

AN ABSTRACT OF THE THESIS OF

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The central purpose of this study was to examine physicians' knowledge of and attitudes toward hearing aids. This study was conducted with 71 general practitioners affiliated with Scarborough General Hospital in Scarborough, Ontario, Canada.

Attitude was measured by a 5-point Likert-type scale developed for the study. Knowledge was measured through a multiple choice instrument also developed for the study. Regression analysis and comparisons of the means of subgroups were utilized for statistical analysis of the data.

Selected conclusions of the study were: 1) Physicians were found to have positive general attitudes toward hearing aids, 2) physicians were found to have poor prescriptive attitudes toward hearing aids, and 3) no significant relationships were determined among level of knowledge, prescriptive attitude, or general attitude.

Selected recommendations were: 1) Physicians require inservice training pertaining to prescriptive practices of hearing aids; methods for providing training were recommended; 2) medical schools should include more extensive training in hearing impairment and hearing aids; and 3) a replication of study should be conducted based upon a different sample population.

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Physicians' Attitudes Toward Hearing Aids

by

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DEDICATION

This thesis is dedicated to my parents

Caspar and Mia Van Kessel

...with love and gratitude

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PHYSICIANS' ATTITUDES TOWARD HEARING AIDS

I. INTRODUCTION

At least 14 million Americans--or 1 person in every 15--have hearing defective to some measurable degree (Benderly, 1980). Most children with impaired hearing have losses in the mild range, between 40 to 55 db. One hearing impaired child in 200 has a severe loss (greater than 70 decibels) and one in 400, a profound loss (greater than 90 decibels). It has been estimated that more than 50 percent of the elderly population may have hearing losses that interfere with communication (Rupp, 1986). Miller (1986) states that an estimated one-half of all men and one-third of all women over age 65 suffer from impairment of sufficient degree to compromise social interaction, and in nursing homes as many as 95 percent of patients have a potentially handicapping disorder.

Inability to communicate adequately due to loss of hearing results in insurmountable social and emotional difficulties for the afflicted individual (Gilad & Glorig, 1979). Early detection of impairment by professionals, however, should result in induction into an aural rehabilitation program, where the individuals overall communication situation would be considered. The first and most logical step in the rehabilitation process, when a permanent hearing impairment exists, is a hearing aid evaluation (Miller, 1986).

Virtually all individuals reporting any degree of difficulty in social or professional listening situations can benefit from ear level amplification. Over the past 20 years, hearing aids have been improved dramatically. Today, they amplify sound better, can filter out some background noises, and are cosmetically more acceptable to the user.

Despite the advances of modern hearing aid technology and the potential for improved quality of life for the hearing aid user, only one percent of the population now benefits from their use (Benderly, 1980).

These statistics suggest that the hearing impaired population is not being reached. Miller (1986) suggests that it is the primary care physician to whom patients or their families often turn first with complaints of a hearing impairment. This initial consultation is very important, as patients whose hearing losses are detected early tend to accept and use hearing aids more readily than those who have already made mental and social accommodation for an older and greater impairment. The primary care physician occupies the important role of monitoring his patients hearing health and performance (Rupp, 1986).

Since the percentage of patients who require hearing aids appears to vastly outnumber those who actually use them, the possibility exists that physicians may not be referring appropriately. In this case, it becomes necessary to determine the cause of the low rate of referral, and to actively participate in the remediation of this problem. The purpose of this research is to determine physicians' level of knowledge with regard to hearing aids and their attitudes toward the use and prescription of hearing aids.

Criticisms of the physician's role in dealing with the patients hearing health care exist in the literature. Physicians themselves must be directly involved in the research concerning their judgments on patient care. Physicians attitudes and knowledge of hearing aids are areas of research which should be addressed.

Purpose of the Study

The central focus of this study was to examine physicians' knowledge of and attitudes toward hearing aids.

Major Objectives of the Study

The major objectives of the study were to:

- 1) Review the literature related to:
 - a. hearing loss among the adult population,
 - b. the impact of hearing impairment on the lives of adults,
 - c. physician identification of hearing aid candidates,
 - d. physician intervention for presbycusis patients, and
 - e. physicians' attitudes toward hearing aids.
- 2) Identify and develop methodology designed to assess:
 - a. physicians' attitudes toward hearing aids, and
 - b. knowledge physicians have of hearing aids.
- 3) Examine physicians' knowledge of and attitudes toward hearing aids using the methodology developed.
- 4) Utilize findings to prepare recommendations for physician in service training pertaining to hearing aid candidacy.

Rationale for the Study

Currently there is a void where research and information on health services for the hearing impaired from the physician's perspective is concerned. Rather, the majority of the research has concentrated on surveys and personal accounts of either satisfied or dissatisfied hearing aid users. Those hearing impaired persons left unidentified remain unaccounted for. Several studies have been conducted (National Center for Health Statistics, 1985; Schow & Nerbonne, 1980) in an attempt to provide hearing health professionals with a reasonable perspective on numbers of people who are in need of care. Studies consistently show a major percentage of the hearing impaired population existing in society without the benefit of amplifica-

tion. This researcher has chosen to approach the evident breakdown of efficient hearing health care provision from the perspective of the physician. The family practitioner is likely to be the first professional from whom the hearing impaired person will seek advice (Miller, 1986). As general practitioners are the primary providers of medical care to the hearing impaired and, therefore, are the key to the successful delivery of health services, the physicians themselves must be directly questioned about their own role in providing health care to the hearing impaired.

This study was designed to examine physicians' attitudes toward and knowledge of hearing aids. The underlying rationale for this study is the need to provide information which has been previously unavailable on this subject.

Limitations of the Study

This study was limited in the following ways which may affect the ability to generalize these findings.

- 1) This study was limited to physicians (general practitioners) practicing medicine in Scarborough, Ontario, Canada.
- 2) The population was limited to physicians receiving the Scarborough General Hospital G.P. newsletter, and who voluntarily returned a mail survey.
- 3) The measurement of physicians' attitudes toward hearing aids was limited to the reliability, validity and objectivity of the two instruments administered, the Attitude Toward Hearing Aids and Physician Knowledge of Hearing Aids.

Definition of Terms

Atrophy: A wasting away of a bodily part.

Audiology: The science of hearing; the evaluation of hearing defects and rehabilitation of those who have such defects.

Auditory deprivation: Withholding sound from an organism.

Auditory pathway: The pathway of sound impulses from the auditory nerve to the cortex.

Auditory training: The training of the hearing impaired individual in the optimum use of residual hearing.

Aural rehabilitation (audiological habilitation): Therapy for a hearing-impaired person that can include auditory, visual and other sense training; speech and language therapy; counseling and guidance.

Basilar membrane: A membrane extending the entire length of the cochlea, separating the scala tympani from the scala media and supporting the organ of corti.

Bilateral: (1) Of, having, or involving two-sides, halves, or factions; (2) affecting both sides equally, reciprocal.

Binaural: Using, pertaining to, or involving the function of two ears.

Cholesteatoma: A cyst-like mass lined with epithelium and containing shed epithelium and cholesterol. It usually occurs in the middle ear.

Chronic: Lasting a long time or recurring often, such as a disease.

Cochlea: That portion of the inner ear responsible for converting sound waves into an electrochemical signal that can be sent to the brain for interpretation.

Conductive hearing loss: The loss of sound sensitivity produced by abnormalities of the outer ear and middle ear.

Decibel (dB): A unit for expressing the ratio between sound pressures of two sound powers. One-tenth of a bell.

Denial: An act, conscious or unconscious attempt at concealment of the hearing impairment so that the person does not publicly acknowledge the existence of a hearing loss.

Frequency: The number of complete oscillations of a vibrating body per unit of time. In acoustics the unit of measurement is cps or Hz.

G.P. (General Practitioner): A practicing physician who does not specialize in any particular field of medicine.

Genetics: The branch of biology that deals with heredity and variations in similar or related animals and plants.

Hair cells: Hair cells are situated on the fibrous basilar membrane of the inner ear. Shearing of the hair cells (cilia) causes stimulation or inhibition of nerve impulse to the brain.

Hearing aid: An electronic instrument that amplifies sound for a hearing impaired user.

Hearing aid evaluation: Measurement in soundfield using a number of different tests, performed both aided and unaided to determine optimum amplification.

Hearing threshold: The least audible sound pressure level. Often defined operationally as the level of a sound at which it can be heard by an individual 50 percent of the time.

Inner ear: That portion of the hearing mechanism, buried in the bones of the skull, that converts mechanical energy into electrical energy for transmission to the brain.

Localization: The ability of an animal to determine the specific location of a sound source.

Middle ear: An air-filled cavity containing three small bones, the function of which is to carry sound energy from the outer ear to the inner ear.

Monaural: Using, pertaining to or involving the function of one ear.

Neuron: A cell specialized as a conductor of nerve impulses.

Nuclei: Loss or impairment of mental powers due to organic causes.

Organ of Corti: The end organ of hearing found within the scala media of the cochlea.

Otitis media: An inflammation of the middle ear.

Otosclerosis (otospongiosis): A pathologic condition in which spongy bone grows around the footplate of the stapes, producing conductive hearing loss.

Pathology: An anatomic or physiologic abnormality that characterizes a disease.

Presbycusis: Loss of hearing with increasing age.

Sensorineural impairment: A hearing loss caused by lesions of the hair cells in the cochlea and the neurons of the auditory part of cranial nerve VIII.

Stapes: The third and smallest bone in the ossicular chain of the middle ear, connected to the incus and standing in the oval window. Named for its resemblance to a stirrup.

Stria vascularis: A vascular strip that lies along the outer wall of the scala media. It is responsible for the secretion and absorption of endolymph; it supplies oxygen and nutrients to the organ of Corti, and it affects the positive DC potential of the endolymph.

Suppurative: Pus producing.

Symmetrical: Affecting corresponding parts of the body simultaneously in the same way.

Unilateral: Of, occurring on, or affecting one side only.

Word discrimination: The ability to repeat or write words that are heard as a list of 50 monosyllables.

II. REVIEW OF THE LITERATURE

The review of the literature related to the topic of this study is presented in five major areas. The first area of emphasis focuses upon hearing impairment, specifically among the older adult population. The social and emotional effects of unamplified hearing loss among this group are explored in the second part. The third and fourth areas of emphasis identify and describe the breakdown at the level of the primary care physician in the provision of appropriate hearing health care for all adult hearing impaired people. The final portion is a review of the literature related to physicians' attitudes toward hearing aids.

Hearing Loss Among the Adult Population

The most common cause of hearing loss is presbycusis, which may be defined as a physiological process in which changes in cell structure are primarily degenerative. Presbycusis is commonly described as hearing loss due to aging (Fisch, 1978; Gilad & Glorig, 1979; Schuknecht, 1974). In 1971, the United States National Health Survey determined that the prevalence of hearing impairment rose rapidly with advance in age. About two-fifths of the hearing impaired were 65 years of age or older.

Presbycusis is usually manifested by a loss of hearing acuity which is progressive and bilateral (McDavis, 1984). Typically, the presbycusic hearing loss is greater for high frequencies, particularly above 500 Hz (Schein & Delk, 1974). In the 1960-1962 Health Examination Survey program (Glorig & Roberts, 1965), subjects demonstrated hearing thresholds which became progressively worse in the higher frequencies from 3000 Hz to 6000 Hz. At age 65, the thresholds of both men and

women begin to deteriorate rapidly with age, especially in the high frequencies. The 1965 National Center for Health Statistics study revealed a percentage translating to approximately two million people with significant hearing impairment. This study ranked presbycusis with arthritis and rheumatism as the chief three complaints of the aging. In nursing homes, however, where physical and physiological deterioration generally is more advanced, the prevalence of hearing impairment is higher than in the general population and in a number of studies reviewed by Schow and Nerbonne (1980) has been estimated in ranges varying from 51 percent to as high as 97 percent; the prevalence of loss of hearing sensitivity for all subjects was 82 percent. As noted by Gilad and Glorig (1979),

there is no doubt as to the aging ear hearing deterioration phenomenon and to the wide prevalence of this disorder. Less is known about the correct etiology of presbycusis, and contradictory opinions exist as to the previous factors involved in the hearing impairment of the aging ear.

They go on to add that presbycusis will evolve as an independent entity after all other factors (environmental, metabolic, genetic and vascular) are clarified and become clinically identifiable.

Hearing loss in the aged is the end result of the cumulative damaging effects of multiple pathological processes throughout the individual's life. It is extremely difficult to differentiate the net effects of aging from other damaging factors to which the individual has been exposed throughout his/her life.

Several functional abnormalities associated with the aging auditory system can be identified: impaired sensitivity; derangement of loudness perception; impaired sound localization; decline in discrimination ability, especially of speech; and decrease in time related processing abilities. Any or all of these abnormalities can be severely handicapping (Fisch, 1978).

Impact of Unaided Impairment on the Lives of Older Adults

Any sensory deprivation will erode the relations of the individual with his society as well as impair his communication abilities. Of all the sensory deprivations, a hearing loss, affecting the older person, has the most devastating and profound effect on his communication process. (Gilad & Glorig, 1979)

Gilad and Glorig have summarized the work of several prior research studies on the social and emotional impact of untreated hearing loss among the aging:

Failing hearing among the healthy elderly population can be an invisible progressive handicap which goes unrecognized socially, causing mutual deterioration of communication. Loss of auditory contact with the environment will enhance the process of withdrawal and introversion. As a result, changing personalities may appear paranoid. Difficulty in conversation causes tension between the individual and his/her family, again contributing to the feeling of isolation.

Denial of impairment by the individual will create the mistaken impression of "senility" during failed attempts at normal conversations (Fisch, 1978). McDavis (1983) studied the effects of severity of hearing impairment in the aged. She predicted that the less severe the impairment, the greater the denial that would be manifested, explaining that

Hearing loss or any disability sets certain limitations on an individual that may cause that person to become uncertain of other people's reaction to his/her impairment and to become uncertain in previously comfortable situations.

The second phase examined locus of control and evaluated the degree to which individuals felt that they had control over their hearing problems, thereby nullifying the problem and existing in society under very poor circumstances of communication. The results revealed a peak of denial in the moderate loss range (31-50 dB). In addition, a correlation was found between denial and the subjects responses to the question of whether hearing loss could be controlled as they aged.

Deafness has been associated with depression and dementia. Herbst and Humphrey (1980) revealed significant relations between hearing impaired and

clinically depressed subjects. They were not able to show a relation between dementia and hearing loss. However, they hypothesized that a long-term sensory deprivation may play a role in producing symptoms of dementia. Herbst and Humphrey suggest that hearing loss is a contributing factor to depression and that only 13 percent of their subjects possessed hearing aids. As a contributing factor, hearing loss could be more readily ameliorated than many others

without an aid, however, the social and psychological effects of deafness--namely withdrawal, depression, and the frustration of other people--are unalleviated and may feed back into the disorder accentuating alienation and discrimination.

A conflicting study demonstrated no deleterious affects of uncorrected hearing impairment on emotional status, memory, or social interaction (Thomas et al., 1984). However, the sample population was a select group and not representative of the general population. Of the sample of healthy volunteers, 20 were already using hearing aids and only 46 percent of the participants were actually hearing impaired.

Finally, the effects of hearing aid use on self-concept in older persons was examined by Harless and McConnell (1982). This study revealed that subjects who had learned to use a hearing aid in every day life were higher at a significant degree in overall self-concept than non-hearing aid users.

Physician Identification of Hearing Aid Candidates

Matkin and Hodgson (1982) estimate that by the year 2000, 12 to 13 percent of the population will fall into the category of 65 years of age and older. Goldstein (1984) relates these statistics to the importance of appropriate hearing health care in the following way:

Better health care in general, longer life span and accentuated by the post world War II baby boom have created an ever growing number of citizens falling into this age group. With the bulk of the population moving toward

retirement age, the problem of hearing impairment will become only greater unless the breakdown in the hearing health care system can be identified.

The most comprehensive research on this subject to date was undertaken in 1983 by the Hearing Industries Association, which identified physicians as the key to the improvement of the ratio of hearing impaired users and non-users of amplification devices. The survey concluded that 6.4 percent of the regular population (or 14.4 million people) admitted a degree of hearing impairment. However, only 3.9 million people in the United States own hearing aids. These statistics do not even account for the vast numbers of people who do not admit, or are not aware of their impairments.

As first-line caregiver for most older persons, the primary care physician occupies the important role of monitoring her patient's hearing health. Miller (1984) suggests that hearing loss is often overlooked or not evaluated. After having confirmed a hearing deficit, a judgement will be made as to whether hearing aid evaluation will take place. Eisenberg (1979) notes that the physician's clinical judgement on patient referral for hearing aid evaluation has been influenced by factors such as age, sexual prejudices, values and attitudes, and lack of information. He further stated that these factors could affect all types of clinical decisions, including the diagnostic and therapeutic, as well as the decision to admit or the decision to refer.

Physicians have been identified in the literature as the weak link in the chain of appropriate provision of hearing health care among the elderly (Harford, 1979; Matkin and Hodgson, 1982; Rupp, 1983, 1986; Vernon, Griffin, & Yoken, 1981). Their task is often made more difficult by patients who, for a variety of reasons, either deny or are unaware of their hearing losses. A study conducted by Crammond (1979) demonstrated that almost all elderly hearing impaired subjects accepted their poor hearing as something they must expect with lengthening years, and that

they were unaware of help freely available through hearing aids. Harford, suggests that:

hearing loss is so common among the elderly population that many patients consider impaired hearing as a normal way of life. Some have had a hearing loss for many years, while others develop an insidious impairment as they age. Clearly physicians who serve elderly patients recognize that a high percentage have difficulty communicating because of impaired hearing.

The results of the study undertaken by the Hearing Industries Association in 1983 revealed inconsistencies with Crammond's (1979) findings. They stated that since hearing loss is an insidious, progressive problem that does not simply become immediately apparent, it is not therefore recognizable until well after rehabilitation should have been initiated. In fact, they found that people had addressed this concern but had not been successful at receiving assistance. The study showed that 70 percent of persons who admit they had difficulty had sought an evaluation. Furthermore, 80 percent had discussed their hearing difficulty with a doctor. The people were either advised not to get a hearing aid or were given no advice at all about an aid.

Screening Program

Miller (1986) describes the visit to the family practitioner as the first step in seeking help for a hearing loss. The hearing complaint arises during the examination as difficulty in patient physician communication occurs. Advocates for early identification have developed a simple but complete series of questions to be posed by the physicians during the initial patient physician interaction (Rupp, 1983, 1986; Vernon et al., 1981). These questions serve to identify symptoms of the hearing loss and, in general terms, determine severity. Vernon suggests that:

some psychological aspects of hearing loss in adults make it difficult to diagnose. For example, the person with a significant hearing loss waits an average of five years before ever seeking help or reporting it to his physician. This may be because of a psychological need to deny the loss, a need fed by

stereotypic demeaning portrayals of aging adults who are hard of hearing. Diagnosis is made difficult by the fact that deafness is not visible.

For this reason, Miller (1986), Rupp (1986), and Fisch (1978) have advocated in-office audiometric screening for the detection of impairment. Fisch has stated that:

While the care of children with impairment developed into a system of paediatric audiology of high standard, including early detection by screening, detailed diagnostic and assessment facilities, parent guidance and early training, the care of elderly people with socially handicapping hearing impairment remains largely neglected.

Miller (1986) suggests that pure-tone screening by the primary care physician for patients older than 50 years of age will give a quick indication that hearing sensitivity is no longer within a broad normal range. If the patient "fails" the screening, hearing impairment may be present and referral to an audiologist for further assessment and hearing aids may be warranted. The physician's failure to identify the hearing loss during a regular checkup may in fact call his entire transaction into question. (Irvine, 1982)

Patient Counselling

Olsen (1984) suggests that at the time of identification of a hearing loss, the physician's counselling skills become crucial. Matkin and Hodgson (1982) add that

patients expect medical or surgical treatment for their impairments. Those who are still at the denial stages will attribute their communication difficulties to people who mumble, do not speak clearly, speak softly or have weak voices instead of to their own hearing losses. They have fears that they have lost their ability to concentrate and attempt to explain situations where they are still able to function very well. The adaptation afforded by slowly progressive hearing loss prevents the person from assessing the magnitude of change.

From the point of view of the patient, prognosis seems even more negative because no help or hope is consistently offered (Olsen, 1984). Patients, particularly in the geriatric population, must be urged to investigate the use of hearing aids.

The suggestion of pursuit of a hearing aid evaluation may be initially rejected. Pa-

tients may feel ashamed to use hearing aids and can be very critical when accepting one (Kapteyn, 1977). Matkin and Hodgson (1982) have summarized the problem as follows:

Once it has been determined that a patient is a candidate for hearing aids, it is essential to discuss what can realistically be expected of such a device. Some patients, alarmed by reports from friends who were poor hearing aid candidates may be pessimistic and expect too little from amplification, while others expect too much. Depending upon individual auditory characteristics, unless presbycusis patients are informed of the circumstances under which hearing aids will help and the amount of assistance to be expected, they may, through disappointment, reject amplification after only a limited trial period. It is possible that even the poorest hearing aid candidate, prepared carefully for limited benefits, may accept and enjoy a hearing aid.

Harford, (1972) suggests that the physician's approach to counselling should be positive and well informed with direct referral for hearing aid evaluation where further information will be gathered.

Referral

Harford, (1979) stated that it is essential that the patient be directed to competent professionals for the investigation into, selection of, and orientation to a hearing aid. In a symposium on Geriatric Otolaryngology, Matkin and Hodgson (1982) stated their professional opinion that a referral to a certified audiologist for hearing aid trial is the most appropriate recommendation.

Physician Intervention For Presbycusis

Education

The results of the Hearing Industry Association (1986) study showed that the perceptions of the medical community toward hearing aids are somewhat similar to the perceptions of the public at large. The Hearing Industries Association

Committee reported that hearing is not considered a major medical issue, and that physicians are lacking in education and training in hearing.

The American Academy of Otolaryngology-- Head and Neck Surgery--which tends to be much more attuned to hearing loss, reviewed the study (conducted on General Practitioners) and stated that it is difficult for us to believe that physicians as a group are not very positive about hearing aids We see that this is a problem. It is bigger than we would have thought, and physicians do need to be educated about hearing aids and about the impact that hearing loss can have on a patients life.

Hearing Industry Association (1986) researchers also reported that family physicians get their information about hearing aids from first-hand experiences in their own families and from their encounters with other consumers, usually their own patients. Goldstein (1984) offers the explanation that they are likely to hear much more negative feedback on hearing aids than positive feedback because patients tend to contact their physician with problems, and not with their satisfactions. The Hearing Industry Association researchers indicate that hearing loss and hearing help are not part of the general curriculum in medical schools, nor are they part of the board examinations that general practitioners take in their training. Thus, they bring no focus on hearing health care into their practices.

Technological Misconceptions

Miller (1986) has observed that hearing aids have been improved dramatically over the past 20 years and that those presently in use can amplify sound better, can filter out some background noises, and cosmetically have gained greater user acceptance. Sensorineural hearing impairment is such that though completely normal communicative efficiency cannot be expected in all situations, nonetheless the audiologist has a wide range of state of the art technology available to provide optimal listening for the individual loss (Tillman & Olsen, 1986). Patients with

presbycusis are a heterogeneous group and technology exists to treat their impairments as such (Matkin & Hodgson, 1982).

Olsen and Tillman (1986) contend that a misconception which exists among physician's is that any hearing aid will prove satisfactory to the hearing impaired individual. There are many manufacturers of amplification devices, some of whom carry product lines to compensate for hearing deficits of a variety of types and degrees. Products are generally adjustable within a specified range to offer individualized care. The highest percentage of hearing aid users purchase the custom-made devices (Hearing Industry Association, 1986)

Sensorineural Hearing Loss

Matkin and Hodgson (1982) report that a commonly held misconception, especially among general medical practitioners, is that older patients with sensorineural hearing loss are not appropriate candidates for hearing aid use. Harford, (1979) summarized past misconceptions as follows:

Advances in technology over the past 20 years have enabled us to provide effective amplification for various degrees of handicap, ranging from very mild to very severe. During the pioneering days of hearing aids, most people using amplification had a conductive-type hearing loss due to otosclerosis. These people were good candidates for hearing aids, while those with sensorineural impairment reacted negatively to the early, crude amplifying devices. Because of this, certain myths emerged about candidacy for hearing aids--myths which, unfortunately, continue to prevail, particularly among practitioners who have not kept up with recent developments in aural rehabilitation. Probably the most unfortunate myth is that people with "nerve deafness" cannot use a hearing aid. This is totally incorrect. In fact the majority of hearing aid users today have a sensorineural hearing loss.

Olsen (1984) reported that of the 1 million hearing aids fitted in 1983, about 56 percent were for persons over age 65. This means that over 500,000 hearing aids are fitted each year to individuals for whom at least a portion of hearing loss is attributable to presbycusis. Olsen also noted that there are individuals in this age group who could gain substantial benefit from amplification, but who need encour-

agement about hearing aid use. The Hearing Industry Association (1986) survey indicated that 1.7 million people who are nonowners were told that a hearing aid would not help because they had nerve damage. They concluded that when recommendations or the lack thereof are translated into respondents' beliefs about what they think they should or should not do, people believe that their physicians think that they should not use a hearing aid. If a doctor does not recommend it, it translates into, "I shouldn't use it." They also concluded that people do listen to what their doctor tells them with regard to hearing health. Harford, (1979) suggested that there are two simple questions which physicians should pose in the patient interview once hearing loss has been identified and medical/surgical treatment has been ruled out: "Do you have trouble hearing" and "do you want to improve your hearing?" If the answers to both of these questions are "yes," the patient becomes a candidate for hearing aid evaluation.

Binaural Fittings

Binaural amplification has in the past been an issue reflecting a variety of opinions (Byrne & Upfold, 1986; Erdman & Sedge, 1986; Mueller, 1986), but more recent research (Mueller, 1988) has indicated that the concept of binaural amplification has gained support to the degree that at present most clinicians and dispensers consider binaural the standard hearing aid fitting. As noted by Byrne and Upfold (1986),

there is no longer any doubt that binaural fitting is advantageous for many hearing impaired clients, although there are still unresolved questions about which clients should, or should not, be fitted binaurally and about the circumstances in which the most benefit occurs.

Erdman and Sedge,(1986) found a preference (90 percent) for binaural amplification among subjects who evaluated both monaural and binaural fittings for controlled periods of time. New hearing aid users were capable of establishing their

preference for binaural over monaural amplification within the first two hours of hearing aid use. Mueller (1988) reports, given the consistent, demonstrated advantages of binaural amplification, that it is somewhat surprising that most adult patients continue to be fitted monaurally and suggests that if physicians are convinced that the patient will ultimately do better with two hearing aids, then they should encourage a binaural fit, even when the patient is reluctant.

Mild Hearing Loss

The 1986 Hearing Industries Association study determined that physicians believe that mild losses, particularly unilateral, are not impairments to activities and that many patients can compensate for mild losses through a variety of means, i.e., turning up the television and asking family members to speak louder. Miller (1986) explained the importance of early diagnosis in his statement that:

There is growing evidence that failure to diagnose and manage hearing problems early in their course results in significant and--to some extent--irreversible sensory deprivation. It is generally easier to help a patient early in the onset sequence of a mild hearing impairment, when the problem is less complicated, the patient is more likely to accept a hearing aid, and before the patient has grown accustomed to the quality of sound heard through the filter of a hearing impairment. A person at age 40 who is successfully using a hearing aid will, in most cases, continue to wear the aid at age 80. Starting the process at age 80 is entirely different, and the potential for success is reduced.

Discouraging the use of hearing aids for mild deficits in hearing has broad ramifications for the image of hearing aids and, therefore, the rate at which patients accept them. Goldstein (1984) suggests that prompt diagnosis of hearing loss in the mild range with subsequent hearing aid fitting will enable patients to avoid the fate of social withdrawal and isolation, almost certain if their losses are allowed to progress to the moderate/severe ranges. Goldstein added that:

an older and greater impairment, may be compounded by the accommodation of a listener who has grown accustomed to distorted sound The development of adverse attitudes stemming from a history of communication

difficulties and, possibly, a general state of decline which discourages active efforts at pursuing remediation. In the latter case the success rate is generally poorer, a fact which tends to feed an anti-hearing aid point of view and sustains the low user rate. Further, it is advantageous to get aids as early as possible because the prognosis for new fittings among the very old can be difficult and the acceptance rate is low. In contrast, there is not a strong tendency for established users to give up using an aid automatically as they age. Whatever the correct detailed explanation for this difference, the implication is that early fitting by secondary prevention of disability is a wise course.

Unilateral Impairment

According to the data collected in the Hearing Industry Association (1986) study, physicians hold the misconception that patients with unilateral hearing impairments do not require amplification (Goldstein, 1984; Hearing Industry Association, 1986). The 1986 survey concluded that 6 million hearing impaired, nonowners of hearing aids, had unilateral impairments. About 30 percent of all current owners of hearing aids have the same impairment. If a unilateral impairment exists, the only way to achieve balanced hearing is through amplification for the impaired ear (Goldstein, 1984).

Severe/Profound Impairments

Fujikawa and Owens (1979) evaluated 20 subjects with profound (90 to 110 dB) hearing losses. Sixteen of these subjects were able to benefit from hearing aid use. With the recommended aids, all subjects could detect speech at levels within the normal conversational range and 75 percent had some understanding of words. Since this study was conducted, hearing aids have become less conspicuous and fidelity has been improved (Goldstein, 1984; Katz, 1985). Without the benefit of amplification the severe/profound patient must rely solely on sign language and lipreading.

Rehabilitation

Harford, (1970) has stated that after hearing instruments have been obtained, the patient's adjustment to and acceptance of the hearing aid may require monitoring over a long period of time. Many individuals will require extended periods of audiologic rehabilitation on both an individual and group basis (Miller, 1986). Olsen (1984) explains that instead of encouraging patients to return to their audiologist for rehabilitation, when problems of acceptance and adjustment occur, physicians often have their negative beliefs about hearing aids confirmed and rather hesitate to recommend amplification for their next patients diagnosed with presbycusis.

Blood and Danhauer (1978) conducted a survey to determine whether the needs of hearing aid users were being met and determined that 50 percent of the users survey stated that they were not advised regarding periodic reevaluations of hearing status or hearing aids. The same group indicated that they were never enrolled in a therapy program, through approximately 30 percent of the users were interested in receiving services. Those having received therapy felt the therapy had improved their daily communication ability.

Sorri, Luotonen and Laitakari (1984) found that 71 of 150 subjects required more than one month of rehabilitation therapy to learn to use their hearing aids, and many of these patients were not first time users. Brooks (1984) suggested that it was in the area of instruction and counselling that the greatest impact could be made on patterns of hearing aid use.

Physicians Attitudes Toward Hearing Aids

Goldstein (1984) described three attitudinal biases among professionals which hinder appropriate referral for hearing aids. These attitudinal biases are related to stigma, cost, and motivation, which he termed, "the medical funnel." In view of his finding that physicians contended that hearing aids are too expensive, Goldstein justified their cost as follows:

Between 1960 and 1980, the consumer price index rose from about 80 to about 258 for all items. A special index for medical expenses rose about the same amount. If this index increase--caused by inflation--is applied to hearing aids, an instrument costing \$350 in 1960 would have cost \$1,129 in 1980. In fact, the average cost of an aid was \$450 in 1980. In spite of the continuing, albeit abated, inflation running through 1982, the cost of a hearing aid remained about \$455 Clearly, sales expansion, manufacturing technology improvements, and marketing system changes account for this price stability regardless of inflation.

The Hearing Industry Association Study of 1986 found that physicians tend to pass along their attitudes toward the cost of hearing aids to their patients. According to Goldstein (1984), the life expectancy of a hearing aid is approximately four years. Life expectancy may be a variable influencing physicians' attitudes toward hearing aid costs and values.

In the case of bilateral deficit, it is more likely that the physician will recommend a single hearing aid, rather than the two hearing aids which would probably enable the best hearing, having decided that two hearing aids are not worth the money (Hearing Industry Association, 1986). The Hearing Industry Association survey suggests that given the responsibility of the decision to purchase hearing aids, the patient does not necessarily consider cost a major factor.

Aside from the cost issue, persons considering hearing aids can encounter attitudes within medicine which simply do not support their use. Goldstein (1984)

cites an interview with an otolaryngologist where the following exchange was reported:

Q: Just how many Americans suffer from hearing loss? A: Some 13 million have some hearing impairment--almost 1 out of 20 people. Of these, 1.5 million are really deaf and require special training in use of sign language. Another 2 million have considerable hearing loss so that it is very difficult for them to follow a conversation. Most of the others can get by if they lean forward and make an extra effort.

Goldstein further commented that

this interchange indicated a somewhat discouraging attitude on the part of the medical profession towards the use of hearing aids and is often encountered. In fact the reticence of physicians themselves to wear hearing aids when they have an impairment, a circumstance not unusual to encounter, speaks to the difficulties in having them advise hearing-impaired patients.

Summary

This review of the literature has established that the primary care physician or general practitioner is the key to the improvement of the provision of hearing health care. The appropriateness of referral practices, or the lack thereof, was questioned in the literature.

Several of the apparent misconceptions held by physicians about certain categories of hearing impairment were outlined. Some of these categories include: timeliness of identification of impairments, amplification for sensorineural impairment, management of the mildly or severe/profoundly impaired patient, amplification for the unilaterally impaired, the advantages of binaural over monaural amplification, misconceptions about the population, and the hearing loss itself. The literature suggests that present prescriptive or referral practices may be influenced by negative attitudes held by physicians toward hearing aids.

Recommendations have been made to alter physicians attitudes toward hearing aids. However, very little baseline data has been gathered on the status of physicians' current attitudes. Further, the education of physicians has been the sug-

gested method to initiate positive change, yet medical schools provide very little training in hearing impairment/rehabilitation, and the state of the art technology advances every year. Before recommendations can be made about proposed changes within a specific group, data must be obtained with regard to current levels of working knowledge, as well as attitudes, to determine if a relationship between the two can be established.

III. RESEARCH DESIGN

Introduction

This study is an investigation of physicians' attitudes toward hearing aids, to the end of determining whether there is a relationship between physicians' knowledge of hearing aids and their attitudes. This chapter provides an overview of the procedures employed in the investigation. Specifically, this chapter is composed of the following sections:

- 1) a description of the sample population of the study,
- 2) steps taken in implementing the research project,
- 3) the instruments utilized in the research,
- 4) the hypotheses that were tested, and
- 5) the statistical treatment of the data.

Population and Sample

The sample population of this research was drawn from the 250 general practitioner physicians affiliated with Scarborough General Hospital in Scarborough, Ontario, Canada. Physicians receiving the Scarborough General Hospital *G.P. Newsletter* were requested to voluntarily complete and return two mailed questionnaires. The first instrument (Appendix A, Instrument A--Informational) assessed knowledge of hearing aids, while the second instrument (Appendix A, Instrument B--Attitudinal) assessed general and prescriptive attitudes toward hearing aids. These questionnaires were accompanied by a brief note of approval from the Chief of Family Practice (Appendix B), and were circulated with the *G.P. Newslet-*

ter. Only three of the questionnaires were returned completed so a second set was mailed to the same group, separately from the newsletter, along with a letter from the Audiology Department requesting participation (Appendix B). This method proved far more successful and 71 physicians responded.

Research Procedures

To adequately examine the research questions of the study, the following procedures were implemented:

- 1) A review of related literature and research was completed.
- 2) A review of existing instruments appropriate to this type of study was conducted, resulting in the development of two questionnaires assessing attitudes and knowledge.
- 3) A critique of the instruments was carried out by a Delphi consensus panel of eight (8) professionals in the areas of hearing impairment and research. Consensus was considered as being met when 80 percent of the panel members were in agreement.
- 4) Revisions were made to the test instruments as a result of the initial critiques.
- 5) Permission was obtained from Dr. Isaac, Chief of Family Practice at Scarborough General Hospital, to distribute the questionnaires through the *G.P. Newsletter* (Appendix B).
- 6) The total number of physicians who responded to the two initial questionnaires was too low to conduct the study. In order to increase physician interest, second copies of the instruments were mailed with letters clarifying the intent of the research. Seventy-one useable responses were retained for analysis.

- 7) The data resulting from the distribution of the instruments were compiled for appropriate statistical analysis. Based upon the responses to the instruments, a physician education packet was prepared. Half of the respondents were invited to attend a luncheon seminar where topics addressed within the questionnaires would be discussed, current information would be provided, and the posttest would be distributed. The other half of the sample group was considered the control. Unfortunately, there was no response to the invitation to attend the seminar (Appendix B). The lack of response is discussed in the concluding chapter and is the subject of recommendation for further study.
- 8) The results of the analyses were examined, responses to the research hypotheses prepared, and the findings were summarized for relevant recommendations pertaining to further study and action.

Instrumentation

Two instruments were utilized to collect the data for this study. One instrument was devised to assess physicians attitudes toward hearing aids, and the other to assess physicians knowledge of hearing aids. The attitudinal instrument included 11 items written on a 5-point Likert-type scale (strongly agree to strongly disagree), while the instrument assessing knowledge of hearing aids consisted of nine (9) multiple choice questions. The attitudinal questionnaire included one section on general attitude toward hearing aids and one section on prescriptive attitudes. Test items were created based upon statements in the literature which alluded to physician's knowledge of or attitudes toward hearing aids. A Delphi consensus panel of professionals in the hearing health care field and in the area of research was assembled to review and critique the instruments.

Hypotheses of the Study

Based upon the literature, and in order to determine some of the factors involved with physician's attitudes and knowledge of hearing aids, the following null hypotheses were formulated and tested:

- Ho₁ Physicians will not score below six on the knowledge questionnaire.
- Ho₂ Physicians will not score below 20 on either section of the attitude questionnaire.
- Ho₃ There is no relationship between physicians' level of hearing aid knowledge and their attitudes toward hearing aids.
- Ho₄ Physicians in the treatment group will not obtain higher scores on the survey instrument than those in the control group.

Method of Analysis

The two major statistical tools employed in this study were regression analysis and comparisons of the means of subgroups. Descriptive statistics were generated from responses to the survey instruments.

Regression Analysis

Linear regression (Y) was applied as a statistical method of prediction which would allow description of the relationship between sets of scores, as well as determination whether it would be probable that the prediction would be duplicated if subjected to additional testing (Courtney, 1982).

In this study, regression was employed to test a linear relationship between the general attitude scale scores and the prescriptive attitude scale scores, between

the general attitude scale scores and the knowledge level scores, and between the prescriptive attitude scale scores and the general attitude scale scores.

Comparisons of Means of Subgroups

Comparisons of the means of subgroups were used to check the regression analyses.

IV. ANALYSIS AND DISCUSSION OF THE FINDINGS

Introduction

The purpose of this study was to investigate physicians' knowledge of, and attitudes toward, hearing aids. The sample population selected for the research was drawn from physicians practicing medicine in affiliation with Scarborough General Hospital in Scarborough, Ontario, Canada. A total of 71 physicians completed the research instruments and were included in the study.

The data from this study, collected through individual responses to survey instruments, were analyzed by the use of two statistical procedures. Hypotheses 1 and 2 primarily utilized descriptive statistics. Regression Analysis was employed in testing Hypothesis 3. In addition, comparisons of the means of subgroups were used to check the regression. A probability level of .05 was used as the criterion for accepting or rejecting the null hypotheses. When the compared values were less than the tabular values at the .05 level of significance, the null hypotheses were retained. The null hypotheses were rejected when the computed value was equal to or greater than the tabular value.

The following items are included in this chapter in order to present a concise set of findings:

- 1) The data, presented within the frame work of the basic hypotheses of the study,
- 2) a rationale for accepting or rejecting each hypothesis, and
- 3) tables and figures designed to provide a graphic representation of the findings.

Findings

Hypothesis 1

H0₁ Physicians will not score below six on the knowledge questionnaire.

Instrument A, a multiple choice assessment tool, was used in this study to determine physicians' level of knowledge of hearing aids. The possible scores ranged from 0 to 9, with the higher scores representing a greater level of knowledge of hearing aids. The mean scores for this study are presented in Table 1. This group of physicians had a mean score of 3.901, demonstrating a low level of knowledge of hearing aids. None of the physicians achieved scores greater than 78 percent. The highest score was 7 of 9, achieved only by 4 (of 71) respondent physicians. The null hypothesis was rejected.

Table 1. Hearing Aid Knowledge (INFO), Mean Score for Physicians in Study.

No. of Physician Respondents	INFO Mean	SD	SE
71	3.901	1.683	0.199

The findings indicated that the average level of knowledge about hearing aids among the physicians surveyed for this study is less than comprehensive. It was hypothesized that physicians would score above six, however the results have indicated that as a group, these physicians are working significantly below this range. The instrument attempted only to assess very basic working knowledge, i.e, costs of hearing aids and batteries, sale and fitting regulations, trends in hearing aid style, trial period, life expectancy, and warranty. None of the questions included on the instrument required knowledge of technology used in the prescription of hearing

aids. The questions included were those that would likely arise during the physician/patient interview, as agreed by the Delphi consensus panel. The responses to these questions, in the physician's practice, will affect the patient decisions with regard to procurement of hearing aids.

Hypothesis 2

Ho₂ Physicians will not score below 20 on either section of the attitude questionnaire.

For the purposes of this study, physicians' attitudes toward hearing aids were measured through the administration of instrument B, a two-part attitude scale. The first section assessed general attitudes and the second section assessed prescriptive attitudes.

Possible scores for section 1 (ATT1) ranged from 6 to 30, with the higher scores on the scale representing more positive attitudes. The mean attitude scores for physicians in this study are presented in Table 2. The physicians in this study had a mean score of 22.97 on the general attitude section. This is interpreted as representing generally positive attitudes toward hearing aids.

Table 2. Attitude Toward Hearing Aids Scale (ATT1), Mean Score for Physicians in Study.

No. of Physician Respondents	ATT1 Mean	SD	SE
71	22.97	4.497	.5337

Possible scores for the second section of the questionnaire (ATT2), assessing physicians' prescriptive attitudes toward hearing aids, ranged from 5 to 25. The higher scores on the scale also represented more positive attitudes toward hearing aids. The mean attitude scores for physicians in this study are presented in Table 3.

The mean score for this group was 16.35. This is interpreted as representing a less positive prescriptive attitude.

Table 3. Attitude Toward Hearing Aids Scale (ATT2), Mean Score for Physicians in Study.

No. of Physician Respondents	ATT2 Mean	SD	SE
71	16.35	3.406	.4042

It was hypothesized that physicians would score 20 or above for each sections ATT1 and ATT2, indicating overall positive attitudes toward hearing aids. A positive general attitude toward hearing aids was demonstrated, indicating that physicians are not uncomfortable with the idea of wearing hearing aids, nor with patients who wear them. Thus, the respondents indicated that hearing aids are a "worthwhile investment."

Physicians responses to the second section, ATT2, where prescriptive attitudes were assessed, demonstrated scores below those hypothesized. Though physicians indicated that their general attitudes toward hearing aids are positive, their contentions with regard to prescribing have not reflected a positive approach. The null hypothesis was rejected.

Hypothesis 3

Ho₃ There is no significant relationship between physicians' level of hearing aid knowledge and their attitudes toward hearing aids.

For the purposes of this study, administration of the ATT1 (General Attitude Toward Hearing Aids) and ATT2 (Prescriptive Attitude Toward Hearing Aids) scales were used to assess physicians' attitudes toward hearing aids. Knowl-

edge of hearing aids was assessed through the use of the INFO (Instrument A--Informational) instrument.

Three separate linear regression analyses were computed in order to predict relationships as follows:

1) $Y = a + bx$,

where ATT1 = dependent variable and INFO = independent variable.

2) $Y = a + bx$,

where ATT2 = dependent variable and INFO = independent variable.

3) $Y = a + bx$,

where ATT1 = dependent variable and ATT2 = independent variable.

The results were as follows:

- 1) ATT1 was not significantly associated with INFO. The computed values are summarized in Figure 1 and Table 4.
- 2) ATT2 was not influenced by INFO. The computed values are summarized in Figure 2 and Table 5.
- 3) ATT1 was not influenced by ATT2. The computed values are summarized in Figure 3 and Table 6.

Discussion

It was hypothesized that there is no significant relationship between physicians' level of hearing aid knowledge and their attitudes toward hearing aids. In the three separate linear regression analyses, no significant relationships were found. Although physicians demonstrated knowledge levels below those predicted for this study, the data does not reveal that the amount of information (independent

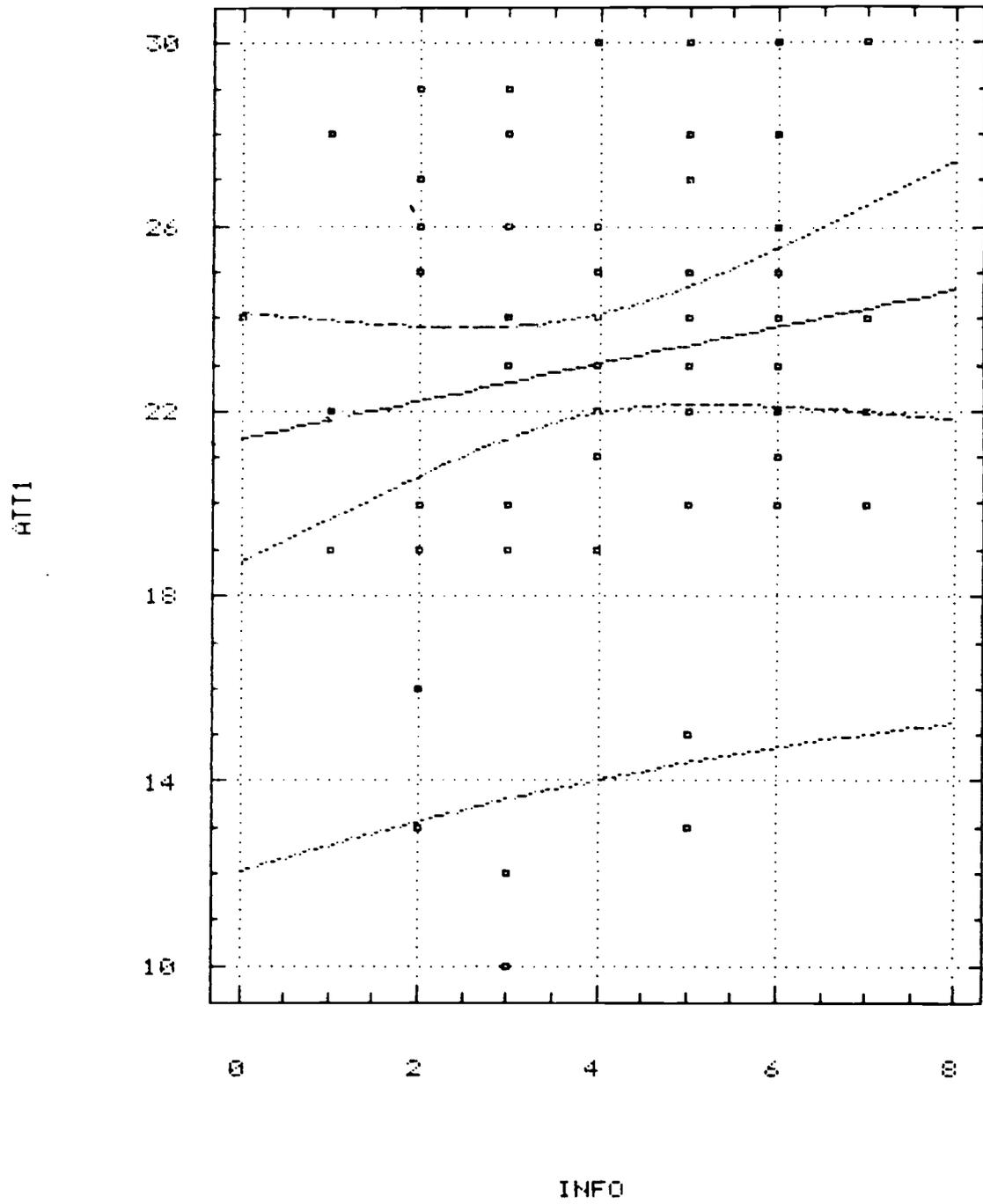


Figure 1. Regression of ATT1 on INFO.

Table 4. Regression Analysis, Dependent Variable = ATT1 and Independent Variable = INFO.

Parameter	Estimate	Standard Error	t-value	Prob. Level
Intercept	21.4018	1.34974	15.8563	.0000
Slope	0.402415	0.318013	1.2654	.20998

<u>Analysis of Variance</u>					
Source	Sum of Square	Df	Mean Square	F-Ratio	Prob. Level
Model	32.113832	1	32.113832	1.60125	.20998
Error	1383.8298	69	30.0555		
Total (Corr.)	1415.9437	70			

Note: Correlation coefficient = 0.150599; R-squared = 2.27 percent; standard error of est. = 4.47834.

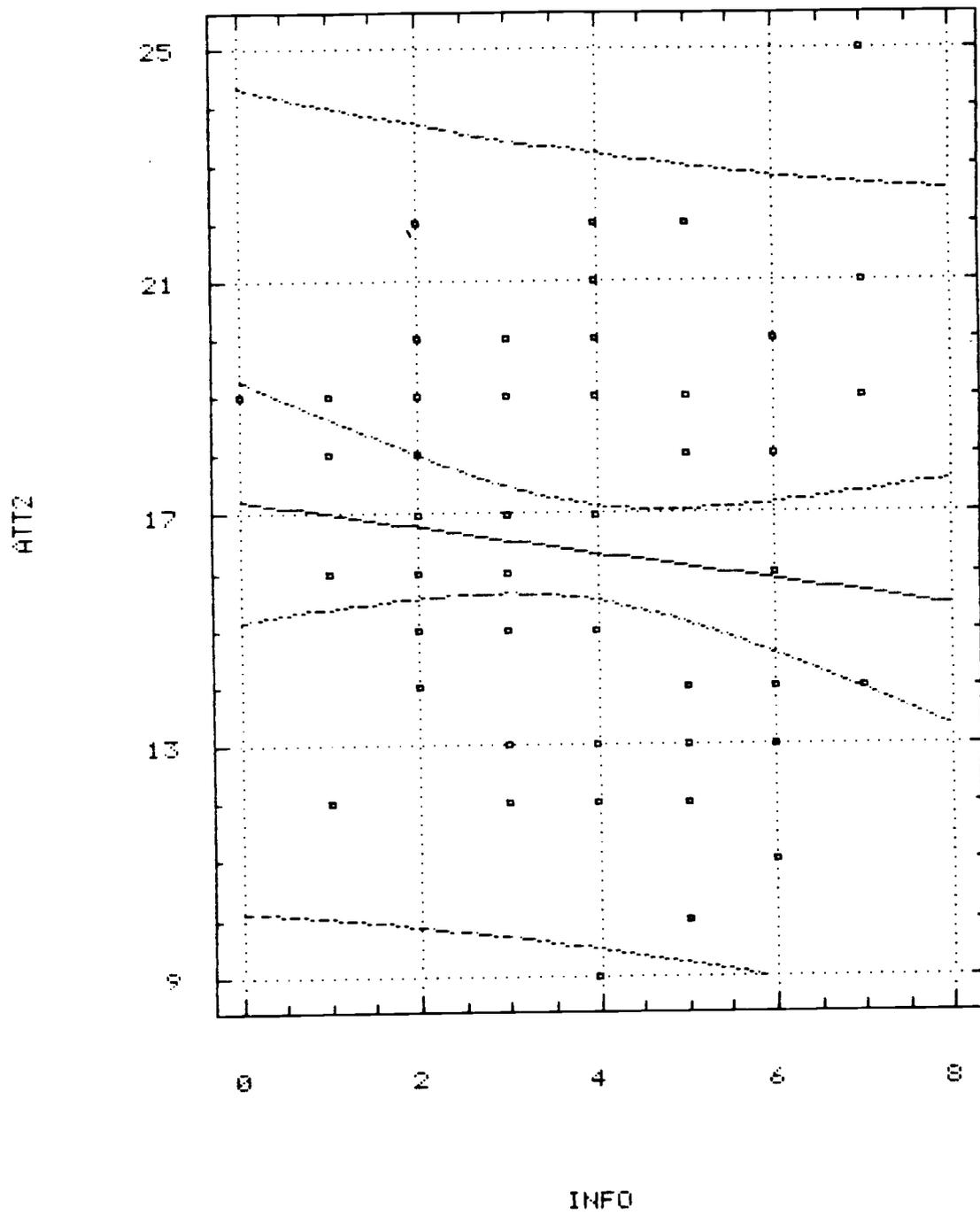


Figure 2. Regression of ATT2 on INFO.

Table 5. Regression Analysis, Dependent Variable = ATT2 and Independent Variable = INFO.

Parameter	Estimate	Standard Error	t-value	Prob. Level
Intercept	17.2283	1.02766	16.7646	.0000
Slope	-0.224574	0.242127	-0.927504	.35690

Source	Analysis of Variance				
	Sum of Square	Df	Mean Square	F-Ratio	Prob. Level
Model	10.001444	1	10.001444	.86026	.35690
Error	802.19574	69	11.62603		
Total (Corr.)	812.19718	70			

Note: Correlation coefficient = -0.110969; R-squared = 1.23 percent; standard error of est. = 3.4097.

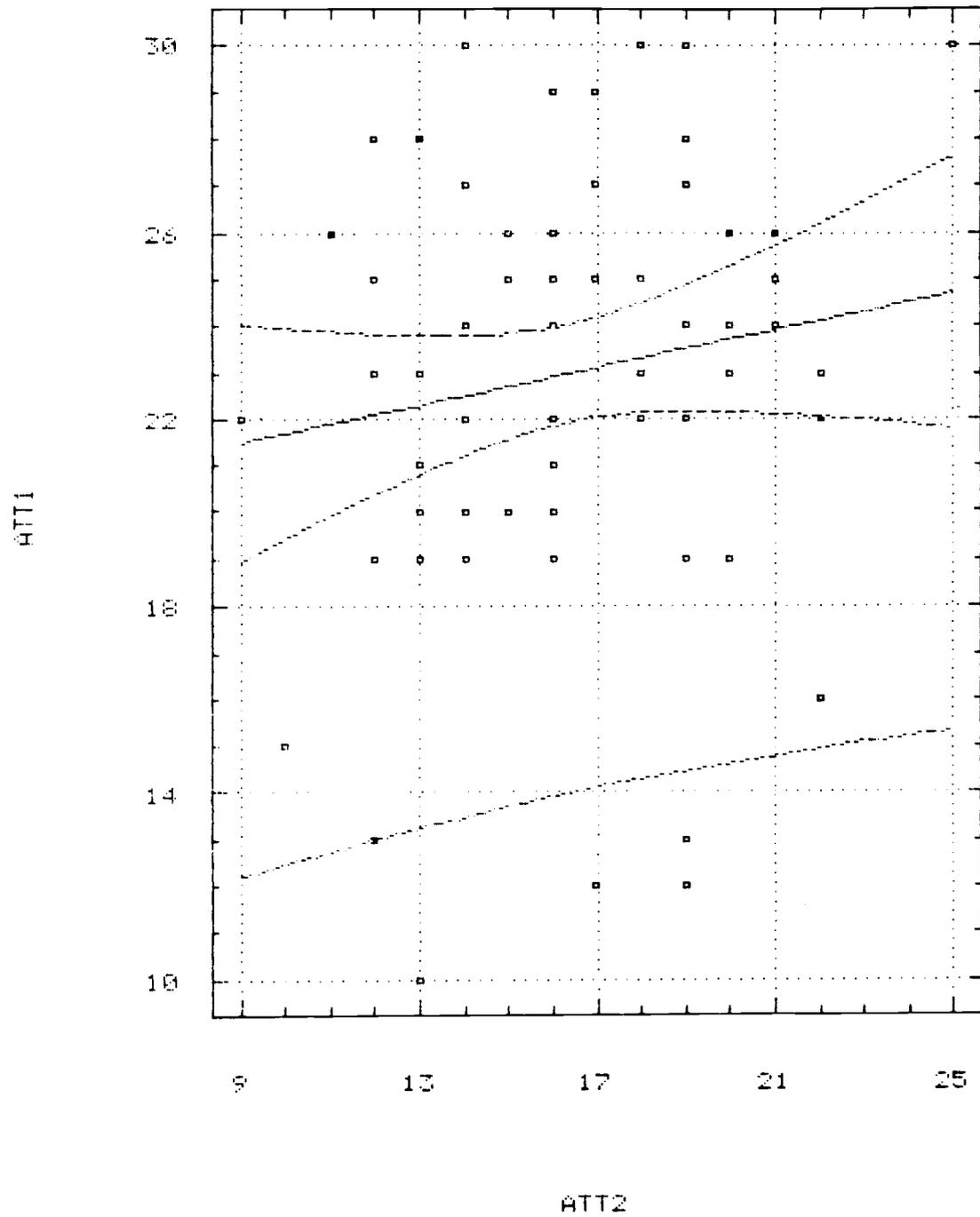


Figure 3. Regression of ATT1 on ATT2.

Table 6. Regression Analysis, Dependent Variable = ATT1 and Independent Variable = ATT2.

Parameter	Estimate	Standard Error	t-value	Prob. Level
Intercept	19.6759	2.62312	7.50097	.0000
Slope	0.201557	0.15709	1.28307	.20376

<u>Analysis of Variance</u>					
Source	Sum of Square	Df	Mean Square	F-Ratio	Prob. Level
Model	32.995772	1	32.995772	1.64627	.20376
Error	1382.9479	69	20.0427		
Total (Corr.)	1415.9437	70			

Note: Correlation coefficient = 0.152653; R-squared = 2.33 percent; standard error of est. = 4.47691.

variable) affects general attitudes or prescriptive attitudes (dependent variable) of this sample group. Further, when the regression analysis was computed for the purpose of determining whether physicians general attitude toward hearing aids (independent variable) affected prescriptive attitudes (dependent variable), no significant relationship was found.

Comparisons of Means Subgroups

Comparisons of mean of subgroups were used to check the regression analyses. The total number of 71 physicians in the sample were divided among three subgroups, A, B, and C, based upon their scores on the INFO instrument.

1. Subgroup A: Subgroup A included the group of physicians who demonstrated the least amount of knowledge on the INFO instrument. This subgroup included physicians with scores of 1, 2 or 3 of a possible 9. These subjects constituted 41 percent of the sample. Their mean scores for the ATT1 and ATT2 instruments were, respectively, 21.82 and 16.96. Data are presented in Table 7.

2. Subgroup B: Subgroup B included the group of physicians who demonstrated knowledge level scores of 4 or 5 of a possible 9 on the INFO instrument. These subjects constituted 41 percent of the sample. Their mean scores for the ATT1 and ATT2 instruments were, respectively, 23.55 and 15.65. Data are presented in Table 8.

3. Subgroup C: Subgroup C included the group of physicians demonstrating the highest level of knowledge in this sample. This group scored 6 or 7 of a possible 9 (only 4 subjects scored 7 of 9 and none in the entire sample group exceeded a score of 7 on the INFO instrument) and constituted 18 percent of the total sample. Their mean scores on the ATT1 and ATT2 instruments were, respectively, 24.3 and 16.53. Data are presented in Table 9.

Summary statistics of the comparisons of means of the subgroups are presented in Table 10.

Table 7. Comparisons of Means, Subgroup A.

Sample No.	ATT1	ATT2	INFO
2	16	22	2
3	22	18	1
4	20	15	2
5	24	16	2
9	26	20	3
10	27	17	2
12	28	19	1
13	19	19	2
19	20	16	3
20	26	16	2
22	26	15	3
26	10	13	3
27	24	19	3
33	19	14	2
34	22	16	1
35	19	20	2
37	25	18	2
41	19	16	3
45	13	19	2
50	23	20	3
55	19	12	1
56	29	16	2
59	25	15	2
60	29	17	3
62	12	17	3
63	12	19	3
64	24	19	0
67	28	12	3
71	27	17	2

Total	633	492	64
Mean	21.8275	16.9655	2.2068

Note: 4 Scored 20 or > (13.79 percent of the sample).

Table 8. Comparisons of Means, Subgroup B.

Sample No.	ATT1	ATT2	INFO
1	22	22	4
6	23	22	5
8	24	14	5
14	15	10	5
15	26	15	4
16	30	14	5
21	25	17	4
23	22	19	5
24	23	12	4
25	23	12	5
29	21	13	4
30	19	13	4
31	24	20	4
32	23	13	5
36	28	13	5
39	20	13	5
40	27	19	5
42	22	09	4
43	25	12	5
44	26	21	4
46	30	19	4
49	23	18	5
51	13	12	5
52	25	21	4
58	22	14	5
61	26	20	4
65	26	21	4
66	27	14	5
68	23	12	4

Total	683	454	131
Mean	23.55	15.65	4.51

Note: 7 Scored 20 or > (24.13 percent of the sample).

Table 9. Comparisons of Means, Subgroup C.

Sample No.	ATT1	ATT2	INFO
7	20	14	7
11	24	11	6
17	30	25	7
18	25	16	6
28	22	19	7
38	20	14	6
47	23	20	6
48	30	18	6
53	24	14	6
54	24	21	7
57	22	14	6
69	21	16	6
70	28	13	6

Total	315	215	82
Mean	24.230	16.538	6.37

Note: If 20 is the acceptable score, 3 of 13 pass (23.076 percent of the sample).

Table 10. Comparisons of Means of Subgroups, Summary Statistics.

	INFO	ATT1 Mean	ATT2 Mean
Subgroup A	1,3	21.82	16.96
Subgroup B	4,5	23.55	15.65
Subgroup C	6,7	24.23	16.53

The results demonstrated by the regression analyses were supported by the comparisons of means of subgroups. No significant pattern has been determined reflecting a relationship between physicians' attitudes and knowledge levels of hearing aids. Physicians who scored well (Subgroup C) on the INFO instrument did not exceed those who scored poorly (Subgroups A and B) by significant amounts in either general attitude (ATT1) or prescriptive attitude (ATT2). Hypothesis 3 is retained.

Hypothesis 4

Ho₄ Physicians in the treatment group will not obtain higher scores on the survey instrument than those in the control group.

This hypothesis was not tested due to lack of cooperation from the sample group. This finding is discussed in the summary in Chapter V.

Summary of the Statistical Findings

The collected data were analyzed for each of the hypotheses and the results were as follows:

- 1) Hypothesis 1 (Ho₁) was rejected because the subjects scored more poorly on the instrument assessing their level of knowledge than was hypothesized.
- 2) Hypothesis 2 (Ho₂) was rejected because the subjects demonstrated less positive prescriptive attitudes than was expected. The results of the section of the instrument assessing general attitudes were consistent with the hypothesis. However, physicians must obtain acceptable scores on both sections for the hypothesis to be retained.

- 3) Hypothesis 3 (H_{03}) was retained since no significant relationship was found among level of knowledge, prescriptive attitude, or general attitude, using either regression analysis or comparisons of the means of subgroups for this sample population.
- 4) Hypothesis 4 (H_{04}) was not tested as the data could not be collected.

V. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The central purpose of this study was to examine physician's attitudes toward and level of knowledge of hearing aids. The major objectives, procedures, and findings are summarized in this section and the following section. Recommendations for further study are included as the final section of this chapter.

Objective 1

Review the literature related to: a) hearing loss among the adult population, b) the impact of hearing impairment on the lives of adults, c) physician identification of hearing aid candidates, d) physician intervention for presbycusis patients, and e) physicians' attitudes toward hearing aids.

The results of the review of literature revealed that:

- 1) The most common cause of hearing loss is presbycusis; hearing loss due to aging. Approximately 14.4 million Americans are significantly impaired due to presbycusis and this number is constantly increasing. Presbycusis is not medically or surgically treatable.
- 2) Unamplified hearing impairment in older adults has been tied to depression, dementia, uncertainty, withdrawal, social isolation, reduced feelings of selfworth, and impatience with others. Hearing loss, as well as some of the accompanying factors listed above, could be ameliorated through the procurement of hearing aids.

- 3) Only 3.9 of the 1.4 million hearing impaired in the U.S. benefit from the use of hearing aids. Physicians have been identified as the key to the improvement of this ratio. Suggestions directed at alerting physicians to the needs of the large numbers of patients requiring guidance include increasing attention toward those patients denying hearing loss, establishment of routine hearing screening programs, and development of skills and knowledge in hearing disorders and counselling.
- 4) The literature suggests that misconceptions exist among physicians with regard to hearing loss and hearing aids. Further education on hearing aid candidacy, technological capabilities, and the appropriateness of various amplification systems for a heterogeneous group has been recommended.
- 5) Physicians have been considered as negatively biased toward hearing aids. Suspected factors influencing their attitudes have been cost, life expectancy, cosmetic values, and stigma. However, physicians have rarely been invited to provide insights into the bases for their attitudes. Moreover, it has been suggested that physicians should approach the possibility that a patients may be given the opportunity to improve their hearing with more positive attitudes. The physician should prepare the patient, through counselling and presentation of up-to-date information, for the hearing aid evaluation with the audiologist.

Objective 2

Identify and develop methodology designed to assess: a) physicians' attitudes toward hearing aids, and b) knowledge physicians have of hearing aids.

The attitude scale was developed in two parts, an assessment of general attitudes and an assessment of prescriptive attitudes. Additionally an instrument was developed to assess physicians' knowledge of hearing aids. A Delphi consensus panel achieved agreement on the items selected for inclusion on the test instruments.

Objective 3

Examine physicians' knowledge of and attitudes toward hearing aids using the methodology developed.

The research instruments were administered to 250 physicians practicing medicine in affiliation with Scarborough General Hospital in Scarborough, Ontario, Canada. The instruments were distributed by mail and returned by mail.

Four hypotheses were generated to enable the investigator to examine physicians' attitudes toward and knowledge of hearing aids. The findings for these hypotheses are discussed in the following section.

Hypotheses

- 1) H_{01} : Physicians will not score below six on the knowledge questionnaire.

Physicians demonstrated a low level of hearing aid knowledge as measured by the instruments administered for this study. Since it was hypothesized that physicians would not score below six, the hypothesis was rejected.

The literature indicated that a deficit in the knowledge levels of physicians about hearing aids may exist. Physicians are involved daily with adult presbycusis patients and require basic knowledge of hearing aids in order to provide appropriate intervention. Through administration of the instruments developed for this

study, specific areas of knowledge were tested. Physicians in the sample scored poorly, which was consistent with previous findings in the literature reviewed. The literature also suggested a need for further education of physicians in the areas of hearing and hearing aids. In consideration of the results of this study, it is agreed that efforts to improve the quality of hearing health care among presbycusic patients should be targeted through the education of the general practitioner.

- 2) H_{02} : Physicians will not score below 20 on either section of the attitude questionnaire.

Physicians demonstrated positive attitudes toward hearing aids in response to the section of the instrument assessing general attitudes. Less desirable results were obtained with the second section of the instrument, an assessment of prescriptive attitudes. Since the hypothesis required a score of 20 or greater for each section, the hypothesis was rejected.

It is the researcher's opinion that a certain level of knowledge of hearing aids is necessary before an attitude about hearing aids can be responsibly formulated. For this study, physicians indicated generally positive attitudes toward hearing aids, at the same time demonstrating low levels of knowledge of hearing aids. The indications of the test instruments were that physicians consider hearing aids to be a worthwhile purchase, feel comfortable with them, and would themselves utilize such hearing aids. However, the literature reviewed included a study which indicated a reluctance on the part of physicians to wear hearing aids. The possibility exists that during testing procedures physicians are conditioned to choose the "correct" response. Therefore, a positive answer may have seemed more "correct" than a negative response to the test items. However, it is assumed that the physicians in this sample population had generally positive attitudes toward hearing aids.

The scores on the second section of the instrument demonstrated prescriptive attitudes below the target of the hypothesis. Prescriptive attitudes require some degree of knowledge of hearing disorders and hearing aids. Physicians were able to make generally positive statements about hearing aids, yet when further stressed to apply their attitudes and knowledge to prescriptive practices, their contentions were far less positive. An example of the inconsistency in types of responses was in the test item on cost (see Appendix B). Physicians stated that they felt that hearing aids were a worthwhile investment, yet of 71 in the sample population only 3 physicians scored correctly when asked the price of a hearing aid.

- 3) H_{o3} : There is no relationship between physicians' level of hearing aid knowledge and their attitudes toward hearing aids.

Three linear regression analyses were computed through the use data derived from administration of the attitudes instrument (ATT1, general attitudes toward hearing aids and ATT2, prescriptive attitudes toward hearing aids) and the knowledge (INFO) questionnaire. No significant relationships were computed. Comparisons of the means of subgroups were run to check the regression. The physicians were divided among three groups according to their results on the INFO instrument. Comparisons of the means of ATT1 and ATT2 for these subgroups supported the results of the linear regression analyses. The hypothesis was retained.

Physicians appeared to have much more positive general attitudes toward hearing aids than has been indicated in the literature. Their prescriptive attitudes were not positive and their level of knowledge was low. However, no significant relationships were determined from this study by statistical analysis of any combination of data (regression for INFO and ATT1, INFO and ATT2, or ATT1 and ATT2).

- 4) H_{04} : Physicians in the treatment group will not obtain higher scores on the survey instrument than those in the control group.

The data for consideration of this hypothesis was unavailable. Therefore, the hypothesis was not tested.

The hypothesis was formulated for two reasons. The literature suggested a deficit in the knowledge of hearing aids among physicians and was in large part critical of physicians' unwillingness to participate in programs designed to stimulate attitude change in the medical setting (McNeil, 1984). It was intended in this study to posttest the treatment and control groups after providing an educational seminar for the treatment group. The purpose was to determine whether positive changes in attitude, general and/or prescriptive, would result. Individual invitations were mailed to the physicians in the treatment group (see Appendix B) to attend a luncheon seminar at the hospital through which they all practiced. Physician information packets were prepared, to be used in their offices, including practical, easily readable flipcharts, on basic topics helpful for counselling the hearing aid candidates in their area. The date of the seminar had been cleared through the Chief of Family Practice so there were no professional conflicts on that day. However, none of the physicians responded to the invitations. The reasons for the lack of participation are unclear. If the goal is to educate physicians about hearing impairment and the use of hearing aids, other approaches should be considered. Although no data were collected for the present study, the lack of response to the seminar is of possible significance insofar as it is supportive of the critical remarks cited in the literature which were directed at physicians' unwillingness to participate in similar programs.

Conclusions

This study has demonstrated that physicians' knowledge levels of hearing aids are lower than hypothesized, that general attitudes toward hearing aids are positive, that prescriptive contentions are not positive, and that willingness or ability to participate in continuing education with regard to hearing aids is negative for the group sampled. No significant relationships were determined among knowledge levels and general or prescriptive attitudes toward hearing aids.

Objective 4

Utilize findings to prepare recommendations for physician in service training pertaining to hearing aid candidacy.

The apparent nonexistence of a relationship among knowledge levels of physicians and their general or prescriptive attitudes toward hearing aids may call into question the appropriateness of targeting education for physicians as the key to improved hearing health care, as has been so strongly suggested in the review of the literature. However, it can be suggested that a similar study, with consideration of the methods and findings of the present study, could successfully demonstrate a relationship between prescriptive attitude and level of knowledge of hearing aids. Such findings could lead to targeting continuing education programs facilitating physician participation.

Recommendations

Based upon the literature review and the results of this study, the following recommendations for action are proposed.

Further information is needed by physicians regarding hearing aids. Physicians in this study demonstrated low knowledge levels of hearing aids, unwillingness to participate in the type of continuing education offered to them, and less than positive prescriptive contentions with regard to hearing aids. Several approaches to educating physicians are proposed:

- 1) Trusting referral relationships are formulated among professionals over time. One approach to physician education in hearing aids may be through these individual relationships. An audiologist, receiving referrals from a general practitioner, may be advised to communicate closely with the referral source, offering feedback on successful fittings, scheduling personal meetings (once in 6 months) to offer technological updates and case studies, offering assistance in setting up an ongoing screening program, and implementing a research project of mutual interest. A competent and well-informed professional working closely with referral sources may play a significant role in improving hearing aid awareness among physicians.
- 2) Audiologists may explore the possibility of offering presentations at regular family practice meetings at the local hospital.
- 3) Audiologists may share hearing aid information through publications in medical journals.
- 4) Medical training programs may be approached with the statistics on hearing and aging, and may be encouraged to prepare for the future through the consideration of more extensive training for medical students in hearing impairment and hearing aids.

Further research should be conducted to provide the following information:

1. A replication of the study based upon a different sample population of physicians is appropriate. This research methodology was effective in gaining new insight and information from the medical community with regard to hearing aid knowledge, attitudes, prescriptive contentions, and willingness to participate in continuing education. A suggested approach to a future study would be to:

- a) Eliminate the general attitude section of the instruments;
- b) Increase the number of questions related to prescriptive attitudes;
- c) Interview the physicians personally during administration of the questionnaires (recording comments) to gain further insight and to formulate a relationship which may influence the likelihood of physician participation in educational follow-ups;
- d) Make an initial appointment with the physician where her prescriptive/referral practices could be discussed and documented. The second part of the study (knowledge) could then be conducted, either by mail, phone or in person; and
- e) Determine prescriptive/referral practices for the total of the sample and run a linear regression analysis to determine the need for implementation of a continuing education program.

2. An examination of alternative means of providing information to physicians about hearing aids.

BIBLIOGRAPHY

- Alpiner, J. (1968). Audiologic problems of the aged. *Geriatrics*, 18, 19-26.
- Benderly, B. L. (1980). *Dancing Without Music*. Garden City, NY: Anchor Press/Doubleday.
- Blood, I., & Danhauer, J. L. (1978). Are we meeting the needs of our hearing aid users? *J. of Amer. Speech and Hearing Association*, 18, 343-347.
- Brooks, D. N. (1984). Factors relating to under-use of hearing aids. *Int. J. Rehab. Research*, 1, 214-215.
- Byrne, D. & Upfold, L. (1986). Binaural fitting practices in the National Acoustic Laboratories. *The Hearing Journal*, 39(11), 41-44.
- Courtney, W. E. (1986). *Techniques of Research*. Corvallis, OR: Sanderling Press.
- Crammer, K. (1983). Hearing aid dispensing. *Hearing Instruments*, 34, 9-12.
- Di Pietro, L. J., Knight, C. H., & Sams, J. S. (1981). Health care delivery for deaf patients. The provider's role. *American Annals of the Deaf*, 126, 106-112.
- Eisenberg, J. M. (1979). Sociologic influence on decision-making by clinicians. *Annals of International Medicine*, 90, 957-964.
- Erdman, S. A. & Sedge, R. K. (1986). Preferences for binaural amplification. *The Hearing Journal*, 39(11), 33-36.
- Fisch, L. (1978). Special senses: Age of deafness, the aging auditory system. In J. C. Brocklebury (Ed), *Textbook of geriatric medicine and gerontology*, pp. 267-290. New York: Longman Group Ltd.
- Fujikawa, S., & Owens, E. (1979). Hearing aid evaluation for persons with postlingual hearing levels of 90 to 100 db. *Arch otolaryngol*, 105, 662-665.
- Gallo, R., & Glorig, A. (1964). Permanent threshold shift changes produced by noise exposure and aging. *Am. Ind. Hyg. Assoc. J.*, 25, 237-245.
- Gilad, O., & Glorig, A. (1979). Presbycusis: The aging ear, Parts I and II. *J. Am. Aud. Soc.* 4, 195-217.
- Ginsberg, I. A., & White, T. P. (1985). Otologic considerations in audiology. In J. Katz (Ed.), *Handbook of clinical audiology*, pp. 15-38. Baltimore, MD: Williams & Wikias.

- Glorig, A., & Roberts, J. (1965). *Hearing levels by age & sex. United States, 1960-1962*. Washington, D.C.: U.S. Department of Health, Education and Welfare, Public Hearing Service, National Center for Hearing Statistics Series II, No. 11.
- Goldstein, D. P. (1984). Hearing impairment, hearing aids and audiology. *J. of Amer. Speech and Hearing Association*, 26(9), 24-35.
- Harford,, E. R. (1979). Guidelines for hearing problems = substituting management for myth. *Geriatrics*, 34(12), 69-72.
- Harless, E., & McConnell, F. (1982). Effects of hearing aid use on self concept in older persons. *J. Speech Hear Disord.*, 47, 305-309.
- Hearing Industries Association. (1986). *The Marketing Edge*, 1 (1), 1-5.
- Hearing Industries Association. (1986). *The Marketing Edge*, 1(2), 1-5.
- Hearing Industries Association. (1986). *The Hearing Journal*, 39(1), 7-18.
- Hearing Industries Association. (1987). *The Marketing Edge*, 2(1), pp. 1-5.
- Herbst, K. G, & Humphrey, C. (1980). Hearing impairment and mental state on the elderly living. *British Medical Journal*, 281, 903-905.
- Irvine, P. W. (1982). The hearing impaired elderly patient: A sensitive approach. *Postgrad. Med.*, 72(4), 115-118.
- Jordan, J. M. (1981). "Doc, I can't hear so good"--A deaf consumer views the medical profession. *Medical Aspects of Deafness: Proceedings of Forum IV of The Council of Organizations Serving the Deaf*, pp. 14-18.
- Kapteyn, T. S. (1977). Satisfaction with fitted hearing aids. *Scand. Audiology*, 6, pp. 147-156.
- Katz, J. (1985). *Handbook of clinical audiology*, 3rd ed. Baltimore, MD: Williams & Wilkins.
- Kirikae, I., Sato, T, & Shitara. (1963). A study of hearing in advanced age. *The Laryngoscope*, 205-220.
- Lattin, D. (1980). Doctors and disabled people: Does father always know best? *Disabled USA*, 4(2), 1.
- Lim, D. J., & Melnick, W. (1971). Acoustic damage of Cochlea. *Arch. Otolaryngol*, 94, 294-305.
- Martin, F. N. (1986). *Introduction to audiology*, 3rd ed. Englewood Cliffs, NJ: Prentice-Hall.
- Matkin, N. D., & Hodgson, W. R. (1982). Amplification and the elderly patient. *Otolarygologic Clinics of N. Amer.*, 15, 371-386.

- McDavis, K. C. (1983-84). The effect of severity of hearing impairment and locus of control on the denial of hearing impairment in the aged. *Int'l J. Aging and Human Development*, 18(1), 47-60.
- McNeil, E. E. (1984). *Physicians attitudes toward deaf persons and the communication methods used with their deaf patients*. Unpublished master's thesis, Oregon State University, Corvallis, OR.
- Miller, M. H. (1986). Restoring hearing to the older patient: The physician's role. *Geriatrics*, 41(12), 75-88.
- Mueller, G. H. (1986). Binaural amplification: Attitudinal factors. *The Hearing Journal*, 39(11), 7-10.
- Mueller, G. H. (1988). Selecting binaural hearing aid candidates: A moderate approach. *The Hearing Journal*, 41(3), pp. 20-26.
- National Center for Health Statistics. (n.d.). *Health interview survey (1982-82)* (unpublished data). Washington, D.C.
- Olsen, W. O. (1984). Presbycusis: When hearing wanes, is amplification the answer? *Postgraduate Medicine*, 76, 189-198.
- Olsen, W. O., & Tillman, T. W. (1968). Hearing aids and sensorineural hearing loss. *Annals of Otolaryngology and Laryngology*, 77, 717-726.
- Rupp, R. R. (1986). Modern hearing assistance: Physicians are the "gateway". *Geriatrics*, 41, 16.
- Rupp, R. R. (1983). Advice for treating the hearing impaired. *Geriatrics*, 38(10), 35-40.
- Sataloff, J., & Michael, P. I. (1973). *Hearing conservation*. Springfield, IL: Charles C. Thomas, .
- Schein, J. D., & Delk, M. T. (1980). Survey of health care for deaf people. *The Deaf American*, 32 (5), 5-6, 27.
- Schow, R., & Nerbonne, M. (1980). Hearing level in nursing home residents. *J. Speech Hear. Disord.* 45, 124-132.
- Schuknecht, H. (1974). *Pathology of the ear*. Cambridge, MA: Harvard University Press.
- Silman, S., Gilfand, S. A., & Silverman, C. A. (1984). Late onset auditory deprivation: Effects of monaural vs. binaural aids. *J. Acoustic Soc. Am.*, 76, 1357-1362.
- Sorri, M., Luotonen, M., & Laitakari, K. (1984). Use and non-use of hearing aids. *British Journal of Audiology*, 18, 169-172.

- Thomas, P. D., Hunt, W. C., Garry, P. J., Hood, R. B., Goodwin, J. M., & Goodwin, J. S. (1983). Hearing security in a healthy elderly population: Effects on emotional, cognitive, and social status. *J. of Gerontology*, 38, 321-325.
- Vernon, M., Griffin, M. H., & Yoken C. (1981). Hearing Loss. *J. Fam. Pract.* 6, 1053-1058.

APPENDICES

Appendix A

Research Instruments

Instrument A - Informational

Instrument B - Attitudinal

INSTRUMENT A - INFORMATIONAL

Directions: Please circle either a, b, c or d for each question

- 1) Which style of hearing aid is most commonly used?
 - a. pocket style
 - b. behind-the-ear
 - c. in-the-ear
 - d. in-the-canal
- 2) Most hearing aids are dispensed by...
 - a. business people
 - b. Audiologists
 - c. Physicians
 - d. Otolaryngologists
- 3) Most hearing aids have a warranty of
 - a. three months
 - b. one year
 - c. two years
 - d. three years
- 4) Most hearing aids cost the consumer
 - a. \$200.00 each
 - b. \$400.00 each
 - c. \$600.00 each
 - d. \$800.00 each
- 5) The provision of a trial period to the consumer by the hearing aid dispenser is
 - a. routine
 - b. mandatory
 - c. optional
 - d. illegal
- 6) Prescription of hearing aids in Ontario is regulated by
 - a. provincial government
 - b. federal government
 - c. provincial & federal governments
 - d. none of the above
- 7) Sale and fitting of hearing aids in Ontario is regulated by
 - a. provincial government
 - b. federal government
 - c. provincial & federal governments
 - d. none of the above
- 8) Batteries for a hearing aid cost the consumer
 - a. \$20.00 per month
 - b. \$10.00 per month
 - c. \$ 5.00 per month
 - d. \$ 2.50 per month
- 9) The life of an ear level hearing aid is approximately
 - a. two years
 - b. five years
 - c. eight years
 - d. more than eight years

INSTRUMENT B - ATTITUDINAL

Directions: Please mark the following scale to represent your judgement of each of the items listed. Confidentiality of responses is assured.

- | <u>Strongly Agree</u> | <u>Strongly Disagree</u> |
|---|---|
| 1 | 5 |
| 1) <u>Hearing aids are a worthwhile investment</u>
1 2 3 4 5 | 7) <u>Most hearing impaired people can benefit from amplification</u>
1 2 3 4 5 |
| 2) <u>I feel uncomfortable when I talk to people who wear hearing aids</u>
1 2 3 4 5 | 8) <u>Patients with nerve deafness can benefit from amplification</u>
1 2 3 4 5 |
| 3) <u>People look older when wearing aids</u>
1 2 3 4 5 | 9) <u>A mild hearing loss does not warrant referral for hearing aid evaluation</u>
1 2 3 4 5 |
| 4) <u>I would wear a behind-the-ear hearing aid</u>
1 2 3 4 5 | 10) <u>Patients over 70 years of age can benefit from amplification</u>
1 2 3 4 5 |
| 5) <u>I would wear an in-the-ear hearing aid</u>
1 2 3 4 5 | 11) <u>There is no additional benefit to a binaural fitting as opposed to a monaural fitting</u>
1 2 3 4 5 |
| 6) <u>I would wear a canal hearing aid</u>
1 2 3 4 5 | 12) <u>The prescription of hearing aids should be a legislated act</u>
1 2 3 4 5 |

PLEASE RETURN TO THE DEPARTMENT OF AUDIOLOGY

Appendix B

Letters to Physicians

Initial Letter to Physicians

Note For G.P.'S From Chief of Family Practice

Second Letter to Physicians

Invitation to Hearing Aid Seminar



SCARBOROUGH GENERAL HOSPITAL
 3050 Lawrence Avenue East, Scarborough, Ontario M1P 2V5 — Telephone 438-2911
DEPARTMENT OF REHABILITATIVE MEDICINE

Deborah Greenham
 Director,
 Physiotherapy
 Marel Elinka Schuurman
 Director,
 Occupational Therapy
 Denise Chafe
 Director,
 Speech Pathology and
 Audiology

Dear Participants,

The following is part one of a program to orient physicians to hearing aids and to provide guidelines for referral and counselling for patients requiring aural rehabilitation. It would be most appreciated if you would complete the enclosed and return to the audiology department as soon as possible.

Please initial your copy of the questionnaire so that the post-test data can be statistically matched. Also, please see attached for details on luncheon seminar.

Thank you for your kind cooperation.

Sincerely,
Redacted for Privacy

Jeanette Van Kessel,
 Audiologist

JVK:lm

SCARBOROUGH GENERAL HOSPITAL
 3050 LAWRENCE AVE. E.
 SCARBOROUGH, ONTARIO M1P 2V5
 TELEPHONE 426-2911

FORM 422 10/64

RECEIVED BY Barbara Chaff	DEPT. OF ORIGINATOR AUDILOGY & SPEECH	DATE MAY 19, 1968	SENT BY <input type="checkbox"/>	SENT AS PRIORITY <input checked="" type="checkbox"/>	IS COPY NECESSARY <input type="checkbox"/>
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REASON
OP REELING Information for Dr. Jelic

A study of Physicians attitudes to hearing aids is being conducted by Scarborough General Hospital Audiology Department. The objective of the research is to improve appropriateness of referral and overall care of the hearing impaired patient. Your participation and prompt return of the enclosed questionnaire is greatly appreciated.

Enclosed. This information has been included in the Department of Family Practice monthly mailout (for June). The questionnaire was included. Our mailing date for this newsletter is June 3.

Tinae *[Signature]*
 Med. Staff Office
 x 8101

11487

SIGNATURE	DEPARTMENT	DATE OF REPLY	ATTACHMENT <input type="checkbox"/>
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SCARBOROUGH GENERAL HOSPITAL
 3050 Lawrence Avenue East, Scarborough, Ontario M1P 2V5 — Telephone 438-2911
DEPARTMENT OF REHABILITATIVE MEDICINE

Deborah Greenham
 Director
 Physiotherapy
 Marel Elinkschuurmen
 Director
 Occupational Therapy
 Denise Chafe
 Director
 Speech Pathology and
 Audiology

June 28, 1988

Dear Physicians,

Re: Audiology Questionnaire

The return rate of the questionnaires has been somewhat disappointing, and it has been brought to our attention that perhaps our intent should be clarified.

The longterm goal of the study is to effectively educate in the area of hearing impairment. By compiling statistically valid data on Physicians knowledge and attitude toward hearing aids, we will have completed the first step toward reaching our goal. A treatment group will be randomly selected to receive educational input from the audiology staff as the second phase of the project. Finally, the questionnaire will be recirculated as a post-test to determine benefit of a particular educational program.

For those Physicians who have already returned the questionnaire, we extend our thanks. The instrument has been enclosed for those who have not yet had the opportunity. Please respond at your earliest convenience. Again, your participation is appreciated.

Sincerely,
Redacted for Privacy

Jeanette VANNESSE
 Audiologist

JVK:lm



SCARBOROUGH GENERAL HOSPITAL
 3050 Lawrence Avenue East, Scarborough, Ontario M1P 2V5 — Telephone 438-2911
DEPARTMENT OF REHABILITATIVE MEDICINE

September 1, 1988

Deborah Greenham
 Director,
 Physiotherapy
Marel Elinkschuurmen
 Director,
 Occupational Therapy
Denise Chafe
 Director,
 Speech Pathology and
 Audiology

Dear Physicians,

Thank you for participating in our study on hearing aids! At this point we would like to invite the respondents to attend a luncheon to discuss issues addressed within the questionnaires. An information packet will be provided for your files or waiting areas. Following the seminar, you will be asked to complete the questionnaire a second time to conclude our data collection. Lunch will be served from 11:30 a.m. to 1:00 p.m. on Wednesday October 12th, 1988 in the auditorium at Scarborough General Hospital. Please inform Lisa, our receptionist of your plans to attend at 431-8155.

Hope to see you here on October 12th, 1988.

Sincerely,
Redacted for Privacy

Jeanette Van Kessel,
 Audiologist

JVK:lm