

**MAN-POWER RESOURCES IN SPEECH AND HEARING - EARMOLD**

**Reg.No.M9210**

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

**ALL INDIA INSTITUTE OF SPEECH AND HEARING: MYSORE - 570 006.**

**MAY 1993**

\*\*\*\*\*

MY MOST PRECIOUS POSSESSIONS

MY

ACHAN AND AMMA


I LOVE YOU BOTH

\*\*\*\*\*

CERTIFICATE

This is to certify that this Independent Project entitled: Man-power Resources in Speech and Hearing - Earmold is the bonafide work in part fulfilment for the degree of Master of Science (Speech and Hearing) of the student with Reg.No.M9210.

Mysore  
1993.

  
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**CERTIFICATE**

This is to certify that the  
Independent Project entitled:  
Man-power Resources in Speech and  
Hearing - Earmold has been prepared  
under my supervision and guidance.

Mysore

199 3

Dr.(Miss)



S.Nikam,

GUIDE

### DECLARATION

I hereby declare that this Independent Project entitled: Man-Power Resources in Speech and Hearing - Earmold is the result of my own study under the guidance of Dr.(Miss) S.Nikam, Prof, and HOD, Department of Audiology, and Director, All India Institute of Speech and Hearing, Mysore, and has not been submitted earlier to any University for any other Diploma or Degree,

Mysore

1993.

Reg.No.M9210

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## INTRODUCTION

### Survey Research

"Scientific research or research is an action producing truthful information about things and what happens to them" (Wolman, 1965). Truthful information is sought through different methods of research. Survey research is one among them.

The survey is a data-collection method in which an instrument is used to solicit responses from a sample of respondents (Lin, 1976). It takes many forms ranging from the mail questionnaire to in-depth personal interviews.

The survey method is applied to various fields of study. The significance of survey method is that it is an instrument of great versatility, applicable to a wide range of problems in the general area of social research. The advantage of survey research is that a great deal of information can be obtained from a large population.

Surveys differ greatly in their scope, design and content. As in other methods of research the specific characteristics of any survey will be determined by the objectives (Campbell and Katona, 1966).



**Surveys in the field of speech and hearing:**

In the field of speech and hearing, survey method has been used to meet various needs, Curlee (1975) used the survey method to study the Man-power Resources in Speech Pathology and Audiology, Kapur (1966) conducted a survey of personnel, equipment and facilities available in India in the field of Speech and Hearing. A survey of status of warble tone in audiometers was conducted by Staab and Rintelman (1972), A survey on Man-power Resources and Needs in Speech Pathology and Audiology was done by Balakrishnan (1978), These are a few examples of survey research done in the field of speech and hearing. Survey research seems ideally suited for obtaining facts regarding education training and employment of man-power and updating methods and resource available in speech pathology and audiology,

**Man-power with Critical Skills:**

Development of scientific man-power involves investment in higher education and training. As more and more advances are made in science, technology and medicine, increased specialization may be required to meet the different needs of the society. The Health Survey and

Planning Committee (1961) had recognised the need for man-power resource development in Speech Pathology and Audiology. Keeping this in view, attempts were made to compile information available regarding the earmold technology from various centres in India and apply developed training programmes to suit various centres in India.

All India Institute of Speech and Hearing was established at Mysore in 1965, From 1971 with the collaboration of Danish Project an earmold lab was set-up to cater to the needs of speech and hearing handicap. Apart from this students of B.Sc.,(Speech and Hearing) were trained in making custom earmolds. All India Institute of Speech and Hearing is conducting short-term, refresher course and advanced courses in custom earmold making with the installation of Better Molds for More People Project in 1989 development of indigenously available methods and materials for soft mold were also tried.

It is not enough to have trained personnel with "critical skill". The administrators and professionals must be aware of the availability of people with these types of education and training, and services they can render.

Earmold is the plastic piece with the help of which the hearing aid/receiver fits snugly in the ear. Even-though, ready made standard earmolds are available in the market, a custom-made earmold is essential to get maximum benefit from a hearing aid. The importance of a custom made tight fitting earmold cannot be either overemphasized nor underestimated. Numerous technological advances have been made in hearing instruments over the past few years. These advances particularly in ear-level hearing aids have the capacity to deliver a wider spectrum of sound frequency than ever before. Without a properly fitting earmold however technologically advanced hearing aids cannot be worn by the people who could benefit from them the most. Steps involved in making an earmold are:

- (1) Examination of the ear for wax, infections etc.
- (2) Impression taking
- (3) Flasking
- (4) Packing with acrylic resin
- (5) **Curing**
- (6) **Trimming and polishing**
- (7) **Ring/tube fixing**

Some of the equipment necessary for the earmold lab are: (1) Dental bench motor with sand paper disc or stone, (2) Hanging motor (3) Hydraulic press, (4) Fissure bur, (6) Earmold and impression materials etc.

It is very important for hearing and dispensers, audiologists, teachers, therapists and parents to recognize the important role that earmolds play in determining the overall effectiveness of a hearing aid. Without this recognition the sophisticated technology that is currently available to help the hearing-impaired cannot be used to its fullest advantage.

The present study was designed to determine the pattern of man-power utilization and advancement in manufacturing of earmolds and catering to different needs of cases and to update the earmold technology in India presently available.

**NEEDS FOR THE STUDY:**

A survey of the characteristics of man-power in Speech and Hearing would serve a variety of needs.

First, training programme for which resources are required should be subject to the relevance of the skill

and training they impart. One way of testing the relevance of training is to ascertain the pattern of utilization of man-power.."

Secondly, there are different kinds of informal training programmes run by different institutes in making of earmolds. Higher the level of training greater is the quality of the earmolds produced. Information regarding these would reveal whether the services of the specialists are usefully and economically employed.

Third, quality service delivery depends both on personnel and equipment. People may be employed but without their professional tools their "critical skill" cannot be effectively used. Tools need maintenance and test environment for their better performance. What equipment and facilities the professionals have in the field of earmolds need to be ascertained.

Fourth, speech and hearing specialist is one of the youngest recognised speciality among rehabilitation. With the increased awareness of speech and hearing handicap there is a great demand for custom earmolds. Similarly, with different types of hearing aids available there needs

to be changes made in earmolds. Also with the hearing conservation programmes in industries and in prevention of ear infection in swimmers, earmolds play a vital role. So it becomes necessary to pool all the kinds of services available to different groups of people.

Fifth, information regarding the distribution of the professionals, that is whether they are concentrated in some geographical area or diffused throughout the country is to be ascertained.

Specifically, the study was designed to obtain information regarding the personnel, equipment and work environment. The personnel information consisted of the demographic information, academic history, nature of duties, monthly income and professional interaction.

Regarding equipment, it consisted of information on the earmold tools and equipment and for the sophisticated instrumentation for insertion gain measurements.

REVIEW OF LITERATURE

Only very few studies have been done in this area. And they are, one done by Balakrishnan(1978) and Kapur (1966) etc.

Kapur (1966) conducted a study through mailed questionnaire with the following objectives ie. to know the availability of facilities such as sound treated room, facilities for calibration of audiometers and for making earmolds, to know the number of diagnostic and therapy instruments such as audiometers, hearing aids and speech trainers and to know the utilizations and distribution of technical personal involved in speech and hearing services.

The results of the study indicated that out of 69 teaching hospital nine did not have audiometers, 25 had one audiometer each but not in working condition and 35 did not have any facilities for audiological evaluation. It was reported that only 18 out of 69. Teaching hospitals had a sound treated room and five rooms have had the ambient noise level measured. Further the study indicated that out of 69 teaching hospitals only eight had speech training equipment.

Regarding the personnel the survey indicated that five teaching hospitals had qualified speech pathologists and four teaching hospitals and audiometricians. It revealed that the audiometricians in ten teaching hospitals learned audiometry by practice.

Health Survey and Planning Committee (Mudaliar, 1961) reported that there was inadequate facilities of hearing evaluation and rehabilitation of the communicatively handicapped people in India, The committee report indicated the need for development of training facilities for audiologists and speech pathologists. The importance of indigenous manufacture of diagnostic and rehabilitation instruments like audiometers and hearing aids was stressed by the report. Uniforms education of specialists and improving facilities for diagnosis and treatment were some of the recommendations of the survey.

In (1978) based on a survey of his colleagues in the earmold industry, Hocks, President of Hocks Laboratories estimated that 6.5% of approximately 375000 earmolds manufactured that year were remakes. The laboratory owners reported that every remakes involved the cost of postage



from and to the dispenser, materials, labour and book keeping in the laboratory, the dispensers professional time and his or her patients time and travel expense as well as the intangible cost of not having satisfied the patient the first time around. Remakes will never be eliminated, the laboratories say, but they can and should be reduced to a more acceptable level. According to various laboratories however a long-term, industry wide solution to remake problems will require a number of steps, better and more extensive hands - on training of dispensers and students, more attention to impression taking and order details by dispensers, a great understanding dispensers of the earmold manufacturing process, tighter remake practices in the laboratories and perhaps a universal agreement among earmold laboratories to take tough stand in refusing to work with substandard impression. (Mahon, 1980).

Hearing Instrument asked representatives from member earmolds laboratories of the natural association of earmold laboratories to express their opinion on the following question.

Castleton, Ower Abocoa Lab's Santa Ave, C.A. reported that it was a good impression that is necessary to receive the best custom earmold possible.

Baistti, President, Acoustic Complex System Concord C.A, reported a) perfect impression, (b) Taking consideration of acoustic characteristics of the coupler and proper selection of materials styles, materials. If specific problem such as warts or allergies are present etc.

Schlaegal, President, Pacific Coast Lab, Ive San Francisco#CA, reported that the single most important point has to be communication between the hearing aid dispenser and earmold lab in regard to their texture, type of loss to be fitted, how the impression was taken (material hard or soft). When injected in the ear and other preferences.

**METHODOLOGY**

**A) Survey Design:**

The survey was designed to obtain information regarding the earmold lab set-up and the equipment and materials used for the preparation of earmolds and utilization of man-power resources in the field of earmolds in India,

Further needs for earmold lab technicians in the areas of hearing conservation and rehabilitation of the hearing-impaired was also investigated.

The data were obtained through questionnaires. Two types of questionnaire were prepared to collect the necessary information,

**B) Preparation of Questionnaires:**

(a) Questionnaire<sup>A</sup> :

The questionnaire 'A' was designed to obtain information from the earmold lab technicians. The printed questionnaire contained twelve questions covering the following area:

Nature of the set-up - The following information was sought in this section. Whether it is a training

institute with clinical or an institute with earmold lab facilities, whether it is a teaching set-up, which university is it attached to, whether it is central Government/ state Government/Quasi Government/or missionary.

**Employment history** - It dealt with professional qualifications ie. whether they had the sources of earmold technician and audiologists to attend to patients with hearing problems, qualification, pay scale, their services and duties.

**Earmold lab facility in general** - Information regarding whether they had a separate unit for making earmold. If no, which unit or department did it belong to, how many rooms were available for the earmold section. If more than one is present how is the space utilized?  
(Appendix-A)and Append

**(b) Questionnaire 'B':**

The Appendix ' B' of the questionnaire consisted of questions related to equipment, its working condition and if additional equipment is being used for processing materials used for taking impressions. Materials used for processing of molds, procedure used for taking impression.

procedure used for curing and processing earmolds, materials used in processing kit etc.

There were also questions about the styles of earmolds processed. If there was a demand for a particular type, type of earmold accessories (connectors and rings), electro-acoustic measurements of hearing aids with the earmolds etc.

The next part of the questionnaire dealt with the acoustic modifications if carried out (to enclose a brief report on this) training programs if conducted and the courses offered.

All these questions provide us a knowledge about the type of set-up, type of case load, type of earmolds that are processed on large scale and provide guidelines for the modification in the procedure material choice depending on the insisting set-up. Such information will help in providing additional guidance in case of selecting materials processing, equipment and modifications if any indicated.

With such a questionnaire, it is possible to make up a directory of earmold lab' s in the country and types of services available there. It also helps in updating research technology in India (Appendix-'B' )

**RESULTS AND DISCUSSIONS AND CONCLUSION**

The questionnaire was mailed to fifteen different centers in the country to elicit information about the type of set-up and earmold facilities available in those set-ups. Follow-up questionnaire was mailed to many of the centers as no reply was elicited within the stipulated time. Nearly five questionnaires were personally given to different centers attached to speech and hearing units or deaf schools. Out of the twenty questionnaires sent some questionnaires were partly filled and much information elicited was not available. However with the answered forms returned the following points can be listed:

No.of questionnaire mailed	-	20
No.of completed questionnaire received back	-	10

1. Regarding the set-up : 4 of them were training institute with earmold lab facilities.  
4 centers were private which had only earmold facilities.  
2 centers were attached to the dispenser of hearing aids.
2. The type of teaching hospital or Institute : 2 was hospital set.  
3 was teaching set-ups.  
3 running diploma courses in each

2. : 2 centers were neither hospital or teaching set-up.
3. Regarding the affiliation to the University : 8 the institutes were recognised by different Universities.  
2 of them by rehabilitation Council of India.
4. Funding agencies : 3 centers were funded by both Central and State Government.  
4 by only State Government and the rest by private agencies,
- 5, Separate unit for making earmold : 5 centers had separate unit for making the earmold,  
5 had the lab attached to Audiology Department,
- 6, Personnel employed : 6 centers had full time workers,  
4 had only part-time workers,
7. Personal attending to patients, : 6 centers had both audiologist and earmold lab technicians to cater to the needs of hearing-impaired population.  
4 had only earmold lab technicians.

8. Qualifications : 3 institutes reported that the qualification to be M.Sc.,(Speech and Hearing) and pay scale : 7 reported it to be either B.Sc, (AST) or Diploma. Pay scale ranged from consolidated amount to the prescribed pay scale in the Government scales in all these set-ups.
9. Regarding the : 5 centers reported that the earmold lab involvement in technician are also involved in the administration administrative work. work. 5 centers it is not so.
10. Regarding the : 8 centers except two reported that they space available had only one room set-up.
11. Additional lab : 1 Institute needed the help of additional facilities. additional lab technicians.
12. Regarding the : 8 centers have reported that they have equipment. hydraulic press, grinders, motors, polymerization equipments. 2 centers reported that they need additional equipments such as calibration unit, insertion gain, optimization equipment for diagnosis and therapy.



13. Impression material : All the ten centers have given the correct information.
14. Procedure used : All the centers used the paper cone method to take the ear impression and also syringe was mentioned.
15. Plaster of paris: 3 centers used super fine plaster.  
used for flask- 4 centers used good quality of plaster  
ing. of paris.  
3 centers reported any type readily available in the market.
16. Material included: All the centers reported that they have in the processing the materials as specified by the kit. nearest centers as Ali Yavar Jung National Institute for the Hearing Handicapped and All India Institute of Speech and Hearing.
17. Physical style option : 5 centers made close molds, skeleton molds and canal molds.  
5 made different types of molds according to the needs of the patients.
18. Type of mold : All the centers except two made only hard mold in large scale.  
2 centers made both hard and soft molds.

19. Type of curing : All the centers used heat curing.
20. Rings used : 4 centers reported that they used metal snap rings.  
4 centers used plastic rings.  
2 other centers used rings supplied from New Delhi.
21. Measurement of hearing aid characteristics : Only two centers had the provision for carrying out the measurements of hearing aid characteristics.
22. Training program : Only one center carried out training program for the earmold lab technicians.
23. Regarding the new trend and advances in earmold technology. : All the eight centers do not have any facilities to keep in touch with the new advances and hence they depend on centers like All India Institute of Speech and Hearing and All Yavar Jung National Institute for the Hearing Handicapped for the same.

#### CONCLUSION I

From the above mentioned results it is clearly evident that there is not enough earmold lab. facilities in India

for catering to the needs of the hearing-impaired population. And also, it is necessary to have the facilities for acoustic modifications of the earmold and for testing the hearing aid characteristics in these set-ups. Training programmes for the earmold technicians are also necessary. Facilities should also be available for them to keep in touch with the recent advances in this field.

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## QUESTIONNAIRE

### **APPENDIX-A**

1. Is it a training Institute with clinical or an Institute with earmold lab facilities?
2. Is it an undergraduate/postgraduate teaching hospital or Institute?
3. If it is a teaching set-up, which University, is it attached to?
4. Is it central Government/State Government/Quasi Government/private/missionary?
5. Do you have a separate unit for making earmold?
6. If it is not a separate unit, which unit or Department does it belong to?
7. If yes, how many are in full time service, part-time service?
8. Do you have the services of earmold technician and audiologists to attend to patients with hearing problems?
9. What are the qualification and pay scale?
10. Do they take part in administration work and what are their services/duties?
11. Do you need additional lab technicians to manage the current work load? If yes, how many (full time/part-time)?
12. How many rooms are available for the earmold section and if more than one is present how are they divided?

## APPENDIX-B

1. Name of your set-up.
2. What are the equipment used in your set-up?
3. Which of the equipment is not in working condition due to lack of spare parts?
4. Do you need additional equipment to meet your needs? If so specify the number and the type?
5. What are the materials used for taking ear impressions? If you have any particular choice give reasons?
6. What are the materials used in the impression kit?
7. What is the procedure used for taking ear impression?
8. What type of plaster of paris is used for making plaster casts?
9. What are the materials used for packing in your set-up? If you have a particular choice, specify?
10. What are the materials included in the processing kit?
11. What are the physical style options in earmolds that are processed in your set-up?
12. What type of molds do you make on a large scale?
13. Whether it is hard mold/soft mold?
14. What is the type of curing used for earmolds?
15. What are the type of earmold rings used? Is it plastic or metal, indigenous or imported, indicate the cost of each ring. If imported specify the source?
16. In case of shell/skeleton molds, specify the type of connectors/elbows used?
17. Is there any provision for carrying out measurements of hearing aid characteristics with earmolds?

18. Have you tried any acoustic modification in earmold?  
If **yes**, do enclose a brief report.
19. Do you conduct training programs in making custom earmolds to speech and hearing/non-speech and hearing persons?
- 20, Are there facilities to make you aware of the new trends and advances in earmolds?