

Investigating the knowledge, skills and tasks required for hearing aid management: Perspectives of clinicians and hearing aid owners

Rebecca J Bennett^{*,†},

Carly J Meyer[°],

Robert H Eikelboom^{*,†,‡},

Marcus D Atlas^{*,†}

* Ear Science Institute Australia, Subiaco, Australia, †Ear Sciences Centre, The University of Western Australia, Nedlands, Australia, ° School of Health and Rehabilitation Sciences, University of Queensland, Brisbane, Australia, ‡ Department of Speech Language Pathology and Audiology, University of Pretoria, Pretoria, South Africa.

Correspondence: Rebecca Bennett, Ear Science Institute Australia, Suite 1, Level 2, 1 Salvado Rd, Subiaco WA 6008, Australia. Phone: +61 8 6380 4900. Email: bec.bennett@earscience.org.au

APPENDIX

STATEMENTS GROUPED BY CONCEPTS, WITH BRIDGING SCORE AND IMPORTANCE RATINGS INDICATED IN BRACKETS, RESPECTIVELY**Daily hearing aid use (0.32; 3.79)**

1. Learn how and when to change (or charge) the battery (0.18; 4.68).
99. Check that the hearing aids are working by cupping it in the hand and listening to whether it whistles/feedback (0.19; 3.65).
79. Always put the hearing aid in the box provided to avoid losing it, not in a tissue, on the bench, in your pocket, and in the car (0.22; 3.88).
70. Know that turning the hearing aid off resets the volume and program settings (0.23; 3.94).
12. Know which program to use for which situation (0.24; 3.76).
11. Know how to recognize the different tones for each program (0.24; 3.65).
105. Learn how to use the volume control (0.25; 3.64).
106. Know to store the hearing aids in a small case when not in use, so as not to lose them (0.27; 3.79).
24. Know that hearing aids should never fall out if fitted and inserted correctly (0.27; 3.94).
20. Know not to be afraid of touching the hearing aid batteries with their fingers (0.30; 2.88).
82. Learn how to use the bluetooth options available with the hearing aid, if applicable (0.30; 2.85).
91. Know to put the whisker (retention line) in the ear and not to leave it hanging out (0.31; 3.21).
31. Learn how to mute and unmute the hearing aid while in the ear, for example, such as at the football stadium (0.35; 3.30).
100. Check that the hearing aids are working by pressing the button and listening to whether it beeps (0.35; 3.38).
3. Learn how to put the behind-the-ear (BTE) on the ear so that it does not fall off (0.36; 4.44).

53. Be able to distinguish the right from the left hearing aid (0.36; 4.44).

55. Learn how to overcome noise/whistle/feedback (0.39; 3.97).

2. Learn how to insert the hearing aid in a way that is comfortable so that it does not fall out or hang off the ear (0.44; 4.71).

103. Know whether to take hearing aids out when using headphones or not (0.51; 3.44).

41. Practice using the phone with the hearing aid (0.52; 3.56).

86. Learn how to use the hearing aids on the phone (0.54; 4.12).

Hearing Aid Maintenance and Repairs (0.17; 3.83)

73. Know when and how hearing aid tubing should be replaced (0.00; 3.85).

49. Know how to safely remove and reattach the ear mould/tubing for cleaning in warm soapy water if wax/dirt buildup occurs (0.01; 3.62).

48. Know of and how to use the air puffer to clean out the ear mould tubing and vents (0.01; 3.68).

43. Know how and when to clean the hearing aid tubing with cleaning wire (0.02; 4.15).

50. Clean microphone ports and/or replace microphone covers (0.02; 3.68).

109. Know when to use a dry aid kit, such as when it is humid, after sweating/exercising, wet ears from showering/swimming (0.02; 4.00).

42. Know how and when to clean the hearing aid moulds, including the vents (0.02; 4.32).

74. Know when to change the wax filter/protector (0.07; 4.03).

75. Know how to troubleshoot when the hearing aid is not working, for example, check for wax, change battery (0.07; 4.41).

65. Know that the wires in the plastic tube (receiver in the canal [RIC]) are very fragile—if the hearing aid stops working, it may be because the wire has bent/snapped/cracked and needs replacing (0.07; 3.74).

15. Know how to remove the wax from the hearing aid (different for different types of hearing aids; 0.08; 4.44).

23. Know how to troubleshoot for causes of feedback, for example, wax/moisture in the ear/speaker, cracked tubing, inaccurate insertion (0.10; 3.88).

21. Understand how the hearing aid battery works, that is, the battery will go flat after the sticker is removed regardless of hours of use (0.13; 3.32).
111. Know how to dry the hearing aid appropriately if they are accidentally worn in the water, that is, remove and discard the battery, dry it with dry kit or hair dryer on cold air function, and ensure fully dry before switching on again to avoid shorting the circuitry (0.14; 4.12).
51. Know to complete personal grooming prior to putting the hearing aid in (shower, dry ears/hair, apply hair spray; 0.15; 3.97).
77. Know that batteries can leak if left in a hearing aid for extended periods of time (months/years) and can damage the hearing aid (0.16; 3.88).
56. Remember to take hearing aids out prior to showering (0.18; 4.68).
38. Ensure spare batteries are kept in different locations, such as in the car/wallet/holiday house (0.19; 3.36).
69. Understand why battery life fluctuates, for example, hearing aid use in noisy environments, duration of use, and battery quality (0.19; 3.21).
44. Become familiar with the different components of the hearing aid to be able to troubleshoot if a problem arises (0.21; 3.53).
22. Learn how to tell the positive side from the negative side of the hearing aid battery (0.22; 3.97).
108. Use a magnifying glass with light (obtained from newsagents) to see smaller parts of the hearing aid, such as to assess if microphones or wax protectors are blocked (0.22; 3.33).
47. Know to wipe hearing aids with alcohol wipes if experiencing outer ear infections (0.23; 3.74).
16. Know about the servicing, batteries, and maintenance programs available (0.23; 4.03).
76. Be aware that hearing aids can be a danger to animals and small children (if swallowed) and so to keep the hearing aids in a safe place, out of reach of animals and small children (0.24; 4.12).
78. Know that battery life is extended if you wait 1 min after removing the battery sticker before inserting it into the hearing aid (0.25; 3.62).
13. Be aware that, when you buy your batteries, that there is no guarantee that every battery will work (0.30; 2.94).

81. Understand the need for preventative maintenance, that is, that all hearing aids require some maintenance over their life spans (0.31; 4.18).

19. Know how to dispose of hearing aid batteries (0.34; 3.32).

39. Know to purchase and learn how to use a battery tester to troubleshoot when no amplification with a new battery (0.35; 2.55).

18. Know where to order/purchase/collect hearing aid batteries, domes, tubes, wax protectors, cleaning items, and so forth (0.38; 4.21).

4. Make sure they have the right equipment (mould/dome/whiskers/retention line) so that the hearing aid stays in the ear (0.41; 4.56).

Advanced Hearing Aid Knowledge (0.61; 3.50)

67. Know that it is ok to collect extra batteries before going away, rather than running out or having to find a place to buy batteries while away (0.34; 3.91).

32. Know where to buy puffers or vacuums for cleaning wax (0.36; 3.18).

110. Understand how ear wax in the ear canal can cause problems with the hearing aids (0.39; 4.15).

66. Get the hearing aids serviced before going away to prevent problems while away (0.39; 3.38).

57. Get ear wax flushed or syringed out (0.43; 3.29).

60. Know to ask for a dry box (dry aid kit) as clinicians do not always give them out or mention them (0.56; 3.26).

58. If they feel pressure in their ear canals, they must know to ask their clinician to open up the vents to allow more air in (0.68; 3.00).

8. Know that they can go back for adjustments if the sound is too high/loud (0.72; 4.50).

68. Know the different options for softening ear wax to make it easier for the clinician/doctor to remove (0.74; 3.15).

71. Know to ask about rechargeable battery options before buying the hearing aid, as clinicians do not usually mention them (0.81; 2.85).

7. Know about insurance for hearing aids (0.91; 3.21).

72. Know to still use hearing protection to prevent further hearing loss (1.00; 4.09).

Learning to Come to Terms with Hearing Aids (0.31; 3.97)

34. Wear the hearing aids regularly, even if you feel you do not need to wear them all the time (0.05; 4.18).
35. Set up a reminder to encourage daily hearing aid use (0.10; 2.91).
46. Use hearing aids on a regular basis in order to “retrain” the brain and to accept amplified sounds as “normal” (0.10; 4.56).
64. Understand that getting used to hearing aids can be emotional to start with (0.12; 3.79).
33. Be motivated to wear the hearing aids (0.12; 4.58).
62. Understand that it takes a long time to get used to sounds—it can be scary at first; there is so much noise in the world (0.13; 3.94).
9. Wear the hearing aids for longer periods each day to get used to the annoying feeling in the ear (0.16; 3.65).
26. Remember to use the hearing aid (0.16; 4.41).
27. Commit to using the hearing aid (0.16; 4.59).
85. Not to be bothered by the cosmetics of the hearing aid (0.17; 3.21).
10. Persevere with the hearing aid (i.e., put up with it and be patient; 0.24; 4.26).
104. Trust that the brain will adjust to the strange sounds of the hearing aid (0.29; 3.82).
88. To understand the effects of noise on hearing speech (0.33; 4.24).
29. Be happy with the little achievements (e.g., being pleased with hearing and localizing the rustling of the leaves when bush walking; 0.37; 3.74).
98. Understand how hearing loss can affect others, for example, frustration with having to speak face-to-face (0.37; 4.03).
45. Be aware of the limitations of hearing aids and have realistic expectations from the outset (0.40; 4.18).
61. Understand that hearing aids are not like glasses, it does not just happen—it takes a long time for the brain to relearn the sounds (0.42; 4.21).
63. Be prepared for loud sounds like the clicking of the car noises when they first leave the clinic with their hearing aids in (0.43; 3.79).

84. Set a routine so that hearing aid use and management becomes a habit, for example, when to take it out and put it in (0.49; 3.82).

5. Give it another go if they have given up on the hearing aid (0.52; 4.38).

52. Develop confidence in your own ability to manage hearing aids (0.56; 4.47).

40. Know how to optimize directional microphones by sitting with your back to the noise, where possible, and ensuring the speaker is within 3 m in front (0.59; 3.64).

101. Understand how wind noise can affect hearing aids and that turning the head slightly can stop the wind noise (0.61; 3.65).

83. Use subtitles when watching the TV, even if wearing hearing aids (0.62; 2.97).

Communication Strategies (0.39; 3.91)

92. Teach family/friends to look at you when they speak (0.23; 3.94).

96. Learn not to be afraid to ask people to repeat themselves if you do not hear them the first time (0.26; 4.18).

95. Try to speak one-on-one when talking with people in a noisy place (0.29; 4.06).

94. Know to speak face-to-face when talking with people, to watch their lips (0.29; 3.94).

93. Know to use eye contact when talking with people (0.29; 3.97).

97. Realize that it can be frustrating when people do not use communication strategies, for example, face-to-face (0.46; 4.00).

107. Know and use hearing tactics to improve outcomes of hearing aid use, for example, subtitles on the TV, reducing background noise, or sitting with the noise behind them (0.51; 4.06).

89. Know to order safety alerts for the hearing impaired, for example, strobe and vibrating fire/door alarms (0.82; 3.21).

Working With Your Clinician (0.44; 3.93)

37. Find a clinician who is aware of the impact of different health problems on hearing aid use (0.17; 3.55).

36. Ask to see the same clinician so that they can get to know you (0.20; 3.48).

87. Find a clinician who is always willing to discuss and fix problems (0.21; 4.50).

14. Know what questions to ask their clinician to get all of the information (0.26; 3.65).

54. Find a good clinician who knows what they are doing (0.28; 4.59).

28. Be comfortable informing their clinician if the clinician has made incorrect assumptions (0.38; 4.35).

90. Be comfortable admitting to the clinician how little you have used the hearing aid (0.42; 3.38).

25. Know how to explain what the problem is in a way that the clinician can understand (0.44; 3.41).

102. Ask their clinician for a simple model of hearing aid if they prefer not to have the gadgets or multiple settings (0.45; 3.21).

17. Know to return to the clinician if hearing aids cause soreness or ear pain (0.51; 4.62).

6. Go back to their clinician and ask for help if the hearing aid is not fitting/working properly (0.56; 4.74).

59. Know that if their own voice sounds horrible, they do not have to put up with it; they can ask their clinician to drill bigger holes (0.60; 3.15).

80. Attend follow-up appointments to have the hearing aids adjusted (0.77; 4.32).

30. Ask for training on hearing aid use and maintenance (0.87; 3.88).