

HEARING AID USAGE BY PATIENTS WITH TINNITUS EAR DISCHARGE AND VERTIGO

Reg. No. 8413

AN INDEPENDENT PROJECT WORK SUBMITTED IN PART
FULFILMENT FOR FIRST YEAR M.Sc,
(SPEECH AND HEARING) TO THE
UNIVERSITY OF MYSORE

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TO

ANNA AMMA

CERTIFICATE

This is to certify that the Independent Project entitled: "HEARING AID USAGE BY PATIENTS WITH TINNITUS, EAR DISCHARGE AND VERTIGO" is the bonafide work, done in part fulfilment for First Year M.Sc, (Speech and Hearing) of the student with Register No. 8413

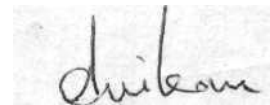


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CERTIFICATE

This is to certify that the Independent Project entitled " HEARING AID USAGE BY PATIENTS WITH TINNITUS, EARDISCHARGE AND VERTIGO" has been prepared under my supervision and guidance.

A handwritten signature in cursive script, appearing to read "Dwibakar", is written over a light gray rectangular background.

GUIDE

DECLARATION

This Independent Project entitled "Hearing Aid Usage by Patients with Tinnitus, Ear discharge and Vertigo" is the result of my own study undertaken under the guidance of Dr.(Miss) S. Nikam, Professor and Head, Department of Audiology, All India Institute of Speech and Hearing, Mysore and has not been submitted earlier at any University for any other Diploma or Degree.

Mysore

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Register No. 8413

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INTRODUCTION

INTRODUCTION

Hearing loss is sometimes associated with problems like tinnitus, ear discharge and vertigo. When hearing aid is prescribed to a patient, these additional problems would also be considered important in making satisfactory adjustment. Though there are studies which show that people with noise induced hearing loss are not good candidates for hearing aid (Heffler, 1975), there are very few studies regarding use of hearing aid by patients with problems such as tinnitus, ear-discharge and vertigo. Hence we do not know how many of these people make satisfactory adjustments with a hearing aid.

Courtosis, (1972) reported that when patients who had hearing defect and dizziness associated with more or less troublesome tinnitus were treated with hearing aid, tinnitus was considerably moderated or disappeared completely. Such treatment has also been reported by Saltzman (1947) and Fowler (1948). Courtosis (1972) also reported that dizziness disappeared when the patients were given binaural hearing aid.

Several authors have published general figures about the use of hearing aid by their patients (Gillissen, 1970b; Brooks, 1972, 1973; Kapteyn, 1973; 1977; Ewertsen, 1974). It seems that 60-90% use their aid always or frequently, 5-30% use it occasionally and 5-10% never. But whether these hearing aid users had only hearing loss or hearing loss with associated problems was not reported.

Need for the study:

There are few studies regarding hearing aid usage by patients who have hearing loss with tinnitus, eardischarge and/or vertigo. This may be because very few patients with eardischarge and vertigo receive a hearing aid.

Patients with eardischarge are usually prescribed a hearing aid with bone-conduction receiver. But they may be given a hearing aid with air-conduction type of receiver, if they do not have active ear discharge at the time of examination. It is necessary to know whether hearing aid is useful with such patients or not.

Patients with hearing loss and vertigo may have more problems than those with only hearing loss. When hearing aid is used, they may not be helped much by its use. Hence it is necessary to know how many of these people are satisfied with their hearing aid.

Though there are studies on hearing aid usage by patients with tinnitus, Indian population has not been studied. Some studies may not be applicable to Indian population for a wide variety of reasons such as reported differences in sociocultural pattern and biological differences. Hence there is need for such a study on Indian population.

The purpose of the present study was to find out how frequently hearing aid is used by patients who have hearing loss with associated problems like tinnitus, eardischarge and/or vertigo and also to find out to what extent they are satisfied with their hearing aids.

METHOD

METHOD

The aim of the study was to find out some facts about hearing aid usage by patients with tinnitus, ear discharge and/or vertigo.

Questionnaire:

A questionnaire was constructed to gather information about usefulness of hearing aid. The questionnaire included some general questions like age and sex of the subject, type of hearing aid used by the subject, age of onset of the problem, period of hearing aid usage and included some questions specifically to cover the broad areas:-

- I. frequency of hearing aid usage.
- II. frequency of changes in hearing aid fitting.
- III. specific benefits provided in real life situations.

Guidelines for these criteria were taken from Vanderbilt Report (1981).

There were twentythree questions in the questionnaire which were in English, later it was translated into Kannada, the regional language.

The questionnaire was checked, for ambiguity.

Subjects:

Subjects included in the study were those who had got their hearing aid under the social welfare scheme and also had hearing loss with additional problems viz. tinnitus, ear discharge and/or vertigo. Only residents of Mysore meeting the above criteria were included. Subjects ranged in age from 7 years to 85 years with the mean age of 45 years. The number included 40 males and 30 females who responded to a letter sent.

All of them had their own body level hearing aids. Duration of hearing aid usage ranged from 6 months to more than 5 years.

Procedure:

One hundred and seventy subjects were selected for the study based on the criteria stated earlier. Letters were sent out asking them to come for followup within a specific period. Seventy people responded subjects were grouped into five categories based on the additional problem(s) they had. The categories and number of subjects in each category was as follows:

Group-1: Included those with hearing loss and tinnitus.

There were 29 subjects (14 males and 15 females). Their age ranged from 16 to 85 years.

Group-II: Included those with hearing loss and eardischarge. There were 11 subjects (9 males and 2 females). Their age range was 7-77 years.

Group-III: Included those with hearing loss and vertigo. There were 7 subjects (4 males and 3 females). Their age range from 55 to 85 years.

Group-IV: Included those with hearing loss, tinnitus and vertigo. There were 17 subjects (9 males and 8 females). Their age range was 16-76 years.

Group-V: Included those with hearing loss, tinnitus and eardischarge. There were 6 subjects (4 males and 2 females) in this group. Their age range from 36 to 75 years.

Their hearing impairment was categorized as conductive hearing loss, mixed hearing loss and sensorineural hearing loss based on the audiogram taken previously.

As and when the subjects came, they were personally interviewed to gather the required information. They also got their hearing aid checked and counselling was done wherever it was found necessary. Interview was in their English or Kannada or sometimes a combination depending on the language. Known to the subject. Responses were recorded on paper. Some times in order for the subjects to understand the question, it was necessary to elaborate on the questions.

RESULTS

RESULTS

Responses of the subjects were tabulated and the percentages were calculated.

Table-1 : Showing distribution of subjects.

	Hearing loss with tinnitus	Hearing loss with eardis-charge.	Hearing loss with vertigo	Hearing loss with tinni-tus and vertigo.	Hearing loss with tinnitus and eardis-charge
Conductive loss	3.45%				16.67%
Mixed loss	55.17%	72.72%	14.29%	29.41%	83.33%
Sensorineural loss	41.38%	27.27%	85.71%	70.59%	-

Table shows that maximum number of the subjects with vertigo had sunsorineural hearing loss. None of the subjects with sensorineural loss had tinnitus and eardischarge. Those with tinnitus and vertigo did not have conductive loss. Subjects with mixed loss were distributed in all the groups with the majority having eardischarge and tinnitus.

Table-2 : Showing duration of hearing aid usage.

	Hearing loss with tinnitus	Hearing loss with eardis-charge	Hearing loss with vertigo	Hearing loss with tinnitus and vertigo	Hearing loss with tinnitus and ear discharge.
<1 Year	6.91%	36.36%	14.29%	11.76%	33.33%
1-5 Year	72.41%	54.54%	85.71%	88.24%	66.67%
>5 Year	17.24%	9.09%			

Table shows that most of the subjects had used their aid for a period of 1-5 years very few had used it for a period of more than 5 years.

Table-3 : Showing frequency of hearing aid usage.

	Hearing loss with tinnitus	Hearing loss with eardis-charge	Hearing loss with vertigo	Hearing loss with tinnitus and vertigo	Hearing loss with tinnitus and eardischarge
Throught the day	48.3%	63.6%	42.9%	29.4%	50%
Only some-times	51.7%	36.4%	57.1%	64.7%	50%

Table shows that significantly less number of subjects with tinnitus and vertigo used their hearing aid throughout the day whereas significantly more number of subjects with tinnitus and/or eardischarge used it throughout the day.

Table-4: Showing wheather the subject had changed the hearing aid to a different model or not.

	Hearing loss with tinnitus	Hearing loss with eardis-charge	Hearing loss with vertigo	Hearing loss with tinnitus and vertigo	Hearing loss with tinnitus and ear-discharge
Yes	7.2%	9.1%			16.7%
No	82.8%	90.9%	100%	100%	83.3%

Table shows that very few subjects had get their hearing aid changed to a different model, None of the subjects with vertigo had changed their hearing aid to a different type/model.

Table-5: Showing percentage of subjects who reported change in usefulness of hearing aid since initial usage.

	Hearing loss with tinnitus	Hearing loss with eardis-charge	Hearing loss with vertigo	Hearing loss with tinnitus and vertigo	Hearing Loss with tinnitus and ear-discharge
Better	13.8%	9.1%	14.3%	29.4%	16.7%
Worse	27.6%	9.1%	-	11.8%	16.7%
No changed	55.2%	81.8%	85.7%	52.9%	66.6%

Table shows most of the subjects reported no change in the usefulness of hearing aid since the initial usage.

Table-6: Showing percentage of subjects who reported change in speech comprehension since initial usage.

	Hearing loss with tinnitus	Hearing loss with eardis-charge	Hearing loss with vertigo	Hearing loss with tinnitus and vertigo	Hearing loss with tinnitus and ear-discharge.
Better	13.8%			29.4%	16.7%
Worse	27.6%	9.1%		11.8%	16.7%
No change	55.2%	90.9%	100%	52.9%	66.6%

Table shows a majority of them did not report any change in speech comprehension since initial usage.

Table-7:: Showing percentage of subjects who wanted a different hearing aid.

	Hearing loss with tinnitus	Hearing loss with eardischarge	Hearing loss with vertigo	Hearing loss with tinnitus and vertigo	Hearing loss with tinnitus and ear discharge.
Yes					
<1 Year				5.88%	
1-5 Year	34.48%	36.36%	28.57%	23.53%	33.33%
>5 Year	3.45%	9.09%			
No					
<1 Year	3.45%	27.27%	14.29%	5.88%	33.33%
1-5 Year	27.59%	18.18%	57.14%	52.94%	16.66%
>5 year	17.24%				
Does not know					
<1 Year	3.4%	9.09%			
1-5 Year	10.35%			11.76%	16.66%
>5 Year			—		

Table shows that majority of subjects who wanted to change their hearing aid had vertigo, Most of those who wanted to change their aid had used for a period of 1-5 years.

Table-8: Showing percentage of subjects satisfied with the current hearing aid.

	Hearing loss with tinnitus	Hearing loss with eardis-charge	Hearing loss with vertigo	Hearing loss with tinnitus and vertigo	Hearing loss with tinnitus and ear-discharge.
Completely satisfied	17.2%	9.1%	14.3%	17.6%	16.7%
Adequate	58.6%	72.7%	61.4%	52.9%	50%
Not satisfied	-	18.2%	24.3%	23.5%	33.3%

Table shows most of the subject found their hearing aid only adequate. Those with tinnitus and eardischarge seem to be the least satisfied.

Table-9: Showing percentage of subject who had derived benefits from hearing aid.

	Hearing loss with tinnitus	Hearing loss with eardischarge	Hearing loss with vertigo & tinnitus	Hearing loss with vertigo tinnitus and ear-discharge
More than anticipated	6.9%	27.3%	14.3%	11.8%
Less than anticipated	24.1%	18.1%	14.3%	23.5%
As much as anticipated	65.5%	54.5%	71.4%	58.8%
				50%

Table shows very few people with tinnitus reported that the aid had helped them more than anticipated. Most of the subjects reported that it helped them as much as anticipated. Those with tinnitus and ear discharge reported that it helped them less than anticipated. For those with vertigo it helped them more than anticipated.

Table-10 : Showing Percentage deriving benefit in real life situation.

	Hearing loss with tinnitus	Hearing loss with eardischarge	Hearing loss with vertigo	Hearing loss with tinnitus & vertigo	Hearing loss with tinnitus and ear-discharge.
Environmental sound	Yes No	100%	100%	100%	100%
Localization	Yes No	62.07% 34.48%	72.73% 27.27%	42.80% 57.14%	70.59% 23.53%
With visual clues	Yes NO	89.55% 6.95%	100%	100%	83.33% 16.66%
Without visual clues	Yes No	65.52% 31.03%	90.91% 9.09%	71.43% 28.57%	76.47% 17.65%
quiet situation	Yes No.	93.1% 3.45%	100%	100%	83.33% 16.66%
noisy situation	Yes No	13.79% 82.76%	63.64% 36.36%	28.57% 71.43%	41.18% 52.94%

Table shows that all subjects reported that they could hear environmental noise with hearing aid. Most of the subjects with eardischarge reported that aid helped them in localizing sound whereas very few subjects with vertigo were helped by the aid in localizing sound.

A majority of subjects in all groups could converse easily in quiet situation. In contrast more people with eardischarge reported that they converse easily in noisy situation and majority of subjects with vertigo had difficulty in noisy situation.

Most of the subjects in all groups could converse easily when visual clues was available. A majority of subjects with eardischarge reported that they could converse easily without visual clues also. More subjects with tinnitus could converse easily without visual clues when compared with those who had vertigo.

Table-11: Showing percentage of hearing aid users who enjoyed wearing it

	Hearing loss with tinnitus charge	Hearing loss with ear discharge	Hearing loss with vertigo	Hearing loss with tinnitus and vertigo	Hearing loss with tinnitus and ear discharge.
Yes	79.3%	81.8%	71.43%	76.5%	50%
NO	20.7%	18.2%	28.57%	23.5%	50%

Table shows that a majority of the subjects enjoyed wearing hearing aid except those with tinnitus and ear discharge. Among those who did not enjoy wearing hearing aid, a majority had tinnitus and ear discharge.

Table-12: Showing percentage of subjects who used hearing aid when they had tinnitus/eardischarge/vertigo.

	Hearing loss with tinnitus	Hearing loss with ear discharge	Hearing loss with vertigo	Hearing loss with tinnitus and vertigo	Hearing loss with tinnitus and ear-discharge.
Tinnitus	Yes 58.6%			58.8%	66.7%
	No 31.3%			41.2%	33.3%
ear discharge	Yes				16.7%
	No	100%			83.3%
Vertigo			14.3%	23.5%	
No			85.7%	76.5%	

Table shows that a majority of subjects with tinnitus continued to use their hearing aid when they had tinnitus whereas those with eardischarge or vertigo did not use the aid when they had eardischarge/vertigo.

Table-13: Showing percentage of subjects who find the hearing aid useful when there is tinnitus/eardischarge/vertigo.

	Hearing loss with tinnitus	Hearing loss with eardischarge	Hearing loss with vertigo	Hearing loss with tinnitus and vertigo	Hearing loss with tinnitus and ear-discharge.
Tinnitus					
Less useful	17.65%			20%	75%
More useful	23.53%	-		20%	25%
No change	58.52%			60%	
Ear discharge					
Less useful		-			
More useful					100%
No change					
Vertigo					
Less useful				25%	-
More useful			100%	75%	
No change					

Table shows majority shown no change in the usefulness of hearing aid when they have vertigo/eardischarge.

Table-14: Showing percentage of hearing aid users who reported change in tinnitus/eardischarge/vertigo/headache since the initial usage.

	Hearing loss with tinnitus	Hearing loss with eardischarge	Hearing loss with vertigo	Hearing loss with tinnitus and vertigo	Hearing loss with tinnitus and eardischarge.
Tinnitus:					
More	6.9%	-		5.88%	33.33%
Less	34.48%			23.5%	66.66%
No change	55.17%			70.59%	
Eardischarge:					
More	-	9.1%		-	
Less					
No change		90.9%			100%
Vertigo:					
More	10.34%			5.88%	16.16%
Less					
No change			100%	88.24%	
Headache:					
More	13.8%			-	33.33%
Less					16.16%
No change					

Table shows that some of the subjects reported that their tinnitus disappeared when the hearing aid was worn. There was no change in vertigo/eardischarge.

DISCUSSION

DISCUSSION

Analysis of the results showed that subjects with eardischarge or mixed hearing loss used their hearing aid more frequently in real life situation than those with tinnitus and/or vertigo. This could be because majority of the subjects with eardischarge had mixed hearing loss or conductive hearing loss. It has been reported that subjects with conductive loss use their hearing aid more frequently than subjects with sensorineural hearing loss (Gillissen, 1970b; Brooks, 1972; Greene and Byrne, 1972; Carstairs, 1973; Kapteyn, 1973, 1977; Ewertsen, 1974).

Subjects in all the groups used their hearing aid more during public meetings, talking with one person or listening to radio. Subjects used their hearing aid least in noisy situations such as market place or talking with two or more persons. This could be because speech comprehension is poor in noisy situation. Percentage of subjects using hearing aid in noisy situation was more in those having hearing loss with eardischarge and was least in those having hearing loss and vertigo. This may be because speech discrimination is better in patients with conductive loss than in those with sensorineural hearing loss.

Subjects with hearing loss and eardischarge reported that they did not switch off the hearing aid in any situation. Some of the subjects with tinnitus switched off their aid in noisy situation and most of the subjects with vertigo reported that

they switched off their aid in noisy situation. This could again be because more subjects with vertigo and tinnitus had sensorineural hearing loss and they might have had greater difficulty whereas more subjects with eardischarge had conductive or mixed hearing loss and also they might have had less difficulty in noisy situation.

Most of the subjects who had their hearing aid changed had been using it for a period of five years or more Aids were changed when the subjects could not hear with/their aid or when the aid was irreparable. Greene and Byrne (1972) reported that deterioration in hearing aid performance often was not evident to the wearer unless the aid had stopped working. Information about how many times the aid had been repaired and information on electroacoustic characteristics of the hearing aid seem pertinent information to have.

Majority of people did not report any change in the usefulness of hearing aid since the initial usage. This could be due to this question being of a general nature.

A majority of the subjects did not report any change in speech comprehension since initial usage. The change may not have been noticed because the subjects had got adopted to making use of the visual clues available. Also information about their life style was not obtained. Perhaps a majority of them being in the older age group, they might have a lived in a quiet environ-

ment, involving less communication. Kapteyn (1977) reported that older people like to live in quiet world.

The reason for some subjects reporting that they recently had more difficulty in understanding speech may be their progressive hearing loss. Further some of them had loose contact switch, dead all, broken cord, earmold canal blocked with wax or broken battery compartment. Sometime may be required for the subjects to get used to the aid and this might be the reason for some subjects reporting that of late they had less difficulty in understanding speech. Kapteyn (1977) reported some period was needed for the hearing aid users to become used to the aid and this period varies with the individual.

Those subjects who wanted their hearing aid changed to a different model gave reasons such as the aid not being useful, lack of clarity in speech, not useful in group situation, head ache if used continuously or the use of hearing aid not having the desired effect on their tinnitus. Some of them preferred to use behind the ear hearing aid on account of it being less conspicuous.

Those who did not want to change their hearing aid fell in two groups either they were completely satisfied or they knew the limitations of the hearing aid and were able to make compromises.

Most of the subjects found their hearing aid adequate. A few subjects, completely satisfied, used their hearing aid through-

out the day and reported that speech was clear with little distortion. The hearing aid helped them in localizing the sound. Some of them reported that tinnitus disappeared when the hearing aid was worn continuously.

A few subjects who were not at all satisfied with their hearing aid reported that they had difficulty in understanding speech and there was more distortion. Some of them reported that wearing the hearing aid was uncomfortable and they got earache or headache when used continuously. Some found their aids not working efficiently. Thus the findings support Plomp (1978) who concluded that many people do not consider their hearing aid as an ideal device for hearing loss compensation.

Those who expected more help from hearing aid were less satisfied than those who did not expect much help from the hearing aid. An unrealistically favourable idea about the hearing aid led to disappointment (Brooks, 1972? Greene and Byrne, 1972? Orwall, 1965). Therefore, when a hearing aid is prescribed, the user must be made aware of what he can expect from hearing aid related to his degree of hearing loss and associated problems. Also it is not known what their anticipations were. At the time of recommending a hearing aid, their expectations can be recorded and can be followed up later.

The subjects were most satisfied with their hearing aid when in quiet situation, during conversation when visual clues were available, were least satisfied in noisy situations. Present findings support the studies which show that performance of a subject is poor in noisy situation. Greene and Byrne (1972), Carstairs (1971) reported the subjects were most satisfied with their hearing aid when they were talking to one person in quiet whereas the use of hearing aid was worst in group conversation. Gillisen (1970b) reported that roughly a hearing aid was satisfactory with one other person in the room and moderately satisfactory with two or three people and unsatisfactory with many people in the same room. It is clear that a overwhelming number of people complain about their hearing aid in background noise. This problem is not unique to Indian hearing aids or their users. This also reflects the better performance of aids in picking up sound from a single source.

Percentage of subjects helped by the hearing aid during conversation in noisy situation and when the speaker was not facing them was more in subjects with ear discharge and it was least in subjects with vertigo. This may be because subjects with conductive component have better speech discrimination than those with sensorineural hearing loss.

Subjects who were satisfied with their aid reported that they enjoyed wearing hearing aid.

As expected subjects did not use their hearing aid when the earcharge was active. Few subjects used their aid when they had vertigo. A majority with tinnitus continued to use their hearing aid when they had tinnitus.

In patients with ear discharge and vertigo, the down time of the hearing aid may have precluded their being able to notice the difference.

Vertigo being unconnected with the hearing loss, is not expected to change with the use of the hearing aid.

Some of the subjects with tinnitus reported that their tinnitus disappeared when they wore their hearing aid. It had completely disappeared in two subjects. Several investigators have reported that hearing aid can be used to help subjects with tinnitus. Since the 1940s hearing aids have been fittett to some patients to amplify external noises and mask or provide distraction from tinnitus. This was first reported by Saltzman (1947). Additional support was given by Courtosis (1972). Some advocates of this approach report 70-80% success rates in tinnitus relief, but others report perhaps a more realistic effectiveness with some 20-30% of patients being helped (Srinivas, 1982).

Sandra and Curtis (1981) suggested that three points must be considered when using hearing aid in treatment of tinnitus. They are:

1. Hearing aid should not be used unless the subject has hearing loss.

2. Hearing aid is a most successful masker if the frequency range of tinnitus is between 2000Hz-4000Hz.
3. Hearing aid will be unsuccessful as masking units if the tinnitus is of a frequency higher than the upper limits of frequency amplified by the hearing aid.

In the present study, the frequency of tinnitus was not investigated. It is likely that subjects whose tinnitus was not relieved by the use of hearing aid, had a tinnitus of higher frequency.

Some subjects reported an increase in vertigo. This may not have been casually related to hearing aid as such. All of them were in the older age group and they had hypotension.

None of the subjects changed the volume control or tone control of the hearing aid when they had tinnitus, eardischarge end/or vertigo. Most of the subjects did not know the utility of the tone control switch. So when prescribing a hearing aid, more information should be provided to the patient.

In general, subjects with vertigo seemed to be less satisfied and had more problems with the hearing aid. Hence presence of vertigo should be taken into consideration when recommending hearing aids for such patients. In addition/closer follow-up seems warranted.

Also most of the subjects in this study used a body level hearing aid with single cord. Courtosis (1972) reported that

dizziness disappeared in his patients when they were treated with binaural hearing aids. This needs to be investigated further.

Subjects included in this study were those who had received hearing aid under welfare scheme and volunteered to come for followup. Further study on a large group of people may be conducted.

SUMMARY AND CONCLUSIONS

SUMMARY AND CONCLUSIONS

This study was aimed at investigating usefulness of hearing aid by patients who have problems such as tinnitus, eardischarge and vertigo.

Seventy subjects who had received hearing aid under Social Welfare Scheme and volunteered to come for followup were included in the study. All of them wore body level hearing aids.

Subjects were grouped into five categories depending on the associated problem(s) they had. The categories were:

I group included those who had hearing loss and tinnitus.

II group included those who had hearing loss and eardischarge.

III group included those who had hearing loss and vertigo.

IV group included those who had hearing loss, tinnitus and vertigo.

V group included those who had hearing loss, tinnitus and ear-discharge.

Each subject was interviewed using a questionnaire designed for the purpose.

Responses of the subjects were tabulated in percentage.

Analysis of the results showed that the hearing aid was more useful for all the subjects in quiet situation and was least useful in noisy situation. In general subjects with eardischarge had had less difficulty in communication and subjects with vertigo derived less benefits. The use of hearing aid made no difference

to ear discharge and vertigo whereas it reduced tinnitus in some subjects.

When recommending a hearing aid, the associated problems the subject has also should be considered and closer follow-up is needed.

Conclusions:

1. Associated problems should also be considered when a hearing aid is recommended.
2. Some of the patients with tinnitus get relief from it when a hearing aid is used.
3. Patients with vertigo are less satisfied with their hearing aid. These subjects being in the older age group, face more problems. This should be considered when a hearing aid is recommended and closer followup of these patients is warranted.
4. Patients with conductive and mixed hearing loss seem to have less difficulty in communication.
5. Patients are satisfied with hearing aid when talking with one person and have less difficulty when visual clues are available. They have more difficulty when visual clues are not available and also in group conversation.

Recommendations for further study:

1. same study may be carried out on larger group of subjects.
2. Similar study may be carried out for subjects with hearing loss and other additional problems such as systemic disorders.
3. Anticipations of the hearing aid users may be recorded when recommending hearing aid and follow-up of those patients may be done.
4. Similar study collecting more information about the usefulness of hearing aid and also considering electroacoustic characteristics of the hearing aid could be done.

REFERENCES

REFERENCES

- Carstairs, Vera., "Utilization of hearing aids issued by the National Health Service", *British Journal of Audiology*, Vol.7, 1973, pp.72-76.
- Courtosis, J., "Dizziness treated with Hearing Aids", *Scandinavian Audiology*, Vol.1., 1972, pp.13-18.
- Ewertsen, H.W., "Use of hearing aids (always, often, rarely, never)", *Scandinavian Audiology*, Vol.3, 1977, pp.173-176.
- Heffler, Allam., "Hearing aids and Noise", MAICO Audiological Library Series, Vol.13, Report-3, pp.17-19.
- Johnson, E.W., "Management of the Tinnitus Patient" in *Sensori-neural Hearing Loss, Vertigo and Tinnitus; Ear Clinics International*, Vol.1 Eds. Paperella, M.M. and Myerhoff, W.L., Baltimore, William and Wilkins, 1981.
- Kapteyn, T.S., "Satisfaction with fitted hearing aids - I: An analysis of technical information", *Scandinavian Audiology*, Vol.6, 1977, pp.147-156.
- Kapteyn, T.S., "Satisfaction with fitted hearing aids-11: An investigation into influence of psycho-social factors", *Scandinavian Audiology*, Vol.6, 1977, pp.171-177.
- Plomp, Reinler, "Auditory handicap of hearing impairment and the limited benefit of hearing aids", *Journal of Acoustical Society of America*, Vol.63, 1978, pp.533-549.
- Sandra, R.C., and Curtis, R.S., "Industrial Tinnitus" *Hearing Aid Journal*, Vol.34, 1981, pp.5
- Srinivas, P.S., "Tinnitus - A review". Independent Project, University of Mysore, Mysore, 1982.
- Vernon, J., and Schleaning, "Tinnitus - A new measurement", *Laryngoscope*, Vol.89, 1978, pp.413.
- Zelnick, E., "Hearing Aid selection - Reviewing the Vanderbilt Report", *The Hearing Journal*, Vol.36, 1982, pp.21-23.

APPENDIX

APPENDIX-I

QUESTIONNAIRE

Name of the hearing aid user:

Case Number at AIISH :

Age :

Education :

Employment :

1. When did your hearing problem start?
(Write approximate month and year)

2. Since when is the hearing aid worn?
(Write approximate month and year)

3. Is the hearing aid worn throughout
the day or only sometimes?

4. If only sometimes, specify the situa-
tions and approximate duration in
hours below:

Situation

No.of hours/day/week

(i)

(iii)

5. Do you wear the hearing aid when:

(i) At home

a) with family members - Yes/No

b) listening to the radio - Yes/No

c) the T.V. is on - Yes/No

d) Others

(ii) Outdoors

- a) School/workplace - Yes/No
- b) Friend's house - Yes/No
- c) Relative's house - Yes/No
- d) Functions/marriages/parties - Yes/No
- e) Others - Market, temple/church etc.

6. When do you switch off the hearing aid? Why?

Situations

Reason

- (i)
- (ii)
- (iii)

7. Have you got your hearing aid changed to a different model?
Give details.

- a) How many times have you changed
- b) From which aid to which aid?
 - i) One body level to other body level,
 - ii) Body level to earlevel or viceversa.
 - iii) Monaural to pseudobinaural or vice versa.
 - iv) Monaural from one ear to the other ear.
 - v) Imported to indigenous or vice versa.
- c) What was the reason for changing?

9. Since you started using the hearing aid is there any change in your understanding of other's speech?

- a) for better
- b) for worse
- c) no change

10. Would you like to have a different hearing aid?

- a) Yes b) No c) ...

Give reasons

11. To what extent are you satisfied with your hearing aid?

- a) Completely satisfied
- b) Adequate
- c) Not satisfied

Explain in what ways?

12. Do you feel that hearing aid has helped you.

- a) more than anticipated
- b) less than anticipated
- c) not at all

Explain in what ways?

13. Which of the following have you noticed in yourself when the hearing aid is worn and when the hearing aid is not worn.

When it's not worn_____	When it's worn__
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i) Can hear the following environmental sounds-

- a) Door bell
- b) Bus horn and other traffic noises
- c) Telephone ring

When it's
not worn

When it's
worn

- d) Dag barking and other animal sounds
 - e) Other sounds such as....
- ii) a) You attend to person when called from same room.
 - b) Attend to a person when called from next room
 - c) Do not attend even when called from near.
- iii) a) Can locate the speaker when you are not looking at the speaker.
 - b) Can locate other sounds such as -- appropriately.
- iv) Can converse easily when
 - a) You are watching the speaker
 - b) You are not looking at the speaker
 - c) In noisy situations
 - d) In quiet situations

14. Do you enjoy wearing the hearing aid sometimes?

- a) Yes (b) No (c)

If yes in which situations?

- (1) When the music is on Yes/No

(iii)...

15. Can you hear yourself when you wear the hearing aid?

16. Have you heard others commenting on your speech or other behaviour when you are not wearing a hearing aid?

17. At what settings do you keep the volume control when you use the hearing aid?

a) Most of the time

b) Occassionally (in situations such as
to settings)

18. At what settings do you keep the tone control when you use the hearing aid?

a) Most of the time

bP Occassionally (in situations such as
to

19. Do you have your problem (ear discharge/tinnitus/vertigo) even now? If so how often?

a) Through the day (i) Continuous

b) Sometimes-specify when (ii) Episodic

(If he/she has more than one problem, collect information about all the problems)

20. Do you use your hearing aid when you have the problem(tinnitus/vertigo/eardischarges).

21. Do you notice any change in the usefulness of the hearing aid when you have the problem (tinnitus/vertigo/eardischarge)

a) Less useful

b) More useful

c) No change

Give details such as speech is not clear.

22. Do you change the volume control or tone control of the hearing aid when you have the problem(tinnitus/vertigo/eardischarge).

- specify the change

23. Have you noticed any changes in the following since you started wearing a hearing aid?.

a) Tinnitus

b) Vertigo

c) Eardischarge

d) Any other problems like head ache.