

# MarkeTrak VIII

## Patients report improved quality of life with hearing aid usage

By Sergei Kochkin, PhD



© shutterstock.com/William Perugini

This is the fourth installment from the MarkeTrak VIII database exploring customer satisfaction and benefit with hearing aids. This paper will specifically address the following questions:

- How much benefit do patients experience with their hearing aids, where benefit is defined as percent hearing handicap improvement perceived by the patient?
- What quality of life (QOL) changes are caused by hearing aid usage from the patient's perspective?
- Do best practices impact benefit and quality of life changes?

When fitting patients with hearing aids, the professional's goal is to optimize amplification within the patient's residual auditory area (with some exceptions duly noted), and to supplement the hearing aid fittings with appropriate assistive listening technology and the vast array of counseling tools available (e.g. videos, books, auditory training and re-training therapy, personal counseling, self-help groups, etc).

As shown below, these protocols facilitate meaningful quality of life improvements. Hearing technology coupled with best practices and accessibility to public places offers substantial benefit with regard to hearing, listening, understanding, and communicating across multiple acoustic environments.



Previously we have shown that hearing healthcare professionals, and the best practices employed by these professionals, play a significant role in the success of the patient's hearing aid experience and journey.<sup>1</sup> Importantly, recent research has shown mini-BTE (open-canal and RIC) technology has resulted in increased levels of customer satisfaction, when degree of hearing loss is controlled.<sup>2</sup>

Two large scale studies have addressed benefit associated with hearing aid usage in the US. In analyzing 16,519 Abbreviated Profiles of Hearing Aid Benefit (absolute benefit/unaided) across 36 studies, Kochkin estimated that patients experienced a 44% reduction in their hearing handicap when using analog hearing aids.<sup>3</sup>

Larson, et. al., using the NU-6 auditory test, demonstrated an absolute improvement of 29% in a sample of more than 300 subjects using analog hearing aids. We can also estimate a relative improvement of 52% in monosyllabic word recognition from this study. Using the connected speech test, he reported

absolute benefit scores of 26% (input SPL 52 dB) versus 6% at higher input levels (input SPL 74 dB), but with marked deterioration in the presence of background noise.

### OUR STUDY

Detailed methodology for the MarkeTrak VIII survey is documented in the first publication and will be briefly reviewed here.<sup>5</sup> In November and December 2008, a short screening survey was mailed to 80,000 members of the National Family Opinion (NFO) panel as a means of identifying people with hearing loss and hearing aid owners. The NFO panel consists of households that are balanced to the latest US census information with respect to market size, age of household, size of household, and income within each of the nine census regions, as well as by family versus non-family households, state (with the exception of Hawaii and Alaska), and the nation's top 25 metropolitan statistical areas.

This short screening survey was completed by 46,843 households; 14,623 people with hearing loss were identified and detailed demographics on those individuals and their households were obtained. The response rate to the screening survey was 59%. In January 2009, an extensive seven-page legal size survey was sent to the total universe of hearing aid owners in the panel database (3,789); 3,174 completed surveys were returned representing an 84% response rate. The detailed MarkeTrak surveys were written by this author along with approximately 30 peers in the hearing health industry.

In querying our MarkeTrak VIII database for hearing aids four years of age or less, we found 2,090 patients. Detailed demography and hearing loss characteristics of this population were reported in an earlier publication on the impact of the hearing healthcare professional on hearing aid user success.<sup>1</sup> Detailed information on outcome measures and best practices were also described in the previous article in this series.

### Listening Situations

With respect to the current analysis, which focuses on benefit and quality of life changes specifically due to hearing aid usage, patients were presented with ten listening situations (shown below) and asked to rate each situation on a scale of 0 to 100% for the "percent of time your hearing problem has been resolved due to the use of your hearing aids." Patients were instructed not to respond if they did not participate in the particular listening situation. The situations were:

1. Conversation with one person in quiet
2. Talking on the telephone
3. Listening to TV with other family or friends when the volume is adjusted to suit other people
4. Conversing in a noisy restaurant
5. Understanding a lecture in a large public place
6. Participating in worship service
7. Business meetings

8. Small social gatherings
9. Listening to music
10. Carrying on a conversation in a busy street or store

### Quality of life

With respect to quality of life, we asked patients to "rate the changes you have experienced in the following areas, that you believe are due to your hearing aids". The quality of life areas assessed were based on a 5 point scale from "A lot better" to "A lot worse." The areas were:

1. Emotional health
2. Mental ability (memory)
3. Physical health
4. Relationships at home
5. Relationships at work
6. Social life
7. Feelings about yourself
8. Ability to participate in group activities
9. Sense of independence
10. Sense of safety
11. Confidence in yourself
12. Sense of humor
13. Romance in my life
14. Overall ability to communicate more effectively in most situations

### Indices

Overall, four key indices were used in cumulating the results:

- **Benefit:** A factor analysis of patient perceptions of hearing handicap improvement in ten listening situations determined that there was only one factor in the ratings. Thus this variable is calculated as the average (mean) of the hearing handicap improvement achieved as a result of hearing aid usage in all ten listening situations, excluding situations the patient did not participate in.
- **Quality of Life Index:** A factor analysis of the 14 quality of life issues measured above yielded one factor. While detailed findings are presented after the results below, the overall QOL index is simply the average of the items to which the patient responded.
- **Best Practices Index:** In the original MarkeTrak study, we factor analyzed 17 aspects of the hearing aid fitting protocol, converted to factor scores and standardized to a z score with a mean of 5 and standard deviation of 2 (stanine scores). In this study, we converted these stanine scores to percentile rankings and then grouped practices into segments of 10 percentage points. Low percentages indicate minimalist best practices and high percentages signify comprehensive best practices. The profile of these ten best practice groupings is detailed in Table 1.
- **Overall success index:** A composite measure of success was derived by factor analysis of all outcome variables from the earlier study presented in this series (also converted to factor scores and standardized to a z score with

**Table 1.** Best practice composite index in percentiles comparing incidence of 17 best practices in fitting hearing aids.

Hearing aid fitting practice	Best Practice Index (%)									
	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90+
Use sound booth (%)	71	79	79	87	88	91	84	88	89	94
Verification - REM (%)	15	29	34	36	35	43	50	51	59	82
Validation - subjective (%)	1	7	8	13	14	18	18	25	36	64
Validation - objective (%)	24	46	55	62	72	77	76	81	87	99
Customer satisfaction survey (%)	3	3	6	14	9	11	14	20	28	53
Loudness discomfort measure (%)	34	54	53	66	64	72	77	81	95	98
Auditory retraining software (%)	1	1	1	2	2	1	2	2	2	7
Aural rehab group (%)	5	9	9	13	14	16	16	18	17	20
Self-help book (%)	9	18	15	24	24	23	36	30	40	49
Self-help video (%)	1	2	2	3	4	2	5	4	7	12
Self-help group referral (%)	1	2	1	2	2	1	2	1	2	5
Achieved sound quality (1-9 scale)	2.8	3.4	3.9	4.6	5	5.6	6	6.4	6.8	7.2
Hearing Health Professional skill set (1-9 scale)	3.4	4.6	5.3	5.2	5.5	5.4	5.5	5.4	5.6	5.5
Quality of office (1-9 scale)	4.4	4.8	4.9	5	5.2	5	5.1	5.5	5.8	6
Visits required to fit hearing aid	3.7	2.9	2.4	2.4	2	2	2	1.9	1.9	1.7
Total time counseling (hours)	0.7	0.8	0.9	0.9	1	0.9	1	1	1.2	1.2
Fit and comfort - satisfied/very satisfied (%)	13	33	57	70	78	85	90	97	98	100

a mean of 5 and standard deviation of 2 [stanine scores]). The variables comprising this factor were: hearing aid usage; customer satisfaction with benefit; multiple environmental listening utility (MELU) in 19 listening situations; benefit as described above in ten listening situations; likelihood of recommending the hearing professional or the hearing aids to a friend; and hearing aid brand loyalty. In this study we have updated the overall success index to include quality of life changes associated with hearing aid usage.

## RESULTS

### Benefit

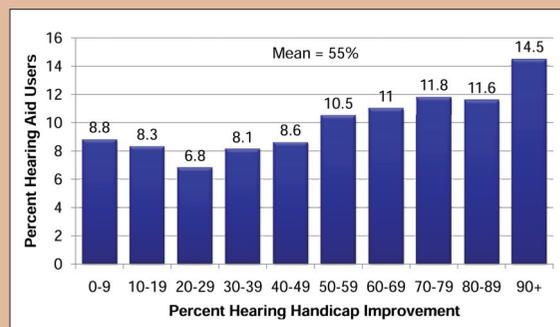
Figure 1 shows the distribution of hearing handicap improvement. Observe that the mean hearing handicap improvement reported by patients is 55%. Nearly four out of ten patients experience a hearing handicap improvement of 70% or more, while nearly one in four patients receive benefit less than 30%.

In Figure 2 we display the hearing handicap improvement in ten listening situations. Patients report a 70% improvement in quiet situations and approximately a 60% improvement in small gatherings, while on the phone, and in a place of worship. They report about a 50% improvement in all other situations measured in this survey.

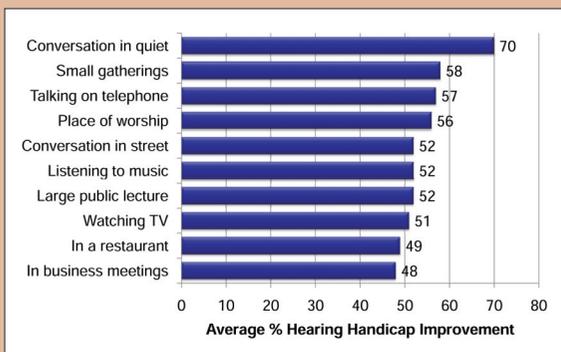
### Quality of life

Figure 3 documents quality of life improvements in 14 areas. Nearly seven out of ten patients report their ability to communicate effectively in most situations improved because of their hearing aid use. Slightly more than half of the patients report hearing aids improved their relationships at home, their social life, and their ability to join in groups.

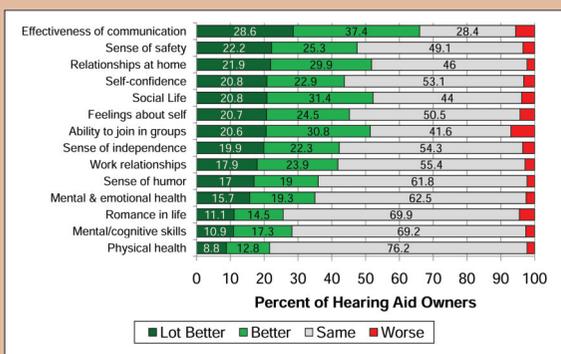
Approximately four in ten report improvements in their sense of safety, self-confidence, feelings about self, sense



**Figure 1.** Hearing handicap improvement (%) for the US population due to hearing aids (n=1,871 for hearing aids LE 4 years of age)



**Figure 2.** Hearing handicap improvement (%) for the US population due to hearing aid usage in 10 listening situations (for hearing aids LE 4 years of age)



**Figure 3.** Quality of life changes attributed to hearing aid usage by hearing aid owners (for hearing aids LE 4 years of age)

of independence, and work relationships (for those working). Between one quarter and one-third of respondents reported improvements in their sense of humor, mental and emotional health, romance, cognitive skills, and physical health.

Assessing all 14 quality of life areas, 75% of patients report at least one area of their life was improved by wearing hearing aids (Figure 4). Additionally, eight out of ten are satisfied with the changes that have occurred in their lives due to hearing aids (Figure 5).

### Impact of benefit on quality of life

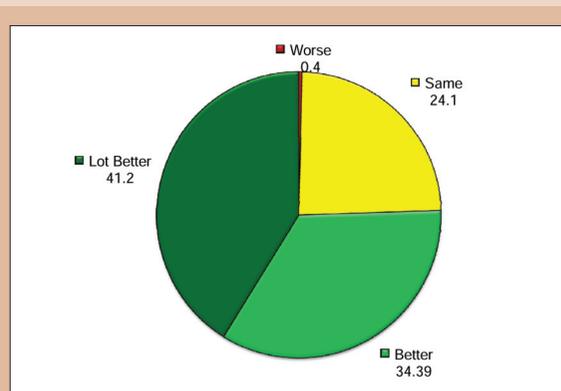
My thesis was that it is difficult for people with hearing loss to substantially improve their lives if they do not experience benefit when using their hearing aids. Figure 6 demonstrates the relationship between benefit and quality of life. For those with minimum benefit (0-9%), 44% reported that their quality of life was “better” or “a lot better.” However, 88% of patients experiencing 90% or greater benefit reported that their lives had improved because of hearing aids. Figure 6 also shows that nine out of ten patients experience significant improvements in their life when they experience a 70% improvement in their hearing handicap.

### Impact of best practices

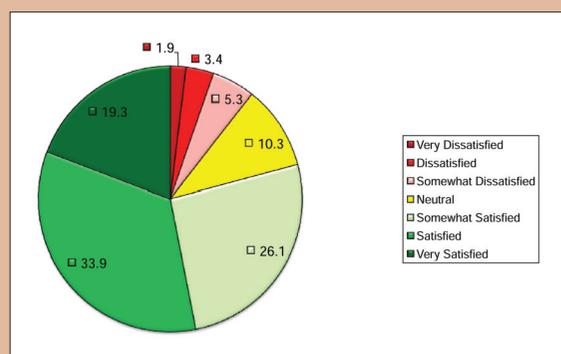
Figure 7 shows the strong relationship between best practices and hearing handicap reduction. Patients who obtained comprehensive best practices associated with their hearing aid fitting experienced a hearing handicap improvement double that of their peers who experienced minimalist best practices.

Figure 7 also suggests by its trends that even when comprehensive best practices are employed, the possible ceiling of hearing handicap reduction as perceived by the patient is in the 65-70% range for the hearing loss population currently using the hearing aid technology that was commonly fitted at the time of this survey.

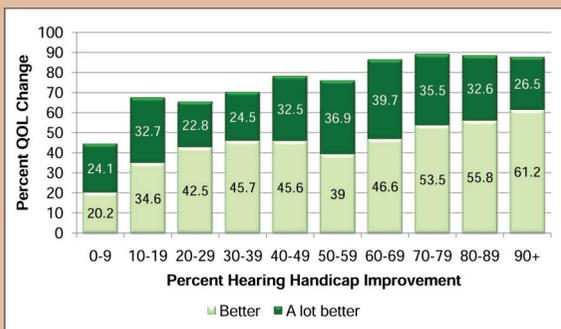
With such a strong relationship between benefit and best practices it is not surprising that quality of life improves dramatically as the quality of best practices improve, as shown in Figure 8. Only 15% of patients report quality of life changes if they received a minimalist protocol (0-9 percentile group) compared to 75% of patients receiving the most comprehensive protocol (90+ percentile group).



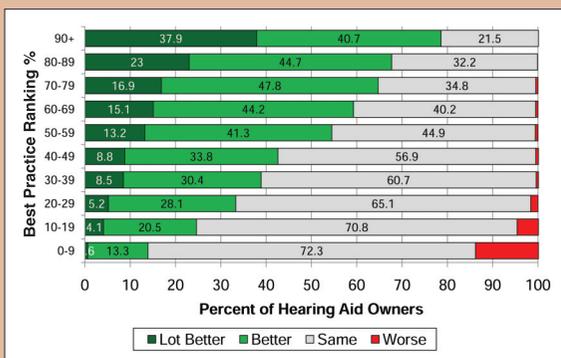
**Figure 4.** Quality of life changes attributed to hearing aid usage (n=1,995 for hearing aids LE 4 years of age). 75% of hearing aid owners experience improvement in at least 1 of 14 QOL issues.



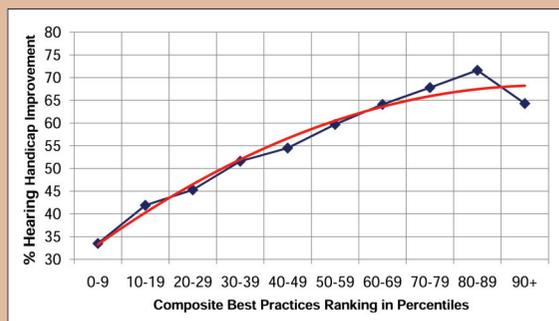
**Figure 5.** Consumer satisfaction with quality of life changes due to hearing aid usage (n=2,073 for hearing aids LE 4 years of age). Eight of 10 people are satisfied with QOL changes in their life due to hearing aids.



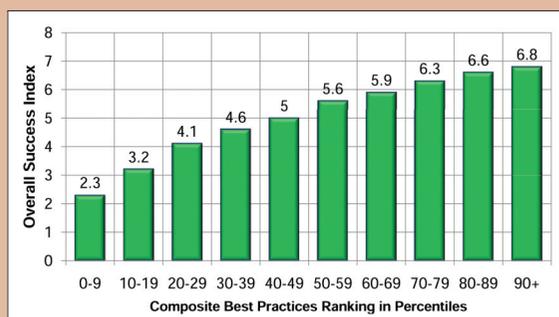
**Figure 6.** Quality of life changes associated with hearing aid benefit; 9 out of 10 people experience QOL change when benefit achieved is at least a 70% hearing handicap reduction. (n=1,848 for hearing aids LE 4 years of age)



**Figure 7.** Quality of life changes attributed to hearing aids by hearing aid owners, segmented by composite best practices ranking scored in percentiles (n=1,808 for hearing aids LE 4 years of age)



**Figure 8.** Hearing handicap improvement (%) segmented by composite best practices ranking scored in percentiles; (n=1,688 for hearing aids LE 4 years of age)



**Figure 9.** Overall patient success by level of composite best practices ranking scored in percentiles (n=1,688 for hearing aids LE 4 years of age; Success = linear composite of benefit, usage, utility, positive attitudes toward hearing aids and QOL changes with mean=5 and std=2)

Figure 9 plots the overall success index (mean=5, std=2) by best practice ranking, updated to now include quality of life changes as part of that index. Patients experiencing minimalist protocols (0-9 percentile group) achieved a patient success score of 2.3 while those experiencing a comprehensive protocol (90+ percentile group) achieved a score of 6.8.

#### KEY CONCLUSIONS

- The average benefit (hearing handicap improvement) achieved by patients with recent hearing aid technology is 55%.
- The upper bounds of hearing handicap improvement may be in the 65-70% range, with due respect to outcomes achieved by practices with the most comprehensive protocol. One would expect that with the wireless revolution in hearing aids and increased looping of public buildings, there will be increased accessibility to people with hearing loss, increased hearing aid utility, and therefore increased benefit and quality of life.
- Seventy-five percent of patients report at least one area of their life was improved by wearing hearing aids.

- Eight out of ten hearing aid users are satisfied with the changes that have occurred in their lives due to hearing aids
- Nine out of ten patients are projected to experience significant improvements in their quality of life once they experience a 70% reduction in their hearing handicap.
- There is a strong relationship between quality hearing healthcare, benefit, and quality of life improvements.

#### ACKNOWLEDGEMENT

This study was made possible by a special grant from Knowles Electronics, LLC, Itasca, IL.

**Sergei Kochkin**, PhD, is Executive Director of the Better Hearing Institute.

#### REFERENCES

1. Kochkin S, Beck D, Christensen L, Compton-Conley C, Fligor B, Kricos P, McSpaden J, Mueller HG, Nilsson M, Northern J, Powers T, Sweetow R, Taylor B, Turner R: MarkeTrak VIII: The impact of the hearing healthcare professional on hearing aid user success. *Hear Rev* 2010;17(4):12-34.
2. Kochkin S: MarkeTrak VIII: Mini-BTEs tap new market, users more satisfied. *Hear J* 2011;64(3):17-18,20,22,24
3. Kochkin S: MarkeTrak VI: On the issue of value: hearing aid benefit, price, satisfaction and brand repurchase rates. *Hear Rev* 2003;10(2):12-25.
4. Larson VD, et al: Efficacy of 3 commonly used hearing aid circuits: a crossover trial. *JAMA*;284(14):1806-1813.
5. Kochkin S: MarkeTrak VIII: 25-Year trends in the hearing health market. *Hear Rev* 2009;16(10):12-31.