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Abstract

Background Data about the ongoing health service use, health outcomes and healthcare treatment costs of adult cochlear implant users are limited. This study examined health service use, health outcomes and treatment costs of adults who had a cochlear implant.

Methods This was a retrospective cohort study of adults aged ≥ 18 years who received a cochlear implant during 2011–2021. Linked hospitalisation, non-admitted patient (NAP) services and mortality data in New South Wales (NSW), Australia were used. Health service use, health outcomes and treatment costs were compared for younger (18–64 years) and older (≥ 65 years) adults. A negative binomial regression model was used to examine factors associated with hospitalisation and health outcomes.

Results There were 3071 adults who had a cochlear implant; 47.6% aged 18–64 years and 52.4% aged ≥ 65 years. Older adults had a higher proportion of all-cause hospital admissions (34.1% vs. 18.4%, respectively), readmission within 28 days (7.8% vs. 4.7%, respectively), ≥ 13 NAP service contacts (33.9% vs. 24.9%, respectively) and mean treatment costs (AUD\$44,101 vs. AUD\$41,663, respectively) than younger adults. Charlson comorbidities and mental health disorders were key predictors of both hospitalisations and NAP service contacts for younger adults. Postoperative mechanical complications and prior hospital admissions were predictors of hospitalisation and NAP service contacts, respectively for younger adults. Having ≥ 13 NAP service contacts and a cochlear implant removed were predictors of hospitalisation and NAP service contacts, respectively for older adults. Having a longer hospital length of stay (LOS) was associated with cochlear implant removal, treatment cost, and other health conditions for both younger and older adults.

Conclusions Adults with multimorbidity used more hospital-based services or incurred large treatment costs. Early detection and treatment of comorbidities and long-term post-cochlear implant follow-up to identify any potential

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Background

Table 1 Demographic and implant related characteristics of adults who had a cochlear implant during 2011 to 2021, in New South Wales, Australia

Characteristics	18–64 years (n= 1461)		65 years (n= 1610)		p-value ^a
	n	%	n	%	
Sex					

admissions varied for the younger and older cohorts, with one-third (32.7%) of the younger adults having 2–3 hospital admissions while 34.1% of the older adults had

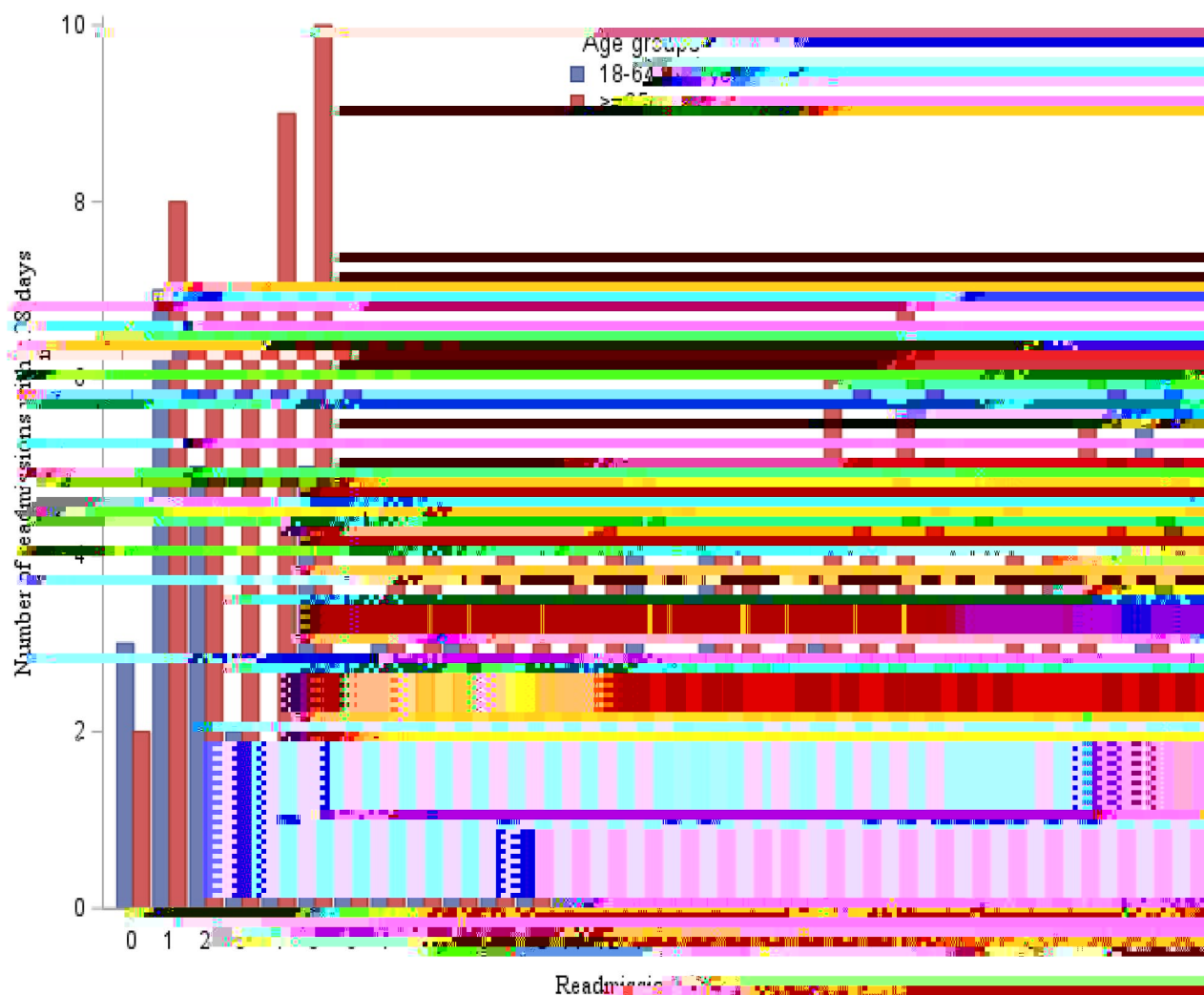


Fig. 1 Readmission within 28 days of index separation for younger and older adults who had a cochlear implant. Zero readmission day indicates same-day separation and readmission

Predictors of NAP service contacts

Residing in the most socioeconomically disadvantaged areas (RR 1.42; 95%CI 1.10–1.84), having at least one Charlson comorbidity (RR 1.71; 95%CI 1.26–2.33), being diagnosed with a mental health disorder (RR 1.89; 95%CI 1.25–2.85), and having prior hospital admissions (RR 1.03; 95%CI 1.02–1.04) were all associated with a higher number of NAP service contacts compared to reference groups for younger adults (Table 6).

For older adults, having at least one implant removal (RR 2.43; 95%CI 1.17–5.02), having had procedures other than an excision around mastoid and temporal bone conducted (RR 2.92; 95%CI 1.33–6.40) and having prior hospital admissions (RR 1.03; 95%CI 1.00–1.06) were all associated with a higher number of NAP contacts.

Discussion

This study examined health service use, health outcomes and hospital treatment costs of younger and older adults who had a cochlear implant during 2011–2021. This study identified that both younger and older adults who had comorbid conditions, 2 cochlear implants, frequent NAP services occasions, and who had their last admission in a private hospital all had a higher number of hospital admissions after their cochlear implant. Younger adults who were female or who had a post-operative mechanical complication with their implant also had a higher number of hospital admissions. Having a longer hospital LOS was associated with cochlear implant removal, treatment cost, and other health conditions, including neoplasms and injury, and also with factors in influencing health status and contact with health services for both younger and older adults. A higher number of NAP occasions of

repeat NAP service contacts for younger adults. Hearing

of cochlear implants may be contraindicated in procedures requiring an MRI scan for diagnosis or assessment of comorbid conditions or injuries, which may necessitate the removal and replacement of the implant. Additionally, a higher health service use could be associated with the need for ongoing post-implant care, device

maintenance, and complications that may arise from multiple implantation procedures.

Having at least one cochlear implant removal was associated with an increased number of NAP service contacts in older adults in the current study. This is likely due to a higher proportion of older adults with a diagnosis

of diseases of the ear and mastoid process

private hospital users could stem from better access to healthcare services, differences in healthcare-seeking

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