Cognitive Status and Psychological Well-Being of Older Adults with Hearing, Vision, or Dual Sensory Impairments

Esteer Ibrahim Ghayth1, Rashaa Ahmed Fouad2, Safaa Mostafa Mohamed 3 & Sanaa MostafaKhalifa4

1. Lecturer of Geriatric Nursing, Faculty of Nursing, Sohag University
2. Professor, Gerontological Nursing Department, Faculty Of Nursing, Alexandria University, Eygpt.- Assistant Professor, Faculty of Nursing, King Soud Bin Abdul-Aziz Unversity for Health Siences Alahsa, Saudi Arabia
3. Lecturer of Psychiatric- Mental Health Nursing, Faculty of Nursing, Sohag University.
4. Lecturer of Psychiatric- Mental Health Nursing, Faculty of Nursing, Sohag University.

Abstract

Background: Visual and hearing impairments increase with age and are associated with increased loneliness, depression, anxiety, and mental health problems. In addition to dependence, the risk of cognitive impairment and dementia increases in older adults. **Aim**: To assess the cognitive status and psychological well-being of older adults with visual, hearing, or dual sensory impairments. **Design**: A descriptive research design was employed. **Sample**: A purposive sample was used to collect the study sample, the study was conducted in the ophthalmology and audiology outpatient clinics of Sohag University Hospital. The total number of subjects was 100 elderly patients. **Tool**: Five instruments were used. Structured interview questionnaire. It includes sociodemographic characteristics and medical history, Geriatric Depression Scale, Generalized Anxiety Disorder Scale, Loneliness Scale UCLA and Mini Mental Status Examination Scale. **Results**: The study showed that the majority of the older adults with sensory impairment suffered from moderate and severe anxiety, depression, and loneliness. There were statistically significant differences between the anxiety and depression levels of elderly with sensory impaired based on age and education level, also there were statistically significant differences between the levels of anxiety and depression in these individuals. There were a coefficient correlation between the elderly cognitive function and the levels of anxiety, depression, and loneliness. In addition, nearly half and almost one-third of them had mild and moderate cognitive impairment, respectively. **Conclusions:** half of the studied elderly with visual, hearing, and duel sensory impairment had moderate depression, mild anxiety and high loneliness. Moreover one-third of them had moderate cognitive impairment. **Recommendation**: Provision of rehabilitation programs for older adults with hearing, visual, and dual sensory impairments.

Keywords: Cognitive and psychological well-being, Dual sensory impairment, Hearing and visual impairment, Older adults.

Introduction:

The world is about to undergo a demographic shift as the population of the majority of the nations is ageing, leading to a rise in the proportion of older adults. Between 2015 and 2030, there will be 1.4 billion people in the world who are 60 years of age or older; by 2050, that number is expected to have increased by 56%, from 901 million to 1.4 billion. Also, the population of those 80 years of age or older, or the "old-old," is increasing at a rate that is even quicker than that of the total elderly population. According to projections, the number of elderly individuals will nearly triple from 125 million in 2015 to 434 million by 2050 (**Sara et al., 2018**).

With the global population ageing, it is critical for public health and research to comprehend both pathologic and successful ageing. Elderly adults frequently experience visual and hearing impairments; 33% of people 70 years of age and older are thought to have hearing disorders, and 18% have vision impairments. A growing percentage of the population will be affected by hearing and vision impairments due to the increased incidence and prevalence of these sensory impairments with ageing (**Whitson, et al., 2018 & Hwang et al., 2020**).

It is projected that 1.5 billion individuals globally will be 60 years of age or older by 2030. The number of people with vision impairment (VI) and cognitive impairment is expected to double and quadruple, respectively, by 2050 due to the fact that both conditions are significantly more common as people age. The literature revealed that there has been extensive research, both cross-sectionally and longitudinally, on the relationship between VI and cognitive impairment (**Fenwick et al., 2021**).

Functional difficulties and a higher risk of death are linked to sensory impairment. Furthermore, a number of prospective studies have discovered that the risk of dementia and cognitive impairment in older adults is independently increased by visual and hearing impairments (**Ward et al., 2018**).

Hypothesized causal effects include social distancing, depression, and decreased physical activity brought on by sensory loss. On the other hand, diseases like neurodegeneration or cerebrovascular illness may have similar disease processes that affect both sensory and cognitive impairment (**Murphy, 2019 & Hwang et al., 2020**).

One of the aspects of ageing that can be changed is sensory impairment; treating it can help prevent dementia and other declines in cognitive function. According to reports, SI and cognitive decline are related (**Maharani et al., 2019**). As people age, they become more susceptible to visual and hearing impairments, which some recent research suggests may be risk factors for Alzheimer's disease and related dementia. Over 900 million people worldwide are predicted to have clinically significant hearing loss by the year 2050 (**Ratanjee-Vanmali et al., 2020**). Additionally, **the World Health Organization (2020)** estimates that 2.2 billion people worldwide suffer from blindness or moderate to severe visual impairment. Chronic diseases like hearing and vision impairments can raise the chance of depression symptoms and cognitive decline (**Loughrey et al.,2018, Harris al., 2019, & Rong et al., 2020**).

Up to one-third of adults over 65 report having hearing impairment (HI), making it a common condition among the elderly. As people age, the prevalence of this condition rises and it is currently the third most common chronic health condition among older adults. It increases the risk of incident morbidity, frailty, and disability and lowers self-rated health. As a result, the disease burden from HI in older adults is significant. Furthermore, it leads to worse psychosocial consequences, such as decreased happiness and self-efficacy. Poor psychological well-being, including the presence of comorbid unipolar depression, is linked to impaired relationship functioning and lower emotional vitality. As such, HI has a major negative impact on quality of life for older adults (**Cosh et al., 2019**). High levels of anxiety and depression as well as a fall risk have been linked to visual impairment. In addition, people with vision impairments might find it challenging to participate in social and religious activities as well as everyday living activities. Because of social isolation and physical dysfunction, it can lower quality of life. According to the literature, people who have sensory impairment are more likely to experience cognitive impairment than people who do not; additionally, people who have both vision and hearing impairment are more likely to experience cognitive impairment and dementia than people who do not have sensory impairment (**Lee, et al., 2022**).

The term dual sensory impairment (DSI) describes a person who has both hearing and vision impairments at the same time. According to **Guthrie et al. (2018),** some older adults have vision and hearing impairment at the same time, making it impossible for them to make up for the loss of one sense by using the other. The term "combined sensory impairment" refers to the possibility of age-related central and peripheral hearing loss, age-related central auditory processing disorder (CAPD), age-related macular degeneration, cataract, glaucoma, and diabetic retinopathy in older adults (**Jaiswal, et al., 2021**).

Additionally, people with DSI encounter functional limitations to differing degrees that make it difficult for them to communicate, access information, travel independently, and perform other everyday tasks. These constraints

lead to a decrease in social interaction and increase the likelihood of depression, social isolation, and cognitive impairment (CI) (**Jaiswal et al., 2021**). Given the correlation between age-related vision and hearing impairments and cognition, it may be possible to restore these losses in order to enhance social engagement, quality of life, and lifetime cognitive health in older individuals. The last ten years have seen a significant increase in the role of the special senses, especially hearing and vision, as modifiable risk factors in the development of dementia prevention strategies (**Logroscino & Panza, 2017**).

Significance of the study

As people age, their risk of developing hearing and vision problems rises. Over 900 million people worldwide are predicted to have clinically significant hearing loss by the year 2050. **Ratanjee-Vanmali et al., 2020**). According to estimates from the **World Health Organization (2020)**, there are 2.2 billion people worldwide who suffer from blindness or moderate to severe visual impairment. Chronic conditions such as visual and hearing impairments have been linked to an increased risk of depressive symptoms and cognitive decline (**Harris al., 2019**, **Loughrey et al.,2018 & Rong et al., 2020).**

Egypt is undergoing a demographic shift, with the number of people over 60 expected to more than double from 8.4 million (8% of the total population) to 22 million (14%), between 2020 and 2050. The population between the ages of 15 and 24 will grow by 1.5 times during that time. There will likely be a significant rise in the number of older adults suffering from HI, VI, DSI, and cognitive impairment. As a result, nurses and other medical professionals must take into account any potential connections between these illnesses (**Fuller-Thomson, et al., 2022**). Therefore, the purpose of this study is to determine whether cognitive status and psychological well-being of older adults with dual sensory impairment—hearing and vision—are related.

Aim of this study:

General objectives:

Assess the cognitive status and psychological well-being of older adults with hearing, vision, or dual sensory impairment.

Specific objectives

▪ To assess the state of cognition in older people who have vision, hearing, or dual sensory impairment.

▪ To assess the elderly with hearing, vision, or dual sensory impairment in terms of their psychological well-being (loneliness, anxiety, and depression).

Research questions

▪ Does the cognitive state of elderly people with hearing, vision, or dual sensory impairment change?

▪ Does an elderly person's impairment in vision, hearing, or dual sensory affect their psychological well-being? (degree of loneliness, anxiety, and depression)?

▪ Is there a relation between the cognitive status and psychological well-being of older adults with hearing, vision, or duel sensory impairment?

Subjects and Method

Research design

This study used a descriptive research design.

Study Setting

The study was conducted in the out-patient ophthalmology and audiology clinics at the hospitals affiliated with Sohag University.

Sample

The study sample was gathered using a purposive sample. This study involved 100

old aged patients who were present in the previously mentioned settings.

Sample size

The study sample, as determined by the online tool Sample Size Calculator (Raosoft), is 92. After determining the confidence interval to be 95% and the margin of error to be 5%, the sample was computed. It is estimated that there are 120 older adults in both clinics. The final sample size should be 100 older adults after accounting for a 10% non-response error.

Subjects

The study subjects comprised 100 geriatric patients attending the previously mentioned setting.

Inclusion criteria

We recruited the cases from ophthalmological and audiological out-patient clinics. The elderly, of both sexes, who were 60 years of age or older, with hearing, visual, or dual sensory impairment based on the clinical examination, were willing to participate in the study, alert, and able to communicate effectively. After signing a consent form, those who were interested in taking part and fit the study's requirements completed all of the study's questionnaires and were interviewed.

Tools for Collecting Data

Data was collected using five different tools.

Tool I: **A structured interview schedule containing sociodemographic and clinical data about elderly patients:**

The researchers will create the following tool to evaluate the sociodemographic traits and clinical information of the study participants based on an analysis of pertinent literature:

o Sociodemographic information, including age, sex, education, marital status, employment, type of housing, and monthly income.

o Clinical information, including diagnosis, co-morbidities, prior medical history, sensory impairment self-report, general health status self-report, and prior hospitalization

Tool II: **Geriatric Depression Scale (GDS)**

This scale, a Short Form GDS with 15 questions, was created by **Sheikh and Yesavage in 1986**. It has undergone extensive testing and usage with old aged citizens. Out of the fifteen questions, ten (question numbers 1, 5, 7, 11, and 13) indicated the presence of depression when answered positively. The remaining questions indicated depression when answered negatively. Patients who are physically sick and mildly to moderately demented, with short attention spans and/or easily fatigued, find it easier to use the Short Form. It takes between five and seven minutes to finish. **(Greenberg, SH. A., 2012).** Regarding how they felt over the previous week, the participants were asked to respond by selecting yes or no. Each accurate response accounted for one point in the scoring system. Items that received no response or a wrong response received no points. 0–4 is regarded as normal; 5–8 denotes mild depression; 9–11 denotes moderate depression; and 12–15 denotes severe depression.

Validity and Reliability When compared to diagnostic criteria, the GDS's validity and reliability were found to have 92% sensitivity and 89% specificity. Both the Long and Short Forms of the GDS were successful in differentiating depressed from non-depressed adults with a high correlation (r =.84, p <.001) in a validation study comparing them for self-rating symptoms of depression **(Greenberg, SH. A., 2012) (Nollett et al., 2019).**

Tool III: **GAD General Anxiety Disorders Scale**

Spitzer et al. (2006) developed this scale, which can be used as a screening tool and a measure of symptom severity for the four most common anxiety disorders (Generalised Anxiety Disorder, Panic Disorder, Social Phobia, and Post Traumatic Stress Disorder) in primary care and mental health settings. There were thirteen scales in the original item pool. A 13-item

survey was created, asking patients how frequently each symptom had bothered them over the previous two weeks. The response options with the scores of 0, 1, 2, and 3 were "not at all," "several days," "more than half the days," and "nearly every day." The score's remarks on symptom severity are as follows: 5–-9 Mild Monitor, 10-14 Moderate Possible clinically significant condition, and 15 severe active treatments probably warranted **(Spitzer et al., 2006).**

The validity and Reliability: Cronbach α=.92 indicated the GAD's internal consistency. According to Spitzer et al. (2006), test-retest reliability was intra-class correlation = 0.8 **(Spitzer et al., 2006)** **(Simning et al., 2020).**

Tool IV: - Loneliness Scale UCLA

Russell, Peplau, and Ferguson created this instrument in 1978. It has twenty statements with a 4-point Likert scale representing how lonely people describe their lives. Russell, Peplau, and Cutrona revised the scale in 1980, and **Russell revised it once more in 1996**. In the most recent iteration, half of the questions are positive and the other half are negative. As a result, two of the scale's items, 3, 4, 7, 11, 12, 13, 14, 17, and 18, are scored normally, while the other ten items, 1, 5, 6, 8, 9, 10, 15, 16, 19, and 20, are scored in reverse. The UCLA-LS provided scores that ranged from 20 to 80. Higher scale scores correspond to higher levels of loneliness. **(Eskimez et al., 2019)**.

In addition, the continuous scores are classified; scores between 20 and 34 indicate low of loneliness, scores between 35 and 48 indicate medium level of loneliness, and scores 49 and above indicate high level of loneliness. Thescores were derived from the UCLA-LS and ranged from 20 to 80. Higher scores obtained from the scale indicate high loneliness level and low scores indicate low loneliness level **(Eskimez et al., 2019).**

The validity and Reliability: The UCLA Loneliness Scale's internal co-efficiency was 0.94 in 1980, according to the scale's validity and reliability assessments. The obtained data were deemed reliable, as indicated by the Cronbach's alpha coefficient of 0.90 **(Eskimez et al., 2019)**

Tool V: The Mini-Mental State Examination (MMSE)

Folestein (1975) created the MMSE as a screening tool to evaluate the overall cognitive function of the elderly. It has questions that evaluate performance as well as verbal response. According to **Folstein et al. (1975)**, the test comprises questions that test orientation, registration, recall, attention and calculation, naming, and language **(Hong et al., (2016).**

Scoring system: The Standardized Mini-Mental State Examination scores range from 26 to 30, which may represent normal levels of cognitive impairment. 20–25 mild cognitive impairment 10–19 moderate cognitive impairment 0–9 severe cognitive impairment **(Hong et al., (2016).**

Validity/Reliability: Reliability and validity The MMSE was developed in 1975 and has been widely used in clinical practice and research since it was validated **(Davey RJ, and Jamieson S., 2004) (Hong et al., (2016).**

Content validity of tools: A panel of experts in the relevant fields evaluated the developed tool to determine its content validity; any necessary changes will be made. Each member was contacted and asked to check the completeness and clarity of the items questioned by reviewing the tool's content and structural design. Every critique and recommendation was taken into account, revised, and the order of some statements was followed appro.

Tools reliability: Cronbach's Alpha, which is represented as a number between 0 and 1, was used to gauge a test's or scale's internal consistency. Internal consistency is a measure of how closely all of the test's items measure the same idea or construct, and it is thus related to how closely the test's items are related to one another. When the researcher measures the internal consistency of the tools used, the results show that the depression, anxiety and loneliness score has a Cronbach's Alpha of 0.789, 0.795, & 0.812 respectively and the mini mental status examination score has a Cronbach's Alpha of 0.824.

Method of data collection:

I. Administrative stage:

To get the required permission to conduct the study, the director of the Sohag University Hospital received an official letter of approval from the dean of the nursing faculty at Sohag University. Permission to gather the required data and describe the goals and design of the study were included in this letter.

II. Pilot study:

To test the questionnaire's clarity and make any necessary modifications, 10% of patients who attended the ophthalmological and audiological out-patient clinics participated in a pilot study prior to the main study. to calculate the required time as well. The study sample did not include any of the participants from the pilot study. The results of the pilot study, which involved ten elderly participants, showed that all of the tools were understandable, practical, and took between thirty and forty-five minutes to use.

III. Ethical Consideration:

The research proposal was accepted by the Sohag University in Egypt's faculty of nursing's ethical committee. The research subject was not at risk while it was being applied. The study adhered to clinical research ethics guidelines. Anonymity and confidentiality were guaranteed. Participants were free to decline participation and/or leave the study at any moment, for any reason.

IV: Field work:

The researchers gathered the study sample in the ground floor waiting areas of Sohag University Hospital's audiological and ophthalmological out-patient clinics. These clinics had a high volume of elderly patients, a large capacity and space, a low cost when compared to private clinics, and were connected to the nearby diagnostic or screening tests that were required.

Meeting with each old aged patient one-on-

one, the researchers presented the study's goals and requested participation. They started by doing in-person interviews with each old aged and finishing the study subjects' forms.

The six months from February 2023 to the end of July 2023 saw the collection of the studied sample. Following a schedule, the researchers will visit the study locations. On the days that were planned, the researchers began gathering data.

Data was gathered twice a week. The researchers completed the structured questionnaire, and they were on hand in the clinics to address any queries or provide more information.

Statistical analysis

While continuous variables were described by mean and standard deviation (Mean, SD), categorical variables were described by number and percent (N, %). Whereas the t-test and T-test ANOVA are used to compare continuous variables, the chi-square test is utilized to compare categorical variables. Something was deemed statistically significant when a two-tailed $p < 0.05$. To display the relationship between the variables, we used Pearson correlation. The IBM SPSS 26.0 program was used for all analyses.

Result

Table (1): shows that 40% of the studied sample was older than 80 years old, and 44% of the sample fell between the 70 and 80 years' age range. Additionally, it reveals that, of the elderly people studied, 55.0 percent were female and 67.0 and 66.0 percent were married but illiterate, respectively. Additionally, (24.0%) and (41.0%) were unemployed and housewives, respectively.

Table (2): shows that, in addition to having chronic diseases, which accounted for 68.0 percent of the elderly studied, 43.0% of them reported having poor health; additionally, 52% of the elderly studied reported having visual impairment, while 27.0% and 21.0%, respectively, self-reported having dual sensory and hearing impairment.

Table (3): demonstrates that while there

were statistically significant differences between the anxiety and depression levels of elderly sensory impaired people based on age and education level, there were also statistically significant differences between the levels of anxiety and depression in these individuals. Increase in loneliness according to gender and age.

Table (4): The cognitive impairment/anxiety level of the elderly individuals under study was found to be significantly correlated with the presence of chronic diseases, self-rating health status, and self-reported sensory impairment (P = <0.001**). Furthermore, self-reported sensory impairment P = <0.001** and the presence of chronic diseases differed statistically from depression impairment.

Figure (1): exhibits that (62.0%) of the studied elderly had mild anxiety and (27.0%) had moderate anxiety.

Figure (2): exhibits that (52.25%) of the studied elderly had moderate depression and (29.29%) had severe depression.

Figure (3): exhibits that (38.0%) and (49%) of the studied elderly had medium and high levels of loneliness respectively.

Figure (4): exhibits that (48.0%) and (32.0%) of the studied elderly had mild and moderate cognitive impairment respectively.

Table (5): indicates that a coefficient correlation was found between the elderly cognitive function that was studied and the levels of anxiety, depression, and loneliness. Additionally, there were highly significant differences and a coefficient correlation between the elderly anxiety level and the levels of depression and loneliness, as well as between the elderly depression and the levels of loneliness.

Table (1): Distribution of the studied elders according to their socio-demographic characteristics

Items	The Studied elderly (N = 100)	No.	%
Sex			
Female		55	55.0
Male		45	45.0
Test of significance			
Age (in years)			
60 –		16	16.0
70 –		44	44.0
80 +		40	40.0
Marital status			
Married		67	67.0
Widowed		25	25.0
Divorced		6	6.0
Single		2	2.0
Educational level			
Illiterate		66	66.0
Read & write		0	0.0
Primary/preparatory school		32	32.0
Secondary school		0	0.0
University degree		2	2.0
Occupation before institutionalization			
Housewife		41	41.0
Not work		24	24.0
Employee		19	19.0
Skilled worker		11	11.0
Other		5	5.0

Table (2): Distribution of the studied elderly according to their medical history

Items	Studied elders (N = 100)	
	No	**%**
Presence of chronic diseases:		
Yes	68	68.0
No	32	32.0
Self-rating of health status:		
Excellent	0	0.0
Very good	0	0.0
Good	12	12.0
Fair (normal)	45	45.0
Poor	43	43.0
Self-reported sensory impairment:		
Vision impairment	52	52.0
Dual sensory impairment (Vision & Hearing)	27	27.0
Hearing impairment	21	21.0

Table (3): **The relationship between the studied elderly's sociodemographic data and the mean scores of cognitive function, anxiety level, depression level, and loneliness.**

Independent samples F: One-way ANOVA

Items	Cognitive function (Mean ± SD)	Anxiety level GAD (Mean ± SD)	Depression level (Mean ± SD)	Loneliness (Mean ± SD)
Sex				
Female	20.2±6.4	8.8±4.9	20.7±3.9	50.1±11.0
Male	20.8±5.5	8.2±4.8	21.7±3.8	45.2±13.3
Test of significance	T = -0.548 P = 0.585	T = 0.596 P = 0.553	T = -1.285 P = 0.202	**T = 2.012 P = 0.047***
Age (in years)				
60 –	18.8±4.8	7.87±5.4	23.0±3.7	37.7±12.1
70 –	20.6±6.3	7.9±4.8	21.6±3.9	46.4±10.8
80 +	21.05±6.1	9.4±4.6	20.0±3.6	56.5±10.9
Test of significance	F = 0.802 P = 0.451	F = 1.043 P = 0.356	**F = 4.033 P = 0.021***	**F = 12.262 P = <0.001****
Marital status				
Married	19.9±6.1	8.1±5.0	21.7±3.8	46.6±11.1
Widowed	21.3±5.8	9.1±4.4	20.6±3.8	49.5±14.3
Divorced	21.7±6.02	9.2±4.8	19.8±4.4	52.3±16.7
Single	24.0±8.5	12.5±6.4	16.5±2.2	56.0±12.7
Test of significance	F = 0.636 P = 0.593	F = 0.761 P = 0.518	F = 1.798 P = 0.153	F = 0.935 P = 0.427
Educational level				
Illiterate	20.52±6.25	8.94±4.48	21.2±3.6	47.1±12.6
Read & write				
Primary/preparatory school	20.6±5.8	7.4±4.8	21.1±4.5	49.8±11.2
Secondary school				
University degree	15.5±0.71	2.0±1.41	27.5±2.1	31.0±2.8
Test of significance	F = 0.481 P = 0.696	**F = 3.732 P = 0.014***	**F = 3.644 P = 0.015***	F = 2.013 P = 0.117
Occupation before Institutionalization				
Housewife	20.1±5.57	9.05±4.84	21.51±3.58	44.56±13.1
Not work	20.63±5.78	9.04±5.28	20.67±3.68	50.63±10.1
Employee	20.68±6.98	7.53±5.07	21.74±4.84	48.16±12.3
Skilled worker	20.18±6.34	8.09±4.35	20.18±4.67	49.73±14.2
			21±2.35	56.2±2.95
Test of significance	F =0.237 P = 0.917	F = 0.644 P = 0.633	F = 0.446 P = 0.775	F = 1.732 P = 0.149

Independent samples T-Test and One-way ANOVA test,

* Statistically significant difference (p<0.05), ** Highly statistically significant difference (p<0.01).

Table (4): Relationship of the studied elderly's medical history and the mean scores of cognitive function, anxiety level, and depression level.

Items	Studied elders (N = 100)	Cognitive function (Mean ± SD)	Anxiety level (Mean ± SD)	Depression level (Mean ± SD)
Presence of chronic diseases:				
Yes	20.43±5.85	7.18±4	22.85±2.97	45.1±11.87
No	20.59±6.37	11.38±5.28	17.63±3.25	53.69±11.26
Test of significance	T = 0.130 P = 0.897	**T = 4.405 P = <0.001****	**T = -7.968 P = <0.001****	
Self-rating of health status:				
Excellent	0	0	0	0
Very good	0	0	0	0
Good	21.08±5.45	3.08±1.62	25.42±2.87	44.83±10.68
Fair (normal)	20.24±6.54	7.78±3.81	22.04±3.06	46.82±11.9
Poor	20.56±5.65	10.81±5	19.09±3.7	49.77±13.07
Test of significance	F = 0.097 P = 0.907	**F = 17.129 P = <0.001****	**F = 19.658 P = <0.001****	F = 1.042 P = 0.357
Self-reported sensory impairment:				
Vision impairment	20.58±5.58	7.46±4.49	22.46±3.25	44.17±11.74
Dual sensory impairment (Vision & Hearing)	20.89±6.48	12.48±3.64	17.44±2.9	56.41±10.72
Hearing impairment	19.71±6.56	6.05±4.12	22.81±3.44	45.95±10.5
Test of significance	F = 0.142 P = 0.789	**F = 17.305 P = <0.001****	**F = 25.25 P = <0.001****	**F = 10.944 P = <0.001****

Figure (1): Distribution of the studied elderly according to their total score of anxiety levels (GAD). (N=100)
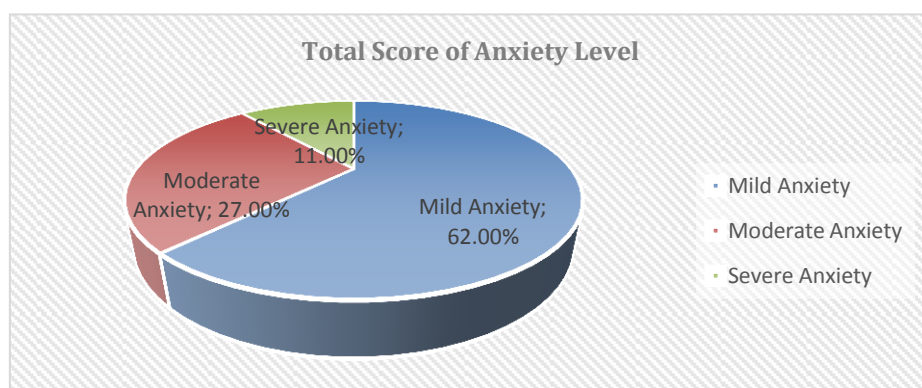
Figure (2): Distribution of the studied elderly according to their total score of depression levels. (N=100).
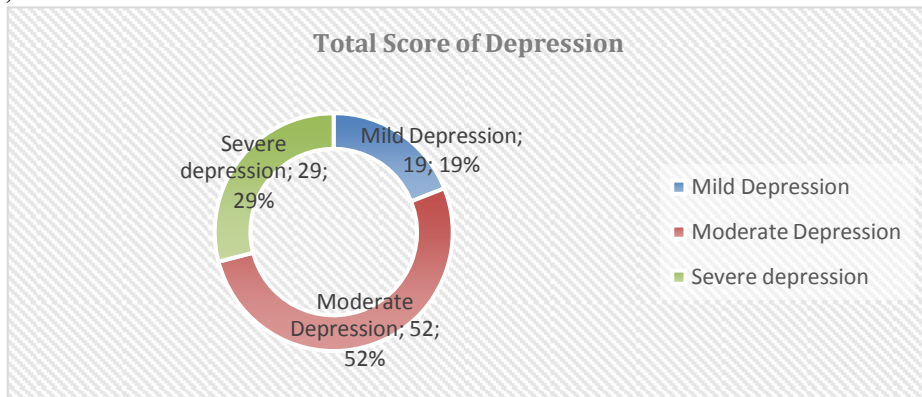

Figure (3): Distribution of the studied elderly according to their total score of loneliness levels. (N=100).
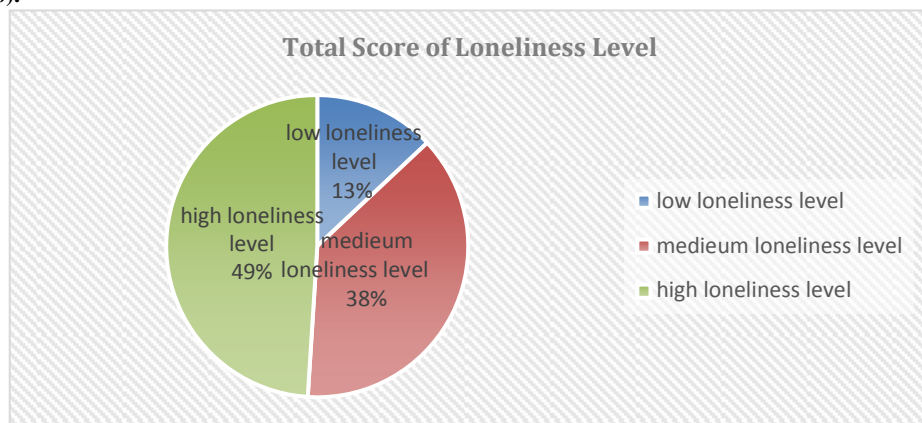

Figure (4): Distribution of the studied elderly according to their total score of cognitive impairment (MMSE). (N=100)
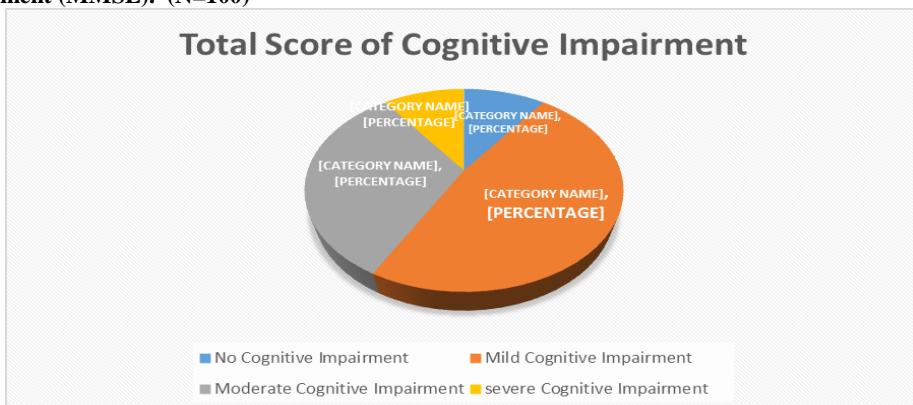
Table (5): Correlation between cognitive function, anxiety level, depression level, and loneliness of the studied elders

Variables	Cognitive function	Anxiety level	Depression level
Anxiety level			
r. (p)	-0.036 (0.721)		
Depression level			
r. (p)	0.001 (0.989)	**-0.640 (<0.001**)**	
Loneliness			
r. (p)	0.159 (0.115)	0.338 (**0.001**)	-0.568 (**<0.001**)

Discussion

There are probably a number of ways in which sensory impairment plays a role in the development of anxiety and depression. For instance, poor psychosocial health outcomes linked to sensory impairment may arise from challenges in adjusting to and/or actively coping with the sensory loss and its effects on daily life and social life activities. Specifically, impaired communication brought on by sensory impairment may diminish satisfaction in carrying out social roles, restrict participation in social activities, and make it more difficult to maintain social networks. Consequently, disability and reduced involvement in social activities and social networks may deteriorate psychological health (**Simning et al., 2019**).

The majority of the studied sample was over 70 years old, and more than half of the sample was male. The study's findings are consistent with those of **Soto-Perez-de-Celis et al. (2019**), who reported that the mean age of the studied elderly was 75.78. This is according to sociodemographic data. Despite having a median age of 72 years (range: 65–94), over half of the sample consisted of men.

In terms of marital status and educational attainment, the current study's findings showed that while 2% of the elderly participants had a university degree, more than two thirds were illiterate. this could be explained by the high rate of illiteracy among Egypt's old aged population. Even so, over two thirds of them were wed. These findings are in line with those of **El-banna et al. (2019**), who found that just 4.8% of old aged citizens have a university degree and that 64.0% of them are illiterate.

Furthermore, over 50% of the old aged population was married, while 65.3% of old aged citizens do not work. These findings are consistent with those of **Brunes et al. (2019**), who found that a majority of them were married and came from rural regions. Furthermore, over two thirds of the elderly people in the study were either literate or could read and write. The relationship between educational attainment and anxiety and depression levels (P>0.014, 0.015*, respectively) was statistically significant.

The current study's findings regarding medical history showed that over two-thirds (68.0%) had a history of chronic illnesses, with diabetes mellitus, hypertension, heart disease, kidney disease, and osteoporosis ranking highest. Age-related changes and long-term cumulative risk factors may be to blame for the high prevalence of chronic diseases among the elderly. Furthermore, there were statistically significant distinctions between the presence of chronic illnesses and (levels of anxiety, depression, and cognitive function) p> 0.001**.

In terms of sensory impairment, the current study's findings showed that over half of the elderly participants self-reported having vision impairment, and over one-fifth had dual sensory impairment and over one-fifth had hearing impairment. This could be related to common chronic diseases of the eyes and hearing that come with ageing, as well as age-related sensory changes. The current study's findings differed from those of **Hwang et al. (2020**), who found that 5.1% had dual sensory impairment, 14.9% had vision impairment, and 7.8% had hearing impairment.

According to **Sung, Li, Blake, Betz, and**

Lin (2016), hearing impairment has been linked to increased risk of suicide as well as depression, anxiety, and mental distress. **Hwang & Shin (2017)**. Furthermore, according to **Simning et al. (2019)**, vision loss is linked to suicide, anxiety, depression, and low self-perceived health

According to our findings, there were statistically significant distinctions between sensory impairment and (levels of depression, anxiety, and cognitive function p<0.001**). This could be explained by the significant negative impact that ageing sensory impairment has on their psychological and cognitive state, which is supported by numerous earlier research projects.

In terms of anxiety, the current study reveals that over one quarter of the elderly people studied had moderate anxiety and nearly two thirds had mild anxiety. Anxiety level and hearing, visual, and dual sensory impairment all showed statistically significant differences P<0.001**. The current study's findings are consistent with those of **Soto-Perez-de-Celis et al. (2019)**, who found that anxiety affected over two-fifths of elderly people with vision and hearing impairments and over half of elderly people with dual sensory impairments (P.0.001**).

The current study's results regarding depression levels revealed that nearly one-third and one-fifth, respectively, had severe and mild depression, and more than half of the elderly (sensory impaired elderly) under investigation had moderate depression. Furthermore, there existed statistically significant distinctions between depression and impairment related to hearing, vision, and dual sensory P<0.001**. The findings of the present investigation are consistent with those of **Soto-Perez-de-Celis et al. (2019)**, who found that among the elderly with vision and hearing impairments, respectively, 40.5% and 27.9% had depression, and among those with dual sensory impairments, 43.6% had depression (P.0.001**). Furthermore, **Rong et al. (2020)** claimed that compared to respondents without visual impairment, those with visual impairment had a higher risk of depression. Compared to respondents without hearing impairment, those

with hearing impairments were more likely to experience depression. Individuals with dual sensory impairment scored lower on all depression measures.

Furthermore, **Atta E. et al. (2022)** discovered that over two-thirds of the subjects in the study experienced late-life anxiety, and over half of the subjects experienced symptoms of late-life depression.

Furthermore, they discovered that among the elderly, there was a noteworthy rise in the scores of depressive symptoms when dual sensory loss first appeared. Additionally, **Xie et al. (2021)** discovered a correlation between depression and dual sensory loss. While hearing loss is unrelated to depression, vision loss and dual sensory loss are significantly associated with the onset and progressive worsening of depressive symptoms. Researchers **Gascoynea B. et al. (2022)** also discovered that individuals with severe visual impairment or blindness experienced worse symptoms of anxiety, depression, or both.

According to the current study's findings, nearly half and nearly two-fifths of the elderly participants with sensory impairment had high and medium levels of loneliness, respectively. The degree of loneliness and hearing, vision, and dual sensory impairment were highly statistically significantly different (P<0.001**). These findings are consistent with those of **Rong et al. (2020),** who discovered that moderate and severe loneliness were prevalent in the VI population at rates of 28.7% and 19.7%, respectively. Additionally, concur with **Brunes et al. (2019)** that adults with vision impairment frequently experience loneliness. Additionally, **IvaniT, (2021)** demonstrated in his research that older people with visual impairments are more likely to feel lonely than older people with normal vision.

According to our findings, nearly half of the elderly people under study had mild cognitive impairment, while roughly one-third and 10%, respectively, had moderate and severe cognitive impairment. The relationship between cognitive level and hearing, vision, and dual sensory impairment was highly statistically significant (P<0.001**). These results are in

line with those of **Harithasan et al. (2019),** who discovered that DSI and hearing loss alone were both independently linked to decreased cognitive function. In addition, **Curhan et al. (2019) and Ren et al. (2019)** discovered a correlation between baseline hearing loss and cognitive decline or dementia. This finding is consistent with **Jin H. (2022)'s** finding that individuals with a single sensory impairment, such as hearing or vision, were more likely to experience cognitive impairment than individuals who have two senses. The highest risk of cognitive impairment was seen in those with dual sensory impairment.

Furthermore, lower Mini-Mental State Examination scores were linked to a combination of low visual and low hearing acuity, according to **Parada H et al. (2021).** Furthermore, **Zhao et al. (2021)** found that for middle-aged and older Chinese adults, vision and hearing impairment are negatively associated with memory, mental status, and cognition (P>0.001).

Conclusions

Based on the findings of the most recent investigation, the researchers came to the conclusion that moderate depression and extreme loneliness were present in half of the elderly individuals with visual, auditory, and dual sensory impairment. Furthermore, mild and moderate cognitive impairment were present in over two-fifths and nearly one-third of them, respectively.

However, when it came to self-reported sensory impairment, there were statistically significant differences in loneliness, anxiety, depression, and cognitive status.

Recommendations

Based on the results of the present study, the following recommendations were suggested:

• Provide regular screening services for older patients with sensory impairment in primary care settings.

• Encourage elderly with sensory

impairment using assistive devices such as glasses and hearing aids, to make up for some of their sensory losses. They should also be given access to affordable health insurance options.

• Apply rehabilitation program for old aged citizens who have visual, auditory, or dual sensory impairments.

• Further studies should be conducted to to assess the psychological and cognitive health of Egypt's elderly population.

References

Atta, O. M., Manan, S., Shahzad, A., Ul-Islam, M., Ullah, M. W., & Yang, G. (2022): Biobased materials for active food packaging: A review. Food Hydrocolloids, 125, 107419.

Brunes, A., B. Hansen, M., & Heir, T. (2019): Loneliness among adults with visual impairment: prevalence, associated factors, and relationship to life satisfaction. Health and quality of life outcomes, 17, 1-7.

Cosh, S., Helmer, C., Delcourt, C., Robins, T. G., & Tully, P. J. (2019): Depression in elderly patients with hearing loss: current perspectives. Clinical interventions in aging, 1471-1480.

Cosh, S., von Hanno, T., Helmer, C., Bertelsen, G., Delcourt, C., Schirmer, H., & SENSE-Cog Group. (2018): The association amongst visual, hearing, and dual sensory loss with depression and anxiety over 6 years: The Tromsø Study. International journal of geriatric psychiatry, 33(4), 598-605.

Curhan, S. G., Willett, W. C., Grodstein, F., & Curhan, G. C. (2019): Longitudinal study of self-reported hearing loss and subjective cognitive function decline in women. Alzheimer's & dementia.

Davey, R. J., & Jamieson, S. (2004): The validity of using the mini mental state examination in NICE dementia guidelines. Journal of Neurology, Neurosurgery &

Psychiatry, 75(2), 343-344.

Dupuis, K., Pichora-Fuller, M. K., Chasteen, A. L., Marchuk, V., Singh, G., & Smith, S. L. (2015): Effects of hearing and vision impairments on the Montreal Cognitive Assessment. Aging, Neuropsychology, and Cognition, 22(4), 413-437.

El-banna, M. A., Ismail, G. M., & Sharaa, H. M. (2019): Relationship between Visual Impairment of Elderly and Their Quality of Life. Saudi J Nurs Health Care, 2(5), 189-196.

Eskimez ,Z., Demirci, P.Y., TosunOz, I.K. et al., (2019): Loneliness and Social Support Level of Elderly People Living in Nursing Homes, International Journal of Caring Sciences January-April 2019 Volume 12 | Issue 1| Page465

Fenwick, E. K., Gan, A. T., Man, R. E., Gupta, P., Sabanayagam, C., Cheng, C. Y., ... & Lamoureux, E. L. (2021): Vision, vision-specific functioning and mobility, and their relationship with clinically assessed cognitive impairment. Age and Ageing, 50(4), 1236-1242.

Folstein, M. F., Folstein, S. E., & McHugh, P. R. (1975): ‒Mini-mental state‖: a practical method for grading the cognitive state of patients for the clinician. Journal of psychiatric research, 12(3), 189-198.

Fuller-Thomson, E., Nowaczynski, A., & MacNeil, A. (2022): The Association Between Hearing Impairment, Vision Impairment, Dual Sensory Impairment, and Serious Cognitive Impairment: Findings from a Population-Based Study of 5.4 million Older Adults. Journal of Alzheimer's Disease Reports, 6(1), 211-222.

Gascoyne, B., Jolley, E., Penzin, S., Ogundimu, K., Owoeye, F., & Schmidt, E. (2022): Vision impairment and self-reported anxiety and depression in older adults in Nigeria: evidence from a cross-sectional survey in Kogi State. International Health, 14(Supplement_1), i9-i16.

Golub, J. S., Luchsinger, J. A., Manly, J. J., Stern, Y., Mayeux, R., & Schupf, N. (2017): Observed hearing loss and incident dementia in a multiethnic cohort. Journal of the American Geriatrics Society, 65(8), 1691-1697.

Greenberg, S. A. (2012): The geriatric depression scale (GDS). Best Practices in Nursing Care to Older Adults, 4(1), 1-2.

Guthrie, D. M., Davidson, J. G., Williams, N., Campos, J., Hunter, K., Mick, P., ... & Wittich, W. (2018): Combined impairments in vision, hearing and cognition are associated with greater levels of functional and communication difficulties than cognitive impairment alone: Analysis of interRAI data for home care and long-term care recipients in Ontario. PloS one, 13(2), e0192971.

Harithasan, D., Mukari, S. Z. M. S., Ishak, W. S., Shahar, S., & Yeong, W. L. (2020): The impact of sensory impairment on cognitive performance, quality of life, depression, and loneliness in older adults. International journal of geriatric psychiatry, 35(4), 358-364.

Harris, M. S., Doerfer, K., & Moberly, A. C. (2019): Discussing age-related hearing loss and cognitive decline with patients. JAMA Otolaryngology–Head & Neck Surgery, 145(9), 781-782.

Hong T, Mitchell P, Burlutsky G, Liew G, Wang JJ (2016): Visual Impairment, Hearing Loss and Cognitive Function in an Older Population: Longitudinal Findings from the Blue Mountains Eye Study. PLoS ONE 11(1): e0147646. doi:10.1371/journal.pone.0147646

Hwang, P. H., Longstreth Jr, W. T., Brenowitz, W. D., Thielke, S. M., Lopez, O. L., Francis, C. E., ... & Fitzpatrick, A. L. (2020): Dual sensory impairment in older adults and risk of dementia from the GEM Study. Alzheimer's & Dementia: Diagnosis, Assessment & Disease Monitoring, 12(1), e12054.

Hwang, T. J., Rabheru, K., Peisah, C., Reichman, W., & Ikeda, M. (2020): Loneliness and social isolation during the COVID-19 pandemic. International psychogeriatrics, 32(10), 1217-1220.

Jaiswal, A., Martiniello, N., Holzhey, P., Aubin, G., Dumassais, S., Huang, S., ... & Wittich, W. (2021): Cognitive impairment in older adults with concurrent hearing and vision impairment: A systematic scoping review protocol. Frontiers in Psychiatry, 12, 661560.

Joo, H. J., Joo, J. H., Kim, S. H., Kwon, J., & Park, E. C. (2022): The impact of self-reported sensory impairment on cognitive function using the Korean longitudinal study of aging survey data. Scientific reports, 12(1), 17907.

Kurlowicz, L., & Greenberg, S. A. (1999): The geriatric depression scale (GDS). Geriatr Nurs, 20(4), 212-213.

Lee, J., Suh, Y., Park, J., Kim, G. U., & Lee, S. (2022): Combined effects of handgrip strength and sensory impairment on the prevalence of cognitive impairment among older adults in Korea. Scientific reports, 12(1), 6713.

Logroscino, G., & Panza, F. (2017): Sensory impairments and cognitive disorders in older age. Geriatric Care, 3(4).

Loughrey, D. G., Kelly, M. E., Kelley, G. A., Brennan, S., & Lawlor, B. A. (2018): Association of age-related hearing loss with cognitive function, cognitive impairment, and dementia: a systematic review and meta-analysis. JAMA otolaryngology–head & neck surgery, 144(2), 115-126.

Maharani, A., Dawes, P., Nazroo, J., Tampubolon, G., Pendleton, N., & Sense-Cog WP1 group. (2018): Visual and hearing impairments are associated with cognitive decline in older people. Age and ageing, 47(4), 575-581.

Murphy, C. (2019): Olfactory and other sensory impairments in Alzheimer disease. Nature Reviews Neurology, 15(1), 11-24.

Nollett C, Ryan B, Bray N, et al., (2019): Depressive symptoms in people with vision impairment: a cross-sectional study to identify who is most at risk. BMJ Open 2019;9:e026163. doi:10.1136/ bmjopen-2018-026163

Parada, H., Laughlin, G. A., Yang, M., Nedjat-Haiem, F. R., & McEvoy, L. K. (2021): Dual impairments in visual and hearing acuity and age-related cognitive decline in older adults from the Rancho Bernardo Study of Healthy Aging. Age and Ageing, 50(4), 1268-1276.

Ratanjee-Vanmali, H., Swanepoel, D. W., & Laplante-Lévesque, A. (2020): Patient uptake, experience, and satisfaction using web-based and face-to-face hearing health services: process evaluation study. Journal of medical Internet research, 22(3), e15875.

Ren, F., Luo, J., Ma, W., Xin, Q., Xu, L., Fan, Z., ... & Wang, H. (2019): Hearing loss and cognition among older adults in a Han Chinese cohort. Frontiers in Neuroscience, 13, 632.

Rong, H., Lai, X., Jing, R., Wang, X., Fang, H., & Mahmoudi, E. (2020): Association of sensory impairments with cognitive decline and depression among older adults in China. JAMA network open, 3(9), e2014186-e2014186.

Russell, D. W. (1996): UCLA Loneliness Scale (Version 3): Reliability, validity, and factor structure. Journal of personality assessment, 66(1), 20-40.

Russell, D., Peplau, L. A., & Cutrona, C. E. (1980): The revised UCLA Loneliness Scale: concurrent and discriminant validity evidence. Journal of personality and social psychology, 39(3), 472.

Russell, D., Peplau, L. A., & Ferguson, M. L. (1978): Developing a measure of loneliness. Journal of personality assessment, 42(3), 290

294.

Sara, H. H., Chowdhury, M. A. B., & Haque, M. A. (2018): Multimorbidity among elderly in Bangladesh. Aging medicine, 1(3), 267-275.

Saskia, T. I. (2021): Loneliness Among Adult with Visual Impairment. Sriwijaya Journal of Ophthalmology, 4(1), 75-78.

Shin, H. Y., & Hwang, H. J. (2017): Mental health of the people with hearing impairment in Korea: A population-based cross-sectional study. Korean journal of family medicine, 38(2), 57.

Simning, A., Fox, M. L., Barnett, S. L., Sorensen, S., & Conwell, Y. (2019): Depressive and anxiety symptoms in older adults with auditory, vision, and dual sensory impairment. Journal of aging and health, 31(8), 1353-1375.

Soto-Perez-de-Celis, E., Sun, C. L., Tew, W. P., Mohile, S. G., Gajra, A., Klepin, H. D., ... & Hurria, A. (2018): Association between patient-reported hearing and visual impairments and functional, psychological, and cognitive status among older adults with cancer. Cancer, 124(15), 3249-3256.

Spitzer, R. L., Kroenke, K., Williams, J. B., & Löwe, B. (2006): A brief measure for assessing generalized anxiety disorder: the GAD-7. Archives of internal medicine, 166(10), 1092-1097.

Sung, Y. K., Li, L., Blake, C., Betz, J., & Lin, F. R. (2016): Association of hearing loss and loneliness in older adults. Journal of aging and health, 28(6), 979-994.

Van der Aa, H. P., Comijs, H. C., Penninx, B. W., van Rens, G. H., & van Nispen, R. M. (2015): Major depressive and anxiety disorders in visually impaired older adults. Investigative ophthalmology & visual science, 56(2), 849-854.

Ward, M. E., Gelfand, J. M., Lui, L. Y., Ou, Y., Green, A. J., Stone, K., ... & Yaffe, K. (2018): Reduced contrast sensitivity among older women is associated with increased risk of cognitive impairment. Annals of neurology, 83(4), 730-738.

Whitson, H. E., Cronin-Golomb, A., Cruickshanks, K. J., Gilmore, G. C., Owsley, C., Peelle, J. E., ... & Lin, F. R. (2018): American Geriatrics Society and National Institute on Aging Bench-to-Bedside Conference: sensory impairment and cognitive decline in older adults. Journal of the American Geriatrics Society, 66(11), 2052-2058.

Xie, T., Liu, D., Guo, J., & Zhang, B. (2021): The longitudinal effect of sensory loss on depression among Chinese older adults. Journal of Affective Disorders, 283, 216-222.

Zhao, X., Zhou, Y., Wei, K., Bai, X., Zhang, J., Zhou, M., & Sun, X. (2021): Associations of sensory impairment and cognitive function in middle-aged and older Chinese population: The China Health and Retirement Longitudinal Study. Journal of global health