**Original Article**

# Relationship between blood hemoglobin level and depression in post hysterectomy women

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**Objective:** To determine the relation of serum hemoglobin level with depression in patients undergoing hysterectomy.

**Methodology:** This cross-sectional study was conducted at Fauji Foundation Hospital, Rawalpindi from January to July 2021 among women with age of 40 to 60 years underwent hysterectomy for more than a year. A total of 120 women were included. Serum hemoglobin levels were accessed from hospital database and severity of anemia were analyzed. BDI was used for depression analysis. Relationship between the variables was done using Pearson correlation, taking $p \leq 0.05$ as statistically significant.

**Results:** The mean depression score of BDI was 13.5 (SD = 9.3), ranging from 1 to 30. Mean serum hemoglobin levels were 9.37 g/dl. There was a statistically significant association found between anemia and depression ($p = 0.04$). Pearson's Correlation 'r' between serum hemoglobin level and depression showed a weak correlation between these two variables i.e., 0.368 with a $p = 0.04$.

**Conclusion:** Low level of serum hemoglobin is significantly associated with depression in hysterectomy patients.

**Keywords:** Anemia, depression, hemoglobin, hysterectomy.

## INTRODUCTION

Depression is a mental health condition characterized by feelings of sorrow, worthlessness, and despair and hopeless, as well as a loss of interest or pleasure and difficulty concentrating.[1] Depression is common among patients before and after numerous procedures, and it can be caused by immune system suppression, postoperative pain and infection, anesthetic side effects, and decreased social activities.[2] WHO lists major depressive disorder as the fourth most common cause of disability worldwide, with projections that it will become the second most common cause by 2030.[3]

According to recent studies, the incidence of mental illness in gynecology and obstetrics practiced ranged from 4–22% for major depression, 20 to 48% for any mental health disorder, and 13 to 40% for any depressive illnesses.[4-6] Gynecological surgery might induce psychological issues because it affects the female reproductive organs directly. Bilateral salpingo-oophorectomy (BSO), vulvectomy, hysterectomy, and pelvic exenteration are gynecologic procedures that have particular psychological consequences.[7] Hysterectomy has been considered as the most common surgery for the treatment of a fibroid, adenomyosis, excessive menstruation flow, menstrual pains, uterine prolapse, gynecologic cancer and pelvic inflammatory disease.[8] The term "post hysterectomy syndrome" has been used in the 1970s and growing evidence from clinical investigations has revealed that women who have had a hysterectomy are more likely to develop psychological comorbidities than women who have not had a hysterectomy.[9] Candidates for hysterectomy who have a history of mild or neurotic psychiatric problems should be examined for depression or anxiety for 18 months after surgery.[10]

The prevalence of hysterectomy varies by regions.[11] In the United Kingdom, 20% of women and in the United States 37% women underwent hysterectomy until they were 60 years old. So, the lifetime risk of having a hysterectomy in the United States is 25%, while it is 10.4% in Denmark and 4.6% in India.[12] Hysterectomy rates are highest in the United States and lowest in Norway and Sweden.[13] There is limited information available in Pakistan about the time trend of hysterectomies. However, there is a disagreement on the high rate.

Because endometrial ablative procedures are expensive and difficult to come by in Pakistan, hysterectomy is the single treatment option provided.[14] The incidence of preoperative anemia prior to gynecologic surgery is unclear, but it has implications on postoperative complications. Several studies in the gynecologic surgical context have investigated the impact of preoperative anemia on postoperative outcomes.[15]

Anemia is caused by an iron deficiency, which can also affect tissue healing and the body's ability to adapt to stress.[16] The aim of this study was to determine the relation of serum hemoglobin level with depression in patients undergoing hysterectomy.

## METHODOLOGY

This cross sectional study was undertaken at Fauji Foundation Hospital, Rawalpindi from January to July 2021. Ethical review committee approval (Letter no. 501/RC/FFH/RWP) was taken from Foundation University and an Informed written consent was taken from all patients. We used non-probability purposive sampling technique. Sample size was calculated as 120 by using Epitool, taking assumed population standard deviation 11.3 with keeping the confidence interval 0.95 and accepted error 2.[17]

Women between the ages of 40 and 60 who had a hysterectomy for more than a year were included in the study. Those with any other comorbidities were excluded from the study. Whereas gravida and parity, cause for hysterectomy and comorbidities were not assessed. A two-part questionnaire survey was used to collect data. The researcher developed a demographic data sheet that contains variables such as age, marital status, family history, comorbidities, past history of depression or anemia, family support, and satisfaction.

The Beck Depression Inventory (BDI) is the second part. A questionnaire contain 21 items for the assessment of depression severity on a scale of 0 to 3. The maximum possible score for the test would have been 63. Scores between 1 and 10 are considered to be normal, scores between 11 and 16 shows mild mood disturbance, scores between 17 and 20 borderline clinical depression, scores between 21 and 30 moderate depression, scores between 31 and 40 predicts severe depression, and scores over 41 are considered extreme depression, according to the BDI. For serum hemoglobin level, nursing staff collected venous blood samples and sent them to the pathology department of Fauji Foundation Hospital, where they were analyzed and verified by lab technicians and pathologists using automated hematology analyzer. Hemoglobin level between 10.0 – 10.9 g/dl was taken as mild anemia, whereas 7.0 – 9.9 g/dl and below 7.0 g/dl were considered as moderate and severe anemia respectively.

**Statistical Analysis:** Data were analyzed by SPSS version 22. For categorical variables, data was compiled as frequency and percent. For continuous variables, data was calculated as mean ± SD. Relationship between the variables was done using Pearson correlation.

## RESULTS

In this study a total of 120 women were participated. The average age of these women was 46.5 ± 3.03 years with age range from 41 to 53 years. Mean serum hemoglobin levels were 9.377 g/dl. Overall, 44 women (36.6%) out of 120 presented with the moderate depression on BDI score and 76 (63.3%) women presented 1 – 10 score with no depression. The mean depression score of BDI for the study population was 13.5 (SD = 9.3), ranging from 1 to 30. Mean serum hemoglobin levels were 9.37 g/dl.

**Table 1: Association between anemia and depression in patients undergoing hysterectomy.**

| Variable | | N | % | P value |
|---|---|---|---|---|
| Anemia | Mild anemia | 50 | 41.6 | 0.04 |
| | Moderate anemia | 70 | 58.3 | |
| Depression | No depression | 76 | 63.3 | |
| | Moderate depression | 44 | 36.6 | |

**Table 2: Correlation between serum hemoglobin levels and depression in patients undergoing hysterectomy.**

| | Serum hemoglobin & BDI |
|---|---|
| Pearson correlation | 0.368 |
| P value | 0.04 |

To determine the association between anemia and depression chi square test was used and it was found that there was a statistically significant association between anemia and depression in hysterectomy patients with p value 0.04 (Table 1). Pearson's Correlation 'r' of serum hemoglobin level with depression exhibits a weak correlation between the variables, 0.368 with 0.04 p-value (Table 2). This suggests that changes in one variable are only weakly associated with changes in the other.

## DISCUSSION

Psychosocial, sexual, and endocrinologic perspectives have all been presented in earlier studies as causes for the increased risk of post hysterectomy depression.[18] In a low income country like Pakistan we hardly found any psychiatric services for the management of depression and anxiety after surgeries like hysterectomy although

the rate of depressive symptoms are high.[19] Anemia is one of the commonest problems after common gynecological surgeries around the world as well as psychological problems like depression. This study aimed to evaluate the relationship of levels of anemia and depression in women after hysterectomy.

According to Flory et al, 10 – 20% of women who had a hysterectomy experienced depressive symptoms, that is consistent with the present study in which we found moderate depression in 36.6% women after hysterectomy.[18] Severity of anemia is highly associated with post-operative complications in patients who had gone through hysterectomy according to one study which was conducted in 2020. They reported 19% patients after hysterectomy were anemic which was significantly associated with several medical problems. Hence, they recommended the surgeons to do measures to control anemia in order to reduce co morbidities after hysterectomy.[20] This current study also found moderate levels of anemia in 58.3% women post hysterectomy while moderate depression in 36.6% women moreover weak positive correlation has been observed between them.

One systematic review has indicated reduction in the depressive symptoms associated with hysterectomy, however they found no significant association of clinically diagnosed anxiety in post hysterectomy patients.[21] The present study has also found mild to moderate depression in post hysterectomy patients. The robot assisted hysterectomy showed less number of post-operative complications like bleeding and anemia according to one study in women who were obese and had benign conditions.[22] One comparative study of hysterectomy versus levonorgestral intrauterine system showed higher control of bleeding and control of hemoglobin levels with hysterectomy and similarly secondary outcomes like satisfaction and quality of life were improved with both methods.[23]

Similarly current study has found significant reduction in serum hemoglobin levels and its positive relationship with secondary outcome measures like depression. Comparison of modes of hysterectomy was not done in relation with anemia and depression. Follow up of patients was not done and it was a single setting study. More trials and prospective studies should be done to evaluate the impact of different modes of hysterectomy on hemoglobin and depressive symptoms in women at different follow up times.

## CONCLUSION

Comparison of modes of hysterectomy was not done in relation with anemia and depression. Follow up of patients was not done and it was a single setting study. More trials and prospective studies should be done to evaluate the impact of different modes of hysterectomy on hemoglobin and depressive symptoms in women at different follow up times.

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## REFERENCES

1. Kessler RC, Bromet EJ. The epidemiology of depression across cultures. Annu Rev Public Health 2013;34:119-38.
2. Ghoneim MM, O'Hara MW. Depression and postoperative complications: an overview. BMC Surg 2016;16:1-10.
3. Mathers CD, Loncar D. Updated projections of global mortality and burden of disease, 2002-2030: data sources, methods and results. Geneva: World Health Organization. 2005.
4. Little K. Integrated Behavioral Care Models: Improving the Screening and Treatment of Perinatal Mood and Anxiety Disorders 2020.
5. Raffi ER, Gray J, Conteh N, Kane M, Cohen LS, Schiff DM. Low barrier perinatal psychiatric care for patients with substance use disorder: meeting patients across the perinatal continuum where they are. Int Rev Psyc 2021;33:543-52.
6. Scholle SH, Haskett RF, Hanusa BH, Pincus HA, Kupfer DJ. Addressing depression in obstetrics/gynecology practice. Gen Hosp Psychiatry 2003;25:83-90.
7. Rocca WA, Grossardt BR, Geda YE, Gostout BS, Bower JH, Maraganore DM, et al. Long-term risk of depressive and anxiety symptoms after early bilateral oophorectomy. Menopause 2008;15:1050-9.
8. Whiteman MK, Hillis SD, Jamieson DJ, Morrow B, Podgornik MN, Brett KM, et al. Inpatient hysterectomy surveillance in the United States, 2000-2004. Am J Obstet Gynecol 2008;198:34-7.
9. Richards D. A post-hysterectomy syndrome. Lancet 1974;304:983-5.
10. Laganà AS, La Rosa VL, Rapisarda AM, Platania A, Vitale SG. Psychological impact of fertility preservation techniques in women with gynaecological cancer. Ecancermed Sci 2017;11:ed62.
11. Anbreen F, Qadir S, Naeem H, Farhat N, Ghafoor M,

Hassan S. Type, time-trend and indications of hysterectomy. Gomal J Med Sci 2018;16:92-6.
12. Singh A, Arora AK. Why hysterectomy rate are lower in India. Indian journal of community medicine: Indian J Community Med 2008;33:196-9.
13. Jacobson GF, Shaber RE, Armstrong MA, Hung Y-Y. Hysterectomy rates for benign indications. Obstet Gynecol 2006;107:1278-83.
14. Majeed T, Adnan R, Mahmood Z, Mahmood H. Audit of gynecological Hysterectomies. Pak J Med Health Sci 2013;7:684-7.
15. Lim S, Lee C-M, Park J-M, Jung S-Y, Lee K-B. An association between preoperative anemia and poor prognostic factors and decreased survival in early stage cervical cancer patients. Obstet Gynecol Sci 2014;57:471-7.
16. Bliss S. Anemia and oxygen delivery. Veterinary Clinics: Small Ani Pract 2015;45:917-30.
17. Uccella S, Garzon S, Lanzo G, Gallina D, Bosco M, Porcari I, et al. Uterine artery closure at the origin vs at the uterus level in total laparoscopic hysterectomy: A randomized controlled trial. Acta Obstet Gynecol Scand 2021;100:1840-8.
18. Flory N, Bissonnette F, Binik YM. Psychosocial effects of hysterectomy: literature review. J Psychosom Res 2005;59:117-29.
19. Raza N, Waqas A, Jamal M. Post-operative anxiety, depression and psychiatric support in patients undergoing hysterectomy: A cross sectional survey. J Pak Med Assoc 2015;65:443-5.
20. Tyan P, Taher A, Carey E, Sparks A, Radwan A, Amdur R, et al. The effect of anemia severity on postoperative morbidity among patients undergoing laparoscopic hysterectomy for benign indications. Acta Obstet Gynecol Scand 2020;99:112-8.
21. Darwish M, Atlantis E, Mohamed-Taysir T. Psychological outcomes after hysterectomy for benign conditions: a systematic review and meta-analysis. Eur J Obstet Gynecol Reprod Biol 2014;174:5-19.
22. Brunes M, Johannesson U, Häbel H, Söderberg MW, Ek M. Effects of Obesity on Peri- and Postoperative Outcomes in Patients Undergoing Robotic versus Conventional Hysterectomy. J Minim Invasive Gynecol 2021;28:228-36.
23. Cozza G, Pinto A, Giovanale V, Bianchi P, Guarino A, Marziani R, et al. Comparative effectiveness and impact on health-related quality of life of hysterectomy vs. levonorgestrel intra-uterine system for abnormal uterine bleeding. Eur Rev Med Pharmacol Sci 2017;21:2255-60.