Relation between Depression and Dyslipidemia in Geriatric Patients Attending Family Medicine Outpatients Clinics at Kasr Alainy Hospital: A Cross-sectional Study

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Abstract:
Background: Aging is a worldwide phenomenon. The elderly in Egypt is expected to rise to 10.9% by 2026. Prevalence of depression and cardiovascular diseases are common among the elderly population. **Objective:** This study was conducted to estimate the prevalence of depression among the elderly and to determine its relationship with their lipid profile. **Methods:** A cross-sectional descriptive study was conducted in family medicine clinics at Kasr Alainy hospital. One hundred and 50 elderly patients were included. Screening for depression using the short form of the Arabic version of the Geriatric Depression Scale. Levels of total cholesterol (TC), triglycerides (TG), high-density and low-density lipoprotein cholesterol (HDL and LDL) are assessed. **Results:** The mean age of the studied group was 73.51±8.24 years, the females represent 53.3%. More than three-fourth of the studied population had depressive symptoms with score >5. There was a statistically significant difference between normal and those with depressive symptoms regarding mean levels of cholesterol, LDL and TG with higher levels in the depression group. Also, there was a significant correlation between GDS score and levels of cholesterol, LDL and triglycerides. **Conclusion:** Depressive symptoms are associated with dyslipidemia characterized by high total cholesterol, high triglycerides, high LDL. Further studies assessing this relationship and its underlaying mechanism are needed.
Keywords: Depressive Symptoms, Dyslipidemia, Geriatrics

Introduction:

The number of elderly people worldwide is estimated to reach more than two million by the year 2050 and to comprise 21 % of the world population.[1] Depression and cardiovascular diseases are considered major public health problems being common among the geriatric population. Depression markedly impairs the quality of life and affects daily functionality and decreases productivity.[2]

Depression usually exhibits a chronic course as around one-quarter of the patients experience further attacks. Shorter life expectancy is documented in major depressive disorder patients, this may be contributed to the increasing rate of suicide, and higher death rates associated with increased risk of ischemic heart diseases and cerebrovascular diseases. An increased risk of development of cardiovascular diseases is associated with a diagnosis of major depressive disorder. Unfortunately, this risk is equivalent to the risk of diabetes and smoking.[3] The relationship between lipid metabolism and serotonin function has been addressed in various studies. It was suggested that the metabolism of serotonin is affected by the decrease in the level of serum total cholesterol (TC) concentration.

This resulted in developing of depression and an increased risk of suicides.[4] Serum cholesterol level is associated with the development of other psychiatric illness, including mood disorder and schizophrenic violent suicide attempters.[5] Also, it was concluded in other studies that drugs used in the treatment of depression can result in an increase

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in the cholesterol levels.[6]Several studies found an association between depression and suicidal risk and low levels of high-density lipoprotein cholesterol (HDL). While other studies concluded that major depressive disorder is associated with HDL concentrations and higher ratios of total cholesterol/high-density lipoprotein cholesterol (TC/HDL) and low-density lipoprotein cholesterol/high-density lipoprotein cholesterol (LDL/ HDL). [6]

Due to the lack of available information on depression among the elderly and its association with dyslipidemia in Egypt, this study was conducted to estimate the prevalence of depression among the elderly and to determine its relationship with their lipid profile.

Methods:

Study Setting and Population: This cross-sectional descriptive study was conducted from July 2018 to January 2019 in the family medicine clinics at kasralainy hospital, which is considered one of the largest public hospitals in Egypt. All elderly patients $\geq$ 65 years old attending the clinic were enrolled in this study. Any patient suffering from chronic conditions that can cause depression (e.g. hypothyroidism), known to have depression, or revising treatment for depression, or has neurological, co-morbid mental disorder or dementia (detected by using The Arabic version of MMSE) was excluded from the study.

Sampling: Using Epi Info 7, the sample size was calculated using the following input: prevalence of depression among Egyptian elderly attending the outpatient clinics were 74.5%; [7] the frequency of elderly attending the family medicine outpatient clinics in 6 months was 540 patients, with a significant level of 0.05 and power of 90%, the total sample size was 150 participants.

Data Collection: In the first stage, following consent, participants completed an interview that includes the assessment of Socioeconomic Status (SES) using the Arabic version of the scale developed by El Gillany, et al. [8] Then a comprehensive medical history was done. The Arabic version of the Standardized Mini-Mental Status Examination (SMMSE) [9,] was used to assess the cognitive function. Participants with score $\geq$24 were considered normal. While those with score <24 were considered cognitively impaired and were excluded from the study.

In the second stage, screening for depression was done using the short form of the Arabic version of Geriatric Depression Scale (GDS-SF),[10] It consists of 15 short (yes/no) questions about symptoms of depression, absence of depression is considered with a score of less than five, a score > 5 represents probable depression and definite depression is considered with a score of more than or equal $\geq$ 10.

The Third stage comprised full physical examination, including a neurological examination. Blood pressure was measured three times at 2 min intervals after at least 5 min of rest. The mean of three BP measurements was calculated. The JNC-8 definition of hypertension was used which includes systolic

blood pressure (SBP) ≥140 mmHg and/or diastolic blood pressure (DBP) ≥ 90 mmHg and/or use of antihypertensive medications. [11]

Weight and height were measured, and Body mass index (BMI) was calculated as the individual's weight in kilograms divided by the square of the height in meters.

In the fourth stage, we collected fasting blood samples after an overnight to assess lipid profile, and fasting plasma glucose.

Data mangement: The collected data were analyzed by the Statistical Package for Social Science (SPSS) version 20. Qualitative data were represented as frequencies and percentages. For quantitative variables mean ± standard deviation (SD) and median with range (for not normally distributed data) were computed. Chi-square ($X2$) test was used to detect the relation between different qualitative variables. Independent t-test (t) was used for the detection of a difference between different quantitative variables. Pearson correlation (r) was used to correlate GDS with demographic and laboratory results. logistic regression test was done for the different variables. The results were considered statistically significant when the significant probability (P-value) was < 0.05*.

Ethical Approval: Ethical approval was obtained from the Research Committee of Cairo University. Written consents were obtained from all participants after explaining the objectives of the study.

Results: The mean age of the studied group was 73.51±8.24 years ranging from (65-91) years and more than half (53.3%) of them were females. Most participants were of low social class (74.7%), while 21.3% and 4% were from very low and moderate social class respectively.

The mean BMI of the studied group was 35.94±8.79 Kg/m2 and 48% of them had high blood pressure (≥140/90 mmHg). The mean of the blood cholesterol of the studied group was 241.74±53.54 while that of triglyceride was139.59±52.74. The mean of the fasting blood sugar of the studied group was 136.54±65.79 (table 1).

The mean score of GDS- SF of the studied group was 8.05±1.69 ranging from (3-11) with 117 (78%) of them having depressive symptoms with score>5.

There was a statistically significant difference between normal participants and those with depressive symptoms (p value<0.05) when comparing mean levels of cholesterol, LDL and TG with higher levels in the depression group (Table 2).

There was a positive significant correlation between GDS score and levels of cholesterol, LDL and triglycerides (Table 3). While, there was no significant difference between male and female with depressive symptoms regarding dyslipidemia, BMI and hypertension (Table 4).

The logistic regression test was done for the different variables and only the LDL cholesterol had a statistically significant value (Table 5).

Discussion:

This cross-sectional descriptive study of Egyptian elderly attending the family medicine clinics at KasrAlainy hospital aimed to estimate the prevalence of depression among the elderly and to determine its relationship with their lipid profile.

The current study revealed that the prevalence of depression was 78% among Egyptian elderly, this was consistent with another study conducted in Beni Suef, that concluded that the prevalence of depression among Egyptian elderly was (89.7%). [12]

In contrast to another study was done in Mansoura district that revealed the prevalence of depression in the Egyptian elderly to be 44.4%. [13] Another study done in Cairo in 2014, found that the prevalence of depression among elderly living in geriatric homes to be 37.5%. [14] This discrepancy in the prevalence of depression among Egyptian elderly could be due to the difference in the study design and variation in the geriatric depression scales used.

In addition, the current study suggested a significant association between high total cholesterol, high LDL and high triglycerides and presence of depressive symptoms in Egyptian elderly. Many studies have documented a decrease in HDL, an increase in LDL and an increase in LDL/HDL ratio in depressed patients. [15,16] On the other hand, some studies concluded that there is no association between serum cholesterol and depression in elderly patients. [17,18]

There was a positive significant correlation between GDS score and levels of cholesterol, LDL and triglycerides. While there was no significant difference between male and female with depressive symptoms and dyslipidemia. This finding is similar to population-based studies of older adults, which found that depressive symptoms are directly correlated with hypercholesterolemia, among the elderly. [19,20] In contrast to a meta-analysis study done in 2008, to assess the relation between total, high- and low-density lipoprotein and depression. It found that there was an inverse correlation between total cholesterol and depression, while a high HDL level was associated with increased depression, especially in females. [21] The most suitable explanation linking dyslipidemia and presence of depression in elderly may be due to the fact that depression in elderly is associated with a change in behaviors, such as a decreased appetite and physical inactivity of elderly which may lead to elevated lipid profiles. [22]

To our knowledge, the present study is the first study addressing the association of depression and lipid profile in Egyptian elderly patients.

Limitations: The sample size of the current study is relatively small, and the study participants are from Family medicine outpatient clinics at Kasralainy hospital. Therefore, the generalization of the findings needs to be confirmed in a larger population-based study.

Conclusion: This cross-sectional descriptive study shows that elevated depressive symptoms in the elderly are associated with the elevated lipid profile characterized by high total cholesterol, high triglycerides, and high LDL.

Recommendation: Screening for depression in elderly individuals is essential for early detection of depression, which highlights the importance of comprehensive biopsychological approach. Also, it is crucial to increase the awareness of the elderly patients regarding the importance of regular follow up of lipid profile.

Conflict of Interest: There was no conflict of interest as well.

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Table (1): Laboratory Results of the Studied Group (N=150)

Labs Results	Cholesterol	LDL	HDL	TG	FBG
Mean ± SD	241.74± 53.54	140.68± 39.81	74.54± 384.18	139.59± 52.74	136.54± 65.79
(Min.-max.)	(104-388)	(70-234)	(30-48)	(41-300)	(70-377)

Table (2): Comparing Laboratory Results between Normal and Depressive Patients

Variable	Normal (n=33)	depressive symptoms (n=117)	P value
	Mean± SD	**Mean± SD**	
▪ **Cholesterol** Mean± SD	222±55.26	247.30±51.93	**0.016***
▪ **LDL** Mean± SD	119.27±39.21	146.71±38.009	**0.000****
▪ **HDL** Mean± SD	45.72±5.25	82.66±435.06	0.627
▪ **TG** Mean± SD	119.54±48.17	145.24±52.79	**0.013***
▪ **FBS** Mean± SD	123.24±58.75	140.29±67.41	0.189

Table (3): Correlation between Age, Laboratory Results and Geriatric Depression Scale

Items	Geriatric depression scale	
	r	**P value**
▪ **Age**	0.177	0.111
▪ **Cholesterol**	0.172	**0.035***
▪ **LDL**	0.239	**0.003***
▪ **HDL**	0.043	0.602
▪ **TG**	0.180	**0.028***
▪ **FBS**	0.050	0.544

Table (4): The Relation between Sex and Age, Lipid Profile, BMI And Hypertension among Patient with Depressive Symptoms (N= 117)

Characteristics	Male (n=59) Mean±SD		Female (n=58) Mean±SD		P value
Age (years)	74.40±8.267		73.75±8.50		.677
BMI	35.88±9.114		36.25±8.832		.821
GDS	8.93±.449		8.93±.255		.986
Lipid profile ▪ Cholesterol ▪ LDL ▪ HDL ▪ TG	249.74±52.14 153.00±37.09 121.54±612.71 143.98±49.06		244.82±52.062 140.32±38.18 43.12±38.18 146.53±56.73		.611 .071 .332 .795
hypertension	No	%	No	%	**P value**
▪ < 140/90 ▪ ≥140/90	28 31	47.45% 52.54%	29 29	50% 50%	.78

Table (5): The Logistic Regression Test of the Different Variables

Variables	B	S.E.	Wald	df	Sig.	95% C.I.for EXP(B)		
						Exp(B)	Lower	Upper
▪ **Gender**	-0.391	0.419	0.871	1	0.351	0.676	0.297	1.538
▪ **Age**	-0.004	0.024	0.031	1	0.861	0.996	0.950	1.044
▪ **BMI**	-0.011	0.025	0.190	1	0.663	0.989	0.942	1.039
▪ **Hyperte nsion**	-0.431	0.562	0.588	1	0.443	0.650	0.216	1.955
▪ **Diabetes**	-0.477	0.827	0.333	1	0.564	0.621	0.123	3.139
▪ **Choles**	-0.001	0.006	0.054	1	0.816	0.999	0.986	1.011
▪ **LDL**	0.020	0.009	5.035	1	**0.025**	1.021	1.003	1.039
▪ **HDL**	0.001	0.003	0.111	1	0.739	1.001	0.995	1.006
▪ **TG**	0.006	0.006	0.952	1	0.329	1.006	0.994	1.018
▪ **FBG**	0.002	0.006	0.087	1	0.768	1.002	0.990	1.013

الملخص العربي
**العلاقة بين الاكتئاب ومعدل الدهون بالدم في مرضى الشيخوخة من المترددين على عيادات طب الأسرة،
بمستشفى قصر العيني: دراسة مقطعية**

هبه جلال النحاس- ايناس طلعت السيد- مروه سعيد احمد

المقدمة: تعد الشيخوخة ظاهرة عالمية, حيث يمثل المسنون حوالي ٧.٢٪ في مصر ومن المتوقع أن يرتفع هذا العدد ليصل إلى ١٠.٩٪ بحلول عام٢٠٢٦. ويعتبر الاكتئاب وأمراض القلب والأوعية الدموية أمر شائع بين كبار السن.**هدف الدراسه:** نظرا لنقص الابحاث المتاحة عن معدلات الاكتئاب بين كبار السن ومدى ارتباطه بنسب الدهون بالدم في مصر، أجريت هذه الدراسة لتقدير مدى انتشار الاكتئاب بين كبار السن وتحديد علاقته بمستوياتالدهون بالدم. **طرق البحث:** تعد هذه الدراسة هيه دراسه وصفية مستعرضة اجريت بعيادات طب الأسرة في مستشفى قصرالعيني. حيث شملت مائة و خمسون مريضا مسن حيث تم فحص الاكتئاب باستخدام النسخة العربية المصغره من مقياس الاكتئاب لدي المسنين و عمل تحليل لقياس مستوى الدهون في الدم لتقييم مدي ارتباطها باعراض الاكتئاب.**نتائج البحث:** لقد اظهرت النتائج ان متوسط عمر المجموعة المدروسة ٧٣.٥ سنة ووبلغ عدد الإناث ٥٣.٣٪. وقد تبين ان ٧٨٪ من العينه يعانون من أعراض الاكتئاب. ولقد تبين ان هؤلاء الذين يعانون من اعراض الاكتئاب لديهم معدلات اعلي عن غيرهم بمستويات الكوليسترول و الدهون الثلاثيه والدهون الضاره مع عدم وجود اختلاف بين الجنسين.**الخلاصه:** ترتبط أعراض الاكتئاب بخلل الدهون في الدم الذي يتميز بارتفاع الكوليسترول الكلي ، والدهون الثلاثية، والدهون الضاره. و قد يساهم ارتفاع الدهون بالدم الي مزيد من تطور أعراض الاكتئاب.