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Original Article

The Impact of Perceived Hearing Loss and Tinnitus on the Quality of Life in the Geriatric Population: A Multidimensional Analysis

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What is already known on this topic?

- *Tinnitus often occurs with hearing loss. Age-related hearing loss and tinnitus are common among older adults and can negatively impact their quality of life.*
- *Hearing loss can negatively impact sensory function, communication, and social participation among older adults, potentially leading to social isolation and loneliness.*

What does this study add on this topic?

- *This study aimed to evaluate the impact of perceived hearing loss on the quality of life of older adults. This study considered perceived hearing loss and tinnitus severity alongside the subdomains of the World Health Organization Quality of Life Instrument-Old (WHOQOL-OLD) scale to provide a multidimensional evaluation of quality of life.*
- *The importance of subjective screening tools, such as the Hearing Handicap Inventory for the Elderly (HHI-E), Tinnitus Handicap Inventory (THI), and WHOQOL-OLD, in the early detection of perceived hearing loss and tinnitus and in the prevention of social isolation is emphasized.*

ABSTRACT

Objective: This study aims to multidimensionally evaluate the effects of perceptual hearing loss and tinnitus on quality of life specific to the elderly in geriatric individuals aged 65 years and older.

Methods: This cross-sectional study included 108 volunteers aged 65-90 years with subjective hearing loss. Participants were contacted via social media and asked to complete the scales using the Google Forms platform. Data collection was conducted between December 2025 and January 2026. The Hearing Handicap Inventory for the Elderly (HHI-E), Tinnitus Handicap Inventory (THI), and World Health Organization Quality of Life Instrument-Old (WHOQOL-OLD) quality of life scale were used as data collection instruments. Mann–Whitney *U*-test, Spearman correlation, and multiple linear regression analyses were applied to the data analysis.

Results: In the group with perceptual hearing loss, the WHOQOL-OLD total score, "sensory functions" ($P < .001$), and "death and dying" ($P = .008$) subscale scores were found to be statistically significantly lower. A positive correlation ($rho = 0.312$) was found between HHI-E and THI, whereas a strong negative correlation ($rho = -0.587$) was found between HHI-E and the sensory function sub-dimension of quality of life. According to the established regression model ($R^2 = 0.230$), the level of hearing impairment was found to be a more dominant predictor of quality of life compared to the presence of tinnitus.

Conclusion: The findings of this study indicate a high prevalence of perceived hearing loss and tinnitus among older adults. Perceived hearing loss negatively affects not only sensory functions but also the social participation and existential well-being of elderly individuals. In clinical practice, the use of screening tools such as HHI-E is critical for the early detection of hearing loss and the development of holistic rehabilitation strategies to prevent social isolation.

Keywords: aged-related hearing loss, presbycusis, quality of life, social isolation, tinnitus

Introduction

Aging is an irreversible natural process characterized by physiological, psychological, and social changes.[1] Generally defined by the World Health Organization as aged 65 and over, this period is characterized by the expected loss of organ function, decline in cognitive and psychomotor skills, and reduced daily living activities. These physiological changes directly affect an individual's quality of life and social interactions.[2]

After hypertension and arthritis, hearing loss is the third most common chronic health problem in older adults.[3] Age-related hearing loss, called "presbycusis," is a slowly progressing, bilateral sensorineural disorder that usually affects high frequencies.[4] This makes it difficult to distinguish consonants, making it

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harder to understand speech in noisy environments.[5] Rehabilitation of presbycusis, an irreversible process, is achieved through amplification systems such as hearing aids or cochlear implants. With global aging, the number of individuals experiencing hearing loss is projected to exceed 2.5 billion by 2050.[6] Untreated hearing loss leads to communication disorders, social isolation, depression, cognitive decline, and, ultimately, a decrease in quality of life.[7] The use of screening scales is critical for the accurate assessment of these effects in clinical settings and for providing early intervention. The "Hearing Handicap Inventory for Elderly (HHI-E)" scale was developed by Ventry et al.[8] The Turkish validity and reliability of the HHI-E have been established by Aksoy et al.[9]

Tinnitus, which frequently accompanies hearing loss, is the sensation of sound perceived without an external acoustic stimulus and is the third most common symptom in the elderly after pain and dizziness.[10] The prevalence of tinnitus, which is 10%-19% in the general adult population, rises to 24%-45% in the elderly population.[11] Hall et al categorized the effects of tinnitus on individuals as (a) physical (sleep disturbance, somatic complaints), (b) psychological (stress, depression, attention deficit), (c) social (restriction of work and social life), and (d) auditory (perception of disturbing sounds) problems.[12] Since tinnitus is a subjective symptom, standard otoneurological tests may be insufficient to assess the impact of symptoms on an individual's quality of life. Although pure-tone audiometry, a basic audiological test, shows hearing thresholds, it does not fully reflect the communication difficulties and emotional distress experienced by the individual. Scales that measure an individual's perception of disability in daily life are essential for rehabilitation planning. For this reason, the "Tinnitus Handicap Inventory (THI)" was developed by Newman et al to measure the functional, emotional, and social effects of tinnitus.[13] The Turkish adaptation of the THI was developed by Aksoy et al.[14]

Quality of life is a multidimensional concept that reflects an individual's perception of their physical and mental health and social relationships.[15] In older individuals, high health-related quality of life is associated with low morbidity and mortality.[16] However, presbycusis and tinnitus negatively affect this quality. Studies have shown that individuals with severe tinnitus have lower physical health, vitality, and mental health scores.[17] Given the increasing elderly population, it is important to examine the impact of perceived hearing loss and tinnitus on the quality of life using specific tools. Using modules specific to the elderly rather than the general quality of life scales provides more sensitive data for understanding which specific areas of life (autonomy, proximity, sensory functions, etc.) are impaired by hearing and tinnitus. Emphasizing the importance of the subjective health perception of older individuals, the "World Health Organization Quality of Life Instrument-Old (WHOQOL–OLD)" scale is specific to this group.[18] The Turkish version of the scale was adapted by Eser et al.[19]

Although the effects of hearing loss and tinnitus on quality of life have been examined separately in the literature, there is a need to investigate the detailed relationship between hearing and tinnitus impairment perceptions in geriatric individuals over 65 years of age and age-specific quality of life components rather than the general quality of life scales. Accordingly, the main aim of the study was to determine the relationship between hearing and tinnitus impairment levels in geriatric individuals and to investigate the impact of these conditions on quality of life. Specifically, the study aimed to identify the subareas of the WHOQOL-OLD scale (sensory functions, autonomy, social participation, etc.) that show the strongest correlation with Hearing Impairment Scale scores. The data obtained are expected to contribute to the holistic planning of auditory rehabilitation in the geriatric population, aiming not only to improve hearing but also to enhance the overall well-being.

The following research question guided this study:

To what extent and in what ways do perceived hearing loss and tinnitus affect the overall quality of life and the WHOQOL-OLD subdomains of older adults?

Methods

Data Collection Tools

Participants were contacted via social media and asked to complete the scales using the Google Forms platform. Data collection was conducted between December 2025 and January 2026. To ensure the integrity and quality of the data collected via the online platform, several control measures were implemented. The dataset was manually inspected for duplicate entries by cross-referencing demographic variables (age, gender) and response timestamps. Duplicate submissions and incomplete questionnaires were identified and excluded from the analysis to ensure that each participant was represented only once.

Hearing Handicap Inventory for Elderly Assessment

The effects of hearing loss on the emotional and social lives of elderly individuals were assessed using the Turkish version of 25-item HHI-E (Long Version) scale[9]. The scale consists of 2 subdimensions: social (12 items) and emotional (13 items). Responses were scored using a 3-point Likert scale with "no" (0 points), "sometimes" (2 points), and "yes" (4 points). The total score ranged from 0 to 100, with an increase in the score indicating an increase in the perceived level of disability. The obtained scores were classified into 3 levels, according to the criteria of Ventry et al[8]:

- Level 1 (0-16 points): No disability,
- Level 2 (18-42 points): Mild-moderate disability,
- Level 3 (≥ 44 points): Significant disability.

Tinnitus Handicap Inventory Assessment

The Turkish version of THI was used to determine the impact of tinnitus severity on individuals[14]. The total score obtained from the 25-item scale, which has a 3-point Likert-type (0 = no, 2 = sometimes, 4 = yes) scoring system, is between 0 and 100. Higher scores reflected the severity of the disability caused by tinnitus. The scale results were classified into 5 categories, as determined by Newman et al:[13]

- Level 1 (0-16 points): Very mild (only audible in a quiet environment).
- Level 2 (18-36 points): Mild (masked by ambient noise).
- Level 3 (38-56 points): Moderate (noticeable in noisy environments, but does not interfere with daily life).
- Level 4 (58-76 points): Severe (continuously audible, causes sleep disturbance).
- Level 5 (78-100 points): Very severe (continuously audible, interfering with all activities).

World Health Organization Quality of Life Instrument-Old Assessment

The quality of life of elderly individuals was assessed using the Turkish version of WHOQOL-OLD scale, which consists of 24 items and 6 sub-dimensions[19]. Each item is scored on a 5-point Likert scale ranging from 1 to 5, and the total score for each sub-dimension ranges from 4 to 20. An increase in the total score indicated an increase in quality of life. The sub-dimensions and scope of the scale are as follows:[19]

1. Sensory functions: The impact of sensory losses on quality of life.
2. Autonomy: The ability to live independently and freedom of decision-making.
3. Past, present, and future activities: Satisfaction with achievements and expectations for the future.

4. Social participation: The level of participation in social activities in daily life.
5. Death and dying: Anxiety, fear, and acceptance of death.
6. Intimacy: The ability to establish personal and intimate relationships.

Statistical Analysis

The sample size was determined to be a minimum of 100 participants using G-Power analysis with 95% power and a 5% margin of error ($\alpha = 0.05$). Statistical analysis was performed using IBM SPSS Statistics 25.0 (IBM Corp., Armonk, NY, USA). The normality of the data distribution was examined using the Shapiro–Wilk test. Numerical variables that did not show a normal distribution were presented as median (minimum-maximum), and categorical variables as number (n), percentage (%), and mean ± standard deviation (mean ± SD) values were presented as descriptive statistics. The Mann–Whitney *U*-test was used for intergroup comparisons, and Spearman's correlation analysis was used to examine the relationship between variables. The statistical significance level was set at $P < .05$.

To identify the determinants of quality of life in the geriatric population, a multiple linear regression analysis was performed. The WHOQOL-OLD total score was defined as the dependent variable, while the HHI-E, THI, and age were included as independent variables using the "Enter" method. Prior to the analysis, the assumptions of the regression model were verified. Multicollinearity among the independent variables was assessed using Variance Inflation Factor (VIF) and tolerance values; no multicollinearity issues were detected (VIF < 10 and tolerance > 0.1). The level of statistical significance was set at $P < .05$.

The internal consistency of the scales used in the current analysis was evaluated using Cronbach's alpha coefficient. The reliability coefficients were found to be excellent for the Hearing Handicap Inventory for the Elderly (HHI-E) ($\alpha = 0.95$) and the Tinnitus Handicap Inventory (THI) ($\alpha = 0.96$). The WHOQOL-OLD module also demonstrated acceptable internal consistency with a Cronbach's alpha of 0.70.

Ethical Approval and Participants

This study was approved by the Atılım University Human Research Ethics Committee (Date: December 3, 2025; Decision No. E-59394181-604.01-126888) and conducted in accordance with the principles of the Helsinki Declaration. Informed consent was obtained electronically from all participants via Google Forms prior to participation. The study sample consisted of 108 volunteers aged 65-90 years. The inclusion criteria were as follows.

- Being 65 years of age or older,
- Not having any diagnosed neurological or cognitive impairment,
- Being literate and able to speak Turkish.

Demographic data of the participants are presented in Table 1.

Table 1. Demographic Information

	Sample Size (n)	Age (Mean ± SD)	Perception of Hearing Loss	Perception of Tinnitus
Female	63	71.58 ± 6.09	%60.31	%63.49
Male	45	70.26 ± 6.03	%73.33	%68.88

SD, standard deviation.

Results

Descriptive Statistics and Scale Scores

The mean age of 108 participants included in the study was 72.4 ± 6.1 (65-90). The median total HHI-E score of the participants was 24 (0-92), and the median total THI score was 20 (0-96). When the sub-dimensions of the WHOQOL-OLD quality of life scale were examined, it was observed that the highest satisfaction was in the "death and dying" sub-dimension (median: 16), and the lowest satisfaction was in the "sensory functions" sub-dimension (median: 12). Table 2 summarizes the general characteristics of the study population (N = 108).

Group Comparisons

The Hearing impairment level, tinnitus impairment level, and WHOQOL-OLD total score of the group with perceived hearing loss were significantly different from those of the other groups ($P < .05$). When examined in terms of quality of life (WHOQOL-OLD), it was determined that the group with perceived hearing loss had significantly lower total quality of life scores ($U = 892$, $P = .006$) and in the sub-dimensions of sensory functions ($U = 591$, $P < .001$) and death and dying ($U = 912$, $P = .008$) (Table 3). However, no significant differences were observed between the groups in other sub-dimensions, such as autonomy, social participation, and proximity ($P > .05$).

In the Mann–Whitney *U*-test results based on sex, no statistically significant difference was found between female and male participants in terms of hearing impairment and tinnitus levels ($P > .05$). However,

Table 2. Descriptive Statistics of the Participants and Scale Score Distributions

Variables	Mean ± SD	Median (Min-Max)
Age	72.4 ± 6.1	71.5 (65.0-90.0)
HHI-E total	29.3 ± 23.2	24.0 (0.0-92.0)
THI total	25.6 ± 22.6	20.0 (0.0-96.0)
WHOQOL-OLD total	83.5 ± 11.4	83.0 (55.0-112.0)
Sensory abilities	11.8 ± 3.6	12.0 (4.0-20.0)
Autonomy	13.9 ± 2.8	14.0 (7.0-20.0)
Death and dying	15.3 ± 3.9	16.0 (4.0-20.0)

HHI-E, Hearing Handicap Inventory-Elderly; Max, maximum; Min, minimum; SD, standard deviation; THI, Tinnitus Handicap Inventory; WHOQOL-OLD, World Health Organization Quality of Life Instrument-Older Adults Module.

Table 3. Comparison of Scale Scores Based on Perceived Hearing Loss

Scales/Sub-Dimensions	Perceived HL (+)	Perceived HL (−)	Test Statistic (*U*)	*P*
HHI-E total	39.4 (Median)	6.0 (Median)	309.5	<.001*
THI total	24.0 (Median)	12.0 (Median)	1059.5	.007*
WHOQOL-OLD total	81.0 (Median)	88.0 (Median)	892	.006*
Sensory abilities	10.0 (Median)	15.0 (Median)	591	<.001*
Death and dying	15.0 (Median)	18.0 (Median)	912.5	.008*
Social participation	14.0 (Median)	15.0 (Median)	1091	.131

HHI-E, Hearing Handicap Inventory-Elderly; HL, hearing loss; THI, Tinnitus Handicap Inventory; WHOQOL-OLD, World Health Organization Quality of Life Instrument-Older Adults Module.
*Statistically significant at $P < .05$.

it was observed that the sensory function scores of individuals using hearing aids differed significantly from those of individuals not using them.

Correlation Analysis Results

According to the Spearman correlation analysis results, positive, moderate, and statistically significant correlations were found between HHI-E and THI (*rho* = 0.312; $P < .001$).

A strong negative correlation was found between HHI-E and the "sensory functions" sub-dimension of quality of life (*rho* = −0.587; $P < .001$), while significant negative correlations were also found with the "social participation" (*rho* = −0.380; $P < .001$) and "closeness" (*rho* = −0.306; $P = .001$) sub-dimensions. Similarly, an increase in tinnitus impairment level negatively affected sensory function (*rho* = −0.281; $P = .003$) and autonomy level (Table 4).

Regression Analysis Results

The multiple linear regression model established to determine the factors predicting quality of life (WHOQOL-OLD total score) in elderly individuals was statistically significant ($F(3, 104) = 10.38$; $P < .001$). The independent variables (level of hearing impairment, level of tinnitus impairment, and age) explained 23% of the total variance in quality of life (QoL) ($R^2 = 0.230$). When the coefficients were examined, it was determined that the level of hearing impairment (HHI-E) was a statistically significant negative predictor of quality of life ($\beta = -0.36$, $t = -3.42$, $P = .001$). In contrast, tinnitus impairment level ($\beta = -0.13$, $P = .213$) and age ($\beta = -0.11$, $P = .187$) did not have a significant predictive effect on quality of life in the model (Table 5).

Discussion

In this study, the effects of hearing and tinnitus impairment perception on quality of life in geriatric individuals aged ≥ 65 years were examined using a holistic approach. The most fundamental finding of the study was that as hearing and tinnitus impairment perception increased, the quality-of-life scores of elderly individuals decreased significantly. The findings showed that the HHI-E, THI, and WHOQOL-OLD of the group with perceived hearing loss differed significantly from those of the control group. Although perceptual hearing loss reduces the general quality of life of individuals, it does not significantly impair their ability to act independently (autonomy) or establish close relationships. Analyses revealed that as hearing impairment increases, the quality of life of older individuals decreases significantly, particularly in the sub-dimensions of "sensory functions" and "death and dying." This finding demonstrates that sensory deprivation constitutes not only a physical disability but also a multifaceted psychosocial burden in the geriatric population.

Literature frequently emphasizes that presbycusis is associated with social isolation, depression, and decreased quality of life.[1,20] The negative correlation found between HHI-E and WHOQOL-OLD scores in the study supports this view. As hearing impairment increases, the quality-of-life score obtained from sensory function assessments in elderly individuals decreases significantly. The low scores obtained by participants with severe hearing loss in the sub-dimensions of social participation and proximity indicate that these individuals tend to avoid social situations because of the intense cognitive effort they expend while communicating (listening effort). Although Vieira et al stated that elderly individuals can obtain high scores in social relationships despite hearing loss, the findings are consistent with those of Zyśk and Moser et al, who showed that the failure to rehabilitate hearing loss deepens social isolation.[21-23] This proves that hearing aid use is critical not only for auditory perception, but also for maintaining social integration and psychological well-being.

A notable finding in the study is that the group with perceived hearing loss scored significantly lower on the "death and dying" sub-dimension of quality of life. This indicates that the perception of hearing loss in the geriatric population affects the quality of life globally but specifically targets sensory abilities and existential anxieties. In geriatric individuals, the perception of hearing loss does not affect the overall quality of life but specifically affects sensory abilities and anxieties about death/loneliness. This finding from the study suggests that hearing loss pushes the individual towards "social death," which in turn triggers anxiety about physical death. It can be hypothesized that sensory deprivation accelerates detachment from the outside world in geriatric individuals, triggering existential anxiety and feelings of loneliness.

Although pure-tone audiometry is the gold standard for diagnosing hearing loss in the geriatric population, screening inventories are of great importance because of time and cost constraints. Tomioka et al and Servidoni et al reported that the HHI-E scale has high sensitivity (89.1%) and specificity for detecting hearing loss in the elderly.[24,25] Purnami et al emphasized that this scale is a screening tool with similar specificity to alternative tests such as the whisper test.[26] The regression analysis results obtained in the study also showed that HHI-E scores are a strong predictor of variance in quality of life, supporting the possibility of using this scale as a priority screening tool in clinical practice.

The lack of a normal distribution of data in the current study indicates that the perception of hearing and tinnitus in the elderly population is highly heterogeneous at the individual level and that individual outliers, rather than a standard mean, influence the results. The results of the study show that the perception of hearing loss in the geriatric population affects quality of life but specifically targets sensory functions and existential anxiety. Hearing is the most affected system among sensory functions that show age-related impairment. Hearing impairment can lead to communication difficulties, social isolation, and cognitive impairment. All these conditions have a negative impact on quality of life.

When examining the impact of tinnitus on quality of life, the literature shows a strong correlation between tinnitus and anxiety, depression, and cognitive decline.[27,28] The study also found a negative correlation between THI scores and QoL. However, in the established multiple linear regression model ($R^2 = .230$, $P < .001$), the most fundamental

Table 4. Spearman's Correlation Matrix Between Hearing Handicap, Tinnitus, and Quality of Life

	1 (HHI-E)	2 (THI)	3 (Sensory Abilities)	4 (Social Participation)	5 (Intimacy)
1. HHI-E total	1				
2. THI total	.312**	1			
3. Sensory abilities	−.587**	−.281**	1		
4. Social participation	−.380**	−.165	.477**	1	
5. Intimacy	−.306**	−.111	.394**	.601**	1

HHI-E, Hearing Handicap Inventory-Elderly; THI, Tinnitus Handicap Inventory.
**Correlation is significant at the .001 level.

Table 5. Multiple Linear Regression Analysis for for WHOQOL-OLD total score

Model Variable	B	Std. Error	β	*t*	*P*
Constant	98.63	6.84		14.42	<.001
HHI-E Total	−0.18	0.05	−0.36	−3.42	.001*
THI Total	−0.06	0.05	−0.13	−1.25	.213
Age	−0.12	0.09	−0.11	−1.33	.187

$R = 0.480$; $R^2 = 0.230$; $F = 10.38$; $P < .001$.

factor predicting quality of life was "Hearing Impairment Level," while the level of tinnitus was not a statistically significant predictor in the presence of hearing loss. This finding suggests that the detrimental effect of tinnitus on quality of life, as reported by Teixeira et al and Rocha et al, is overshadowed by the perception of severe communication and social barriers created by presbycusis in the geriatric population.[29,30] The study showed that tinnitus may be secondary to hearing loss in the geriatric population. This suggests that auditory rehabilitation should primarily focus on addressing communication barriers and hearing difficulties and that the negative impact of tinnitus on quality of life may be overshadowed by the perception of hearing impairment. Therefore, rehabilitation strategies in this patient group should focus primarily on addressing hearing loss.

Although 23% of the variance in the regression model was explained by hearing loss ($R^2 = .230$), the remaining 77% remained unexplained. This unexplained portion may be due to the presence of other geriatric syndromes. This model reveals that although perceptual hearing loss has a significant impact on quality of life in geriatric individuals, systemic diseases, family history, personal history, and general medical status are also important factors.

Strengths and Limitations

The strongest aspect of this study is its multidimensional and holistic approach to address the effects of hearing loss and tinnitus, which are often overlooked in the geriatric population, on the quality of life of the elderly. In particular, the examination of the relationship between quality of life not only in physical terms but also in psychosocial sub-dimensions such as "death and dying" or "intimacy" makes a significant contribution to the literature. Furthermore, demonstrating the predictive power of screening inventories, such as HHI-E and THI, which are easy to apply and cost-effective in clinical practice, in identifying the rehabilitation needs of elderly individuals is another important contribution of this study. However, this study has some limitations. First, the cross-sectional design of the study prevents the definitive establishment of a cause-and-effect relationship between variables. Second, data were collected through self-report scales; the absence of objective hearing tests, such as pure-tone audiometry, limits the complete comparison of the agreement between the degree of hearing loss and the perceived level of impairment. Third, the fact that the sample size may limit the generalizability of the results to the general population. Finally, another limitation of this study is the lack of detailed clinical data regarding the history of auditory impairment. Variables such as the duration of hearing loss, the specific laterality (unilateral vs. bilateral), and the consistency of daily hearing aid use were not recorded. While this study focused on the subjective perception of handicap using standardized screening tools, it is acknowledged that these clinical factors are significant covariates that could influence quality of life outcomes. Future studies incorporating comprehensive audiological history and device usage logs would provide further insights into these relationships with longitudinal designs, supported by larger samples and audiometric data.

Conclusion

The current study suggests that perceived hearing loss in individuals aged 65 years and over is associated with quality of life in multifaceted ways. As the perception of hearing impairment increases, older individuals tend to report lower quality of life, not only in sensory functions but also in social participation and existential well-being. The findings further indicate that, although tinnitus is associated with reduced quality of life, perceived hearing-related disability appears to be more strongly associated with QoL outcomes in the geriatric population. These results highlight the importance of incorporating screening tools such as the HHI-E into routine health assessments of older adults to facilitate early identification of hearing-related difficulties. Auditory rehabilitation programs may benefit from a holistic approach that addresses not only hearing-related needs but also social participation and overall well-being.

Data Availability Statement: The data that support the findings of this study are available on request from the corresponding author.

Ethics Committee Approval: Ethical committee approval was received from the Ethics Committee of University of Atılım University (Date: December 3, 2025; Decision No. E-59394181-604.01-126888)

Informed Consent: Written informed consent was obtained from all participants who participated in this study.

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