Quality of Life among Hearing Loss Patients in Audiology Out Patient Clinics in Ain Shams University Hospitals

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Abstract:

Background: Hearing loss(HL) among adults is one of the most common chronic illnesses worldwide Quality of life(QoL) might be affected if hearing loss is severe, usually causes difficulty in communication, affects cognitive, emotional status; and increased morbidity and mortality. The prevalence of hearing loss is growing because of increasing exposure to excessive noise, increased life expectancy, smoking, cardiovascular risks and infection. Objectives: This study aims to assess the quality of life (QoL) of hearing loss in outpatient clinics in Ain Shams University Hospitals and to recognize the factors which might affect the quality of life (QoL) in patients with hearing loss. Methods: This study is a cross sectional study. It was conducted from February 2018 to July 2018 on 311 patients with hearing loss attending audiology clinics located in Ain Shams University hospital. Data were collected using an interviewed questionnaire. Results: Out of 311 interviewed participants, (52.1%) were females, (24.1%) of the participants were between 18-29 years. Inflammation was found to be the main cause of hearing loss in 40% of the studied population. The environmental domain is the most affected QoL domain with the participants' hearing loss (Mean ± S.D =56.1+11.4) with statistical significant effect of using hearing aids on QoL improvement. Conclusion: Screening high risk group of hearing impairment must be a crucial task in primary health centers activities for early diagnosis and intervention to prevent hearing loss and thus maintain good QoL in adults.

Key Words: Hearing loss, Hearing Aid, HHIA Egypt.

Introduction: Hearing loss is one of the most common sensory deficits in adults throughout the world; it is the third chronic disability after arthritis and hypertension. The impact of hearing loss may be profound, with consequences for the social, functional, and psychological well-being of the person. (1) Nearly 250 million people suffer hearing loss in the world. Nearly 75% of sufferers are in World developing countries. Health Organization global in 2013 reported that one third of the elderly population aged 65 and

above suffers hearing loss. Moreover, WHO predicts an epidemiological transition resulting in a rise between 18% and 50% from the year 2010 to 2020.⁽²⁾

Many risk factors are behind the occurrence of hearing loss; among non-modifiable risk factors as age, genetics, gender, and race., age plays the most significant role. In addition to modifiable risk factors; which encompass the nonuse of hearing protection, cigarette smoking, lack of exercise, low dietary intake of foods rich in

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antioxidant vitamins and minerals, the presence of diabetes or heart disease, and poor oral health.⁽³⁾

Development hearing loss leads to severe handicap that affects the sufferer's job, home and life with subsequent social and economic burden on the society. (4) In Egypt, from 6 randomly selected governorates (Alexandria, Dakahlia, Luxor, Marsa-Matrouh, Minia and North Sinai), 4000 individuals were screened for hearing loss. The prevalence of hearing loss was 16% with no significant sex differences.

There were significant differences between the age groups and governorates: Marsa-Matrouh had the highest prevalence of hearing loss (25.7%) and North Sinai the lowest (13.5%); those > or = 65 years had the highest prevalence (49.3%), but it was also high in those aged 0-4 years (22.4%). (4)

According to some studies, the impact of untreated hearing loss on adult population's quality of life (QoL) may be profound. It affects the domains of QoL(physical, social, environmental and psychological domain as well). It has been noted to reduce social interaction and functional activities. Other studies described presbycusis as a possible reason behind various adverse effects on the

elderly psychological, social and physiological well-being. (5)

Hearing loss affects the capacity to contribute to social activities as it limits their engagement in communication and day to day activities. This results in a sense of seclusion from family, friends, and their community, emotional distress, embarrassment, frustration, anxiety, isolated depression and a sense of guilty being dependent. (6)

Under the hypothesis that hearing loss directly or indirectly leads to cognitive and physical decline, it is reasonable to hypothesize that hearing aids or other aural rehabilitative devices could mitigate these outcomes by reducing psychological, social, and emotional effects of hearing loss.

Industrialized societies have strategies for prevention and early detection for hearing impairment, while these programs progress slowly in developing countries where more than 30 million hearing aids are needed. The population-based data described the impact of hearing loss on QoL of Egyptian adults, and the effect of hearing aid usage on improving the QoL of these patients. The current study aimed to assess the quality of life (QoL) among adults suffering from hearing loss in outpatient clinics in Ain Shams University Hospitals. Also, it aimed at identifying the

most important determinants affecting the quality of life (QoL).

Methods: A Cross sectional study was conducted on 311patients with hearing loss attending audiology clinics located in Ain Shams University hospital (El Demerdash) with the following criteria: Inclusion criteria:Age > 18 years old, both gender are included, diagnosis of bilateral moderate hearing loss as measured by pure tone audiometry with hearing thresholds more than 40 dB HL.For those who use hearing aid should be regular in using it and satisfied with it. As regards the exclusion criteria: hearing loss due to wax, foreign bodies and acute otitis media, Patients with multiple disabilities (mental, visual, motor) and if the hearing loss status hinder the capability for understanding the questionnaire.

Sampling and sample size: A purposive sample was selected, all patients attending the auditory clinic and fulfilling selection criteria were recruited until fulfilling the targeted sample size (311 participants) of six months (from Februry 2018 to July 2018). Sample size was calculated using Epi-info 7.1 program putting in consideration that 28.1 % of patients with hearing loss suffer from poor QOL (study carried out by AL-Mahbashi and Raja'a in 2011 in Yemen) at a confidence level of 95%.

Study tools: Data were collected by interviewing the participants using two standardized questionnaires and set of socio-demographic data collection sheet that included diagnosis and causes of hearing loss. The two standardized questionnaire are as follow:

1- WHO QOL-BREF questionnaire⁽⁸⁾ to assess QoL among patients with hearing loss. It is encompasses of 26 questions, having two general questions, associated with quality of life and 24 representing four domains (physical health, psychological, social relations and environmental). Physical health (7 items: mobility, ability to carry out daily activities, energy, pain, need for medication or other treatment, sleep, and working capacity), psychological health (6 items: involves topics that reflect level of positive and negative feelings, self-esteem, body image, cognition, and spirituality), social relationships (3 items: individual's satisfaction with personal relationships, sex life, and social support), and environment (8 items: reflects individual's satisfaction with the physical environment and its safety, financial resources, opportunities to obtain health care services and information, opportunities to participate leisure activities, and possibilities to use public transportation)

A scoring system for each domain was calculated followed by calculating a transformed score from 0-100 scale, where 100 is the highest and 0 is the lowest in the quality of life.

2- The Hearing Handicap Inventory for Adults (HHIA) is a 25-item survey⁽⁹⁾ divided into 13-item emotional subscale and a 12-item socio-situational subscale. This tool is designed to measure the effects of hearing impairment on the emotional and social adjustment of adults. The HHIA total score categories is reflected as follow: 0 - 16% (no handicap), 18 - 42% (mild -moderate handicap), 44% and more (significant handicap).

Statistical analysis: Data were collected, tabulated and statistically analyzed via SPSS package for windows (statistical package for social science) program version 20, SPSS Inc., and Chicago, Illinois, USA. Qualitative data as (age categories, gender, educational level, occupational status, hearing loss level, laterality of hearing loss, hearing aid use) were expressed as frequency (n) and percentage (%) while quantitative data as (scores of four domains of WHO QOL-BREF questionnaire) were expressed in mean and standard deviation. Independent-testwas used to compare quantitative dependent variables (scores of four domains of WHO QOL-BREF

questionnaire) between two groups as (gender, laterality of hearing loss, hearing aid use).

One-way ANOVA test was used to compare quantitative variables (scores of four domains of WHO QOL-BREF questionnaire) between more than 2 groups as (age categories, educational level, occupational status, degree of hearing loss). P-value ≤ 0.05 was considered significant.

Ethical consideration: Approval from faculty of medicine Ain Shams University, ethical committee was obtained. Administrative approval from Audiology department and Ain Shams University hospitals were taken. Participants were informed about the aims and benefits of the study, verbal consent was used for voluntary participation. Questionnaire used was anonymous; confidentially of data was assured.

Results: Out of 311 interviewed participants, (52.1%) were females, (24.1%) of the participants were between 18-29 years. Only about half of them reached secondary level of education. 44.1% have current occupation. Inflammation (chronic otitis media) was found to be the main cause of hearing loss in 40% of the studied population, followed by presbycusis(27.3%).

Most of the participants suffered from bilateral hearing loss (97.4%) and weren't using a hearing aid as seen in Table (1). As

forthe effect of hearing impairment on social and emotional adjustment of adults using HHIA tool: significant handicap was found in 94% regarding emotional domain (Mean \pm S.D =60.3 \pm 13.4) , and mild to moderate handicap was found in 52% of them regarding the social domain (Mean \pm S.D=43.8 \pm 17.0) Table (2).

The HHIA tool revealed that (65.3%) of participants used phone less than they would like, only (5.8%) avoided groups of people, (10.6%) of them had a difficulty when attending a party, about (86.8%) claimed that they visit their friends and relatives less than they would like, only (11.6%) had no difficulty when listening to TV and Radio.

The study results found that (44.1%) of participants were satisfied with sleep, more than half were satisfied with their ability to perform their daily activities and their capacity for work. 49.1% of them were dissatisfied with their friends' support, (38.3%) were satisfied with the condition of their living place and only (35.4%) were satisfied with their transport.

On assessing the QoL using the WHOQOL- Bref; the current study found that 70% of the participants are satisfied with their lives. However, only 36% of them reported having a good quality of life from their opinion as seen in Table (3). Table (4) shows

that, the environmental domain is the most affected QoL domain with hearing loss (Mean \pm S.D =56.1 \pm 11.4), to be followed by the psychological (Mean \pm S.D =62.1 \pm 7.6) and nearly the physical and social domains are affected equally with hearing loss(Mean \pm S.D=64.4 \pm 9.5), (Mean \pm S.D =65.2 \pm 10.7) respectively.

Table (5) shows the effect of different socio-demographic characteristics on study population, where increase age was found to have a strong effect on lowering QoL mean scores regarding physical, psychological and environmental domains {statistically (p value <0.01)}. Statistically significant significant association was reported between educational level of the studied participants and all QoL domains; as educational level increase, better mean scores are observed. Similarly the occupational level, where those working reported higher mean scores than those not working or housewives.

Statistical significant difference was found between who use and do not use hearing aids, regarding the environmental domain with higher mean scores observed among those using hearing aids. However, other factors as gender, type and degree of hearing loss did not show any significant relation with QoL domains.

Discussion: The current study was conducted with an ultimate goal to participate, along with other future surveys, in setting a national strategy for evaluation, prevention, and control of hearing impairment. In the current study, the mean age of patients was 38.7 and inflammation(CSOM) was the main cause of hearing loss. Similar results was found in a study conducted in Yemen by AL-Mahbashi and Raja'a, in 2011 in which mean age for hearing loss was 37.5 years and inflammation was reported as the main cause as well.

This may be attributed to weak immunity, high prevalence of infectious diseases, poor hygiene and no early detection management for inflammation, which could be due to seeking traditional healing solutions for chronic suppurative otitis media. (7) In the current study, more than 97.4 % of patients with hearing loss were not using hearing aids. This is very high when compared to patients in Yemen (AL-Mahbashi and Raja'a, 2011), where 91 % of patients with hearing impairment don't use hearing aids. (7)

Also, in Australia (Hogan et al., 2009), only 40% of patients did not use hearing aids. A possible explanation can be that 40% of the studied population in the current study suffered mild and temporary hearing loss due to CSOM which is a relative contraindication for hearing aid use. For the rest of patients

who suffered sensory neural hearing loss (SNHL) Quality hearing aids are costly and most patients deny their disability. (10)

The current study showed that (65.3%) of participants used phone less than they would like, only (5.8%) of them avoided groups of people, (10.6%) of them had a difficulty when attending a party, about (86.8%) of them claimed that they visit their friends and relatives less than they would like, only (11.6%) had no difficulty when listening to TV and Radio. However a study conducted by Weinstein et al in 2015 found that 18% of subjects were not accustomed to meeting new people, 50% did not attend religious ceremonies, and 92% were not accustomed to outdoor dining. (11)

The current study found that hearing loss has its effect on all QoL domains (the environmental domain is the most affected followed by the psychological) this consistent with the results of the study carried out by Zhang et al. in 2012 in New Zealand reported hearing loss is associated with poorer QoL scores in every domain, the effects being greatest in the physical and social domains of QoL. (12)

The present study found no significant association between degree of hearing impairment and QoL.Mild and moderate

degree of HL was encountered in around 90% of all participants and 40% are inflammatory. With such degree of hearing loss some loudness in the speaker's voice would compensate for the presence of such handicap.

In some studies, the severity of the hearing loss was associated with poorer QoL (Chia et al., 2007; Dalton 2003), (12,13) whereas other studies found no such association(Hogan et al., 2015;Gopinath et al., 2012a).(10,14) The current study showed there significant that is statistically relationship between age and physical, psychological and environmental domains and there is statistically insignificant relationship between age groups as regards social domain.Statistically significant association was reported between educational level of the participants and all QoL domains; educational level increase, better mean scores are observed. Similarly, the occupational level.

On the other hand, a study in America on recreational firearm users study (Stewart et al., 2002) reveals that QoL significantly decline with age just as hearing loss did. These results are likely linked with hearing status of the respective demographic groups but may also be associated with other factors such as lifestyle and listening needs. (15) The current study found statistically insignificant

relationship between degree of hearing impairment and social, physical, psychological and environmental domains.

As previously stated, Mild and moderate degree of HL was encountered in around 90% participants may explain insignificant relationship. The current study showed that there is statistically insignificant relationship between laterality of hearing impairment and social, physical, psychological and environmental domains. This agrees with a study in Sweden (Hallberg et al., 2008), which reported that persons with unilateral HL did not report significantly lower generic QoL than persons without HL. (16)

The current study showed that there is a statistically significant relationship between using hearing aids and environmental domain and that there is a statistically insignificant relationship between using hearing aids and physical, psychological or social domains. Because of the very small % of hearing aid users in the present(2.6%) study, these data should be further investigated.

Despite the fact that HL may cause poorer generic QoL, and that using a hearing aid may improve generic QoL, some studies as in Finland by Niemensivu et al. in 2015 suggested that many who are fitted with

hearing aids, used their hearing aid only to a limited degree. This may be caused by the patients not receiving sufficient help and follow-up to master the hearing aiduse. (17)

Study limitations: Limitations of the study were small sample, sampling technique which is purposive without randomization, and scarcity of comparable studies.

Conclusion: The social, emotional and environmental aspects of QoL are affected with hearing loss status. Hearing aids helps a lot to improve these aspects enabling the hearing loss patients to have a better QoL.

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Conflict of interest: There is no conflict of interest.

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Table (1): Socio-demographic charactristics of hearing impaired individuals in audiology clinics located in Ain Shams University hospital (El Demerdash)

Socio-demographic charactristics	N	%
· ·	1	70
Age categories 18-29	75	24.1%
1 30-39	67	24.176
4 0-49	52	16.7%
■ 50-59	44	14.1%
• 60-70	55	17.7%
■ >70	18	5.8%
Gender		
Male	149	47.9%
■ Female	162	52.1%
Educational level		
■ Illiterate	24	7.7%
Primary	10	3.2%
Preparatory	27	8.7%
Secondary	161	51.8%
University	89	28.6%
Occupation		
Nonworking/housewife	174	55.9%
Unskilled manual worker	20	6.4%
• Skilled manual worker**	28	9.0%
■ Trade/ business	6	1.9%
Semiprofessional/ clerk	59	19.0%
 Professional* 	24	7.7%
Cause of hearing loss		
Inflammatory(CSOM)***	126	40.5%
Congenital	2	0.6%
presbycusis	85	27.3%
Noise induced	68	21.9%
Ototoxicity	30	9.6%
Post-operative, post-traumatic, oto-sclerosis	0	0.0%
Hearing aid use		•
• No	303	97.4%
• Yes	8	2.6%
Type of hearing impairment		• 50/
Unilateral	8	2.6%
Bilateral	303	97.4%
Degree of hearing impairment	22	7.40/
Mild	23	7.4%
Moderate Sovere	255	82.0%
Severe	33	10.6%

^{*}Professional: doctor, teacher, lawyer and accountant, ** Skilled workers: driver, worker, guard, carpenter, seller man, butcher and barber

^{***(}CSOM) {Chronic Suppative Otitis Media }

Table (2): Description of the effects of hearing impairment on social and emotional adjustment of adults

HHIA Effects	Mean ± SD	Min – Max
HHIA* total percent	52.4 ± 13.1	6.0 - 94.0
HHIA Social domain percent	43.8 ± 17.0	4.2 - 95.8
HHIA emotional domain percent	60.3 ± 13.4	7.7 - 96.2
•	N0.	%
HHIA total score categories		
• 0 - 16% (no handicap)	3	1.0%
■ 18 - 42% (mild - moderate handicap)	56	18.0%
 44% and more (significant handicap 	252	81.0%
HHIA social score categories		
• 0 - 16% (no handicap)	4	1.3%
■ 18 - 42% (mild - moderate handicap)	156	52.2%
 44% and more (significant handicap 	139	46.5%
HHIA emotional score categories		
• 0 - 16% (no handicap)	2	0.7%
■ 18 - 42% (mild - moderate handicap)	15	5.0%
 44% and more (significant handicap 	285	94.4%

^{*} **HHIA:** The Hearing Handicap Inventory for Adults

Table (3): Participants' opinion towards their health and QoL

		No.	%
 Rating perceived quality of life 	■ Very poor	1	0.3%
	■ Poor	21	6.8%
	Neither poor or good	170	54.7%
	■ Good	112	36.0%
	■ Very good	7	2.3%
Satisfaction about own	 Very dissatisfied 	0	0.0%
health	 Dissatisfied 	30	9.6%
	 Neither dissatisfied nor satisfied 	45	14.5%
	■ Satisfied	219	70.4%
	Very satisfied	17	5.5%

Table (4): Description of four domains of WHO QOL-BREF questionnaire

Domains of Quality of Life	Mean ± SD	Min - Max
Domain 1: Physical	64.4 <u>+</u> 9.5	31.4 - 82.9
Domain 2: Psychological	62.1 ± 7.6	46.7 - 83.3
Domain 3: Social	65.2 ± 10.7	26.7 - 93.3
Domain 4:Environmental	56.1 <u>+</u> 11.4	27.5 - 90.0

Table (5): Studying the effect of socio-demographic charactristics of the studied group on the

four domains of WHO QOL-BREF questionnaire

Tour domains of with QO.	Physical	Psychological	Social	Environmental			
	domain	domain	domain	domain			
Gender †							
Male	63.93 + 10.62	62.06 + 8.00	65.88 <u>+</u> 10.33	55.77 <u>+</u> 12.02			
Female	64.83 <u>+</u> 8.43	62.12 + 7.15	64.55 <u>+</u> 10.95	56.42 <u>+</u> 10.91			
P-value	0.406	0.943	0.341	0.619			
Age categories #							
■ 18-29	67.89 + 8.04	64.93 + 7.56	68.41 + 11.05	55.2 + 10.56			
30-39	68.06 ± 7	63.83 ± 7.66	66.26 <u>+</u> 10.39	59.66 <u>+</u> 10.34			
4 0-49	62.64 ± 9.53	61.03 <u>+</u> 7.91	64.87 <u>+</u> 12.46	52.5 <u>+</u> 10.62			
• 50-59	64.09 <u>+</u> 8.72	60.76 ± 6.78	63.48 <u>+</u> 9.59	59.2 <u>+</u> 10.03			
• 60-70	61.92 <u>+</u> 9.15	60 ± 6.22	64.3 <u>+</u> 9.86	56.55 <u>+</u> 11.28			
■ > 70	49.68 <u>+</u> 9.56	56.48 <u>+</u> 5.99	62.22 <u>+</u> 8.07	48.19 <u>+</u> 17.49			
P-value	0.000*	0.000*	0.455	0.000*			
Educational level #							
Illiterate	59.4 <u>+</u> 7.81	56.39 <u>+</u> 3.25	61.33 <u>+</u> 10.73	51.15 <u>+</u> 11.75			
Primary	59.43 <u>+</u> 12.03	54 <u>+</u> 3.44	55.33 <u>+</u> 10.91	49 <u>+</u> 9.29			
Preparatory	62.01 <u>+</u> 6.57	60.12 <u>+</u> 8.14	61.87 <u>+</u> 12.98	53.06 <u>+</u> 11.42			
Secondary	65.25 <u>+</u> 9.96	62.09 <u>+</u> 7.07	64.87 <u>+</u> 10.02	54.97 <u>+</u> 11.09			
University	65.49 <u>+</u> 9.09	65.13 <u>+</u> 7.75	68.92 <u>+</u> 9.22	61.24 <u>+</u> 10.49			
P-value	0.009*	0.000*	0.000*	0.000*			
Occupational level#							
Nonworking/housewife	62.96 <u>+</u> 10.23	60.79 <u>+</u> 6.72	63.16 <u>+</u> 10.53	54.96 <u>+</u> 11.8			
 Unskilled manual worker 	61.43 <u>+</u> 9.66	59.17 <u>+</u> 9.17	63.14 <u>+</u> 14.93	50.38 <u>+</u> 11.54			
 Skilled manual worker 	67.45 <u>+</u> 7.27	59.76 <u>+</u> 6.21	63.59 <u>+</u> 7.83	51.16 <u>+</u> 8.59			
Trade/ business	65.24 <u>+</u> 7.32	67.78 <u>+</u> 7.79	70.67 <u>+</u> 3.65	62.5 <u>+</u> 14.32			
 Semiprofessional/ clerk 	67.75 <u>+</u> 7.49	66.05 <u>+</u> 7.31	68.93 <u>+</u> 9.39	60.97 <u>+</u> 8.01			
Professional	65.36 <u>+</u> 9.09	65.56 <u>+</u> 8.94	69.39 <u>+</u> 11.2	61.46 <u>+</u> 12.02			
P-value	0.005*	0.000*	0.005*	0.000*			
Laterality of hearing loss †							
 Unilateral 	66.79 <u>+</u> 6.65	62.08 <u>+</u> 3.54	56.00 <u>+</u> 8.94	55.31 <u>+</u> 8.18			
Bilateral	64.34 <u>+</u> 9.60	62.09 <u>+</u> 7.64	65.37 <u>+</u> 10.63	56.13 <u>+</u> 11.53			
P-value	0.475	0.998	0.052	0.842			
Degree of hearing loss #							
Mild	68.2 <u>+</u> 7.72	64.64 <u>+</u> 8.21	68.21 <u>+</u> 11.6	56.63 <u>+</u> 10.27			
 Moderate 	64.24 <u>+</u> 9.43	61.99 <u>+</u> 7.53	65.36 <u>+</u> 10.67	56.13 <u>+</u> 11.16			
 Severe 	63.03 <u>+</u> 11.06	61.11 <u>+</u> 7.2	61.94 <u>+</u> 9.73	55.61 <u>+</u> 14.4			
P-value	0.110	0.201	0.191	0.946			
Hearing aid use †							
• No	64.29 <u>+</u> 9.52	62.10 <u>+</u> 7.58	65.16 <u>+</u> 10.58	55.84 <u>+</u> 11.29			
• Yes	68.57 <u>+</u> 9.78	61.67 <u>+</u> 7.35	65.56 <u>+</u> 14.86	66.25 <u>+</u> 13.43			
P-value	0.211	0.873	0.929	0.011*			

^(†) independent t test, (#) ANOVA test, (*) statistically significant

جودة الحياة بين مرضى ضف السمع في عيادة السمعيات الخارجية بمستشفيات جامعة عين شمس

شيماء سلطان- داليا سوس- مها ودان- نجوي هزاع- ضياء عبد الحميد

الخلفية: يعد ضعف السمع عند البالغين أحد الأمراض المزمنة الاكثر شيوعًا في جميع أنحاء العالم. يرتبط ضعفالسمع بانخفاض جودة الحياة، وعادة ما يسبب صعوبة في فهم الكلام، ويؤثر على الحالة المعرفية والعاطفية، انخفاض الدخل وزيادة معدل الإصابة بالأمراض والوفيات. يتزايد انتشار ضعفالسمع بسبب زيادة التعرض للضوضاء المفرطة وزيادة متوسط العمر المتوقع والتدخين والمخاطر القلبية الوعائية والعدوى. الهدف: تقييم نوعية الحياة الضعف السمع بين البالغين في العيادات الخارجية في مستشفيات جامعة عين شمس وتحديد أهم المحددات التي تؤثر على جودة الحياة الضعف السمع بين المرضى البالغين. المنهجية وطريقة البحث أجريت دراسة مقطعية على 311 مريض يعانون من ضعفالسمع في عيادات السمع الموجودة في مستشفى جامعة عين شمس. تم جمع البيانات باستخدام استبيان. النتائج: من بين 311 مشاركاً تمت مقابلتهم ، كانت (52.1٪) من الإناث ، (24.1٪) من المشاركين جمع البيائل البيئي هو السبب الرئيسي لضعف السمع في 40٪ من السكان الذين خضعوا للدراسة. المجال البيئي هو المجالالاكثر تضررا مع ضعفالسمع للمشاركين مع تأثير إحصائي كبير لاستخدام الوسائل السمعية على تحسين جودة الحياة بين المرضى الذين يعانون من ضعف السمع.