

Evaluation of Visual and Hearing Functions of Individuals Over 50 Years Old with a Driver's License

Elli Yaş Üstü Ehliyet Sahibi Bireylerin Görme ve İşitme Fonksiyonlarının Değerlendirilmesi

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DOI:10.38175/phnx.1510183

Cite as:

Yalçın H, Özmen Sever S, Zeren Öztürk G. Evaluation of Visual and Hearing Functions of Individuals Over 50 Years Old with a Driver's License. Phnx Med J. 2025;7(1):5-9.

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Received: 4 Temmuz 2024

Accepted: 26 Kasım 2024

Online Published: 10 Mart 2025



ABSTRACT

Objective: This study aimed to evaluate the visual and hearing functions of individuals with a driver's license over the age of 50.

Material and Method: This is a single-center, prospective, and descriptive study. Individuals aged 50 and older with driver's licenses who presented to Sisli Hamidiye Etfal Training and Research Hospital Family Medicine Outpatient Clinics were included. A data collection form was used to collect sociodemographic information. Visual and hearing examinations were performed using the Snellen Test, the Amsler Grid 16 Test, and the Whisper Test.

Results: The sample of the study included 95 people with a median age of 58 (min: 50, max: 74). The number of participants with vision problems in at least one eye was 17 (22.1%) in the eye tests of those using reading or distance glasses. In the Whisper Test, eight (8.4%) of the participants had a hearing impairment in both ears. 86.3% (n=82) of the participants in the right ear examination had normal hearing, while 84.2% (n=80) of the participants in the left ear examination had normal hearing. Twenty (21.2%) participants had a hearing impairment in at least one ear. Our study's results showed that 41.1% (n= 39) of the participants had hearing and/or vision problems.

Conclusion: In our study, the eyesight and hearing of individuals with driver's license who were aged 50 and older were evaluated, and it was found that two out of every five patients had problems in at least one eye and/or ear. This situation poses a risk of traffic accidents.

Keywords: Hearing loss, vision screening, hearing tests, vision tests.

ÖZET

Amaç: Bu çalışma ile 50 yaş üstü ehliyet sahibi bireylerin görme ve işitme fonksiyonlarının değerlendirilmesi amaçlanmıştır.

Gereç ve Yöntem: Bu çalışma tek merkezli, tanımlayıcı ve prospektif olarak planlanmıştır. Çalışmaya Şişli Hamidiye Etfal Eğitim ve Araştırma Hastanesi Aile Hekimliği polikliniklerine başvuran 50 yaş ve üstü ehliyet sahibi bireyler dahil edilmiştir. Çalışmaya dahil edilen katılımcılara sosyodemografik verilerinin sorgulandığı veri formunun yanı sıra görme muayenesi için Snellen Testi ve Amsler Grid 16 Testi; işitme muayenesi için Fısıltı Testi uygulanmıştır.

Bulgular: Çalışmaya 96 kişi dahil edilmiştir. Katılımcıların yaş median değeri 58 (min: 50, max: 74) idi. Gözlük kullanan katılımcılar arasında en az bir gözünde görme problemi olan katılımcı sayısı 17 (%22,1) idi. Katılımcılar arasında fısıltı testi sonucunda her iki kulağında işitme problemi olan kişi sayısı 8 (%8,4) idi. Yirmi (%21,2) katılımcının ise en az bir kulağında işitme problemi vardı. Her iki kulağın fısıltı testi ile ayrı ayrı değerlendirme sonuçlarında; sağ kulak muayenesinde katılımcıların %86,3'ü (n=82) normal işitmeye sahipken, sol kulak muayenesinde katılımcıların %84,2'si (n=80) normal işitmeye sahipti. Çalışmada, katılımcıların %41,1'inin (n=39) işitme ve/veya görme sorunu yaşadığını saptanmıştır.

Sonuç: Çalışmamızda, 50 yaş ve üstü katılımcıların görme ve işitme değerlendirmesi sonucunda her beş hastadan ikisinin en az bir gözünde ve/veya kulağında problem olduğu tespit edilmiştir. Bu durum trafik kazaları için risk oluşturmaktadır.

Anahtar Kelimeler: İşitme kaybı, görme taraması, işitme testleri, görme testleri.

INTRODUCTION

According to road traffic accident statistics for 2022, 197.267 traffic accidents occurred in Turkey. Among the mistakes causing these accidents, driver errors ranked first at a rate of 86.8%, while 44.9% of those killed in traffic accidents were drivers, 31.8% were passengers, and 23.3% were pedestrians (1). According to the World Health Organization data, approximately 1.2 million people lose their lives, and 20 to 50 million injuries occur each year due to traffic accidents (2). Traffic accidents are one of the leading causes of death for children and young people aged 5 - 29 years. Driver-related causes of accidents (e.g., speeding, careless driving, drunk driving) pose a serious risk (2). There are studies in

the literature analyzing driver errors, which may be related to health problems.

According to the regulation on the health conditions to be examined in individuals who hold a driver's license or are applying for one published in 2016 in Turkey, license-holders are divided into two groups, which also have subclasses (3). In this regulation, examinations in the context of ophthalmology, otolaryngology, orthopedics, internal medicine, and psychiatry and health are specified (3). Based on this regulation, a health report is issued after a set of examinations in healthcare facilities affiliated to the Turkish Ministry of Health. The person obtains their driver's license according to the results of these examinations and then continues to hold their license

without any additional examination.

However, vision and hearing are among the senses that are affected people at older ages due to aging and/or comorbid conditions. According to statistics, the frequency of individuals with vision and/or hearing problems increases with age (4). Although vision loss is seen in individuals of all age groups, most people with visual impairment and blindness are over the age of 50 (5).

Therefore, in this study, we aimed to evaluate whether individuals at or over 50 years of age with driver's licenses have visual and hearing functions that are suitable for driving.

MATERIAL AND METHODS

Population and sample of the study:

This is a single-center, prospective, and descriptive study. Individuals aged 50 and older with driver's licenses who presented to Şişli Hamidiye Etfal Training and Research Hospital Family Medicine Outpatient Clinics for any reason between 30/09/2020 and 30/11/2020 were included. Sample size calculations were made with the G*Power Version 3.1.6 program. For a population of over 120 individuals, the total sample size required for the study was calculated as 92 with 95% reliability. The study was completed with 95 participants. Individuals under the age of 50, those who did not have a driver's license, and those who refused to participate in the study were excluded.

Data collection:

After obtaining consent from the participants, a data form was applied. In the first part of the data form, the sociodemographic data of the participants were collected, and the participants were asked whether they were actively driving. In the second part of the data form, vision and hearing assessment results were noted.

Vision assessment

The Snellen Test was used to assess visual acuity, and the Amsler Grid 16 Test was used to assess visual field. Each eye was evaluated separately in both tests. In the Snellen Test, Snellen cards consisting of 10 rows are shown to the patients at a distance of 6 meters to assess their visual acuity based on distance. On the Snellen Chart, the size of the letters decreases as the row number progresses. Accordingly, the examination results of the participants who could read the smallest row of letters were evaluated as 10/10, the results of those who could only read the letter in the first row were evaluated as 1/10, and the rest of the categories were scored between these values. The participants with Snellen Test scores of 5/10 or below were considered to have vision problems.

The Amsler Grid 16 Test is a sheet of paper with white lines on a black background and a dot at the center for fixation. The test was applied to both eyes separately at reading distance (approximately 30 - 40 cm) from the chart. Both eyes were closed alternately, the participant was instructed to focus on the black dot at the center of the paper, and the test was based on whether the four sides of the large square in the diagram were seen. The tests of the participants with clear vision were considered negative, while they were considered positive if they could not see all corners, if the lines were wavy, blurred, irregular, or refracted, or if any part of the test was wavy, blurred, or dark in color.

Additionally, the use of glasses/contact lenses was questioned to provide a more accurate assessment of visual function. The participants were subjected to the tests with their glasses/lenses on.

Hearing assessment

The Whisper Test was used to assess the hearing function of the participants. The test was performed in a quiet environment by applying wet or alcohol-infused cotton wool to the untested ear and whispering some words from a distance of 6 - 7 meters where the physician's lip movements could not be seen by the participant. To evaluate different frequencies, different words were used, including high-pitched (e.g., eighty, silent) and low-pitched (e.g., car, Bornova) ones. This way, the hearing functions of the participant who heard the whispered words from the specified distance were considered normal.

To evaluate the hearing functions of the participants more accurately, the use of hearing aids was added to the questionnaire, and the participants took part in the test while their hearing aids, if any, were on.

Statistical analysis:

The parameters used in the study were categorized as categorical and individual. The numeric data are presented as median and minimum-maximum, and the categorical data are presented as frequency distribution and percentage. The distribution of the data was assessed using the Kolmogorov-Smirnov test. Participants were divided into three groups according to their age groups as 50-59 years, 60-69 years and 70-75 years and comparisons were conducted accordingly. The Pearson Chi-square test was used for comparisons of descriptive groups. The Spearman correlation test was conducted to examine the relationship between continuous variables. The level of statistical significance was accepted as $p < 0.05$. SPSS 25.0 software package was used for data analysis.

Ethics committee approval:

Approval to conduct the study obtained from the Scientific Committee and Ethics Committee of Şişli Hamidiye Etfal Training and Research Hospital (Approval date: 22/09/2020; Approval code: 2998).

RESULTS

A total of 95 people participated in our study, and the median age of the participants was 58 years (min: 50, max: 74). Most of the participants were men ($n=86$, 90.5%).

It was determined that the median duration for which the participants held their driver's licenses was 31 years (min: 8, max: 57), 55.8% ($n=53$) of the participants were in the 50 - 59 age group, and 63.16% ($n=60$) were actively driving. No significant difference was found among the age groups in terms of their active driving status ($p=0.643$).

It was found that 71.6% ($n=68$) of the participants had at least one chronic disease, and 28.4% ($n=27$) did not have any chronic disease. Diabetes mellitus was present in 40% ($n=38$) of the participants, hypertension was present in 46.3% ($n=44$), hyperlipidemia was present in 17.9% ($n=17$), ischemic heart disease was present in 13.7% ($n=13$), chronic lung disease was present in 6.3% ($n=6$), and hypothyroidism was present in 5.3% ($n=5$).

Results of vision assessments

According to the statements of the participants regarding their use of assistive devices for visual functions, no participant used contact lenses, while 77 (88.1%) used at least one type of eyeglasses. Among the participants who used eyeglasses, there were 6 (7.8%) participants who used only distance glasses and 42 (54.5%) who used only reading glasses. The number of people who used both reading and distance glasses was 29 (37.7%). The usage rate of eyeglasses was 77.4% ($n=41$) in the 50 - 59 age group, 83.8% ($n=31$) in the 60 - 69

Table 1: Comparison of individual characteristics and visual impairment

	Problems in at least one eye n (%) (n=24)	No vision problems n (%) (n=71)	p
Age			
50-59	12 (22.6%)	41 (77.4%)	0.405
60-69	10 (27%)	27 (73%)	
70-74	2 (40%)	3 (60%)	
Gender			
Female	3 (33.3%)	6 (66.7%)	0.407
Male	21 (24.4%)	65 (75.6%)	
Chronic disease			
Yes	15 (22.1%)	53 (77.9%)	0.254
No	9 (33.3%)	18 (66.7%)	
Active vehicle use			
Yes	13 (21.7%)	47 (78.3%)	0.291
No	11 (31.4%)	24 (68.6%)	

age group, and 100% (n=5) in the 70 - 75 age group. According to their Snellen Test results, 24 (25.3%) participants had visual impairments (5/10 vision or less) in at least one eye. In the separate evaluations of both eyes, there were 20 (21.1%) participants with vision problems in their right eye and 11 (11.16%) with vision problems in their left eye. The number of participants with vision problems in both eyes was 7 (7.3%). Although 18.2% (n=11) of the participants had visual problems in their right eye according to their Snellen Test results, they were not wearing glasses. For the left eye, this rate was 15% (n=9). The rates of participants who wore glasses but still had vision problems were 5.7% (n=2) for problems in the left eye and 25.7% (n=9) for problems in the right eye. In the eye tests of the participants who wore reading or distance glasses, the number of those with vision problems in at least one eye was found as 17 (22.1%).

The results of the comparison of the characteristics of the participants with visual impairment in at least one eye according to their Snellen Test results are given in Table 1.

According to the results of the Spearman correlation analysis of the individual characteristics of the participants and their Snellen Test scores for both eyes, there were statistically significant, negative, and weak correlations between the left eye Snellen Test scores of the participants and their age and duration of driver's license-holding ($r=-0.292$, $p=0.004$; $r=-0.248$, $p=0.015$, respectively).

In the Amsler Grid Tests of the participants, the results for the left eye were negative in all participants, while the results for the right eye were negative in 98.9% (n=94) and positive in 1.1% (n=1).

Results of hearing assessments

It was determined that 2.1% (n=2) of the participants used hearing aids, while 97.9% (n=93) did not use hearing aids. The number of participants with hearing impairment in at least one ear was 20 (21.2%). In the Whisper Test, 8 (8.4%) participants were found to have hearing impairment in both ears. In the examinations of the right ear, 86.3% (n=82) of the participants had normal hearing, while 13.7% (n=13) had impaired hearing. In the examinations of the left ear, 84.2% (n=80) of the participants had normal hearing, and

Table 2: Comparison of individual characteristics and hearing problem status

	Have problems in at least one ear n(%) (n=20)	No hearing problems n(%) (n=75)	p
Age			
50-59	12 (22.6%)	41 (77.4%)	0.709
60-69	7 (18.9%)	30 (81.1%)	
70-74	1 (20%)	4 (80%)	
Gender			
Female	3 (33.3%)	6 (66.7%)	0.285
Male	17 (19.8%)	69 (80.2%)	
Chronic disease			
Yes	11 (16.2%)	57 (83.8%)	0.064
No	9 (33.3%)	18 (66.7%)	
Active vehicle use			
Yes	13 (21.7%)	47 (78.3%)	0.016
No	11 (31.4%)	24 (68.6%)	
Hearing aid use			
Yes	2 (100%)	0	0.043
No	18 (19.4%)	75 (80.6%)	

15.8% (n=15) had impaired hearing. There was no significant relationship between age groups and Whisper Test results for either ear (right ear $p=0.733$; left ear $p=0.271$).

The results of the comparison of the individual characteristics of the participants and the presence of hearing loss in at least one of their ears are shown in Table 2.

According to the results of our study, 41.1% (n=39) of the participants had hearing and/or vision problems.

DISCUSSION

In this study evaluating the visual and hearing functions of individuals aged 50 and over with a driver's license, 41.1% of participants were found to have hearing and/or vision issues. In terms of visual functions, 25.3% of participants had vision problems in at least one eye, while in terms of hearing functions, 21.2% were found to have hearing problems in at least one ear.

In a study by Öktem et al. evaluating 252 patients referred to ophthalmology outpatient clinic for a driver's license health examination, the mean age of the participants was found to be 42 years, and it was reported that only 132 of these individuals could hold a driver's license without the compulsory registration of prescription glasses (6). This shows that many vision problems are, indeed, diagnosed at the time of applying for a driver's license. According to the results of our study, 41.4% (n=39) of the participants, who had driver's licenses, had hearing and/or vision problems. The reason for this is that the vision and hearing of a person, which are healthy at the time of obtaining their driver's license, may be impaired over time for various reasons. To prevent the risks created by this situation, additional examinations should be performed at certain intervals after the person obtains a driver's license. In the literature, the rate of eye problems was reported to increase with age (7). In our study, the rate of vision problems was 22% in the age group of 50-59, while this rate increased to 40% among the participants who were 70 years old or older. Vision problems have been found to be associated

with death, falls and injuries, depression, social isolation, and even hospitalization in the elderly (8-11). Therefore, they are one of the components of geriatric health assessments (12). However, it is thought-provoking that vision problems in at least one eye were found in approximately one out of every five participants aged 50 - 59 years in our study. This is because the ages of 50 - 59 constitute a period with a high rate of active driving. The fact that this age group constitutes 53.3% of the active driver rate poses a risk of traffic accidents. The incidence of hearing loss peaks in the 5th-6th decades of life, ranging from 30% to 47% in people older than 65, and the prevalence doubles in each decade (13). On the other hand, in our study, it was a remarkable finding that the rate of participants with hearing problems in at least one ear decreased from 22.6% in the 50 - 59 age group to 20% in the 70 + age group. We think that this may be due to the different structure of the age groups compared to those included in other studies.

In line with these results, it can be stated that individuals should be subjected to both eye and ear examinations at repeated intervals after obtaining a driver's license. Some countries have introduced restrictions on the validity periods and renewal of driver's licenses after a certain age due to conditions such as decreases in the physical and cognitive functions of individuals with age and pathologies developing in these two senses. For example, in the state of Texas in the United States, individuals aged 79-84 are required to apply in person to the relevant offices for the renewal process, and renewal through the online system is not allowed, as is the case for younger age groups. Individuals in this age group are expected to pass a vision test, and the validity of their driver's license is limited to 6 years. For individuals aged 85 and older, the same conditions apply, but the validity is limited to approximately two years (14). In the state of California, the upper age limit for online driver's license renewal is set at 70 (15).

Prior to the renewal obligation for the new type of driver's licenses that started to be distributed in Turkey as of

01/01/2016, it was not possible to renew one's driver's license and/or undergo a re-examination process at any time. It is a positive development that applications for the new type of driver's license have enabled some people to undergo additional medical examinations. Nonetheless, rather than a fixed driver's license validity period, an age-based examination plan and a system based on extending the validity duration of one's current driver's license may be more practical. This is because, according to 2022 data, 32,321,021 people in Turkey had driver's licenses (16). Considering the re-evaluation of these individuals according to age, the most practical way is renewal via online evaluations for those under 50 years of age and renewal with periodic examinations for those over 50 years of age.

Currently, no upper limit has been set for the age of obtaining a driver's license in Turkey. There is also no specific age limit in the majority of European Union countries (17). Among European countries, Switzerland enacted a program in 2019 that limited the examination period for driver's licenses for all individuals over the age of 75 to two years. To examine these individuals for a driver's license renewal process, physicians who have undergone certain training have been assigned (18). In conclusion, opportunities should be created to re-evaluate driving competencies, mainly targeting individuals aged 50 and above, and if necessary, measures such as traffic rules and speed limits specific to age groups and accompanying restrictive conditions should be put on the agenda.

CONCLUSION

In our study, the vision and hearing functions of individuals with driver's licenses at or over the age of 50 were evaluated, and it was found that two out of every five participants had problems in at least one eye and/or ear. This situation creates a risk of traffic accidents.

Individuals at these ages should be targeted for the re-evaluation of their driving-related competencies, and if necessary, measures such as traffic rules and speed limits specific to this age group and accompanying restrictive conditions should be put on the agenda.

Conflict of Interest: No conflict of interest was declared by the authors

Ethics: This research is approved by the Şişli Hamidiye Etfal Training and Research Hospital Ethics Committee (Approval date: 22/09/2020; Approval code: 2998).

Funding: There is no financial support of any person or institution in this research.

Approval of final manuscript: All authors.

REFERENCES

1. Turkish Statistical Institute. Road Traffic Accident Statistics [Internet]. Turkey: Turkish Statistical Institute; 2023 May. [cited 2023 Jul 12]. Available from: <https://data.tuik.gov.tr/Bulten/Index?p=Karayolu-Trafik-Kaza-Istatistikleri-2022-49513>.
2. World Health Organization. Road traffic injuries [Internet]. Switzerland; World Health Organization; 2023 Dec. [cited 2024 Feb 12]. Available from: <https://www.who.int/news-room/fact-sheets/detail/road-traffic-injuries>.
3. Ministry of Health - Republic of Turkey. Regulation on the Health Conditions and Examination of Driver Candidates and Drivers [Internet]. Turkey; Ministry of Health- Republic of Turkey; 2016 Jul. [cited 2024 Feb 12]. Available from: <https://www.mevzuat.gov.tr/mevzuat?MevzuatNo=10664&MevzuatTur=7&MevzuatTertip=5>.
4. Turkish Statistical Institute. Health Survey in Turkey [Internet]. Turkey; Turkish Statistical Institute; 2023 Jun. [cited 2023 Jul 13]. Available from: <https://data.tuik.gov.tr/Bulten/Index?p=Turkiye-Saglik-Arastirmasi-2022-49747>.
5. World Health Organization. Blindness and vision impairment [Internet]. Switzerland; World Health Organization; 2023 Aug. [cited 2023 Jul 13]. Available from: <https://www.who.int/news-room/fact-sheets/detail/blindness-and-visual-impairment>.
6. Öktem Ç, Aslan F. Characteristics of Driver Candidates Referred to the Ophthalmology Clinic in a Tertiary Hospital: Cross-Sectional Descriptive Study, MN Ophthalmology. 2020;27(3):173-177.
7. Congdon N, O'Colmain B, Klaver CC, Klein R, Munoz B, Friedman DS et al. Causes and prevalence of visual impairment among adults in the United States. Archives Ophthalmology. 2004;122(4):477-85. <https://doi.org/10.1001/archophth.122.4.477>
8. Morse AR, Seiple W, Talwar N, Lee PP, Stein JD. Association of vision loss with hospital use and costs among older adults. JAMA ophthalmology. 2019;137(6):634-40. <https://doi.org/10.1001/jamaophthalmol.2019.0446>.
9. Lee DJ, Gómez-Marín O, Lam BL, Zheng DD. Visual acuity impairment and mortality in US adults. Archives of ophthalmology. 2002;120(11):1544-50. <https://doi.org/10.1001/archophth.120.11.1544>.
10. Jones GC, Rovner BW, Crews JE, Danielson ML. Effects of depressive symptoms on health behavior practices among older adults with vision loss. Rehabilitation Psychology. 2009;54(2):164. <https://doi.org/10.1037/a0015910>.
11. Ivers RQ, Norton R, Cumming RG, Butler M, Campbell AJ. Visual impairment and hip fracture. American journal of epidemiology. 2000;152(7):633-9. <https://doi.org/10.1093/aje/152.7.633>.

12. Elsayy B, Higgins KE. The geriatric assessment. American family physician. 2011;83(1):48-56.
13. Lohler J, Cebulla M, Shehata-Dieler W, Volkenstein S, Volter C, Walther LE. Hearing Impairment in Old Age. Dtsch Arztebl Int. 2019;116(17):301-10. <https://doi.org/10.3238/arztebl.2019.0301>.
14. Texas Department of Publis Safety. Drivers Age 79 or Older [Internet]. United States; Texas Department of Publis Safety. [cited 2023 Jul 15] Available from: <https://www.dps.texas.gov/section/driver-license/drivers-age-79-or-older>.
15. State of California Department of Motor Vehicles. California Driver's Handbook: S [Internet]. United States; State of California Department of Motor Vehicles. [cited 2023 Jul 15]. Available from: <https://www.dmv.ca.gov/portal/handbook/california-driver-handbook/seniors-and-driving/#:~:text=If%20you%20are%2070%20years,issued%20a%20temporary%20driver's%20license>.
16. General Directorate of Security, Traffic Directorate [Internet]. Turkey; General Directorate of Security; 2022 Apr. [cited 2023 Jul 15] Available from: <https://www.trafik.gov.tr/ehliyet-ozellik-kimlik-karti-sahibi-sayisi-3-milyon-31-bin-930a-yukseldi-merkezicerik#:~:text=T%C3%BCrkiye%2C%20yeni%20tip%20s%C3%BCr%C3%BCc%C3%BC%20belgesiyle,bin%2021%20ehliyet%20sahibi%20bulunuyor>.
17. European Union. Getting a driving licence in the EU. [Internet]. European Union; 2023 June. [cited 2023 Jul 16]. Available from: https://europa.eu/youreurope/citizens/vehicles/driving-licence/get-driving-licence/index_en.htm#shortcut-0.
18. Swiss Medical Weekly. Aging and driving in Switzerland. [Internet]. Switzerland; Swiss Medical Weekly; 2019 Oct. [cited 2023 Jul 16]. from <https://smw.ch/index.php/smw/announcement/view/23>.