	8 (7-9)
Widowed	12 (11-14)	14 (13-15)	15 (14-17)	17 (16-19)

2.2 Hearing loss in adults aged 52 years and over, Wave 2 to Wave 5

Participants were asked if they felt they have a hearing loss and to rate their hearing (with and without hearing aids) as: excellent, very good, good, fair, and poor. Hearing aid use was measured by asking: Do you use any of the following aids or appliances to help you with your hearing? Responses collected were: Hearing aid (all of the time), Hearing aid (some of the time), Amplifier, None of the above. This variable was also dichotomised as using a hearing aid or not.

Reported hearing loss increased between Waves 2 and 5 from 40% to 46% in men and from 32% to 39% in women. The proportion of participants reporting any hearing loss between Wave 2 and Wave 5, by age group and gender, is shown in Figure 2.1. Hearing loss was most commonly reported in men and women aged 75 and over.

In Wave 5, 42% of older adults overall reported some hearing loss. This proportion was higher in women with primary educational attainment (49%) compared to women with tertiary level education (40%). These differences were not seen in men, where overall 46% reported some loss of hearing.



Figure 2.1. Proportion who report hearing loss by age group and sex, Wave 2 to Wave 5

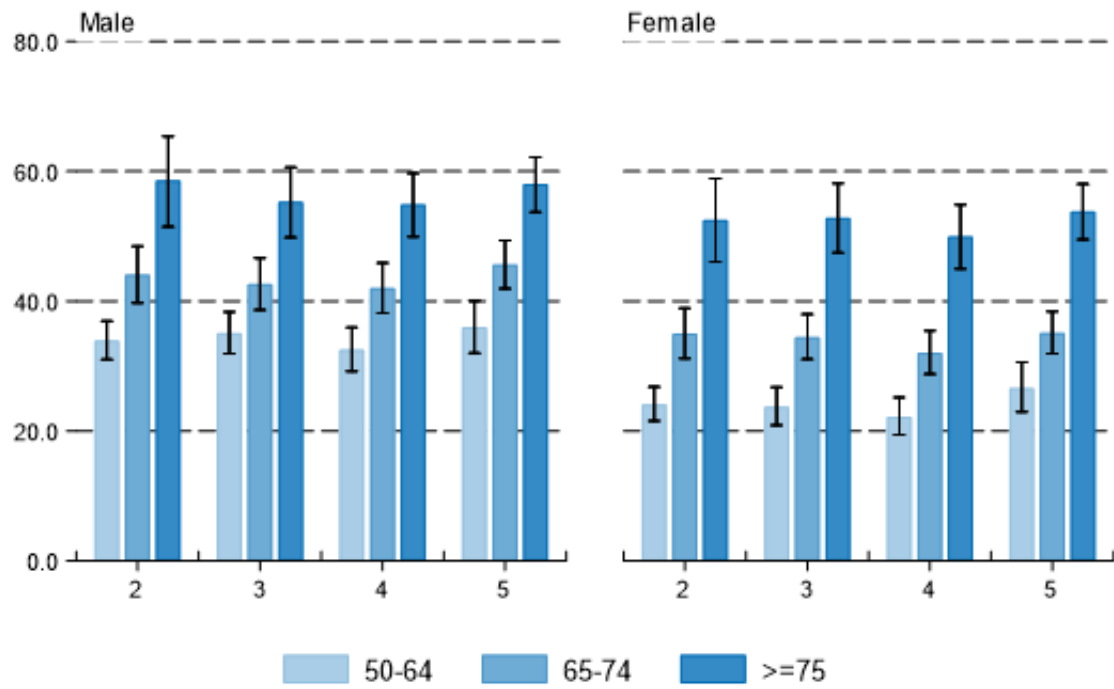


Figure 2.2. Proportion who wear hearing aids by sex, Wave 2 to Wave 5

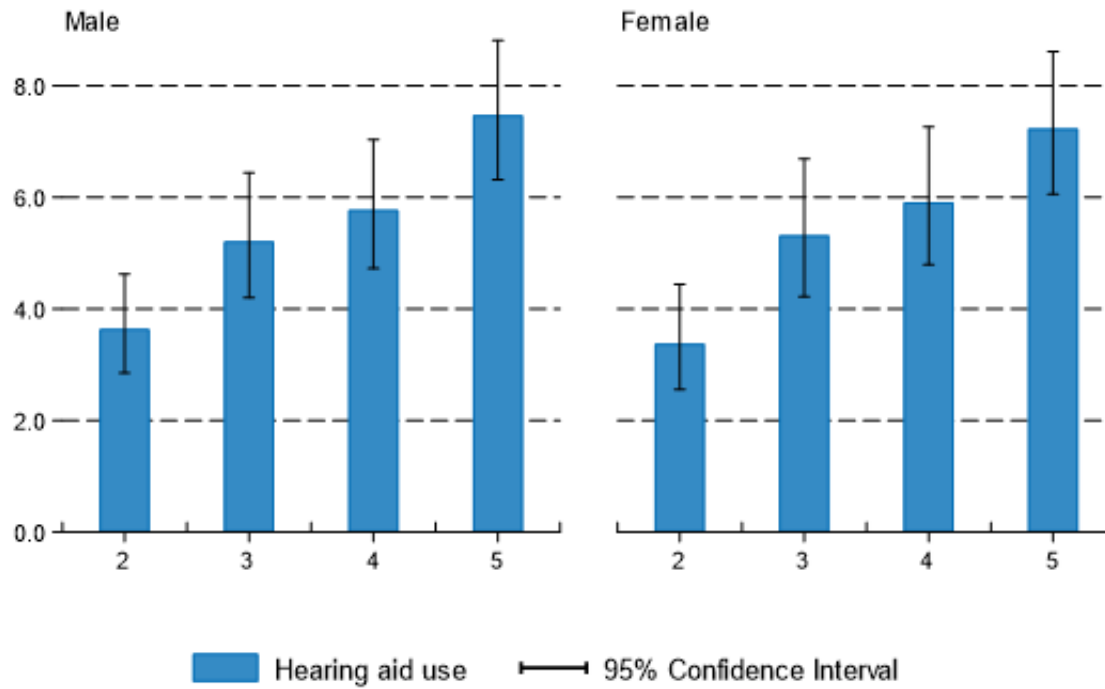
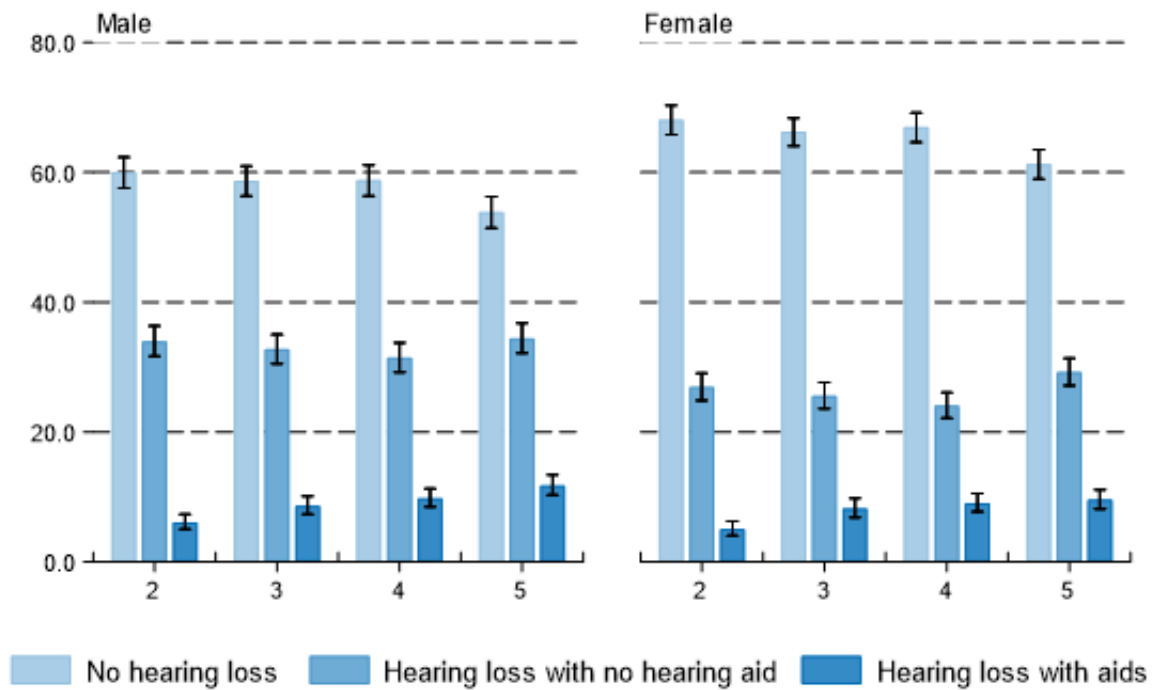


Figure 2.2 shows the proportion of adults who report wearing a hearing aid between Wave 2 and Wave 5. This increased from 4% of men and women in Wave 2 to 7% of men and women in Wave 5.

Figure 2.3 shows the proportion of the population who report a hearing loss and wear hearing aids increased from 6% to 12% in men and from 5% to 10% in women between Wave 2 and Wave 5.



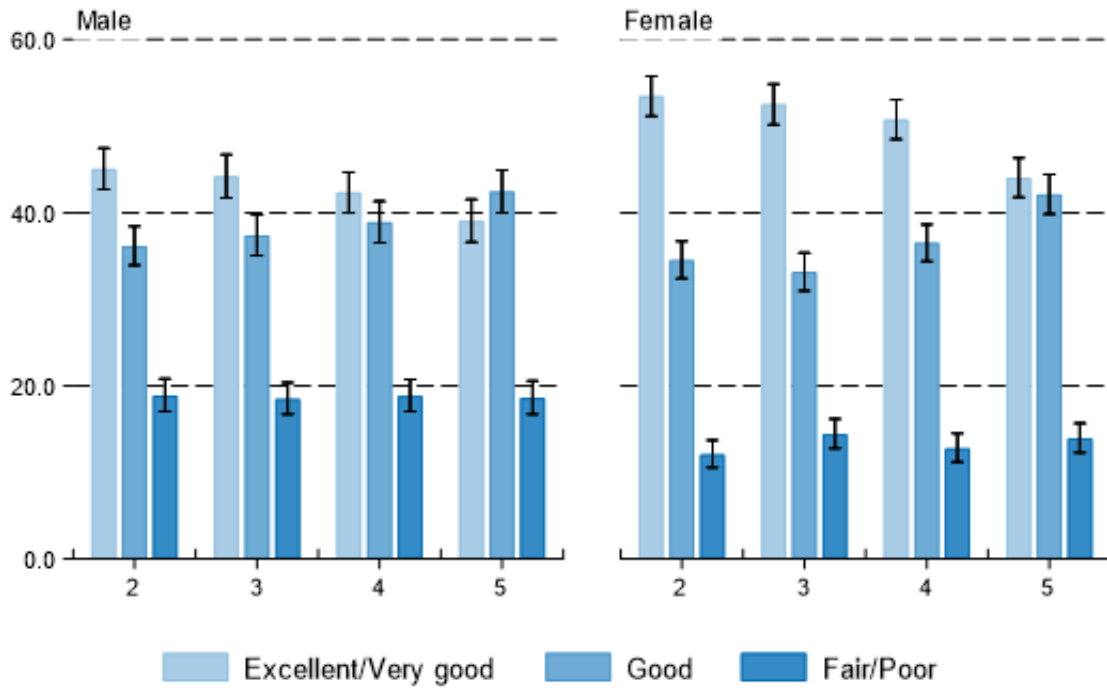
Figure 2.3: Proportion who wear a hearing aid by hearing loss by age group and sex, Wave 2 to Wave 5



2.3 Self-rated hearing

The proportion of the population who reported their hearing as excellent/very good, good or fair/poor between Wave 2 and Wave 5 is shown in Figure 2.4. A higher proportion of women reported their hearing as excellent/very good compared to men in each wave, although both men and women were more likely to report excellent/very good hearing at Wave 2 than at Wave 5 (45% versus 39% in men; 42% versus 36% in women). This was matched with a corresponding increase in those who reported their hearing as good (36% to 42% in men; 34% to 42% in women) across the waves while the proportion who reported their hearing as fair/poor remained at 19% for men, and 13% for women.

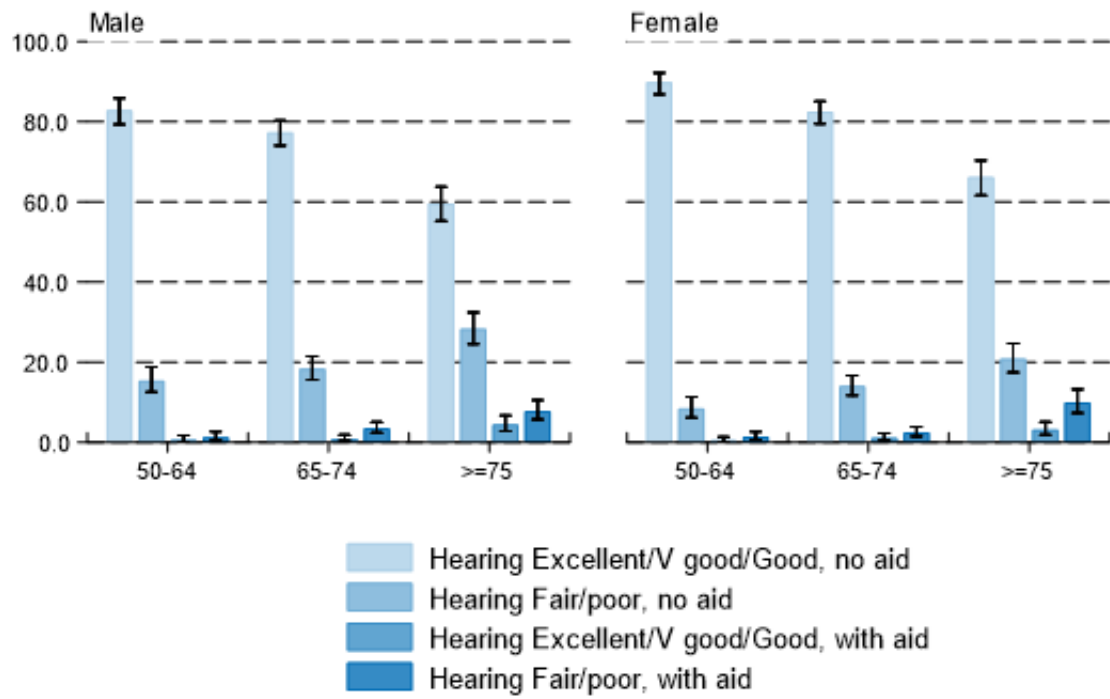
Figure 2.4. Self-rated hearing by sex, Wave 2 to Wave 5



2.4 Self-rated hearing by hearing aid use, Wave 5

The proportion of men and women who rate their hearing as excellent/very good/good or fair/poor by hearing aid use and age group is shown in Figure 2.5. The overall pattern is for increased use of hearing aids with increasing age in both men and women, but also an increase in the proportion of people reporting fair/poor hearing, regardless of hearing aid use. Notably, among women aged 75 years and older, 21% of those with and 10% of those without a hearing aid reported fair/poor hearing, highlighting the high level of ineffective treatment and unmet need in this group. In men aged 75 years and older, the corresponding values are 28% and 8%, suggesting that men may be slower to seek help for hearing problems.

Figure 2.5 Prevalence of hearing aid use by self-reported hearing, age and sex, Wave 5





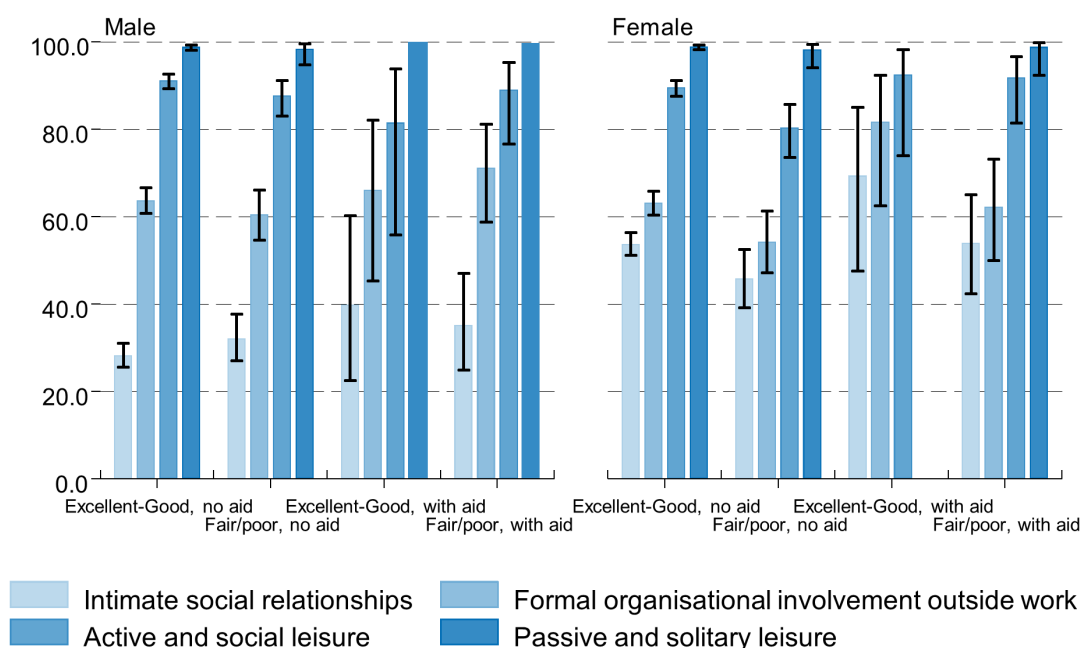
3. Social participation and social connectedness by hearing status

Participation in leisure activities is an important aspect of an individual's social engagement. In TILDA, social participation is measured using a scale proposed by House and colleagues (12). Participants were asked to indicate how often they took part in a range of social activities that were categorised into four groups: (i) close social relationships (including daily visits to or from family and friends); (ii) formal organisational involvements outside of work (such as going to religious services or meetings at voluntary associations at least once a month); (iii) active and relatively social leisure activities (including going to classes, lectures, movies, plays and concerts, playing cards or bingo, eating outside the house or taking part in sports at least once a month); and (iv) passive and relatively solitary leisure activities (such as watching television, listening to the radio, or reading at least once a month).

3.1 Social participation by self-rated hearing and hearing aid use

Ninety per cent of adults in Wave 5 aged 58 years and over participated in active and social leisure activities outside the home at least once per month. There was a difference by hearing and hearing aid use in women, but not men; 81% of women who rated their hearing without hearing aids as fair or poor participated in active and social leisure activities compared to 90% of those who rated their hearing as excellent/very good/good without aids (Figure 3.1). Overall, 99% reported that they took part in passive and solitary leisure activities, 64% took part in formal social activities and a higher proportion of women reported close social relationships than men (53% versus 30%). There were no differences in any of these activities when taking self-rated hearing and hearing aid use into account (Figure 3.1).

Figure 3.1: Social participation by self-rated hearing, hearing aid use and sex, Wave 5

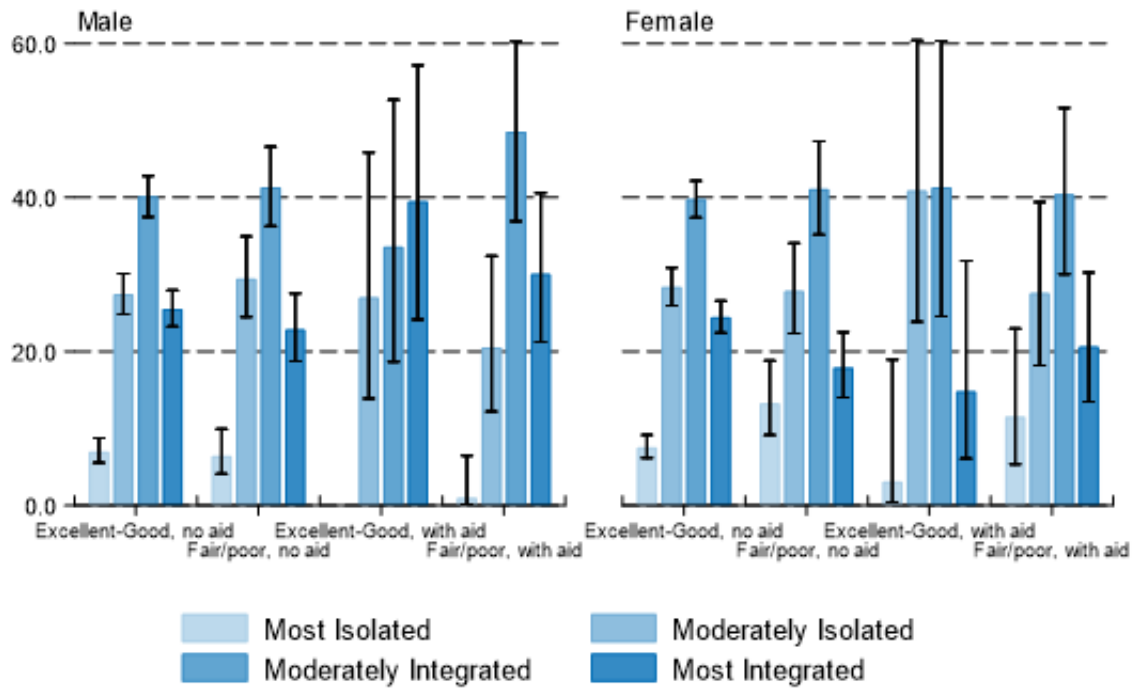


3.2 Social integration by self-rated hearing status

TILDA assesses the size of an individual’s social network to measure social isolation using the Berkman-Syme Social Network Index (SNI) (8). This index is scored on a 0-4 composite scale that captures four types of social connection: (1) marital status; (2) close ties with children, relatives and friends; (3) membership of a church group; and (4) membership of voluntary organisations. A score of 0-1 identifies individuals as ‘most isolated’, with a score of 4 indicating ‘most integrated’.

Overall, one in five (21%) adults aged 58 years and over has four or more regular social contacts. These networks are maintained through participation in a wide range of organisations and attendance at religious services. Compared to those with excellent/very good/good hearing, a higher proportion of women who do not wear hearing aids and rate their hearing as fair or poor are in the most isolated group (15% versus 6%) and a lower proportion are in the most integrated group (17% versus 26%). There was no difference in social integration by self-rated hearing in women who wore hearing aids, while integration also did not vary by self-rated hearing with/or without hearing aid use in men. Regardless of how they rate their hearing, a higher proportion of men who do not wear a hearing aid are most isolated compared to those wearing a hearing aid (See Figure 3.2).

Figure 3.2 Social integration by self-reported hearing and hearing aid use and sex, Wave 5





4. Psychosocial health and well-being by self-rated hearing and hearing aid use

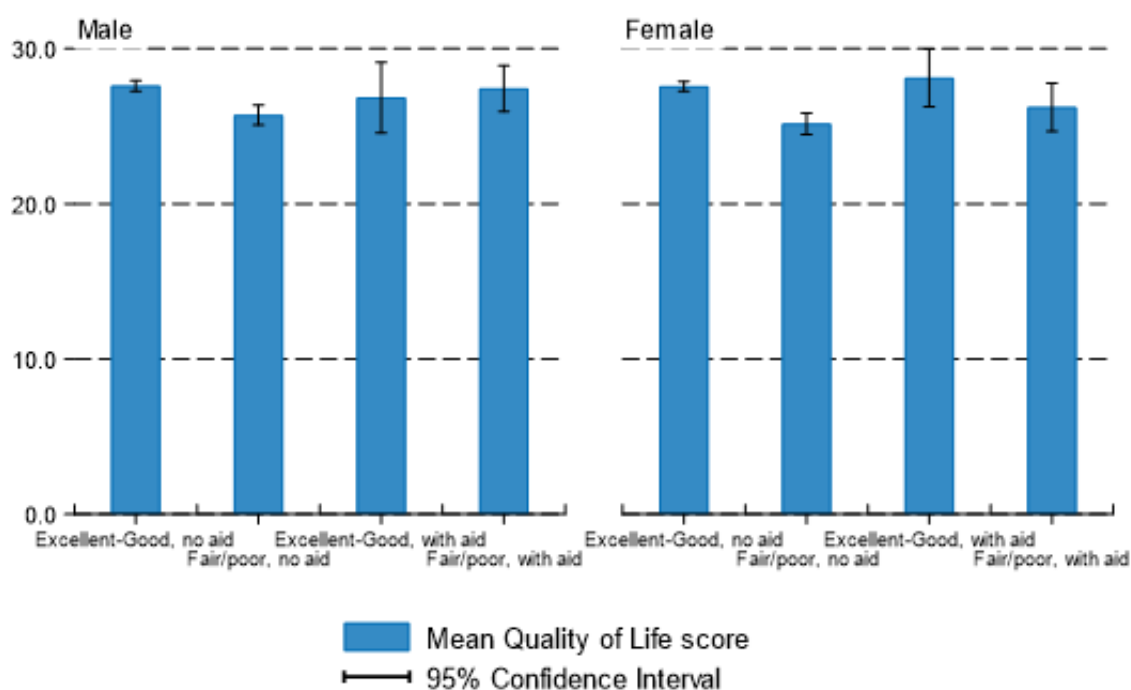
We examine well-being and mental health by self-rated hearing and hearing aid use to determine if these outcomes differ in those with and without hearing difficulties.

4.1 Self-rated hearing and hearing aid use and well-being

TILDA used the 12-item self-report measurement, CASP-12, to assess quality of life in Wave 5 (14). The scale covers the four domains (Control, Autonomy, Self-realisation, Pleasure) considered to encompass quality of life (Table 4.1). The items included in CASP-12 consist of statements such as: 'I can do the things I want to do', 'I look forward to every day' and 'I feel that life is full of opportunities'. These statements are presented to participants in the SCQ, and they are asked to indicate how often (often, sometimes, not often or never) they feel each statement applies to their life. Each item is summed to give an overall score (range 0 to 36), with higher scores denoting better quality of life.

Quality of life is high in older adults, with an average score of 27.3 (sd 5.1) in Wave 5. However, Figure 4.1 shows that quality of life is lower for men and women who do not wear hearing aids and rate their hearing as poor/fair rather than excellent/very good/good (2.44 CASP-12 points lower for women; 2.1 CASP-12 points lower for men). There is no difference in quality of life for those who wear hearing aids, with a similar pattern seen in all age groups.

Figure 4.1 Mean Quality of life score (CASP-12) by self-rated hearing, hearing aid use and sex, Wave 5



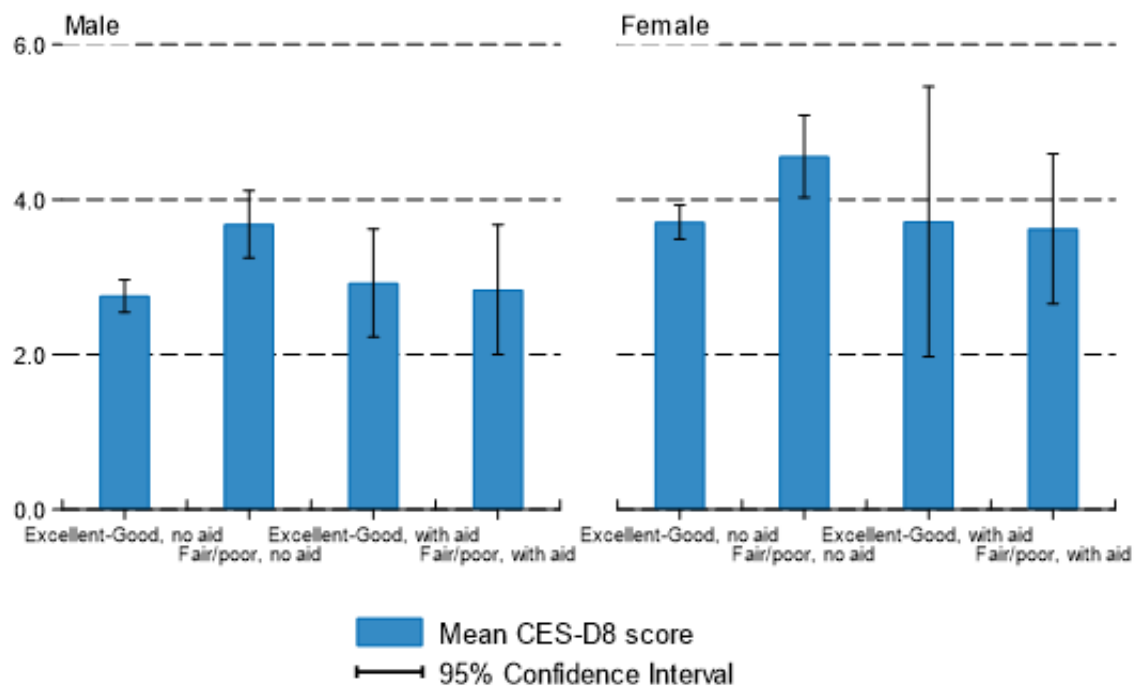
4.2 Self-rated hearing with hearing aid use and depressive symptoms

In TILDA, depressive symptomology is assessed using the 8-item Centre for Epidemiological Studies-Depression (CES-D8) scale (19,20). This validated measurement tool captures the frequency that participants have experienced a variety of depressive symptoms within the past week. The total number of positive and negative responses to the eight statements are summed to give a total CES-D8 score (range 0 to 24), with higher scores indicating increased depressive symptomology.

Figure 4.2 shows that the prevalence of depressive symptoms is higher in men and women who do not wear hearing aids and who report their hearing as fair or poor rather than excellent/very good/good. Depressive symptoms were lower for both men and women who use hearing aids, and were similar to those who reported excellent/very good/good without aids (Figure 4.2).



Figure 4.2: Prevalence of CES-D8 depressive symptomology by self-rated hearing and hearing aid use and sex, Wave 5



These higher depressive symptoms were seen in men and women living in Dublin but not in another town or city, or a rural area (Figure 4.3). In those not wearing hearing aids, Dublin-based women and men who report their hearing as fair/poor scored 2.13 and 1.72 CES-D8 points higher respectively compared to those who reported excellent/very good/good hearing.

Figure 4.3: Prevalence of CES-D8 depressive symptomology by self-rated hearing, hearing use and area of residence, Wave 5

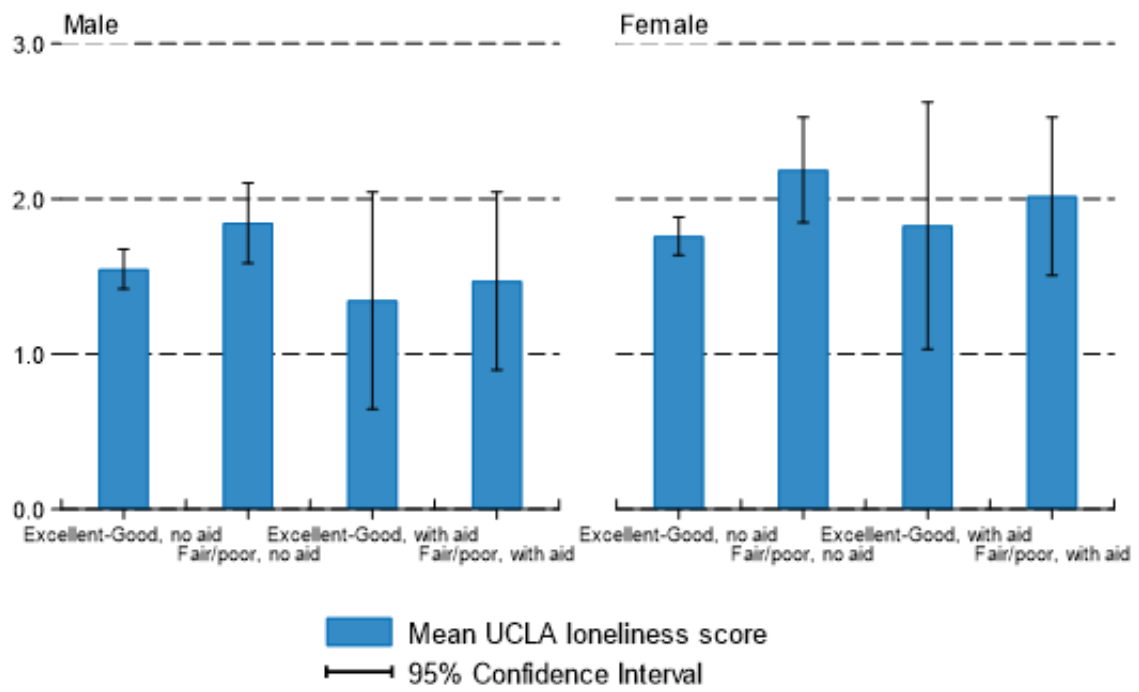


4.3 Hearing status and loneliness

Loneliness reflects an individual's evaluation of their overall level of social interaction, and describes a deficit between the actual and desired quality and quantity of social engagement (13). It has been associated with declines in physical, mental and cognitive health in older adults (14). In TILDA, loneliness is measured using a modified version of the University of California-Los Angeles (UCLA) Loneliness scale (15). This version includes five items, each with three response options (hardly ever or never, some of the time, often). Responses are summed with the overall score ranging from 0 (not lonely) to 10 (extremely lonely). Loneliness scores are low overall, but Figure 4.4 shows that they were higher in both men and women who report their hearing as fair or poor (without a hearing aid) relative to those who report their hearing to be excellent, very good or good. Men and women who wore hearing aids had similar loneliness scores to those who report their hearing to be excellent, very good or good without aids. These differences were seen in all age groups and areas of residence.



Figure 4.4: Prevalence of loneliness by self-rated hearing and hearing aid use and sex, Wave 5





5. Healthcare utilisation by hearing status and hearing aid use

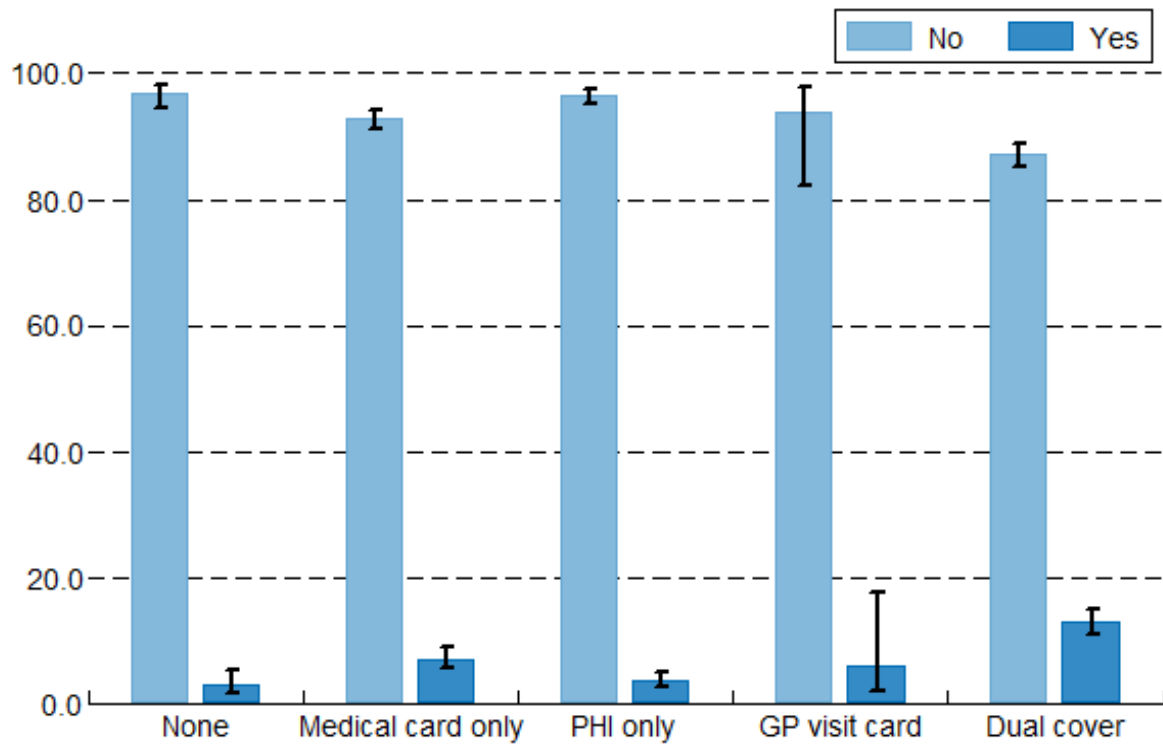
In this section, we examine whether use of hearing aids is related to healthcare cover and if access to and use of medical services, particularly hearing-related services, are related to self-reported hearing and hearing aid use.

5.1 Hearing aid use and healthcare cover

Healthcare cover reflects the protection that people have from being exposed to the full cost of healthcare. In this report, we describe healthcare cover from three different perspectives, examining (i) the proportion of older adults in Ireland with additional public cover from a medical card or a GP visit card; (ii) the proportion of older adults in Ireland with additional private cover from having purchased private health insurance; and (iii) the proportion of additional public or private healthcare cover in five categories where 'None' indicates no medical card, GP visit card or private health insurance; 'Medical card' indicates having a medical card only; 'PHI' indicates having private health insurance only; 'GP visit card' indicates having a GP visit card only and 'Dual cover' indicates adults with either a medical card or GP visit card in addition to private health insurance.

Nine per cent of older adults with a medical card or GP card have a hearing aid compared to 3.5% of those with neither. There was no difference in those with or without private health insurance (7.4% versus 6.7%). There was also no difference in these patterns between men and women. Figure 5.1 shows that hearing aid use was most common in those with a medical card only or dual cover (medical card plus private health insurance).

Figure 5.1: Hearing aid use by healthcare cover, Wave 5

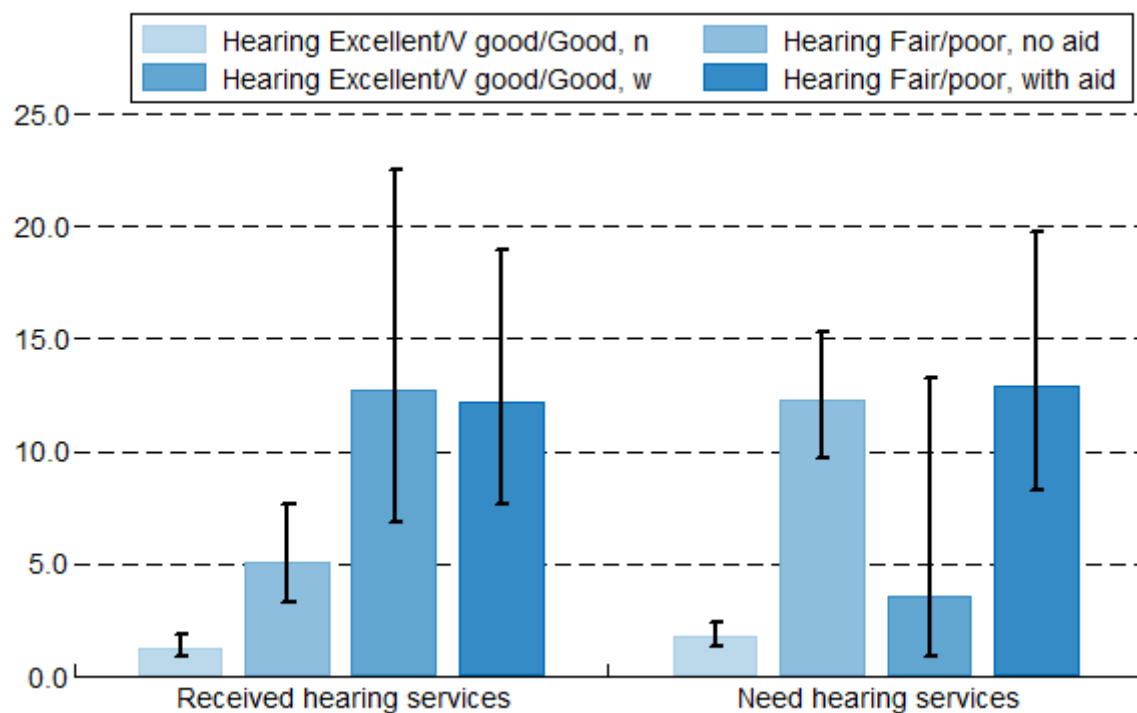


5.2 Hearing-related services

Participants were asked if they accessed hearing-related services in the last year (yes/no), and if yes, how many times. If they did not access hearing-related services, they were asked if they felt that they needed these services (yes/no).

As expected, older adults who self-reported their hearing without an aid as excellent/very good/good were very unlikely to report needing or receiving hearing services (Figure 5.2). One in eight older adults (12-13%) who rated their hearing as fair/poor, regardless of hearing aid use, reported needing hearing services while 5.0 and 12.2% of those without and with a hearing aid respectively received hearing services. There were relatively low numbers in the group with hearing aids who rated their hearing as excellent/very good/good leading to high variation and limiting the conclusions that can be drawn. Once again, there was no difference between men and women.

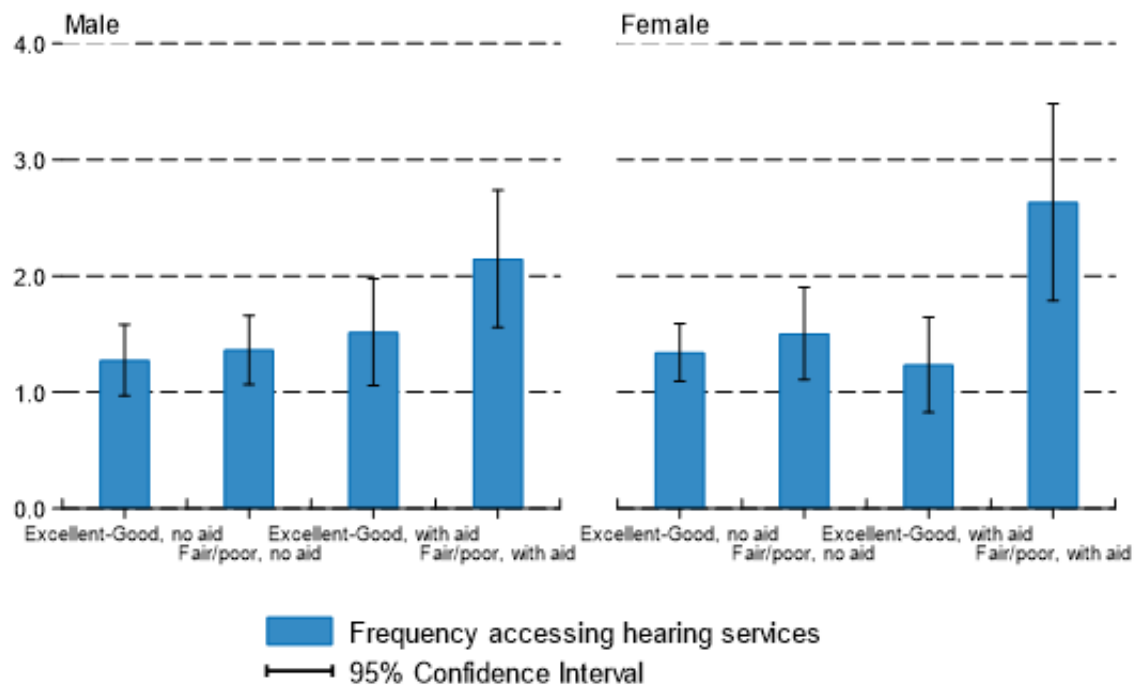
Figure 5.2: Receipt of and need for hearing-related services, by self-reported hearing and hearing aid use, Wave 5



Of those who accessed hearing services, the frequency of doing so was the same (1.5 visits), regardless of whether older adults had a medical card or not, or whether they had private health insurance or not. Older women who self-reported that their hearing was fair/poor with a hearing aid accessed hearing services more frequently than women in all other groups (2.6 visits versus 1.2-1.3 visits) (Figure 5.3). In contrast, this difference was not as pronounced for men, suggesting that they are less likely to seek support for hearing loss and/or suboptimal function with a hearing aid.



Figure 5.3: Frequency of accessing hearing services, by self-reported hearing and hearing aid use, Wave 5





6. Conclusions

In this report, we show that both hearing loss and hearing aid use increase with age, with highest levels reported in those aged 75 and over. Overall, hearing loss was reported by 42% of older adults in 2018, with the level higher in men than women (46% versus 39%). Despite the high prevalence of self-reported hearing loss, the use of hearing aids is low in the general population in Ireland (11%), which is consistent with other studies (16). Use of hearing aids was most common in those with a medical card, which is unsurprising given that many medical card holders can access hearing aids for free. Thirteen per cent of adults who rated their hearing as fair/poor with an aid indicated that they needed hearing services but did not access them, suggesting that there is scope for further assessment and intervention to improve hearing function. Women with fair/poor hearing with an aid accessed hearing services most frequently, suggesting that men are less likely to seek additional support for hearing or hearing aid-related problems. This is supported by the higher proportion of men (than women) aged under 65 years who do not wear a hearing aid but reported poor hearing.

Social participation and social integration are lower for women who report poor self-rated hearing without hearing aids; however, there is no difference in social engagement in either men or women who wear hearing aids, regardless of how they rate their hearing. This suggests that hearing aid use can help maintain social engagement as people experience declines in their hearing with age. Given the benefits of social engagement, it highlights the advisability of actively seeking out and encouraging early diagnosis of hearing loss and wearing of hearing aids.

We also find that poor self-rated hearing without hearing aids is associated with worse mental health and well-being, higher depressive symptoms, higher loneliness and lower quality of life. Again, hearing aid use appears to alleviate these differences and those wearing hearing aids had similar mental health and well-being scores to those who rated their hearing as excellent, very good and good, without hearing aids. There was some evidence of regional differences in these effects, with women in Dublin with poor hearing and no aids reporting worse mental health outcomes

A recent US study reported that the barriers to obtaining a hearing aid include cost, lack of insurance coverage, vanity or stigma related to the hearing loss or aid and lack of support



and focus on addressing the problem on the part of health care providers (17). Other barriers included discomfort, lack of support and instructions on how to use and maintain hearing aids (10). While cost is a substantial barrier for many people, some studies have found that the stigma relating to hearing aids remains even in countries where full coverage is provided (18). This highlights the importance of advertising and public health campaigns to emphasise the benefits of hearing aid use, the reduced size of devices, and to encourage and empower people to feel comfortable using hearing aids and seek a high level of function. McKee and colleagues (17) also suggested that there should be an increased focus on hearing-related health and function from primary care providers and the ability to test and return hearing aids in order to find the most suitable device.

In Ireland, many hearing aid providers will check if an individual is eligible for the Treatment Benefit Scheme; individuals should also check if hearing aids are covered under private health insurance. At a policy level, increased provision of hearing aids at no (or low) cost is likely to increase uptake of hearing aids with associated benefits in hearing-related function compared to unaided/placebo conditions (19). Given the high prevalence of hearing impairment with age, and the largely modifiable nature of this disability, the public health impact on access to health services and inclusion in social participation is highly relevant. Improvement in audiology screening at an earlier stage and promotion of uptake of hearing aids may significantly contribute to the reduction of disability and associated consequences in the older population, thereby improving the ageing experience for many.



6. References

1. World Health Organization. World report on ageing and health. Geneva; 2015.
2. GBD 2015 Disease and Injury Incidence and Prevalence Collaborators. Global, regional, and national incidence, prevalence, and years lived with disability for 310 diseases and injuries, 1990-2015: a systematic analysis for the Global Burden of Disease Study 2015. *Lancet*. 2016;388(10053):1545-602.
3. Lin FR, Ferrucci L. Hearing loss and falls among older adults in the United States. *Arch Intern Med*. 2012;172(4):369-71.
4. Genther DJ, Betz J, Pratt S, Martin KR, Harris TB, Satterfield S, et al. Association Between Hearing Impairment and Risk of Hospitalization in Older Adults. *J Am Geriatr Soc*. 2015;63(6):1146-52.
5. Loughrey DG, Kelly ME, Kelley GA, Brennan S, Lawlor BA. Association of Age-Related Hearing Loss With Cognitive Function, Cognitive Impairment, and Dementia: A Systematic Review and Meta-analysis. *JAMA Otolaryngol Head Neck Surg*. 2018;144(2):115-26.
6. Holt-Lunstad J, Smith TB, Layton JB. Social relationships and mortality risk: a meta-analytic review. *PLoS Med*. 2010;7(7):e1000316.
7. Kamiya Y, Whelan B, Timonen V, Kenny RA. The differential impact of subjective and objective aspects of social engagement on cardiovascular risk factors. *BMC Geriatr*. 2010;10:81.
8. Berkman LF, Syme SL. Social networks, host resistance, and mortality: a nine-year follow-up study of Alameda County residents. *American journal of epidemiology*. 1979;109(2):186-204.
9. Department of Health. The National Positive Ageing Strategy. Dublin: The Department of Health; 2013.
10. Department of Employment Affairs and Social Protection. Report under Section 23

of the Social Welfare (No. 2) Act 2019 on the Cost of Hearing Aids and the Adequacy of Financial Supports. August 2020.

11. Donoghue OA, McGarrigle CA, Foley M, Fagan A, Meaney J, Kenny RA. Cohort Profile Update: The Irish Longitudinal Study on Ageing (TILDA). *International journal of epidemiology*. 2018;47(5):1398-I. doi: 10.093/ije/dyy163.
12. House JS, Robbins C, Metzner HL. The association of social relationships and activities with mortality: prospective evidence from the Tecumseh Community Health Study. *American journal of epidemiology*. 1982;116(1):123-40.
13. Victor CR, Scambler SJ, Bowling ANN, Bond J. The prevalence of, and risk factors for, loneliness in later life: a survey of older people in Great Britain. *Ageing and Society*. 2005;25(6):357-75.
14. Hawkley LC, Cacioppo JT. Loneliness matters: a theoretical and empirical review of consequences and mechanisms. *Annals of behavioral medicine : a publication of the Society of Behavioral Medicine*. 2010;40(2):218-27.
15. Russell DW. UCLA Loneliness Scale (Version 3): reliability, validity, and factor structure. *Journal of personality assessment*. 1996;66(1):20-40.
16. Chien W, Lin FR. Prevalence of hearing aid use among older adults in the United States. *Arch Intern Med*. 2012;172(3):292-3.
17. McKee MM, Choi H, Wilson S, DeJonckheere MJ, Zazove P, Levy H. Determinants of Hearing Aid Use Among Older Americans With Hearing Loss. *Gerontologist*. 2019;59(6):1171-81.
18. Hougaard S, Ruf S, Egger C. Societal and Personal Benefits of Hearing Rehabilitation with Hearing Aids. *The Hearing Review*. 2012.
19. Feltner C, Wallace IF, Kistler CE, Coker-Schwimmer M, Jonas DE. Screening for Hearing Loss in Older Adults: Updated Evidence Report and Systematic Review for the US Preventive Services Task Force. *Jama*. 2021;325(12):1202-15.