

The Impact of Treated Hearing Loss on Quality of Life

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The number one reason why people purchase their first hearing aids is they recognize their hearing has worsened. The second reason is pressure from family members who are negatively impacted by the individuals hearing loss. As you know by now, hearing loss occurs gradually. By the time you recognize a need for hearing aids, your quality of life may have deteriorated unnecessarily. The average age of first-time hearing aid wearers is close to 70 years of age, despite the fact that the majority (65 percent) of people with hearing loss are below the age of 65; and nearly half of all people with hearing loss are below the age of 55.

For the vast majority of individuals who have decided to wait to purchase hearing aids (78 percent of all people who admit to hearing loss), although they may be aware their hearing loss has deteriorated, they delay hearing aid purchases under the excuses: "My hearing loss is not bad enough yet; I can get by without them; my hearing loss is mild." A large number of people wait 15 years or more from the point when they first recognize they have a hearing loss to when they purchase their first hearing aids. This is a tragedy since they might not be aware of the impact this delayed decision has had on their life, and the lives of their family and associates.

The literature presents a compelling story for the social, psychological, cognitive and health effects of hearing loss. Impaired hearing results in distorted or incomplete communication leading to greater isolation and withdrawal and therefore lower sensory input. In turn the individual's life space and social life becomes restricted. One could logically think that a constricted lifestyle would negatively impact the psychosocial well-being of people with hearing loss.

Research indicates that hearing loss is associated with: embarrassment, fatigue, irritability, tension and stress, anger, avoidance of social activities, withdrawal from social situations, depression, negativism, danger to personal safety, rejection by others, reduced general health, loneliness, social isolation, less alertness to the environment, impaired memory, less adaptability to learning new tasks, paranoia, reduced coping skills, and reduced overall psychological health. For those who are still in the workforce, uncorrected hearing loss has a negative impact on overall job effectiveness, opportunity for promotion and perhaps lifelong earning power. Few would disagree that uncorrected hearing loss is a serious issue.

Prior Experimental Evidence that Hearing aids Improve Quality of Life

An effective human being is an effective communicator; optimized hearing is critical to effective communication. Modern hearing aids improve speech intelligibility and therefore communication. The benefits of hearing aids (audiologically defined as improved speech intelligibility) have been demonstrated in rigorous scientific research. It would seem that if one could improve speech intelligibility by correcting for impaired hearing, that one should observe

improvements in the social, emotional, psychological and physical functioning of the person with the hearing loss. There have only been a few studies to date comparing hearing aid owners and non-owners with known hearing loss. The majority of studies had small sample sizes and in general tended to confine themselves to U.S. male veterans. The results of these studies, as well as the exciting findings of a very large U.S. study conducted in collaboration with the National Council on the Aging in 1999 (with publication in January 2000), are described below.

Harless and McConnell demonstrated that 68 hearing aid wearers had significantly higher self-concepts compared to a matched group of individuals who did not wear hearing aids. Dye and Peak studied 58 male veterans pre- and post-hearing aid fitting and found significant improvement on memory tests. In the most rigorous controlled study to date, Mulrow, Aguilar and Endicott studied 122 male veterans and 72 patients from primary care clinics. Half were randomly chosen and fit with hearing aids while the other half were not. After four months compared to the control group, the researchers found significant improvements in the hearing aid wearers on emotional and social effects of hearing handicap, perceived communication difficulties, cognitive functioning, and depression.

In addition, the same researchers in a follow-up study published in 1992 demonstrated that the quality of life changes were sustainable over at least a year. Bridges and Bentler determined in a study of 251 subjects comprised of normal hearing elderly individuals with hearing aids, and individuals with unaided hearing loss that hearing aid wearers had less depression and higher quality of life scores compared to their unaided counterparts.

Finally, in a pre-post study (that is the person was studied before and after a hearing aid fitting) with 20 subjects, Crandall demonstrated after three months of hearing aid use that functional health status improved significantly for hearing aid wearers.

Research on the Positive Impact of Hearing aids on Quality of Life

Following are the results of the largest study in the world conducted on the impact of hearing aids on quality of life. After reading this, we hope you agree that hearing aids when successfully fit to your unique audiological needs, have the potential to literally transform your life.

Utilizing the famous National Family Opinion Panel (NFO) in 1997, a short screening survey was mailed to 80,000 panel members to find a representative sample of people with hearing loss in the United States. This short survey helped identify nearly 15,000 people with self-admitted hearing loss. The response rate to the screening survey was 65 percent. Since 1989, research has been conducted in this manner on more than 25,000 people with hearing loss and the findings have been under the generic name "MarkeTrak." Working with the National Council on the Aging, a sample of 3,000 individuals with hearing loss ages 50 and over were randomly drawn from the MarkeTrak hearing loss panel. Equal samples of 1,500 hearing aid owners and non-owners were drawn from the panel. What is unique about this study is that people with hearing loss, as well as their significant other (usually the spouse), were studied.

Extensive questionnaires were sent to both the person with the hearing loss and the spouse or family member. The number of questions was 300 and 150 respectively. The comprehensive

survey covered a myriad of topics including: self and family assessment of hearing loss, psychological well-being, social impact of hearing loss, quality of relationships, life satisfaction, general health, self and family perceptions of benefit of hearing aids (wearers only), reasons for purchasing hearing aids (wearers only), reasons for not purchasing hearing aids (non-wearers only), and attitudes toward hearing health and hearing aids. In addition, a number of personality scales, which were deemed relevant to this study, were included in the survey.

After analyzing the returned surveys for usability (e.g. minimal missing information, hearing aid owners who wear their hearing aids) the final sample sizes for respondents with hearing loss and family members were reduced to 2,069 and 1,710 respectively. Thus, this study involved nearly 4,000 people.

The goal of the study was to determine if hearing aids had an impact on hearing loss independent of hearing loss. In other words, do people with mild hearing loss derive as much benefit as individuals with more serious hearing losses? As part of the research design, in addition to quality of life items, a paper and pencil assessment of hearing loss was administered with the anticipation that the results of this assessment would be used to control for hearing loss when comparing the quality of life of hearing aid wearers and non-wearers.

The key hearing assessment tool used was the Five Minute Hearing Test (FMHT) by the American Academy of Otolaryngology-Head and Neck Surgery. The FMHT is a fifteen-question test measuring self-perceived hearing difficulty in a number of listening situations (e.g. telephone, multiple speakers, television, noisy situations, reverberant rooms), as well as self-assessments of some signs of hearing loss (e.g. people mumble, inappropriate responses, strain to hear, avoid social situations). Previous research has determined that the FMHT is significantly correlated with objective audiological hearing loss measures.

Based on hearing difficulty scores, all subjects in this study were grouped into five equal size groups (20 percent each-called quintiles). These ranged from quintile 1 (the 20 percent of respondents with the mildest hearing loss as measured by the FMHT) to quintile 5 (the 20 percent with the greatest hearing loss). The quintile system was utilized for all analysis as a means of controlling for differences in hearing loss between the hearing aid wearer and non-wearer samples. The use of these quintiles allowed the researchers to achieve more valid comparisons between samples of hearing aid wearer and non-wearers.

If the responses of all hearing aid wearers with those of all non-wearers were compared without regard to degree of hearing loss, the findings would have been misleading, and even erroneous. For example, it is widely known that incidence and degree of depression have been found to increase with severity of hearing loss. Thus, even if people with severely hearing loss experience reduced depression after getting hearing aids, they might still report more depression than non-wearers overall, since hearing aid wearers tend to have more severe hearing loss. However, when hearing aid wearers are matched with non-wearers in the same quintile (non-wearers having a fairly similar degree of hearing loss), the differences between them better reflect the potential impact of the hearing aids rather than the effect of their degree of hearing loss.

While there is no audiological basis for labeling hearing loss associated with each quintile group, the researchers did find an excellent correlation between self-perceived loss (e.g. mild to profound hearing loss) and the FMHT test. As we discuss the findings of this study with respect to the five hearing loss groups, it's appropriate to consider people in quintile hearing loss groups 1, 3 and 5 as having respectively a "mild," "moderate," and "severe /profound" hearing loss; group 2 is between mild and moderate hearing loss while group 4 should be viewed as between moderate and severe hearing loss.

Research Findings

Following is a systematic evaluation of the impact that hearing aids have on quality of life. This will be done by comparing the responses of hearing aid wearers and non-wearers while controlling for hearing loss. As you evaluate the impressive findings below keep in mind the following:

- the devastating impact of hearing loss on quality of life is well-documented;
- quality of life is primarily impacted by the fact that uncorrected hearing loss results in reduced speech intelligibility;
- hearing aids when fitted correctly improve speech intelligibility and therefore can restore your ability to function more effectively in life.

Demographics & Household Income.

It should be recognized that in most respects the five hearing loss groups were well matched on key demographics: gender, marital status, employment status, and age. A striking trend was discovered when evaluating household income by level of hearing loss. Income is significantly related to both hearing loss and hearing aid usage. Figure 1 shows there was close to an \$8,000 difference between those with mild hearing loss (quintile 1) and those with profound hearing loss (quintile 5). Note that income drops significantly only for severe to profound hearing loss groups (4 and 5-the top 40 percent of individuals with hearing loss).



Compared to non-wearers, there was a \$13,000 a year difference between the mild and profound hearing loss groups. The differential for hearing aid wearers was much less severe (\$7,000). Hearing aids appeared to have a positive impact on household income, but only for individuals whose hearing loss was in the higher 60 percent (moderate-profound). People with a moderate to profound hearing loss, who did not use hearing aids, on average, experienced household incomes \$5000-\$6000 less than their counterparts who did use hearing aids. This is despite the fact that the higher hearing loss non-wearer groups tended to be employed slightly more often.

Hearing aid wearers also reported that they have plenty of discretionary income more often than non-wearers. For example, 22 percent of group 5 (profound hearing loss) hearing aid wearers reported they had plenty of discretionary income compared to only 8 percent of non-wearers. The discretionary income differential for samples with more severe hearing loss was a likely cause of the lower earning power. Because of higher hearing disability levels, communication is probably impacted, resulting in lower income and therefore less earning power. Finding a solution to their hearing loss is exacerbated for these groups, in that lower earning power means that the respondent was less likely to be able to afford a hearing aid to correct the hearing loss.

Activity level

Respondents were asked to indicate the extent (times per month) to which they engaged in thirteen activities in a typical month. Six of the activities were solitary in nature while seven involved other people. Total solitary and social activity scores were calculated. Hearing aid wearers were shown to have the same level of solitary activity as non-wearers. However, hearing aid wearers were more likely to engage in activities involving other people. They were shown to have significantly higher participation in three to four of the seven activities measured. Four out of five quintile hearing aid wearer groups indicated they participated more in organized social activities while three out of five of the hearing loss groups reported they were more likely to attend senior centers if they were hearing aid wearers. The most serious hearing loss group (quintile 5) reported greater participation in four out of the seven activities if they were hearing aid wearers.



Interpersonal relations

The survey asked 12 questions concerning the respondents' quality of interpersonal relationships with their family using a four-point scale. Twelve questions concerned negativity (e.g. arguments, tenseness, criticism) in the relationship. We found that interpersonal warmth in relationships significantly declined as hearing loss worsened. Hearing aid wearers in quintiles 1-3 (mild to moderate) were shown to have significantly greater interpersonal warmth in their relationships than their non-wearer counterparts. Also, significant reductions in negativity in family relationships appeared to be associated with hearing aid usage in quintiles 1 and 2-the hearing loss groups with the mildest hearing disability.

Social Effects

Forty-seven items in the survey assessed the social impact of hearing loss and hearing aid usage. The majority of the items were scored on a five-point scale taking the values "strongly agree" to "strongly disagree." Average monthly contact with family and friends by phone and in person was also assessed.

The stigma of hearing loss was shown to increase as hearing loss increased. All five non-wearer groups reported they would be embarrassed or self-conscious if they wore hearing aids, while all five wearer groups reported lower stigmatization with hearing aids. The conclusion is not, of course, that usage of hearing aids would lead to reduced stigma; most likely hearing aid wearers have resolved their concerns about the stigma associated with hearing aid usage more so than their non-wearer counterparts.

As hearing loss increased, respondents were more likely to overcompensate for hearing loss by pretending that they heard what people said, by avoiding telling people to repeat themselves, by avoiding asking other people to help them with their hearing problem, by engaging in compensatory activities such as speech reading, or by defensively talking too much to cover up the fact that they could not hear well.

All five hearing aid wearer groups reported significantly lower overcompensation scores. The greater the hearing loss, the greater was the likelihood that respondents reported they were the target of discrimination. The greater the hearing loss, the greater the likelihood that respondents with more serious hearing losses were accused of hearing only what they wanted to hear, found themselves the subject of conversation behind their backs, were told to "forget it" when frustrated family members were not heard the first time, and so on. All hearing loss groups except quintile 1 (the mildest hearing loss) reported significant reductions in discriminatory behaviors, if they were hearing aid wearers.

A strong relationship between hearing loss and family member concerns of safety (e.g. cannot hear warning signs, instructions from doctor, made a serious mistake, not safe to be alone) was found, as well as significant differences between hearing aid wearers and non-wearers. Respondents also agreed that safety concerns increased as hearing loss increased.

The data however, indicated that safety concerns were significantly higher among hearing aid wearers than non-wearers in quintiles 1-3. Perhaps the realization that mistakes were being made or that unaided hearing loss could result in possible injury, motivated the current hearing aid owner to purchase hearing aids. This explanation is consistent with the findings from previous MarkeTrak research, which indicated that the number one motivation to purchase hearing aids was "the realization that their hearing loss was getting worse."

There were a number of social effects that were correlated with hearing loss but were not impacted by hearing aid usage. These were negative effects on the family (e.g., "I find it exhausting to cope with their needs"), family accommodations to the individual with hearing loss (e.g., "I have to use signs and gestures a lot of the time"), rejection of the person with hearing loss (e.g., "They tend to get left out of social activities because of their hearing loss"), and withdrawal (e.g., "They tend to withdraw from social activities where communication is difficult"). In addition, hearing aid usage was not associated with increased phone or in-person contact with family or friends.

The Emotional Effects

Eighty items in the survey dealt with the emotional aspects of hearing loss. All five hearing aid wearer groups scored significantly lower in their self-ratings of emotional instability. In agreement with their family members, they were less likely to be tense, insecure, unstable, nervous, discontent, temperamental, and less likely to display negative emotions or traits. Four of the five hearing aid wearer groups reported significantly reduced tendencies to exhibit anger (e.g., "I sometimes get angry when I think about my hearing") and frustration (e.g., "I get discouraged because of my hearing loss"). In agreement, family members observed significantly less anger and frustration in all five hearing aid wearer groups.

The average reduction in depression associated with hearing aid usage across all five groups was 36 percent. All five hearing aid wearer groups reported significantly lower depressive symptoms (e.g., tired, insomniac, thinking of death) while four of the five hearing aid wearer groups (quintiles 1-4) reported a significantly lower incidence of depression within the last 12 months compared to their non-wearer counterparts.

Hearing aid wearers in quintiles 2-4 reported significantly lower paranoid feelings (e.g., "I am often blamed for things that are just not my fault"). Not surprisingly, in agreement with family members, all five non-wearer groups scored higher on denial when compared to hearing aid wearers (e.g., "I don't think my hearing loss is as bad as people have told me").



Family members and respondents were asked to indicate if the person with the hearing loss exhibited anxiety, tenseness or if they worried for a continuous period of four weeks in the previous year. In addition, they were asked to indicate if they experienced anxiety symptoms (e.g., keyed up or on edge, heart pounding or racing, easily tired, trouble falling asleep). Three of the five non-wearer groups (1, 3, 5) exhibited higher anxiety symptoms. In addition, three of the five non-wearer groups (1, 2, 5) exhibited more social phobias than non-wearers of hearing aids. Reduction in phobia and anxiety associated with hearing aid usage would appear to be more pronounced in individuals with serious to profound hearing losses (Quintile 5).

Factors not appreciably impacted by hearing aid usage in this study were: sense of independence (e.g., burden on family, answering for the person with hearing loss) and overall satisfaction with life. Although not as conclusive as some of the previous factors, non-wearers reported that they were more self-critical (e.g., "I dwell on my mistakes more than I should") and had lower self-esteem (e.g., "All in all, I'm inclined to feel that I am a failure"). Hearing loss was found to be highly correlated with self-criticism. There is also some evidence, though not as strong as other correlates of hearing aid use, that non-wearers were more critical of themselves (Quintiles 1, 3, 5).

Personality Assessment

Seventy-nine items were devoted to miscellaneous personality scales in addition to the personality measures under emotional and social effects. All of the personality scales used in this study are published scales. Family members indicated that the respondents' cognitive/mental state (e.g., they appear confused, disoriented or unable to concentrate) was affected by their hearing loss, primarily if the hearing loss was "severe" to "profound" (groups 4 and 5). In this study, impressive improvements in family perceptions of the persons' mental and intellectual state were observed if the individual had a severe to profound hearing loss (groups 4 and 5 only). Non-wearers were more likely to be viewed as being confused, disoriented, non-caring, arrogant, inattentive, and virtually "living in a world of their own."

Previously we indicated that there were no significant differences in measures of "withdrawal" between aided and unaided subjects. This finding is contrary to the literature. However, family members did report that non-wearers in three of five groups (1,4, 5) were more introverted as evidenced by greater likelihood of being private, passive, shy, quiet, easily embarrassed, etc. Moderate to severe hearing loss non-wearers (quintiles 3-5) were shown to score higher on a personality variable called "external locus of control." This means they were more likely to believe that events external to them control their lives. In other words, they felt less in control of their own lives. On the other hand, hearing aid wearers felt they were more in control of their lives and less a victim of fate.

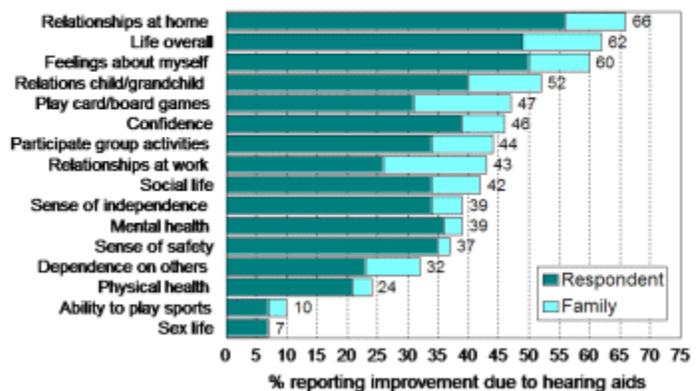
Health Impact

The survey asked six generic questions on self-perceptions of health, prevalence of pain and the extent to which the respondent believed that hearing loss impacted their general health. In addition, from a list of 28 health problems, respondents indicated whether they experienced that health problem and the extent to which the problem interfered with their activities.

Overall assessment of health (including absence of pain) appeared to decline as a function of hearing loss with further deterioration of health associated with non-usage of hearing aids for the three most serious hearing loss groups (quintiles 3-5). Three of the five hearing aid wearer groups (quintiles 1, 3, 5) reported significantly better health compared to their non-wearer counterparts. The lowest self-rating of overall health was the non-wearer group in quintile 5 (profound hearing loss).

Nonetheless, our research determined there was no consistent evidence that hearing aid usage is associated with reductions in arthritis, high blood pressure, heart problems or other serious disease states.

Figure 2. Percent of hearing aid owners and their family members reporting improvement in their quality of life in 16 areas due to hearing aids. In nearly all cases the family members report greater improvements due to hearing aids than the hearing instrument wearers.



Perceived Benefit of Hearing aids

As a validation check on comparisons of hearing aid wearers and non-wearers, both respondents and their family members were asked to rate changes they observed in 16 areas of their life that they believed were due to the respondent using hearing aids. Total findings are shown in Figure 2. In general, for nearly all quality of life areas assessed, the observed improvements were positively related to degree of hearing loss. Family members in nearly every comparison observed greater improvements in the respondent.

The top three areas of observed improvement for both respondents and family members were "relationships at home," "feelings about self," and "life overall." The most impressive improvements were observed in quintile 5 (profound hearing loss) in that 11 of 16 lifestyle areas were rated as improved by at least 50 percent of the respondents or family members.

Conclusions and Discussion

The results for this study are impressive. Hearing aids clearly are associated with impressive improvements in the social, emotional, psychological, and physical well-being of people with hearing loss in all hearing loss categories from mild to severe. As such, these findings clearly provide strong evidence for the value of hearing aids in improving the quality of life of people with hearing loss. Specifically, hearing aid usage is positively related to the following quality of life issues:

- greater earning power (especially the top 60% of hearing losses)
- improved interpersonal relationships (especially for mild-moderate losses) including greater intimacy and lessening of negative dysfunctional communication
- reduction in discrimination toward the person with the hearing loss
- reduction in difficulty associated with communication (primarily severe to profound hearing losses)
- reduction in hearing loss compensation behaviors
- reduction in anger and frustration
- reduction in the incidence of depression and depressive symptoms
- enhanced emotional stability
- reduction in paranoid feelings
- reduced anxiety symptoms
- reduced social phobias (primarily severely impaired subjects)
- improved belief that the subject is in control of their lives
- reduced self-criticism
- improved cognitive functioning (primarily severe to profound hearing loss)
- improved health status and less incidence of pain
- enhanced group social activity



In this study, both respondents and their family members were asked to independently rate the extent to which they believed their life was specifically improved due to hearing aids. All hearing loss groups from mild to profound reported significant improvements in nearly every area measured:

- relationships at home and with family
- feelings about self
- life overall
- mental health
- social life
- emotional health
- physical health

Short of stating definite causality, the evidence is quite compelling and perhaps suggestive of causality for the following reasons:

- The sample, the largest of its kind, is nationally representative of hearing loss subjects ages 50 and over. Thus, we need not be concerned with spurious findings due to sampling methodology.
- Many of the findings held up across all hearing loss quintiles from mild to profound.
- The specific findings were corroborated within the study. That is, significant differences between wearers and non-wearers were noted. Also, at the end of the survey respondents and their family members were asked to specifically indicate if their life was improved as a result of wearing hearing aids in 16 quality of life areas. Both respondents and their family members indicated significant benefit due to hearing aids in most areas measured.
- The differential efficacy between the 16 quality of life parameters noted by respondents and their family members (from a low of 4 percent to high of 74 percent improvements) indicates that a positive halo or acquiescence did not exist in this sample of respondents.
- The survey findings are consistent with other correlational and especially the randomized control studies and pre-post hearing aid fitting studies among smaller, more narrowly defined samples.
- The findings are consistent with the literature on factors impacting hearing loss; that is, the theoretical improvements that should occur if hearing loss is alleviated.
- The findings are consistent with the observations of clinicians and dispensers of hearing aids.

A Call to Action

Dr. Firman of the National Council on the Aging stated in his speech to the media in the summer of 1999, "This study debunks the myth that untreated hearing loss is a harmless condition."

In focus groups conducted with physicians, the prevalent view is that hearing loss is "only" a quality of life issue. If, quality of life is defined as "greater enjoyment of music," then one might agree. But the literature and this study clearly demonstrate that hearing loss is associated with physical, emotional, mental, and social well-being. Depression, anxiety, emotional instability,

phobias, withdrawal, isolation, lessened health status, lower self-esteem, and so forth, are not "just quality of life issues." For some people, uncorrected hearing loss is a "life and death issue."

This study challenges every segment of society to comprehend the devastating impact of hearing loss on individuals and their families, as well as the positive possibilities associated with hearing aid usage. We need to help physicians recognize hearing loss for the important health issue that it is. We need to help those with hearing loss who are currently in denial about their impairment, to understand the impact their hearing has on their life as well as that of their loved ones. We need to assure that hearing aids are recognized in society not just for their treatment of hearing loss, but also as a potential contributing factor to the successful resolution of other medical, emotional, social and psychological conditions.

This study also demonstrates for the first time that individuals with even a mild hearing loss can experience dramatic improvements in their quality of life. This finding is significant because the challenge is to demonstrate to "baby-boomers" (ages 45-59) with emerging hearing losses that hearing aids offer something to them of value early-on in their lives, and that they do not need to wait until retirement to receive the benefits of enhanced hearing.

If you are one of those people with a mild, moderate or severe hearing loss, who is sitting on the fence, consider all the benefits of hearing aids described above. Hearing aids hold such great potential to positively change so many lives.

Common Myths

The consequences of hiding hearing loss are better than wearing hearing aids.

What price are you paying for vanity? Untreated hearing loss is far more noticeable than hearing aids. If you miss a punch line to a joke, or respond inappropriately in conversation, people may have concerns about your mental acuity, your attention span or your ability to communicate effectively. The personal consequences of vanity can be life altering. At a simplistic level, untreated hearing loss means giving up some of the pleasant sounds you used to enjoy. At a deeper level, vanity could severely reduce the quality of your life.

Only people with serious hearing loss need hearing aids.

The need for hearing amplification is dependent on your lifestyle, your need for refined hearing, and the degree of your hearing loss. If you are a lawyer, teacher or a group psychotherapist, where very refined hearing is necessary to discern the nuances of human communication, then even a mild hearing loss can be intolerable. If you live in a rural area by yourself and seldom socialize, then perhaps you are someone who is tolerant of even moderate hearing losses.