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Effects of hearing aids in the balance, quality of life and fear to fall in elderly people with sensorineural hearing loss

Efeitos da adaptação às próteses auditivas na qualidade de vida, no equilíbrio e no medo de queda em idosos com perda neurossensorial

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Summary

Introduction: The aging process provokes structural modifications and functional to it greets, compromising the postural control and central processing. Studies have boarded the necessity to identify to the harmful factors of risk to aged the auditory health and security in stricken aged by auditory deficits and with alterations of balance.
Objective: To evaluate the effect of auditory prosthesis in the quality of life, the balance and the fear of fall in aged with bilateral auditory loss.
Method: Carried through clinical and experimental study with 56 aged ones with sensorineural auditory loss, submitted to the use of auditory prosthesis of individual sonorous amplification (AASI). The aged ones had answered to the questionnaires of quality of life Short Form Health Survey (SF-36), Falls Efficacy International Scale- (FES-I) and the test of Berg Balance Scale (BBS). After 4 months, the aged ones that they adapted to the use of the AASI had been reevaluated.
Results: It had 50% of adaptation of the aged ones to the AASI. It was observed that the masculine sex had greater difficulty in adapting to the auditory device and that the variable age, degree of loss, presence of humming and vertigo had not intervened with the adaptation to auditory prosthesis. It had improvement of the quality of life in the dominance of the State General Health (EGS) and Functional Capacity (CF) and of the humming, as well as the increase of the auto-confidence after adaptation of auditory prosthesis.
Conclusion: The use of auditory prosthesis provided the improvement of the domains of the quality of life, what it reflected consequently in one better auto-confidence and in the long run in the reduction of the fear of fall in aged with sensorineural auditory loss.
Keywords: hearing loss, quality of life, postural balance.

Resumo

Introdução: O processo de envelhecimento provoca modificações estruturais e funcionais à saude, comprometendo o controle postural e processamento central. Estudos têm abordado a necessidade de identificar os fatores de risco prejudiciais à saúde auditiva e segurança em idosos acometidos por déficits auditivos e com alterações de equilíbrio.
Objetivo: Avaliar o efeito da prótese auditiva na qualidade de vida, no equilíbrio e no medo de queda em idosos com perda auditiva bilateral.
Método: Estudo clínico e experimental realizado com 56 idosos com perda auditiva neurossensorial, submetidos ao uso da prótese auditiva de amplificação sonora individual (AASI). Os idosos responderam aos questionários de qualidade de vida Short Form Health Survery (SF-36), Falls Efficacy Scale-Internacional (FES-I) e o teste de Berg Balance Scale (BBS). Após 4 meses, os idosos que adaptaram ao uso da AASI foram reavaliados.
Resultados: Houve 50% de adaptação dos idosos ao AASI. Foi observado que o sexo masculino teve maior dificuldade em adaptar ao aparelho auditivo e que as variáveis idade, grau de perda, presença de zumbido e vertigem não interferiram na adaptação à prótese auditiva. Houve melhora da qualidade de vida nos domínios Estado da Saúde Geral (EGS) e Capacidade Funcional (CF) e do zumbido, assim como o aumento da auto-confiança após adaptação da prótese auditiva.
Conclusão: O uso de prótese auditiva propiciou a melhora dos domínios da qualidade de vida, o que refletiu em uma melhor auto-confiança e consequentemente a longo prazo na redução do medo de queda em idosos com perda auditiva neurossensorial.
Palavras-chave: perda auditiva, qualidade de vida, equilíbrio postural.

Introduction

In the aged one, the auditory loss, is one of the three more prevalent chronic conditions, being behind only of the arthritis and the hypertension (1,2). According to (3), approximately 90% of the people with superior age the 80 years present auditory loss.

When it occurs in function of the aging process it is known as presbycusis and it generates one of the crippling riots of the communication, hindering the aged ones to play in the society, because it not only provokes the sensorial privation to hear, as the difficulty of understanding of speaks of that they surround it making it difficult the full communication (1,4,5,6). Besides, it causes a series of social problems, amongst them: the removal of the social and familiar activities, low self-worth, isolation, solitude, depression and irritability (1,7,8). The aging process does not only represent the loss of the auditory threshold, it generates structural and functional modifications compromising all the components of the postural, sensorial control (visual, somatic sensorial and vestibular contest), effector (force, amplitude of movement, biomechanical alignment, flexibility) and the central processing (9,10).

The physiological reduction of the vision, the hearing, the corporal stability, the articulate alterations and of the muscular power can facilitate to the risks of accidents and fall for the slowing of the defensive reactions (11).

The falls are dealt with as factor great epidemiologist relevance, social and economic in the whole world, therefore, it is the type most common of accident between the aged ones (12). The complications lead the causes of deaths in people above of 65 years and promote physical, psychological, and social deficiency, being able to take the individual the dependence, reduction of the daily activities and the confidence, alteration of the life style (13) generating negative consequences in relation to the quality of life (14).

As the life expectancy is increasing, it is important to adopt measured in which they minimize the damages caused for it a time that the surgical and medicinal indications are rare, taking advantage the use of adaptations of device of individual sonorous amplification (AASI). The use allows the rescue of the perception of the sounds of speaks, beyond the ambient sounds, promoting the improvement of the communication ability (15).

The increase of the social visibility of the segment of people older than 60 years, in Brazil, was one of the factors that had instigated the mobilization of governmental bodies and not governmental for the attendance of the new demands appeared in the scope of the health, the assistance and the social security (16). In 2004 the Health department, instituted the National Politics of Attention to the Auditory Health and through nº would carry SAS/MS. 587 had distribution of the state net for action in the basic attention, the average and high complexity (BRAZIL, Health department, 2004). By means of deliberation CIB-SUS-MG nº 156 in 21/03/2005, the Association of Parents and Friends of Exceptional (APAE) of Patos de Minas was credential and qualified to the rendering of services of the related program having guaranteed to the individual the diagnosis, adaptation and supply of the device of individual sonorous amplification - AASI (17).

In this context, the objective of this study was to evaluate balance, fear of fall and aged quality of life of with bilateral sensorineural auditory loss before and after the adaptation to the device of individual sonorous amplification (AASI).

Method

This study was previously approved by the Committee of Ethics and Research with human beings of the UNITRI (register nº 647923) and followed resolution 196/96 of the National Advice of Health. All the procedures had been explained as well as described at great length in the assent term, that was signed by the volunteers, and from now on, it was initiated collects it of data.

The sample was constituted by 56 individuals (32 of the masculine sex) between 60 and 84 years, carriers of bilateral sensorineural auditory loss, chosen teams from handbooks of the Service of Attention to Hearing Care (SASA).

The handbooks had been constituted by evaluation of the otoloraryngologist, audiological evaluation, speech therapy evaluation, interview with social assistant and psychologist. All the volunteers had putted prosthesis with hearing devices.

The aged inserted carriers of bilateral sensorineural loss auditory in the System of Attention to Hearing Care (SASA) had been enclosed of Patos de Minas/MG – Brazil, with age between 60 and 84 years; e excluded the users of prosthesis or orthesis of inferior members; carriers of neurological and behavioral riots; individuals previously submitted to the auditory rehab; not signature of the Term of Free and Clarified Assent; not understanding of the commands for the application of the tests.

In the evaluation the identification data had been collected, physicians, anthropometrics (weight, height and index of corporal mass - IMC).

The volunteers had answered to the questionnaires of quality of life (questionnaire SF-36) (18) and of fear to fall (Falls Efficacy Scale - International /FES-I) (19) and had carried through the balance test (Berg Balance Scale/BBS) (20). After 4 months, the volunteers who have adapted to the AASI, had returned for reevaluation, they had remade the balance test, and had answered beyond the questionnaires cited to the Satisfaction with Amplification in Daily Life (SADL) (21). All the questionnaires applied in this research previously had been validated and possess adequate psychometrics properties.

Statistical Analysis

The prevalence of the variable: sex, degree of auditory loss, presence of humming, presence of vertigo, the sample had been dichotomized and analyzed for the test of the independence Qui-square.

For comparative analysis of you prop up them of the domains of the SF-36 was used the test of Mann Whitney. Test T was used to compare the anthropometrics data and age of the sample.

The values of FES-I, BERG and BBS between the adapted, not-adapted groups and reevaluated had been compared by means of the Analysis of the Variance (ANOVA Two Way) and the test of Post-hoc de Tukey.

To correlate the follow up of the domains of the SF-36, scale BBS, to the FES-I, the presence of vertigo, the presence of humming and to the age of the volunteers the Correlation of Spearman was used.

A level of significance of 5% ($p< 0,05$) in all was considered on the tests.

RESULTS

It is noticed in Table 1, a homogeneous distribution between the gender and how much to the degree of auditory loss and one high prevalence of humming and vertigo between the participants.

Table 2 presents the anthropometrics characteristics, age and props up of scales FES-I and BBS of the volunteers. One verifies overweight in the sample, good level of balance and little fear to fall.

We observe that volunteers present good shore up in domains of SF-36, what indicates that does not have reduction in the quality of life in aged with auditory loss, however is distinguished reduction of the item vitality (Table 3).

After 4 months of the rank of the auditory device the volunteers who adapted itself to the auditory device had been reevaluated. In our study, 50% of the volunteers adapted to the auditory device. In Table 4, it is noted a homogeneous distribution of the anthropometrics variable and age between the groups.

Table 1. General characterization of the Sample N=56.

Variable	N (%)
Masculine Sex	32 (57%)
Degree of Loss	
Moderate loss	15 (27%)
Severe loss	21 (37%)
Deep loss	20 (36%)
Presence of humming	39 (69,6%)
Presence of Vertigo	32 (57%)

Absolute value (percentile value).

Table 2. Anthropometrics characteristics, age and prop up of scales FES-I and BBS of the volunteers (N=56).

Variable	Average ± DP
Corporal mass	69,0 ± 6,7
IMC (Kg/m^2)	27,4 ± 4,9
Age	72,1 ± 6,7
FES-I	25,8 ± 7,8
BBS	51,3 ± 5,1

The data are presented on average and shunting line standard.

Table 3. Average and shunting line standard of the domains of SF-36 (N=56).

Domains SF-36	Average ± DP
CF	64 ± 23,9
AF	83,5 ± 29,2
DOR	67,1 ± 24,3
EGS	72,5 ± 17,2
VIT	50,7 ± 14,0
AS	83,5 ± 22,8
AE	72,3 ± 42,6
SM	54,4 ± 10,9

The data are presented on average and shunting line standard. CF, Functional Capacity; AF, Physical Aspect; EGS, General State of Health; VIT, Vitality; AS, Social Aspects; AE, Emotional Aspects; SM, Mental Health.

Table 4. Anthropometrics characteristics of the separate sample for groups of aged: Adapted (a) and Not adapted (IN).

Variable	A (n=28)	NA (n=28)
Corporal Mass (Kg)	68,1 ± 15,4	69,6 ± 12,1
Stature (m)	1,6 ± 0,1	1,6 ± 0,1
IMC (kg/m^2)	27,6 ± 5	27,2± 4,8
Age	70,6 ± 6,6	73,6 ± 6,7

The data are presented on average and shunting line standard.

How much to the adaptation to the AASI, it is noticed that the masculine sex had greater difficulty in adapting to the auditory device and that the degree of auditory loss, complaints of humming and vertigo, are variable that had not influenced in the adaptation of the AASI (Table 5).

As pointed in Table 6, in relation the humming complaint, only 4 of the 20 volunteers had not related benefits with the use of auditory prosthesis in this variable. How much to questionnaire SADL, in the referring item self-confidence, 100% of the volunteers had told to improvement of this variable after adaptation, being that 90% had answered much improvement of the self-confidence.

In Table 7 it is observed that the aged ones that if they did not adapt they present greater functional capacity that the aged ones of the suitable group. However, in the reevaluation of the suitable group (FROG), a significant improvement when comparing with the evaluation was verified. Furthermore, it had significant improvement of the EGS of the suitable group when comparing the values of the evaluation and reevaluation.

In the analysis intergroup, did not have difference between props up them of the BBS and of the FES-I, however, in the analysis intra-group, the suitable group presented minor fear to fall (Table 8).

Table 9 presents the gotten correlations of the groups evaluated between the domains of the SF-36 and you prop up them of scales FES-I, BBS, presence of vertigo, presence of humming and the age. It is verified that in the suitable group it had positive correlation between the BBS and the domains CF, PAIN, EGS and a negative correlation between the FES-I and the domains CF and PAIN.

After the adaptation of the AASI, notices positive correlation between the BBS and domains CF and EGS, as well as, between age AE and. A negative correlation between fear of fall is noticed and domains CF, EGS and VIT.

Table 5. Evaluated general characteristics of the sample of the aged ones: Adapted (A) and Not adapted (NA).

Variable	A (n=28)	NA (n=28)
Sex	13 (47%)	19 (68%)
Male	15 (53%)	9 (32%)
Female		
Degree of Auditory Loss	———	———
Light	8 (28,6%)	7 (25%)
Moderate	10 (35,7%)	11 (39%)
Severe	10 (35,7%)	10 (36%)
Deep		
Vertigo	16 (57%)	16 (57%)
With vertigo	12 (43%)	12 (43%)
Without vertigo		
Humming	20 (71,4%)	19 (67,8%)
With humming	8 (28,6%)	9 (32,2%)
Without humming		

Absolute value (percentile value).

Table 6. Comparison after 4 months of adaptation to the AASI how much the improvement of the humming and the auto-confidence.

Variable	Adapted (A) N=28 Before of AASI	Reassess (RA) N=28 After 4 months do AASI
Com Humming	20 (79%)	4 (20%)
Self-Confident	__	28 (100%)

Absolute value (percentile value).

Table 7. Results of the evaluation of the quality of life of the evaluated groups. The values are express on average and shunting line standard.

Domains SF-36	A (n=28)	NA (n=28)	RA (n=28)
CF	57,5 ± 15	69,3 ± 19,7*	71,9 ± 15+
AF	82,8 ± 30,9	84,3 ± 28,6	83,5 ± 29,5
DOR	68,9 ± 24,8	66,9 ± 23,9	67,1 ± 24,3
EGS	68,7 ± 18,1	75,6 ± 15,5	72,5 ± 17,2+
VIT	51,3 ± 11,6	48,5 ± 16,7	48,7 ± 14,0
AS	85,3 ± 23,8	81,5 ± 22,3	83,5 ± 22,8
AE	72,6 ± 41,6	75,3 ± 41,7	72,3 ± 42,6
SM	56,3 ± 12,6	52,4 ± 9,2	54,4 ± 10,9

CF, Functional Capacity; AF, Physical Aspect; EGS, General State of Health; VIT, Vitality; AS, Social Aspects; AE, Emotional Aspects; SM, Mental Health.
A, Suitable Group; IN, the Group Not Adapted; FROG, Reevaluation of the Adapted ones.
*p<0,05 comparing the X IN
+p < 0,05 comparing the X FROG

Table 8. Scores of scales FES-I and BBS of the evaluated groups. The values are express on average and shunting line standard.

Variable	A (n=28)	NA (n=28)	RA (n=28)
FES-I	27,7 ± 8,3	24,5 ± 7,1	25,3 ± 8,0+
BBS	50,6 ± 4,9	51,4 ± 5,4	51 ± 5,0

A, , Suitable Group; IN, the Group Not Adapted; FROG Reevaluation of the Adapted ones.
*p ≤ 0,05 comparing the X IN
+p < 0,05 comparing X R

Table 9. Gotten correlations of the groups evaluated between the domains of the SF-36 and you prop up them of scales FES-I, BBS, presence of vertigo, presence of humming and the age.

Domains SF-36	Groups	FES-I r	BBS r	Presence of Vertigo r	Presence of Humming r	Age r
CF	A	-0,69*	0,78*	0,23	0,22	-0,18
	RA	-0,64*	0,54*	0,32	0,2	-0,22
AF	A	-0,16	0,01	0,33º	0,27	0,21
	RA	0,28	-0,31	-0,05	-0,03	0,25
DOR	A	-0,41*	0,36*	0,01	0,15	-0,06
	RA	-0,16	0,05	0,28	-0,15	0,19
EGS	A	-0,29	0,35*	0,15	0,08	-0,3
	RA	-0,50*	0,52*	0,17	-0,03	0,09
VIT	A	0,15	0,25	0,15	0,15	0,17
	RA	0,33*	0,11	0,21	0,22	0,29
AS	A	-0,25	0,35*	0,23	0,09	0,28
	RA	0,28	-0,22	-0,19	-0,12	0,34
AE	A	-0,16	-0,15	0,04	0,11	-0,13
	RA	0,06	-0,17	-0,06	-0,15	0,34
SM	A	-0,16	-0,15	0,04	0,11	-0,13
	RA	-0,22	-0,06	0,07	0,18	0,22

CF, Functional Capacity; AF, Physical Aspects; EGS, General State of Health; VIT, Vitality; AS, Social Aspects; AE, Emotional Aspects; SM, Mental Health; , Suitable Group; IN, the Group not adapted, FROG, Reevaluation of the adapted ones.
*p≤0,005; +p<0,06; ºp<0,0

Discussion

In the present study it had for purpose to evaluate the contribution of auditory device AASI in the quality of life, balance and fear to fall in aged with bilateral sensorineural auditory loss.

To observe greater prevalence of auditory loss in men (57%) corroborating with other studies (7-8). The complaint of humming (69.6%) and vertigo (57%) associate to the auditory loss was highly prevalent in the sample a time that inherent degenerative processes to the age are responsible for the occurrence of vertigo and humming in the geriatric population (10).

The score of the questionnaire that evaluates balance was 51 points, what it represents a good functional balance, probably for the fact of that our sample was constituted by aged not institutionalized with auditory loss and good functional capacity, a time that had been excluded individuals that made use of device of aid to the march and that they presented neurological illnesses.

How much to the fear of fall one was observed score average of 25,5 in the volunteers of this research. Similar results had been found by (22) that when evaluating physically active the aged FES-I of aged of the community and found one medium score of 24,9 and 27,5 respectively. In such a way we can infer that, the auditory loss did not influence in the fear of fall. Probably, this is related to the good balance that the aged ones had presented what it diminishes the fear of fall.

In general, the averages of the scores of the domains of the SF-36 had been above of 50% demonstrating that the volunteers have good quality of life. Second (23) in the SF-36 one props up high in the domain physical aspect and functional capacity can indicate that the aged ones possess little limitation to the work and in activities of daily life, presents good health and functional ability.

We know that the concept of quality of life (QV) is very ample, subjective, dependent of the socio-cultural level, the personal ambitions of the individuals and not only of the structure attack (24). This can be observed in the present study, therefore, nor always a structure attack, as the auditory loss intervenes directly with the quality of life of the volunteers, being the QV a product of some factors.

All the volunteers of the sample had putted prosthesis. After 4 months of use of AASI, 50% of the volunteers adapted to the auditory device. In the suitable volunteers it had reevaluation of the variable: quality of life, balance and fear of fall. This stated period was established in virtue of studies to demonstrate that 90 days are enough for a good adaptation

and acclimatization of the AASI (25). How much to the factors related to the adaptation to the AASI, our findings are in accordance with study previously carried through that demonstrated that presence of humming and vertigo do not influence in the adaptation to the AASI (26). However, valley to point out that, previous studies demonstrate that factors as story of satisfaction with the device, the number of hours/day, participation of the family (5), expectations, necessities of communication, degree of loss, tolerance for intense sounds, expectations, motivation (4) and auditory whitewashing (2), is important criteria for a successful adaptation.

One of the main complaints of the aged ones with presbycusis is the presence of the humming that frequent is a factor of great negative repercussion in the life of the individual, compromising the quality of life, making it difficult sleep, the concentration in the daily and professional activities, as well as the social life (27). The humming is an extremely frequent clutter in patients with auditory loss, reaching about 40 million people in U.S.A., affecting approximately 1/3 of the population above of the 65 years of age (28). The practical clinic has demonstrated that carrying individuals of auditory loss associated the humming benefit themselves with the use of auditory prosthesis, therefore these, beyond improving the understanding of the conversation, alleviates the humming, (29), had demonstrated that the use of prosthesis auditory improved the humming in 78,2% of the individuals and our sample 79% of the suitable volunteers if they had benefited with reduction of the humming.

In accordance with (6) the auditory use of prosthesis benefits to the daily activities and the functionality in carrying individuals of sensorineural auditory loss. This corroborates with our findings, therefore we find significant improvement of the functional capacity (CF) and of the general state of health (EGS). Probably due to adaptation to the AASI, improvement of the hearing, the ability of communication occurred and security feeling, which had also influenced the increase of EGS and CF, and consequently improves of the quality of life (7).

Having as endorsement the findings of (30) we believe that the increase of the EGS resulted consequently in the increase in the daily activities of life and of the CF what it reflected in reduction of the fear of fall of the volunteers. Another factor associated with this reduction was possibly the increase of the confidence and security told by the volunteers from the positive results of questionnaire SADL.

Conclusion

Aged with auditory sensorineural loss they had presented good quality of life and balance and had related little concern in falling. However after adaptation to the AASI, had improvement of the quality of life (EGS and CF), reduction of the fear of fall and the humming and increase of the auto-confidence after adaptation to the AASI. Valley to point out despite 50% of the volunteers if only adapted and that the masculine sex had greater difficulty in adapting to the auditory device and that the variable age, degree of loss, presence of humming and vertigo, they had not been factors that had intervened with the adaptation to the AASI.

From this study we can infer that so important the AASI is for the aged one, how much the direct benefit of it in the physiotherapist intervention is. The well adapted patient will have greater communication capacity, increase of the self-confident, greater attention and understanding of the information that are important factors in a preventive and rehabilitative interaction. Valley to point out that the development of new studies that they aim at to elucidate the factors associates to the adhesion to the AASI would be of great interest therefore would prevent unnecessary expenses of the public health.

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