International Journal of Medical and Health Research
www.medicalsciencejournal.com
ISSN: 2454-9142
Received: 03-08-2025, Accepted: 03-09-2025, Published: 18-09-2025
Volume 11, Issue 5, 2025, Page No. 6-10

Serum Level of Zinc in Patients with Depression -Baghdad Medical City/2025

Dr. Marwah Alaa Kamal[1], Dr. Salah Salman Abd Al-Bundi[2], Dr. Ruaa Alaa Kamal[3], Dr. Lina Abdulhussein Jebur[4], Dr. Israa Tareq salman[5]

[1] Deparment of family medicine physician, Ghazi-AL Hariri Hospital Iraqi board of - Arabic board fellowship of Clinical Nutrition Iraqi MOH, Iraq

[2] Department of Consultant Psychiatrist, Al-kindy teaching Hospital, Iraqi MOH, Iraq

[3] Anesthesiologist, Abu-Gharib General hospital Iraqi board, Iraqi MOH, Iraq

[4] Deparment of family medicine physician, Baghdad Medical City Iraqi board- Arab Board fellowship of Geriatrics, Iraqi MOH, Iraq

[5] Department of family medicine physician, Primary health center Arab board, Iraqi MOH, Iraq

Abstract

Background: Depression is a common disorder, the etiology is too complex to be explained totally by a single social, developmental, or biological theory. A variety of factors appear to work together to cause or precipitate depressive disorders. Various functions of trace elements deficiency such as zinc link to depression exacerbation.

Objectives: to estimate prevalence of hypozincemia in patients with depression and to compare serum levels of zinc with the severity of depression.

Methods: Cross-sectional comparative study, non-probability convenience sampling was conducted at Out-patient's department of psychiatry in Baghdad Medical City, from March till august 2025. The study tools used measuring serum level of zinc, completed 24-h food recall questionnaires to assess the daily zinc intakes with lists of a variety of foods and their zinc content per serving and PHQ9 score in assessment of severity of depression.

Inclusion criteria: All patients with depression diagnosed by PHQ9 criteria at age groups above 20 years included.

Exclusion criteria: All patients depressive symptoms in the context of other neurological disease psychiatric disorders (e.g., schizophrenia, bipolar disorder, autism) medical illnesses (e.g., coronary artery disease, cancer), or conditions (e.g., pregnancy, postpartum period) and those on medications for any chronic diseases such as mental/congenital or metabolic diseases, hematology, liver, renal, thyroid disease and those taking vitamin/mineral supplements were excluded.

Results: The study showed that serum level of zinc was low among depression 34% with P.value <0.001 and there was statistically significant association.

Conclusions: about half of moderately- sever depression had low serum level of zinc and there was statistically significant association.

Keywords: Depression, zinc, dietary recall

Introduction

Depression is a mental disorder associated with functional impairment, disability, morbidity, and mortality [1] .

Individuals prone to depression due to changes in biochemical and regulatory systems, such as oxidative stress and immune-inflammatory pathways, additionally an unhealthy diet may also trigger depression [(2)].

Generally, a high-quality diet is associated with improved mental health overall, reduced incidence and severity of depression [2].

Specifically, zinc is one of the trace elements that is necessary for all living things. It has a significant function in depression treatment and psychopathology [3].

Besides, Zinc deficiency affects the homeostasis of zinc in the brain, which changes behavior, learning, mental function, and increases the risk of epileptic convulsions [3]. Insufficient dietary intake or low zinc levels in the blood have been shown to contribute to depression; zinc is a necessary cofactor for maintaining the regular operations of numerous enzymes with critical functions in the brain and is involved in several numbers of protein structural elements [4].

Circulating zinc exists primarily in protein-bound form, with only 9–17 µg/dL present in free serum fractions [5]. Emerging evidence highlights zinc's role in neurophysiological processes, with deficiencies linked to neurodegenerative and psychiatric disorders [6].

Zinc must be obtained externally through diet and is absorbed by the intestine, the richest food sources of zinc include beef, pork, fish, nuts, seeds and whole-grain cereals [7]. Therefore, inadequate intake of food rich in zinc causes a deficiency so According to a recent study, approximately 25% of the global population was vulnerable to inadequate zinc intake [8].

A person with zinc deficiency is recommended to change the diet, to include foods rich in zinc, and the doctor may prescribe zinc supplements based on his condition [9]. Some symptoms may appear in people with zinc deficiency, these symptoms include loss of appetite, poor immune function, diarrhea, hair loss, poor wound healing, and unexplained weight loss [10]. Eating 40 mg of zinc can be safe, but there are some concerns that a dose of more than 40 mg may reduce the absorption of copper in the body, which may cause anemia and also warns against using nasal sprays that contain zinc; this is because it may lead to a permanent loss of sense of smell [11]. Excessive zinc intake may cause some severe symptoms and problems for the human body such as

fever, coughing, stomach pain, fatigue, and tiredness [12]. Zinc status is most frequently assessed by assaying zinc concentration from serum or plasma [13].

Clinical trials have suggested that zinc added to antidepressant treatment might result in more rapid or more effective symptomatic improvement [14].

The Iraq Mental Health Survey is a nationally representative face-to-face survey of 4,332 non-institutionalized adults aged 18 years and older interviewed in 2006–2007 as part of the WHO World Mental Health Surveys [15]. About 7.4% of people in Iraq experience major depressive episodes (MDE) at some point in their lives, and 4.0% had MDE in the past 12 months, almost 46% of the people who had depression in the past year had severe or very severe depression [15]. Another finding was that about 53.4% of depressed met criteria for zinc deficiency [16].

Methods and Materials

Cross - sectional comparative study, non-p Cross-sectional comparative study, non-probability convenience sampling conducted Outpatient's department of psychiatry in Baghdad Medical City, from March till August 2025.

The target population of this study were patients with depression. This study was taking 150 patients with depression and serum zinc level would be measured for those who were accepted to participate in the study.

Inclusion criteria

All patients with depression diagnosed by PHQ9 criteria at age groups above 20 years were participated.

Exclusion criteria

All patients depressive symptoms in the context of other neurological disease, psychiatric disorders (e.g., schizophrenia, bipolar disorder, autism) medical illnesses (e.g., coronary artery disease, cancer), or conditions (e.g., pregnancy, postpartum period) and those on medications for any chronic diseases such as mental/congenital or metabolic diseases, hematology, liver, renal, thyroid disease and those taking vitamin/mineral supplements were excluded.

Study tools

Using PHQ9 scoring Depression Severity (1 to 4 None, 5 to 9 Mild, 10 to 14 Moderate, 15 to 19 Moderately Severe, 20 to 27 Severe) [17].

Sample Collection a venous blood sample (5 mL) was collected from each participant in a sitting position done by an experienced laboratory technician.

Supernatant serums were separated using 3000-rpm centrifuge for 10 min and were then stored at −80 C for further analyses. No hemolysis sample was observed in the specimens.

Serum zinc levels were measured using atomic absorption spectrometer.

Serum zinc concentrations lower than 70 μg/dL were regarded as deficiency and above 70 μg/dL as normal [18].

The questionnaire encompassed two parts

Part one: Cover Dietary and Anthropometric Measurement of study participants by researcher-reported which included: The participants completed 24-h food recall questionnaires to assess the daily zinc intakes with lists of a variety of foods and their zinc content per serving [19]. Age, gender, height, weight, BMI (underweight<18.8, normal weight 18.5-24.9, overweight 25-29.9, obesity ≥30) [19].

Part two: This part used PHQ9 scoring (Patient Health questionnaire-9) [17] for diagnosis of depression to assess the degree of depression severity.

Results

Table 1: Shows distribution among different age groups of depression. The highest prevalence was found in individuals aged 20-33 years 42.7%, with majority experiencing mild depression 60.9%. Among those aged 34-47 years, the prevalence was 33.3% with the highest proportion experiencing moderately-severe depression 40%, and age 48-61 years was 24% highest with moderately depression 44.5%. There was significant association between depression and age with P-value< 0.001. The mean age of participants was 37.8 years ±11.12 years.

Regarding gender, depression was more prevalence among females 66.6% compared to males 33.3% females were more likely to suffer from mild depression 44% compare to moderate or moderately-sever types. On other hand, males experience higher rates of moderate depression 25.4%. There is significant association between depression and gender with P-value <0.001.

Moreover, the prevalence of depression was highest among individuals with obesity 35.3%. A significant association was found between BMI level and the severity of depression.

Table 1: Distribution of the studied groups, severity of depression with Socio-demographic and health characteristics

Variables	Mild depression (n=64)		Moderate depression (n=47)		Moderately- sever depression (n=39)		Total (n=150)		P-value
	No.	%	No.	%	No.	%	No	%	
Age(years)									
20-33	39	60.9	22	34.3	3	4.7	64	42.7	<0.001
34-47	17	34	13	26	20	40	50	33.3	
48-61	8	22.2	12	33.3	16	44.5	36	24	
Gender									
Male	20	60.0	25	25.4	24	14.5	69	33.3	0.229
Female	44	41	22	29	15	30	81	66.6	
BMI (kg/m^2)									
normal weight (18.5-24.9)	30	66.6	15	33.3	0	0	45	30	<0.001
overweight (25-29.9)	26	50	3	5	23	44.2	52	34.7	
obesity (>30)	8	15	29	54.7	16	30.1	53	35.3	

Figure 1: Shows distribution of low serum level of zinc among depression was 34% (51 out of 150 sample size) and normal serum level of zinc among depression was 66% (99 out of 150 sample size).

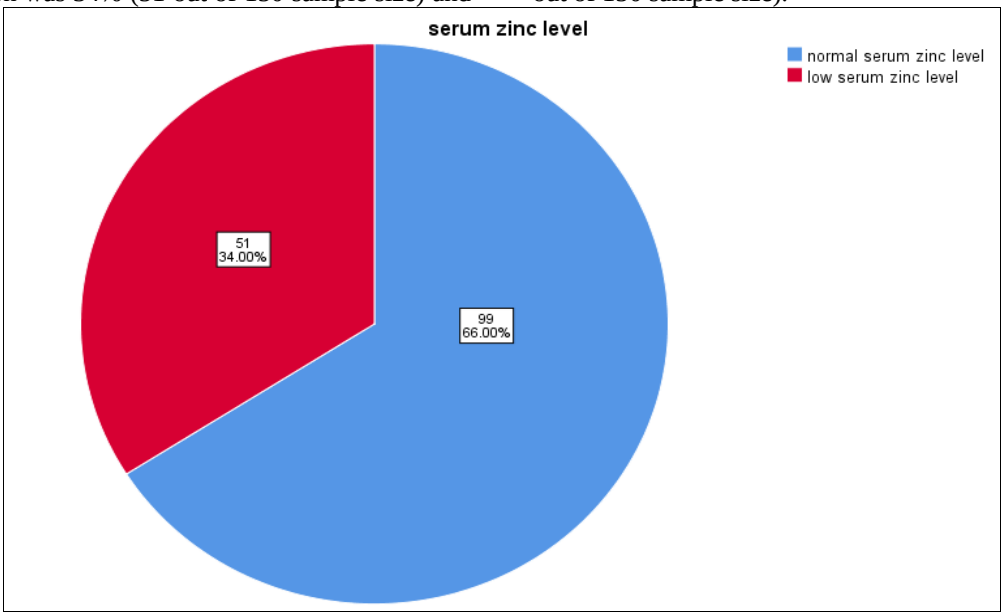

Fig 1: Distribution of serum level of zinc among studied sample of depression

Table 2: shows that low serum levels of zinc were highest among moderately-severe depression 49%. The overall prevalence of zinc deficiency among participants with depression in this study was 34%. A statistically significant association was found between serum level of zinc and the severity of depression with P-value <0.001.

Table 2: Distribution of the studied groups of severity of depression with serum level of zinc

Serum level of zinc	Mild depression (n=64)		Moderate depression (n=47)		Moderately- severe depression (n=39)		Total (n=150)		P-value
	No.	%	No.	%	No.	%	No.	%	
Normal	55	55.5	30	30.3	14	14.1	99	66	<0.001
Low	9	17.6	17	33.3	25	49	51	34	

Mean of serum level of zinc is 1.34 ± SD 0.475

Table 3: Shows that 58.8 % of individuals with low serum zinc levels were among those with depression and low zinc dietary intake. There was significant association between serum level of zinc and the zinc dietary intake.

Table 3: Distribution of the studied groups of 24 hours zinc dietary intake with serum level of zinc

Serum level of zinc	Low zinc dietary intake (n=55)		Moderate zinc dietary intake (n=60)		High zinc dietary intake (n=35)		Total (n=150)		P-value
	No.	%	No.	%	No.	%	No.	%	
Normal	25	37.8	45	68.1	29	43.9	99	66	<0.001
Low	30	58.8	15	29.4	6	11.7	51	34	

Discussions

The current study revealed that the overall percentage of participants who experienced depression symptoms—classified as either mild, moderate, or moderately severe—was highest among the 20–33 age group and lowest among those aged 48–61 years. The proportion of individuals experiencing mild depressive symptoms was highest in the younger age group, while moderately severe depression was most prevalent in the 48–61 age group. The mean age of the cases was 37.8 years (±11.12). A statistically significant association was found between depression and age, which is consistent with a study conducted in the United States [21].

Furthermore, the study found that women reported higher rates of depression symptoms—mild, moderate, or moderately severe—compared to men, indicating a significant association between gender and depression. This finding aligns with studies conducted in the United States 2019 [21] and Iraq [22], but, but contrasts with a study from Bangladesh, which may be due to differences in social behavior and how female psychiatric patients present compared to those with other illnesses [23].

The prevalence of depression in this study was higher among individuals with obesity than those with normal BMI level. A significant association b Was observed between depression and BMI level in agreement with findings from study in Canada [24], and corroborated by research conducted in china [25].

In addition, the study noted a decrease in serum zinc levels among patients with depression, with a significant inverse relationship observed between zinc levels and depression. This finding is consistent with previous research conducted in Egypt, showed that inverse relationship between serum zinc levels and depression, underscoring the potential role of

zinc in depression's pathophysiology and its relevance [26], and the study also agreed with study done in Iran [27].

In the present study, we found an association between dietary zinc intake and serum zinc levels This finding is consistent with a study conducted in Thailand, which showed that daily intake of zinc is necessary to meet the Recommended Dietary Allowance (RDA) for maintaining normal immune function and overall well-being [28].

The assessment of dietary zinc intake revealed that the studied sample consumed less than the recommended amount. Those with lower zinc intake had a higher prevalence of mild to moderate zinc deficiency. This inadequate intake was observed among a considerable portion of the sample. Furthermore, a significant association was found between serum zinc levels and dietary zinc intake, consistent with findings from a study conducted in Iraq/Baghdad [29].

Finally, this study also demonstrated an inverse relationship between serum zinc levels and dietary zinc intake in individuals with depression, which aligns with findings from a study conducted in Iran [27].

Conclusion

Approximately half of the individuals with moderate to severe depression had low serum zinc levels. Additionally, more than half of the participants with low dietary zinc intake also showed low serum zinc levels. This association was found to be statistically significant.

Refrences

1. Hansen R, Gaynes B, Thieda P, Gartlehner G, Deveaugh-Geiss A, Krebs E, et al. Meta-analysis of major depressive disorder relapse and recurrence with second-generation antidepressants. Psychiatric Services,2008:59(11):1121–1130.
2. Khalid S, Williams C, Reynolds MAS. Is there an association between diet and depression in children and adolescents? A systematic review. British Journal of Nutrition,2016:116(12):2097–2108.
3. Amani R, Saeidi S, Nazari Z, Nematpour S. Correlation between dietary zinc intakes and its serum levels with depression scales in young female students. Biological Trace Element Research,2010:137(2):150–158.
4. Yary T, Aazami S. Dietary intake of zinc was inversely associated with depression. Biological Trace Element Research,2012:145(3):286–290.
5. Maret W. Zinc biochemistry: from a single zinc enzyme to a key element of life. Advances in Nutrition,2013:4(1):82–91.
6. Szewczyk B, Kubera M, Nowak G. The role of zinc in neurodegenerative inflammatory pathways in depression. Progress in Neuro-Psychopharmacology and Biological Psychiatry,2011:35(3):693–701.
7. Olza J, Aranceta-Bartrina J, González-Gross M, Ortega RM, Serra-Majem L, Varela-Moreiras G, et al. Reported Dietary Intake and Food Sources of Zinc, Selenium, and Vitamins A, E and C in the Spanish Population: Findings from the ANIBES Study. Nutrients,2017:9(7):697.
8. Prasad AS. Discovery of human zinc deficiency: Its impact on human health and disease. Advances in Nutrition,2013:4(2):176–190.
9. da Cruza RS, Andrade F de O, Carioni VM de O, Rosim MP, Miranda MLP, Fontelles CC, et al. Dietary zinc deficiency or supplementation during gestation increases breast cancer susceptibility in adult female mice offspring following a J-shaped pattern and through distinct mechanisms. Food and Chemical Toxicology,2019:134:110813.
10. Dassoni F, Abebe Z, Ricceri F, Morrone A, Albertin C, Naafs B. High Frequency of Symptomatic Zinc Deficiency in Infants in Northern Ethiopia. Dermatology Research and Practice,2014:2014:719701.
11. World Health Organization and Food and Agriculture Organization of the United Nations. Vitamin and mineral requirements in human nutrition. WHO Library Cataloguing-in-Publication Data, 2004
12. Plum LM, Rink L, Haase H. The essential toxin: impact of zinc on human health. International Journal of Environmental Research and Public Health,2010:7(4):1342–1365.
13. Hambidge M. Biomarkers of trace mineral intake and status. The Journal of Nutrition,2003:133(3):948S–955S.
14. Lai J, Moxey A, Nowak G, Vashum K, Bailey K, McEvoy M. The efficacy of zinc supplementation in depression: Systematic review of randomised controlled trials. Journal of Affective Disorders,2012:136(1):31-39.
15. Al-Hasnawi SM, Sadik S, Rasheed MA. Prevalence of major depressive episodes in Iraq: a population-based study. Eastern Mediterranean Health Journal,2019:25(3):189–195.
16. Mousa A. Clinical Medicine and Medical Research Zinc Deficiency and Depressive Disorders: A Hospital-Based Study Study in Kut Governorate, Iraq. Clinical Medicine and Medical Research,2025:6(1):273–278.
17. Kroenke K, Spitzer RL. The PHQ-9: a new depression diagnostic and severity measure. Psychiatric Annals,2002:32(9):509–521.
18. Burtis CA, Ashwood ER, Bruns DE. Tietz textbook of clinical chemistry and molecular diagnostics. Elsevier Health Sciences, 2012:
19. U.S. Department of Agriculture. Food Data Central, 2022.
20. Hales CM, Fryar CD, Carroll MD, Freedman DS, Ogden CL. Trends in Obesity and Severe Obesity Prevalence in US Youth and Adults by Sex and Age, 2007-2008 to 2015-2016. Journal of the American Medical Association,2018:319(16):1723–1725.
21. Villarroel MA, Terlizzi EP. Symptoms of Depression Among Adults: United States, 2019. NCHS Data Brief,2020:379:1–8.
22. Al Shawi AF, Sarhan YT, Altaha MA. Adverse childhood experiences and their relationship to gender and depression among young adults in Iraq: A cross-sectional study. BMC Public Health,2019:19(1):1687.

23. Islam MR, Adnan R. Socio-Demographic Factors and Their Correlation with the Severity of Major Depressive Disorder: A Population Based Study. World Journal of Neuroscience,2017:7(2):193–202.
24. Fulton S, Décarie-Spain L, Fioramonti X, Guiard B, Nakajima S. The menace of obesity to depression and anxiety prevalence. Trends in Endocrinology and Metabolism,2022:33(1):18–35.
25. Hu B, et al. Dietary Zinc Intake Affects the Association Between Dietary Vitamin A and Depression: A Cross-Sectional Study. Frontiers in Nutrition,2022:9:927823.
26. Abdelmoneam AH, Khafagy GM, Elbeh KA, Hasan MDA. The inverse correlation between serum zinc levels and depression severity in Egyptian adolescent students: a case–control study. Egyptian Journal of Neurology, Psychiatry and Neurosurgery,2024:60(1):25.
27. Amani R, Saeidi S, Nazari Z, Nematpour S. Correlation between dietary zinc intakes and its serum levels with depression scales in young female students. Biological Trace Element Research,2010:137(2):150–158.
28. Ruangritchankul S, Sumananusorn C, Sirivarasai J, Monsuwan W, Sritara P. Association between Dietary Zinc Intake, Serum Zinc Level and Multiple Comorbidities in Older Adults. Nutrients,2023:15(2):322.
29. Al-Timimi DJ, Al-Sharbatti SS, Al-Najjar F. Zinc deficiency among a healthy population in Baghdad, Iraq. Saudi Medical Journal,2005:26(11):1777–1781.