

Advances in Obstetrics and Gynecology Research

Editors-in-Chief

K. Matsuo

University of Southern California, USA

Qionghua Chen

The First Affiliated Hospital of Xiamen University, China

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Advances in Obstetrics and Gynecology Research

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Clinical Value of Insulin Aspartate Injection in The Treatment of Obstetric Gestational Diabetes Mellitus

Yuliang Zhang*

Guangzhou Medical University, Guangzhou 510000, Guangdong Province, China

*Corresponding author: Yuliang Zhang, 292260743@qq.com

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Abstract: Gestational diabetes mellitus (GDM) is a common metabolic disorder during pregnancy, which has a high incidence and has a serious impact on maternal and infant health, including premature delivery, macrosomia and postpartum complications. Therefore, timely and effective treatment is particularly important. The purpose of this study was to investigate the clinical value of insulin aspartate in the management of gestational diabetes mellitus, and to provide evidence for improving the treatment of gestational diabetes mellitus. Through the comprehensive analysis of the pharmacological properties and clinical applications of insulin aspartate, the research results showed that insulin aspartate can effectively control blood sugar levels and reduce adverse pregnancy outcomes in the treatment of gestational diabetes mellitus. It is worth noting that during the use of insulin aspartate, the impact on the mother and child is relatively small, and does not affect breastfeeding, reflecting its importance in the treatment of gestational diabetes. To provide a new treatment idea for the clinical management of gestational diabetes mellitus, emphasize the importance of individualized treatment, and lay a foundation for future related research.

Keywords: Gestational diabetes mellitus; Insulin aspartate; Clinical application; Security analysis

Online publication: January 6, 2025

1. Introduction

Gestational diabetes mellitus (GDM) refers to abnormalities in sugar metabolism that first appear during pregnancy, usually between 24 and 28 weeks of gestation. According to epidemiological studies, the incidence of GDM is on the rise worldwide, especially in high-risk populations, and the incidence can be as high as 15%^[1]. This disease not only affects the health of pregnant women but is closely related to the development of the fetus and its health after birth. Gestational diabetes can lead to macrosomia, premature delivery, birth canal damage and neonatal hypoglycemia and other adverse pregnancy outcomes, which brings potential health risks to mothers and infants^[2].

The main goal of treating gestational diabetes is to control maternal blood sugar levels to reduce adverse

effects on the mother and child. This not only helps to improve the pregnancy experience of the mother but also significantly reduces the risk of complications during childbirth ^[3]. In addition, scientific and sound management measures can reduce the risk of developing type 2 diabetes later on. Individualized treatment for gestational diabetes, combined with dietary regulation, exercise, and insulin therapy, can help achieve a good pregnancy outcome.

2. Basic overview of insulin aspartate

2.1. Pharmacological properties of insulin aspartate

Insulin aspartate is a fast-acting recombinant human insulin used to control blood sugar levels, especially in the management of postprandial hyperglycemia. Its pharmacological mechanism is to promote the uptake and utilization of glucose by cells through binding to insulin receptors on cell membranes, thereby reducing glucose concentration in the blood. The onset time of insulin aspartate is usually 10 to 20 minutes after injection, the peak effect occurs 1 to 3 hours after injection, and the duration of action is about 3 to 5 hours ^[4]. This property makes it particularly suitable for use with meals to effectively control blood sugar fluctuations after meals. In addition, the molecular structure of insulin aspartate has been modified to have better solubility and absorbability, thus improving its bioavailability ^[5]. Compared with other types of insulin, insulin aspartate has greater flexibility in administration, and patients can adjust according to meal time and blood sugar level, which significantly improves the individualization and adaptability of treatment. This makes insulin aspartate an important option in the management of gestational diabetes, which can effectively help pregnant women control blood sugar and reduce the risk of pregnancy complications ^[6].

2.2. Comparison with other insulin preparations

Compared with other insulin preparations, insulin aspartate has significant advantages and different adaptations. Compared with traditional intermediate-acting and long-acting insulin (such as NPH insulin and insulin glargine), insulin aspartate is more suitable for mealtime injection because of its rapid onset and short action time, and can quickly control the rise of postprandial blood sugar. This feature makes insulin aspartate particularly suitable for patients with gestational diabetes who need to adjust their blood sugar levels frequently. In addition, when compared to fast-acting insulins such as lisinsulin and almotriptan, insulin aspartate has become a more widely used choice due to its greater stability and clinical studies supporting its safety during pregnancy ^[7-9]. Although other fast-acting insulin formulations can also rapidly control blood sugar, the use of insulin aspartate in pregnant patients has extensive clinical data supporting its safety and effectiveness for both mother and child. In addition, insulin aspartate is highly compatible and can be used in combination with other types of insulin to achieve more refined blood sugar management.

2.3. Application history and clinical research progress of insulin aspartate

The history of the use of insulin aspartate dates back to 2004 when it was first approved. As a fast-acting insulin formulation, insulin aspartate was developed to meet the needs of patients with diabetes for flexible and efficient blood sugar control. Studies have shown that insulin aspartate has significant advantages in the control of postprandial blood sugar, so it has been widely used in clinical practice. In the years that followed, insulin aspartate was gradually incorporated into diabetes treatment guidelines and recommended for patients with different types of diabetes, especially those who require refined blood sugar control, such as pregnant women and severely ill patients ^[10]. In clinical studies of gestational diabetes mellitus, insulin aspartate has shown good safety and efficacy. A large number of clinical trials have shown that insulin aspartate can effectively control blood sugar levels in patients with gestational diabetes and reduce adverse pregnancy outcomes for pregnant women and fetuses. For example, some studies have shown that pregnant women using

insulin aspartate have significantly lower rates of macrosomia than those using other insulin formulations. In addition, insulin aspartate has also shown good results in reducing the incidence of hypoglycemia, giving patients more security ^[11].

In recent years, with the deepening of research, more and more clinical data support the efficacy and safety of insulin aspartate in the treatment of gestational diabetes mellitus. More and more doctors and patients are recognizing the potential of insulin aspartate in personalized therapy, with the ability to flexibly adjust the dose according to the specific situation of the patient. This makes insulin aspartate one of the indispensable treatment options in the management of gestational diabetes ^[12].

3. Application of insulin aspartate in gestational diabetes mellitus

3.1. Administration mode and dose adjustment of insulin aspartate

The administration of insulin aspartate in gestational diabetes mellitus is usually a subcutaneous injection, which is not only simple and easy but also suitable for the daily use of most patients. According to the patient's specific blood glucose monitoring results, the dosage of insulin aspartate needs to be adjusted individually. In general, the initial dose is set at the beginning of treatment based on the patient's basal blood glucose level and postprandial blood glucose status, and then gradually adjusted based on the blood glucose monitoring results. Injections of insulin aspartate are usually recommended within 15 minutes before meals for it to work quickly to control blood sugar after meals. For those patients with poor blood sugar control after meals, increasing the dose or adjusting the time of administration may be necessary ^[13]. In addition, due to the physiological changes in women during pregnancy, especially as the pregnancy progresses, insulin sensitivity and demand will change, so patients need to regularly monitor blood sugar to timely adjust the insulin dose and injection strategy.

3.2. Use strategies for different pregnancy periods

At different stages of pregnancy, patients with gestational diabetes have different insulin requirements and blood sugar management strategies. In the first trimester, the patient's blood sugar levels are relatively low and the dosage of insulin aspartate is usually smaller. As pregnancy progresses, changes in placental hormone levels lead to increased insulin resistance and the patient needs to gradually increase the dose of insulin aspartate ^[14]. During the second and third trimesters, patients' insulin needs tend to rise significantly due to the increased demands of fetal growth and metabolism. Therefore, during this period, blood sugar should be closely monitored and the dose should be adjusted in time to prevent complications caused by high blood sugar. For patients in the third trimester of pregnancy, especially near the stage of delivery, doctors usually strictly evaluate the frequency and dosage of insulin aspartate to ensure the safety of maternal and child health ^[15].

3.3. Monitoring and evaluation criteria in clinical practice

The clinical use of insulin aspartate requires strict monitoring and evaluation criteria to ensure that the blood glucose control of gestational diabetes mellitus is within the ideal range. Blood glucose monitoring is an important part of the management of gestational diabetes mellitus, patients should regularly self-measure fasting blood glucose and postprandial blood glucose, and record the results. It is generally recommended that pregnant women have their blood sugar tested before and within 1 hour after a meal to assess the effect of insulin therapy. In clinical practice, the doctor will evaluate the patient's blood sugar control based on the monitoring results, and adjust the dosage of insulin aspartate as needed ^[16]. In addition, regular prenatal visits are also very important, including fetal growth monitoring and maternal health assessment, to ensure the safe course of pregnancy. By comprehensively monitoring blood sugar, evaluating the effects of medication, and keeping a close eye on maternal and child health, healthcare teams can individualize treatment options for people with gestational diabetes, thereby reducing the risk of adverse pregnancy outcomes.

4. Safety analysis of insulin aspartate

4.1. Maternal and fetal adverse reactions

Insulin aspartate is widely used in the treatment of gestational diabetes mellitus, however, its use still needs to be concerned about possible adverse reactions. For mothers, the use of insulin aspartate may lead to a risk of hypoglycemia, especially if the dose is not properly adjusted or the intake of meals is insufficient. Symptoms of hypoglycemia include sweating, shaking, palpitations and dizziness, and can even lead to loss of consciousness in severe cases. Patients need to be educated to recognize early signs of hypoglycemia and to prepare emergency sugar sources for prompt treatment ^[17]. In addition, the use of insulin aspartate may also lead to weight gain, because insulin itself has a growth-promoting effect, so it is necessary to monitor weight and develop a reasonable diet and exercise plan to reduce the risk of weight gain.

The use of insulin aspartate is relatively safe for the fetus, and clinical studies have not found a significant association with fetal malformation or other major adverse events. However, caution should still be exercised during use to ensure that blood sugar levels are controlled to prevent fetal growth, macrosomia, and other related complications due to high blood sugar. Therefore, doctors should consider the health status of the mother and the development of the fetus to achieve the best treatment ^[18].

4.2. Precautions in the use of insulin aspartate

In the clinical application of insulin aspartate, medical staff and patients need to pay attention to several aspects to ensure the safety and effectiveness of treatment. Patients should fully understand the mechanism of action and the method of administration of insulin aspartate before using it, especially in terms of dose adjustment and injection techniques ^[19]. Educate patients to master the method of self-blood glucose monitoring, record and feedback on blood glucose changes to doctors regularly, to adjust the treatment plan. Due to physiological changes during pregnancy, patients' insulin requirements may change with the progression of pregnancy, so it is necessary to regularly evaluate the effect of blood glucose control and timely adjust the dosage of insulin aspartate to prevent the occurrence of hyperglycemia and hypoglycemia.

There may be interactions between insulin aspartate and other medications, so patients should inform their doctor of all medications and supplements used during medication. At the same time, pregnant women should pay attention to the adjustment of diet and exercise during the use of insulin, and reasonably arrange meals and exercise to maintain good blood sugar control ^[20]. Finally, postpartum need to continue to pay attention to the use of insulin aspartate, especially during breastfeeding, to ensure the safety of the drug for mother and child.

4.3. Effects on breastfeeding

Regarding the effect of insulin aspartate on breastfeeding, the current study results show that the use of insulin aspartate is relatively safe during lactation. The concentration of insulin in breast milk is extremely low and usually does not have a noticeable effect on the baby, so breastfeeding mothers do not need to stop breastfeeding while using insulin aspartate. Breastfeeding is not only good for the health of the baby, but it also helps the mother regain weight and blood sugar levels after delivery. Through breastfeeding, the mother is able to pass on antibodies, improve the baby's immunity, and also contribute to the mother's mental health and the establishment of parent-child relationships.

However, mothers still need to monitor their blood sugar levels closely while using insulin aspartate, especially at the beginning of breastfeeding, as breastfeeding may cause changes in the mother's blood sugar levels. Therefore, the medical team should guide the mother on how to carry out appropriate blood sugar monitoring and diet adjustment during breastfeeding to ensure the health of the mother and child. In addition,

medical personnel should pay attention to the emotional and psychological state of the mother, support her smooth transition to breastfeeding, and ensure the safety and health of the mother during the use of insulin aspartate.

5. Conclusion

In this paper, the clinical value of insulin aspartate in the treatment of gestational diabetes mellitus was discussed, and the importance of insulin aspartate in improving maternal and infant health was emphasized. Gestational diabetes mellitus (GDM) is a common complication of pregnancy. Without timely intervention, it may have serious effects on the mother and fetus. With the deepening of the understanding of gestational diabetes mellitus, timely and effective treatment has become an inevitable demand, and insulin has gradually become an important choice for the treatment of this disease due to its rapid onset and good safety. By analyzing the pharmacological properties of insulin aspartate and its comparison with other insulin preparations, we found that it has significant advantages in post-prandial blood glucose control and is suitable for different use strategies during pregnancy.

In clinical application, the administration mode and dose adjustment of insulin aspartate need to be individualized to meet the needs of different patients. At the same time, regular blood glucose monitoring and evaluation criteria are the key to ensuring the effectiveness of treatment. In terms of safety, although the use of insulin aspartate may cause adverse reactions such as hypoglycemia, compared with other treatment methods, its risk is relatively low, and it is suitable for pregnant patients. In addition, the effects on breastfeeding suggest that the use of insulin aspartate during lactation is safe and provides health assurance for both mother and baby.

In summary, the good effect of insulin aspartate in the treatment of gestational diabetes provides strong support for improving maternal and infant health and is of great significance for promoting the management and treatment of gestational diabetes. With the deepening of clinical research, the application potential of insulin aspartate will be further explored, and more safe and effective treatment options will be brought to the majority of pregnant women.

Disclosure statement

The authors declare no conflict of interest.

References

- [1] Song M, Tian C, Zhu Q, 2019, Effects of Metformin Combined with Insulin Aspartate on Blood Glucose Level and Maternal and Infant Outcomes in Patients with Gestational Diabetes Mellitus. *New World of Diabetes Mellitus*, 26(10): 104–107.
- [2] Wang C, Zhu Y, Liu F, 2013, Effects of Vitamin D Combined with Insulin Aspartate on Glycolipid Metabolism and Insulin Resistance in Gestational Diabetes Mellitus. *Journal of Medical Informatics*, 36(7): 131–134.
- [3] Wei R, Zhou L, Wang J, 2002, Effects of Insulin Detemide Combined with Insulin Aspartate, Diet, and Exercise on Blood Glucose Index and Maternal and Infant Outcomes of Gestational Diabetes Mellitus. *New World of Diabetes Mellitus*, 25(23): 85–87 + 91.
- [4] Xu S, Zhen M, Long X, et al., 2019, Effect of Insulin Aspartate Combined with High-Dose Vitamin D Regimen on Neonatal Hypocalcemia of Gestational Diabetes Mellitus. *Chinese Journal of Drug Abuse Prevention and Control*, 28(11): 1607–1610.
- [5] Guo X, Xiao S, Wen X, 2019, Effects of Insulin Aspartate on Blood Glucose and Glycated Hemoglobin in Patients with Gestational Diabetes Mellitus. *Journal of Clinical Rational Use of Medicine*, 15(25): 82–84.
- [6] Niu X, Fang Y, Qiang D, et al., 2019, Effect of Insulin Aspartate Combined with Vitamin D in the Treatment of Gestational Diabetes Mellitus. *Ningxia Medical Journal*, 44(8): 728–730.
- [7] Amei M, Yan'e C, Yongmei L, et al., 2022, Exercise-Diet Therapy Combined with Insulin Aspartate Injection for

the Treatment of Gestational Diabetes Mellitus: A Study on Clinical Effect and Its Impact. *Computational and Mathematical Methods in Medicine*, 2022: 488061–4882061.

- [8] Meng X, 2022, Clinical Effect Analysis of Insulin Aspartate Combined with Nutrition and Exercise Intervention in Patients with Gestational Diabetes Mellitus. *Journal of Hebei Medicine*, 44(11): 1650–1653.
- [9] Bi L, Yong M, Feng J, 2022, Clinical Value of Vitamin D Adjuvant Insulin Aspartate in the Treatment of Gestational Diabetes Mellitus. *Ningxia Medical Journal*, 44(5): 447–449.
- [10] Yang L, Yu H, Huang C, 2022, Effect of Insulin Aspartate in Patients with Gestational Diabetes Mellitus and Analysis of Pregnancy Outcomes. *China Maternal and Child Health Care*, 37(10): 1785–1787.
- [11] Wang L, 2022, Observing the Effect of Subcutaneous Injection of Insulin Aspartate in the Treatment of Gestational Diabetes Mellitus with Sleep Disorders and Its Effect on Pregnancy Outcome and Sleep Quality in Pregnant Women. *World Journal of Sleep Medicine*, 9(4): 664–667.
- [12] Liu Y, Liu X, Chen L, 2019, Effects of Dietary Intervention Combined with Insulin Aspartate on Blood Glucose Control and Maternal and Infant Outcomes of Gestational Diabetes Mellitus. *Journal of Clinical Research*, 30(1): 84–87.
- [13] Zhang X, Wang Y, Su Q, 2021, Effects of Glimepiride Combined with Insulin Aspartate on Insulin Resistance and Islet Cell Secretion in Patients with Gestational Diabetes Mellitus. *Hainan Medical Science*, 32(23): 3054–3057.
- [14] Zhang Y, Zhong L, Zeng H, 2021, Effect of Insulin Detemide Combined with Insulin Aspartate on Maternal and Infant Outcomes of Gestational Diabetes Mellitus. *New World of Diabetes Mellitus*, 24(15): 81–84.
- [15] Zhang M, 2019, Clinical Effect of Subcutaneous Insulin Aspartate Injection Combined with Protamine Biosynthetic Human Insulin in the Treatment of Gestational Diabetes Mellitus. *Journal of Shanxi Health Vocational College*, 31(2): 73–75.
- [16] Xu X, Wang Q, Hu X, 2019, Effect of Precision Nutrition Management Combined with Insulin Aspartate on Blood Glucose and Hemodynamics in Patients with Gestational Diabetes Mellitus. *Shanghai Journal of Medicine*, 41(23): 46–48 + 84.
- [17] Wang Z, Wu S, 2019, Clinical Observation of Insulin Aspartate and Insulin Detemide in the Treatment of Gestational Diabetes Mellitus. *Shanghai Journal of Medicine*, 41(20): 30–33.
- [18] Xu Y, Zhou S, Xiao B, 2020, Application of Insulin Aspartate Combined with Metformin in Patients with Gestational Diabetes Mellitus. *Clinical Journal of Practical Hospital*, 17(3): 155–158.
- [19] Fan S, Dong W, Liu W, et al., 2020, Effect of Calcium Carbonate D3 Combined with Insulin Aspartate on Patients with Gestational Diabetes Mellitus. *Journal of Contemporary Medicine*, 18(7): 159–160.
- [20] Lu L, Chen Q, Luo X, et al., 2019, Effect of Premixed Insulin Aspartate Injected by Insulin Pump and Subcutaneous Injection of Recombinant Human Insulin in the Treatment of Gestational Diabetes Mellitus and Its Influence on Pregnancy Outcome. *Journal of Clinical Medicine*, 39(9): 107–108.

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Demographic and Clinical Characteristics of Breast Cancer Patients in Bahawalpur Pakistan: A Comprehensive Analysis

Mehran Khan^{1*}, Abdullah Mehmood¹, Muhammad Sarim¹, Iqra Fatima Ayub¹, Iqra Javed¹, Riffat ul Ain¹, Nida Khan¹, Syed Farhn Raza Bukhari¹, Asna Majeed², Abdul Basit², Zafar Iqbal¹, Shees Safdar², Muhammad Shahzad Khan³, Zara Asghar², Muhammad Yousuf⁴, Faiqa Eram²

¹Bahawalpur College of Pharmacy, BMDC Complex, 63100, Bahawalpur, Punjab, Pakistan

²Department of Pharmaceutics, Faculty of Pharmacy, The Islamia University of Bahawalpur, 63100, Bahawalpur, Punjab, Pakistan

³Abbas Institute of Medical Sciences, 31200, Layyah, Punjab, Pakistan

⁴South Punjab Health Care Institute of Professional Studies, Jalalpur Pirwala, Multan

*Corresponding author: Mehran Khan, mehrankhanpharmacist@gmail.com

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Abstract: This study was conducted at Bahawalpur Medical and Dental College (BMDC) in collaboration with Bahawalpur Institute of Nuclear Oncology (BINO) Hospital, Pakistan, and aimed to analyze the demographic and clinical characteristics of breast cancer patients. A self-structured questionnaire was developed to collect comprehensive data, including gender, age, regional residence, marital status, reproductive history, BMI, cancer type, stage, time of detection, and family cancer history. Data were collected from 500 female breast cancer patients, with 402 meeting inclusion criteria after excluding incomplete records and male patients. The study revealed a distribution of breast cancer cases across age groups, with a majority aged 41–60 years. BMI classification showed notable proportions of patients classified as obese. Family cancer history was reported in 35.3% of patients. Most patients were non-smokers (97%), and reproductive status showed 37.3% premenopausal, 60.2% postmenopausal, and 2.5% nulliparous. Cancer staging indicated 7.9% with stage 1, 27.4% with stage 2, 42.0% with stage 3, and 16.2% with stage 4 cancer. The majority (95.3%) were diagnosed within 0–5 years of detection. Comparisons with existing literature highlight consistency in age distribution trends and BMI correlations, while variations exist in family cancer history and smoking prevalence. The findings emphasize the importance of tailored prevention and early detection strategies, considering demographic and clinical profiles to enhance breast cancer management and outcomes in Bahawalpur, Pakistan. Further research is warranted to validate these findings and explore additional factors influencing breast cancer incidence and treatment responses.

Keywords: Cancer; Epidemiology; Clinical parameter; BMI

Online publication: January 3, 2025

1. Introduction

Cancer is one of the leading causes of mortality worldwide ^[1]. Globally, 1.7 million new breast cancer cases

are diagnosed every year and 33% of them die of the disease ^[2]. Every 14 s, a woman somewhere in the world is diagnosed with breast cancer. In 2020, more than 2.3 million women were diagnosed with breast cancer globally, and out of these 6,85,000 died ^[3]. In case of the Asia breast cancer is the most common and second leading cause accounting for cancer-related deaths with a figure of 39% of all breast cancers diagnosed globally ^[4]. In the case of the Pakistani population incidence of breast cancer is 2.5 times higher as compared to India and Iran, accounting for 34.6% of female cancers ^[2]. The incidence of breast cancer is highly increasing as compared to other Asian countries with an average lifespan of 67 years. Even the ratio of recurrence is almost 20–30% among the women treated or considered free of this disease ^[5]. Breast cancer is generally classified based on the histological appearance, either into lesions that originate from the ductal epithelium (inner lining) or the lobular epithelium which is the conduit of milk to ducts ^[1]. WHO has classified breast cancer into 21 distinctive histological types depending on cell morphology, growth and architectural patterns. The two most common types of breast cancer are Invasive Ductal Carcinoma (IDC) and Invasive Lobular Carcinoma (ILC) according to the incidence of about 75% and 15% respectively ^[2]. Overall, there are multiple risk factors for breast cancer including epigenetic ^[6], genetic ^[7] and environmental or specific lifestyle factors. It is estimated that genetic factors contribute to 5–10% of breast cancer cases while 90–95% are related to environmental factors ^[8]. These factors including inheritance or family history ^[9–11], genetic alterations ^[12], age of women ^[13], reproductive status of the women ^[14–16], geographic variations ^[15], alcohol consumption ^[17], tobacco smoking ^[8,18], exposure to pesticides ^[19,20], exposure to arsenic ^[21], exposure to cadmium ^[22], obesity ^[21,23,24], excess fat consumption ^[25], fertility treatments ^[26], use of contraceptive pills ^[27,28], hormone replacement therapy ^[29,30], sedentary behavior or lack of physical activity ^[31], early age at menarche ^[14], marital status ^[32–34], skin microbiota ^[35]. Risk factors can also be placed into two main camps, i.e. non-modifiable risk factors and modifiable risk factors ^[36]. The goal of the current study is to summarize most of the major demographic factors such as the age of the woman, marital status of the woman, reproductive status, BMI of the woman, tobacco smoking, family history of any type of cancer, time of detection of breast cancer and geographical variations contributing to the high possibility of developing breast cancer up to date.

2. Methodology

2.1. Site of the study

This study was conducted at Bahawalpur Medical and Dental College (BMDC), Bahawalpur, in collaboration with the Bahawalpur Institute of Nuclear Oncology (BINO) Hospital, Bahawalpur, Pakistan.

2.2. Questionnaire design

The authors of this study developed a self-structured, detailed questionnaire to collect demographic data from breast cancer patients. This comprehensive questionnaire was designed to capture a wide range of demographic variables, including gender, age, regional area of residence, marital status, reproductive status, body mass index (BMI), type and stage of cancer, time of detection, and family history of cancer. The questionnaire is presented in detail below (**Figure 1**).



BAHAWALPUR COLLEGE OF PHARMACY (BMDC), BAHAWALPUR

1. patient ID (PRN) _____ PATIENT TREATMENT MEMBER (PTN)

Personal details:

2. Patient Name _____

Gender:

- Male
- Female
- Other (please specify)

Age

- Under 18
- 25-34
- 35-44
- 45-54
- 55-64
- 65-74
- 75 or older

• **Marital status:**

- Single (never married)
- Married
- Divorced
- Widowed

• **BMI range:**

- Normal (18.5-25)
- Over weight (25-30)
- Obese class I (30-35)
- Obese class II (35-40)
- Obese class III (40 above)

Height _____ cm

Weight _____ kg

BSA _____

Figure 1. A scan copy of the designed questionnaire for data collection.

2.3. Data collection procedure

2.3.1. Application for data collection

The study submitted a formal written application to the concerned department at BINO Hospital. The purpose of this application was to seek permission to collect the demographic data required for the study. This step was essential to gain authorized access to the hospital's patient records.

2.3.2. Study duration

The application underwent a thorough review by the hospital authorities, and another application was forwarded for security clearance to the Pakistan Atomic Energy Commission. Access was granted to the patient record room for a specified period of six months, from February 15, 2024, to August 15, 2024. This access was crucial for the primary investigators to gather the necessary data.

2.3.3. Data collection

The data collection process involved extracting information on demographic variables, clinical history, and pathological findings. The primary investigators conducted this data collection by filling out questionnaires based on the information available in the patient records. A comprehensive review was undertaken, examining the records of 500 breast cancer patients during the specified period.

2.3.4. Inclusion and exclusion criteria

To ensure the relevance and completeness of the data, specific inclusion and exclusion criteria were applied. The inclusion criteria focused on female breast cancer patients with a confirmed diagnosis. Conversely, 94 patients were excluded from the study due to incomplete information pertinent to the study objectives. Additionally, 2 male breast cancer patients were excluded, as the study aimed solely at female patients.

2.3.5. Final sample size

After applying the inclusion and exclusion criteria, the final sample consisted of female breast cancer patients whose records were complete and met the study's objectives. This process ensured that the dataset used for the study was both relevant and comprehensive.

3. Results

3.1. Stratification of BC patients according to age

In this section of the study, the collected samples were categorized into the following age groups: 0–20 years, 21–40 years, 41–60 years, and 61–80 years. The total number of breast cancer patients included in the study was 402. Among these patients, there were no individuals aged 0–20 years (0%). A total of 94 patients (23.4%) were aged 21–40 years, while the majority, 249 patients (61.9%), were aged 41–60 years. Additionally, 59 patients (14.7%) were aged 61–80 years (**Figure 2**).

STRATIFICATION OF BC PATIENTS ACCORDING TO AGE

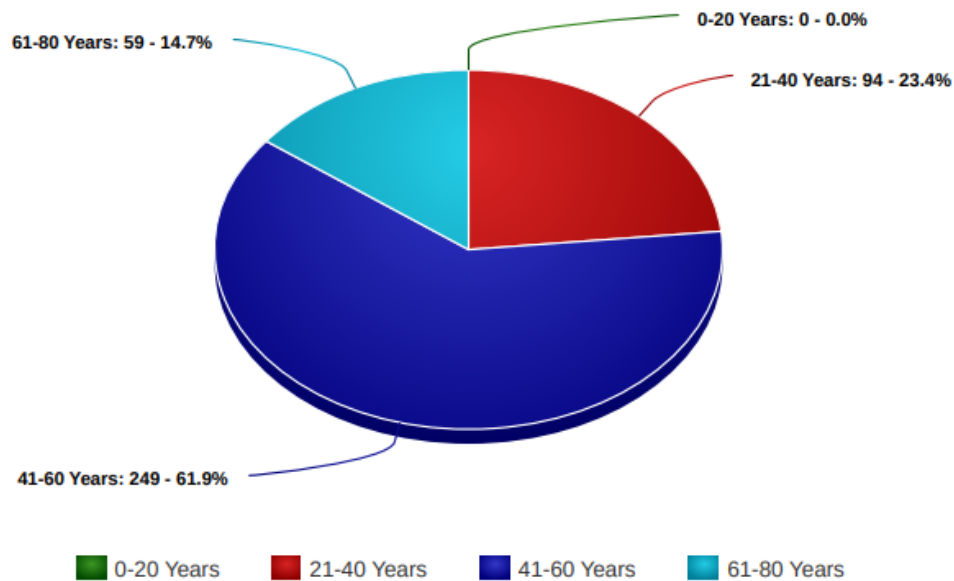


Figure 2. Stratification of breast cancer cases into different age groups.

3.2. Stratification of BC patients according to the BMI ranges

In this section of our study, the collected breast cancer cases were divided into the following categories: underweight, normal weight, overweight, and obese. The total number of breast cancer patients included in the study was 402. Among these patients, 32 (7.9%) were underweight, 147 (36.6%) had normal weight, 88 (21.9%) were overweight, and 135 (33.6%) were classified as obese (Figure 3).

STRATIFICATION OF BC PATIENTS ACCORDING TO BMI RANGES

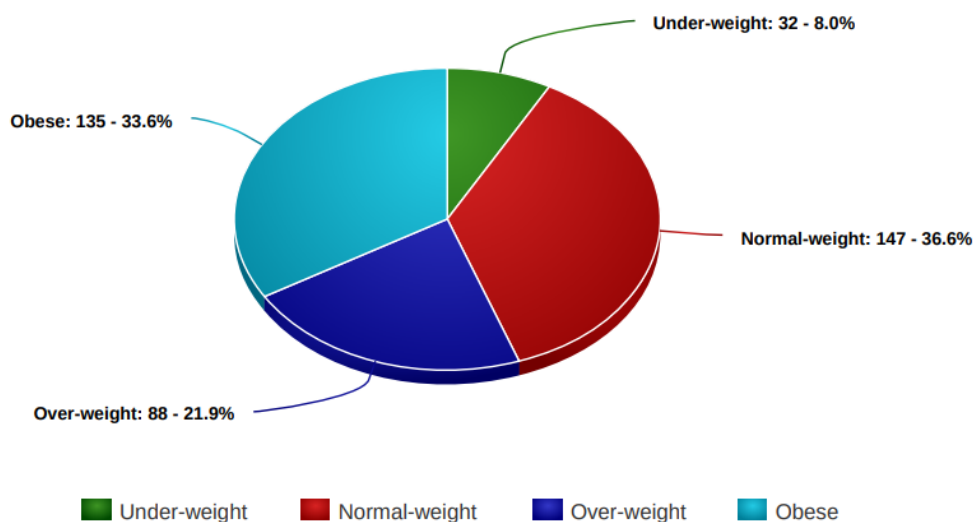


Figure 3. Stratification of breast cancer cases into different groups based on BMI status.

3.3. Stratification of BC patients according to family history of prior cancer

In this segment of the study, all cases were organized into two categories: breast cancer patients with a family history of cancer and those without. The total number of breast cancer patients included in the study was 402. Among these, 142 patients (35.3%) had a family history of cancer, while 260 patients (64.7%) had no family history of cancer (**Figure 4**).

STRATIFICATION OF BC PATIENTS ACCORDING TO FAMILY HISTORY OF CANCER

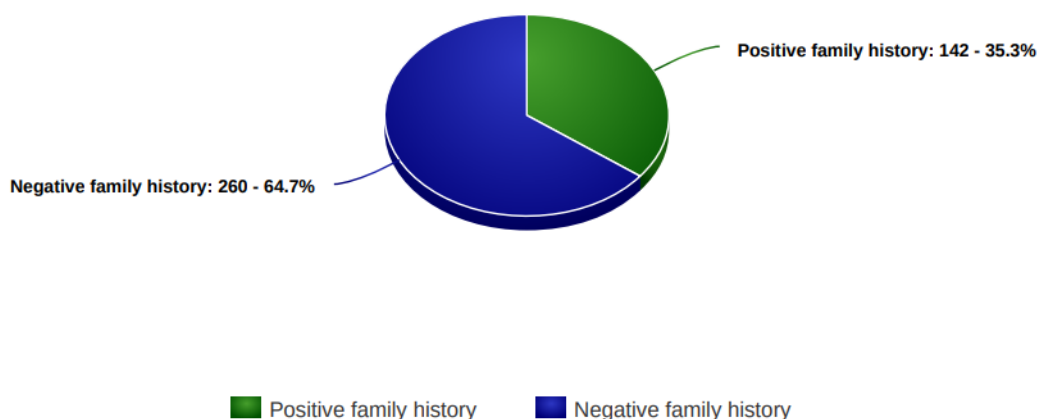


Figure 4. Stratification of breast cancer cases into different groups based on family history of cancer.

3.4. Stratification of BC patients according to smoking status

In this section of the study, all cases of breast cancer (BC) patients were organized into two major categories: smokers and non-smokers. Out of the 402 BC patients, 390 (97%) were non-smokers, whereas 12 (3%) were active smokers (**Figure 5**).

STRATIFICATION OF BC PATIENTS ACCORDING TO SMOKING STATUS

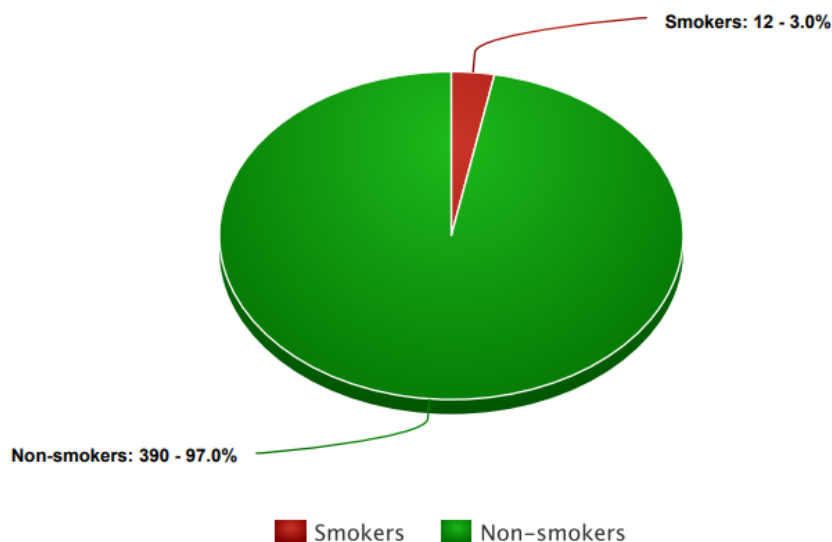


Figure 5. Stratification of breast cancer cases into different groups based on smoking status.

3.5. Stratification of BC patients according to reproductive status

Within this part of the research, all the collected data were classified according to the reproductive status of the female breast cancer patients into three categories: premenopausal, postmenopausal, and nulliparous. Among the total 402 female breast cancer patients, 150 (37.3%) were premenopausal, 242 (60.2%) were postmenopausal, and 10 (2.5%) were nulliparous (**Figure 6**).

STRATIFICATION OF BC PATIENTS ACCORDING TO REPRODUCTIVE STATUS

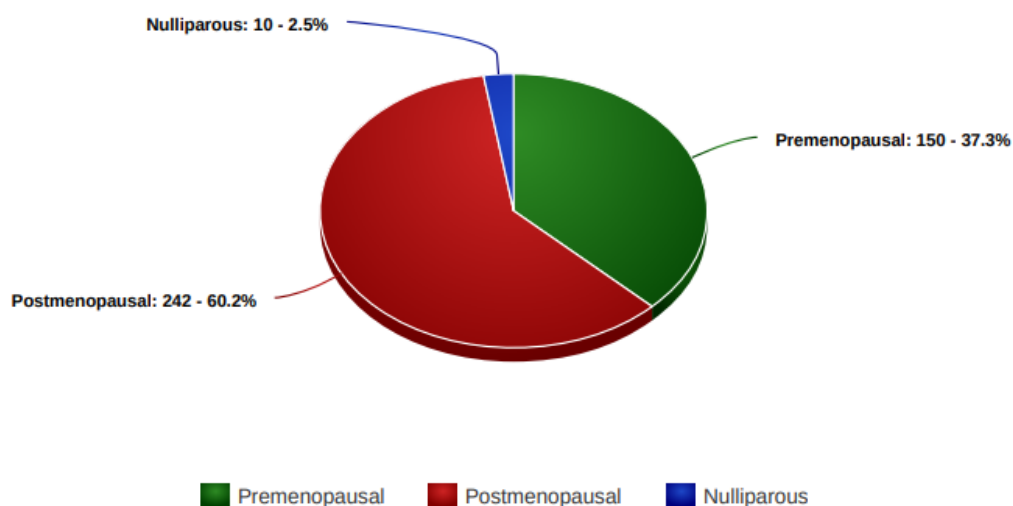


Figure 6. Stratification of breast cancer cases into different groups based on reproductive status.

3.6. Stratification of BC patients according to the cancer stage

Herein, all collected cases of breast cancer patients were categorized based on the detected stage of breast cancer: stage 1, stage 2, stage 3, stage 4, and stage unknown. Among the 402 breast cancer patients, 32 patients (7.9%) were diagnosed with stage 1 cancer, 110 patients (27.4%) with stage 2 cancer, 169 patients (42.0%) with stage 3 cancer, and 65 patients (16.2%) with stage 4 cancer. Additionally, 26 patients (6.5%) had an unknown stage of cancer (**Figure 7**).

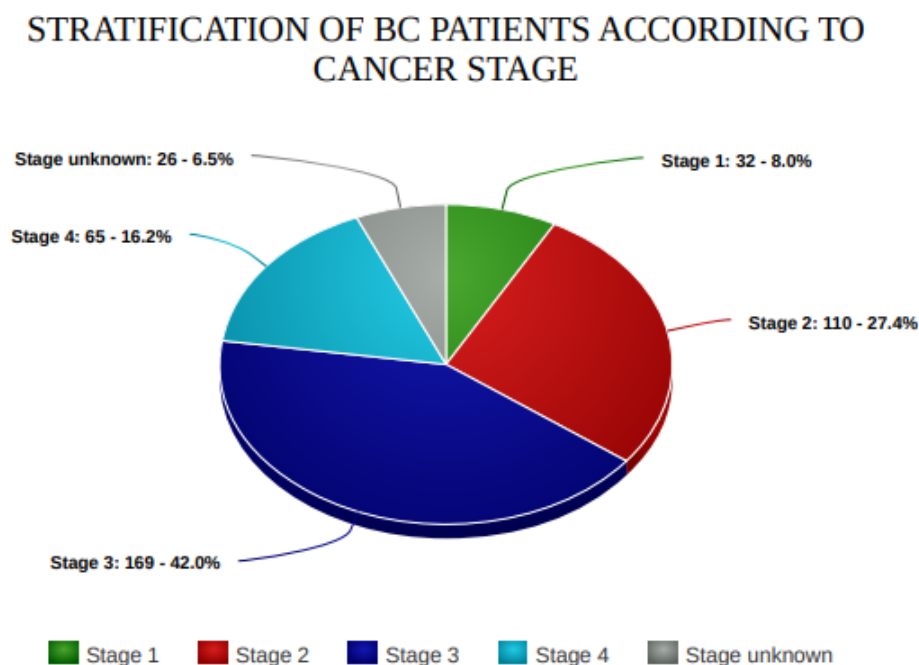


Figure 7. Stratification of breast cancer cases into different groups based on different cancer stages.

3.7. Stratification of BC patients according to the time of detection

Within this portion of the study, all collected data of breast cancer patients were classified into five categories based on the time since diagnosis: 0–5 years, 6–10 years, 11–15 years, and 16–20 years. Among the total 402 breast cancer patients, the distribution based on diagnosis duration was as follows: 383 patients (95.3%) were diagnosed within 0–5 years, 15 patients (3.7%) were diagnosed within 6–10 years, and 2 patients (0.5%) were diagnosed within both the 11–15 years and 16–20 years categories (**Figure 8**).

STRATIFICATION OF BC PATIENTS ACCORDING TO THE TIME OF DETECTION

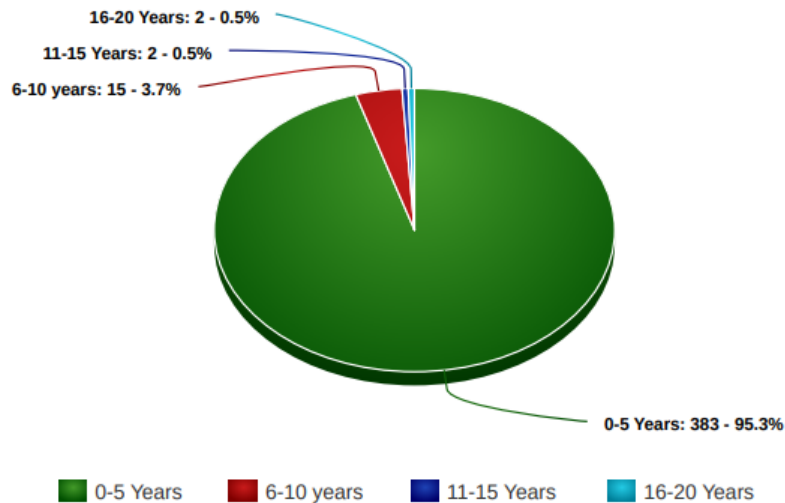


Figure 8. Stratification of breast cancer cases into different groups based on the status of time of detection.

4. Discussion

Breast cancer is a complex and prevalent form of cancer that originates in the cells of the breast tissue^[37]. It is characterized by abnormal growth and proliferation of cells, which can form tumors that invade nearby tissues and, in advanced stages, metastasize to other parts of the body^[38]. Breast cancer can affect both women and, although less commonly, men. It is the most common cancer among women worldwide, impacting millions of lives annually^[39]. Early detection through screening programs, combined with advances in treatment modalities such as surgery, chemotherapy, radiation therapy, and targeted therapies has significantly improved survival rates and outcomes^[40]. Ongoing research continues to unravel the genetic, environmental, and lifestyle factors contributing to breast cancer development, aiming to enhance prevention strategies and personalized treatment approaches.

This study aimed to comprehensively analyze various demographic and clinical factors among breast cancer patients at Bahawalpur Institute of Nuclear Oncology (BINO) Hospital, Bahawalpur, Pakistan. The findings from this study provide valuable insights into the distribution and characteristics of breast cancer within the studied population.

The study categorized breast cancer patients based on age, BMI, family history of cancer, smoking status, reproductive status, cancer stage, and time since detection. Regarding age distribution, a significant proportion of patients fell within the 41–60 years age group, consistent with global trends where breast cancer incidence peaks during middle-age^[41,42]. The distribution based on BMI showed a notable prevalence of obesity among the patients, which is increasingly recognized as a risk factor for breast cancer^[43,44].

Comparing the findings with previous studies reveals both consistencies and variations, similar to global and regional trends, the study found a predominant occurrence of breast cancer among middle-aged women^[45,46]. However, the distribution of BMI categories and the prevalence of specific risk factors such as family history and smoking status may vary across different populations and settings.

Understanding the demographic and clinical profiles of breast cancer patients is crucial for informing targeted prevention strategies, early detection efforts, and personalized treatment plans. The high prevalence of obesity among the study population emphasizes the importance of lifestyle interventions and public health initiatives aimed at promoting healthy weight management to reduce breast cancer risk. It is important to

acknowledge several limitations of the study, including its retrospective nature and reliance on hospital records. Future research could benefit from longitudinal studies and larger sample sizes to further validate the findings and explore additional factors influencing breast cancer incidence and outcomes.

5. Conclusion

In conclusion, this study contributes to the growing body of knowledge on breast cancer epidemiology in Bahawalpur, Pakistan. By analyzing demographic and clinical data, key patterns and trends have been identified that can guide both clinical practice and public health interventions aimed at reducing the burden of breast cancer in this region. Future research and collaborative efforts are essential to further refine the understanding and improve outcomes for breast cancer patients.

Disclosure statement

The authors declare no conflict of interest.

References

- [1] Baset Z, Abdul-Ghafar Jamshid, Parpio YN, et al., 2021, Risk Factors of Breast Cancer Among Patients in Tertiary Care Hospitals in Afghanistan: A Case Control Study. *BMC Cancer*, 21(1): 71.
- [2] Ahmad W, Firasat S, Akhtar MS, et al., 2021, Demographic Variation and Risk Factors Regarding Breast Cancer Among Females in Southern Punjab, Pakistan. *Journal of Pakistan Medical Association*, 71(7): 1749–1756.
- [3] Arafat HM, Omar J, Shafii N, et al., 2023, The Association Between Breast Cancer and Consumption of Dairy Products: A Systematic Review. *Annals of Medicine*, 55(1): 2198256.
- [4] Mubarik S, Sharma R, Hussain SR, et al., 2022, Breast Cancer Mortality Trends and Predictions to 2030 and Its Attributable Risk Factors in East and South Asian Countries. *Frontiers in Nutrition*, 9: 847920.
- [5] Roheel A, Khan A, Anwar F, et al., 2023, Global Epidemiology of Breast Cancer Based on Risk Factors: A Systematic Review. *Frontiers in Oncology*, 13: 1240098.
- [6] Romagnolo DF, Daniels KD, Grunwald JT, et al., 2016, Epigenetics of Breast Cancer: Modifying Role of Environmental and Bioactive Food Compounds. *Molecular Nutrition & Food Research*, 60(6): 1310–1329.
- [7] Wiggs AG, Chandler JK, Aktas A, et al., 2021, The Effects of Diet and Exercise on Endogenous Estrogens and Subsequent Breast Cancer Risk in Postmenopausal Women. *Frontiers in Endocrinology (Lausanne)*, 12: 732255.
- [8] He Y, Si Y, Li X, et al., 2022, The Relationship Between Tobacco and Breast Cancer Incidence: A Systematic Review and Meta-Analysis of Observational Studies. *Frontiers in Oncology*, 12: 961970.
- [9] Brignoni L, Cappetta M, Colistro V, et al., 2020, Genomic Diversity in Sporadic Breast Cancer in a Latin American Population. *Genes (Basel)*, 11(11): 1272.
- [10] Obeagu EI, Obeagu GU, 2024, Breast Cancer: A Review of Risk Factors and Diagnosis. *Medicine (Baltimore)*, 103(3): e36905.
- [11] Brewer HR, Jones ME, Schoemaker MJ, et al., 2017, Family History and Risk of Breast Cancer: An Analysis Accounting for Family Structure. *Breast Cancer Research & Treatment*, 165(1): 193–200.
- [12] Kwong A, Shin VY, Ho JCW, et al., 2016, Comprehensive Spectrum of BRCA1 and BRCA2 Deleterious Mutations in Breast Cancer in Asian Countries. *Journal of Medical Genetics*, 53(1): 15–23.
- [13] Derks MGM, Velde CJH, Giardiello D, et al., 2019, Impact of Comorbidities and Age on Cause-Specific Mortality in Postmenopausal Patients with Breast Cancer. *Oncologist*, 24(7): e467–e474.
- [14] Khalis M, Charbotel B, Chajes V, et al., 2018, Menstrual and Reproductive Factors and Risk of Breast Cancer: A Case-Control Study in the Fez Region, Morocco. *PLoS One*, 13(1): e0191333.
- [15] Dehesh T, Fadaghi S, Seyedi M, et al., 2023, The Relation Between Obesity and Breast Cancer Risk in Women by Considering Menstruation Status and Geographical Variations: A Systematic Review and Meta-Analysis. *BMC Womens Health*, 23(1): 392.
- [16] Hu L, Xu B, Chau PH, et al., 2023, Reproductive Concerns Among Young Adult Women with Breast Cancer: A Systematic Review Protocol. *BMJ Open*, 13(7): e071160.
- [17] Nomura T, Kawai M, Fukuma Y, et al., 2023, Alcohol Consumption and Breast Cancer Prognosis After Breast

Cancer Diagnosis: A Systematic Review and Meta-Analysis of the Japanese Breast Cancer Society Clinical Practice Guideline, 2022 Edition. *Breast Cancer*, 30(4): 519–530.

- [18] Darmon S, Park A, Lovejoy LA, et al., 2022, Relationship Between Cigarette Smoking and Cancer Characteristics and Survival Among Breast Cancer Patients. *International Journal of Environmental Research & Public Health*, 19(7): 4084.
- [19] Ledda C, Bracci M, Lovreglio P, et al., 2021, Pesticide Exposure and Gender Discrepancy in Breast Cancer. *European Review for Medical and Pharmacology Science*, 25(7): 2898–2915.
- [20] Yang KJ, Lee J, Park HL, 2020, Organophosphate Pesticide Exposure and Breast Cancer Risk: A Rapid Review of Human, Animal, and Cell-Based Studies. *International Journal of Environmental Research & Public Health*, 17(14): 5030.
- [21] Moslehi R, Stagnar C, Srinivasan S, et al., 2021, The Possible Role of Arsenic and Gene-Arsenic Interactions in Susceptibility to Breast Cancer: A Systematic Review. *Review of Environmental Health*, 36(4): 523–534.
- [22] Filippini T, Torres D, Lopes C, et al., 2020, Cadmium Exposure and Risk of Breast Cancer: A Dose-Response Meta-Analysis of Cohort Studies. *Environment International*, 142: 105879.
- [23] Pang Y, Wei Y, Kartsonaki C, 2022, Associations of Adiposity and Weight Change with Recurrence and Survival in Breast Cancer Patients: A Systematic Review and Meta-Analysis. *Breast Cancer*, 29(4): 575–588.
- [24] Zaremba SMM, Stead M, McKell J, et al., 2023, Response to a Novel, Weight Self-Awareness Plan Used in a Multi-Component Lifestyle Intervention Programme to Reduce Breast Cancer Risk Factors in Older Women-Secondary Analysis from the ActWELL Trial. *Journal of Human Nutrition & Dietetics*, 36(1): 266–276.
- [25] Gopinath A, Cheema AH, Chaludiya K, et al., 2022, The Impact of Dietary Fat on Breast Cancer Incidence and Survival: A Systematic Review. *Cureus*, 14(10): e30003.
- [26] Liu X, Yue J, Pervaiz R, et al., 2022, Association Between Fertility Treatments and Breast Cancer Risk in Women with a Family History or BRCA Mutations: A Systematic Review and Meta-Analysis. *Frontiers in Endocrinology (Lausanne)*, 13: 986477.
- [27] Barańska A, 2022, Oral Contraceptive Use and Assessment of Breast Cancer Risk Among Premenopausal Women via Molecular Characteristics: Systematic Review with Meta-Analysis. *International Journal of Environmental Research & Public Health*, 19(22): 15363.
- [28] Lalitkumar PGL, Lundstrom E, Bystrom B, et al., 2023, Effects of Estradiol/Micronized Progesterone vs. Conjugated Equine Estrogens/Medroxyprogesterone Acetate on Breast Cancer Gene Expression in Healthy Postmenopausal Women. *International Journal of Molecular Science*, 24(4): 4123.
- [29] Prentice RL, Aragaki AK, Chlebowski RT, et al., 2021, Randomized Trial Evaluation of the Benefits and Risks of Menopausal Hormone Therapy Among Women 50-59 Years of Age. *American Journal of Epidemiology*, 190(3): 365–375.
- [30] Collaborative Group on Hormonal Factors in Breast Cancer, 2019, Type and Timing of Menopausal Hormone Therapy and Breast Cancer Risk: Individual Participant Meta-Analysis of the Worldwide Epidemiological Evidence. *Lancet*, 394(10204): 1159–1168.
- [31] Hermelink R, Leitzmann MF, Markozannes G, et al., 2022, Sedentary Behavior and Cancer—An Umbrella Review and Meta-Analysis. *European Journal of Epidemiology*, 37(5): 447–460.
- [32] Li M, Han M, Chen Z, et al., 2020, Does Marital Status Correlate with the Female Breast Cancer Risk? A Systematic Review and Meta-Analysis of Observational Studies. *PLoS One*, 15(3): e0229899.
- [33] Hinyard L, Wirth LS, Clancy JM, et al., 2017, The Effect of Marital Status on Breast Cancer-Related Outcomes in Women Under 65: A SEER Database Analysis. *Breast*, 32: 13–17.
- [34] Yuan R, Zhang C, Li Q, et al., 2021, The Impact of Marital Status on Stage at Diagnosis and Survival of Female Patients With Breast and Gynecologic Cancers: A Meta-Analysis. *Gynecologic Oncology*, 162(3): 778–787.
- [35] Wang K, Nakano K, Naderi N, et al., 2021, Is the Skin Microbiota a Modifiable Risk Factor for Breast Disease? A Systematic Review. *Breast*, 59: 279–285.
- [36] Khoramdad M, Solaymani-Dodaran M, Kabir A, et al., 2022, Breast Cancer Risk Factors in Iranian Women: A Systematic Review and Meta-Analysis of Matched Case-Control Studies. *European Journal of Medical Research*, 27(1): 311.
- [37] Polyak K, 2007, Breast Cancer: Origins and Evolution. *The Journal of Clinical Investigation*, 117(11): 3155–3163.
- [38] Bombonati A, Sgroi DC, 2011, The Molecular Pathology of Breast Cancer Progression. *The Journal of Pathology*,

223(2): 308–318.

- [39] Torre LA, Islami F, Siegel RL, et al., (2017), Global Cancer in Women: Burden and Trends. *Cancer Epidemiology, Biomarkers & Prevention*, 26(4): 444–457.
- [40] Ahmad A, 2019, Breast Cancer Statistics: Recent Trends. *Breast Cancer Metastasis and Drug Resistance: Challenges and Progress*, 1152: 1–7.
- [41] Siegel RL, Miller KD, Wagle NS, et al., 2023, *Cancer Statistics, 2023*. CA: A Cancer Journal for Clinicians, 73(1): 17–48.
- [42] Siegel RL, Giaquinto AN, Jemal A, 2024, *Cancer Statistics, 2024*. CA: A Cancer Journal for Clinicians, 74(1): 12–49.
- [43] James F, Wootton S, Jackson A, et al., 2015, Obesity in Breast Cancer – What Is the Risk Factor? *European Journal of Cancer*, 51(6): 705–720.
- [44] Chan DS, Norat T, 2015, Obesity and Breast Cancer: Not Only a Risk Factor of the Disease. *Current Treatment Options in Oncology*, 16: 1–17.
- [45] Fitzmaurice C, Dicker D, Pain A, et al., 2015, The Global Burden of Cancer 2013. *JAMA Oncology*, 1(4): 505–527.
- [46] Bray FI, 2006, *Temporal Studies of Cancer Occurrence and Applications of the Age-Period-Cohort Method to Trends in Europe*, thesis, London School of Hygiene & Tropical Medicine.

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Study on the Clinical Significance and Expression Level of CA-125 and D-dimer in the Serum of Patients with Adenomyosis

Narankhuu Ijilmurun*, Ruochan Lv

Hohhot First Hospital, Hohhot 010010, Inner Mongolia Autonomous Region, China

*Corresponding author: Narankhuu Ijilmurun, ijilmurun@163.com

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Abstract: CA-125 and D-dimer show potential applications in diagnosing and managing adenomyosis. As a traditional tumor marker, CA-125 may show a trend of increase in patients with adenomyosis, but its specificity is insufficient, because it may also increase in various gynecological diseases. As a measure of coagulation activity, D-dimer may be associated with inflammation and tissue changes related to adenomyosis. However, its specific mechanism of action and diagnostic efficacy still need to be further studied. Current studies are limited by the small sample size, insufficient standardization and lack of dynamic monitoring data, these factors limit the general applicability of the conclusions and practical value of the application. Therefore, it is particularly urgent to conduct large-scale, prospective studies to verify the effectiveness of these biomarkers and to explore their combined application in the diagnosis and management of adenomyosis. This will help to develop more accurate diagnosis and treatment plans and enhance the scientificity of clinical decision-making.

Keywords: Adenomyosis; CA-125; D-Dimer; Clinical significance; Diagnosis

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1. Introduction

Adenomyosis is a common disease in the field of gynecology, which is characterized by the invasion of endometrial tissue into the uterus and heterometrium. Such pathological changes usually lead to the expansion of the uterine volume and trigger a range of clinical symptoms, including chronic pelvic pain, excessive menstruation, and prolonged menstrual periods. These symptoms not only affect the physical health of patients but also seriously interfere with their quality of life and mental health ^[1-3]. Traditionally, the diagnosis of adenomyosis has mainly relied on imaging techniques, such as ultrasonography and magnetic resonance imaging (MRI) ^[1,3,4]. Although these methods can provide exhaustive information on the uterine structure, there may be a problem of insufficient accuracy in detecting small focal lesions of adenomyosis. Moreover, the high cost of high-end imaging examinations such as MRI limits its widespread application, especially in resource-limited areas ^[3,4].

In this context, the researchers gradually focus on serum biomarkers, hoping to assist in the diagnosis of adenomyosis through simple blood tests. CA-125 and D-dimer are two markers widely studied. As a tumor

marker, CA-125 was used early in the detection of ovarian cancer, but it also showed an elevation in some benign gynecological diseases. The D-dimer is the product of fibrin degradation and is mainly used to assess the thrombotic state. Preliminary studies showed that these two markers may have some diagnostic and monitoring value in patients with adenomyosis ^[1-3]. However, its clinical application needs more systematic and comprehensive studies. These biomarkers are expected to be a powerful complement to traditional diagnostic methods, providing a more convenient and potentially cost-effective approach to diagnosis ^[1,2].

2. CA-125 in adenomyosis

CA-125 is a glycoprotein antigen that was initially used to monitor ovarian cancer, but its elevated levels are also observed in a variety of gynecologic diseases. In recent years, researchers have begun to focus on the performance of CA-125 in adenomyosis, and have tried to evaluate its potential as a diagnostic and monitoring tool. In patients with adenomyosis, the levels of CA-125 are usually higher than those in normal women. This phenomenon is mainly due to uterine tissue inflammation and endometriotic stimulation caused by the disease, resulting in the increased release of CA-125. Several studies have shown that there is a correlation between elevated CA-125 and the degree of lesions of adenomyosis, that is, CA-125 levels may increase with the aggravation of the disease ^[3,5-7]. Therefore, CA-125 can reflect the activity and severity of the disease to some extent ^[3,5-7].

However, CA-125 also has limitations as a diagnostic marker. First, its sensitivity and specificity are not ideal in the diagnosis of adenomyosis. CA-125 can also be elevated in many other conditions, such as pelvic inflammatory diseases, endometriosis, and other uterine fibroid lesions. This limits the usefulness of CA-125 in distinguishing adenomyosis from other diseases. Therefore, relying on CA-125 alone for diagnosis may lead to misdiagnosis or missed diagnosis. Nevertheless, CA-125 is regarded as a potential auxiliary diagnostic tool, especially when combining imaging, to provide more diagnostic information. In addition, CA-125 can also be used to assess efficacy and monitor confirmed patients, judging the effectiveness of treatment and the course of the disease by regularly testing changes in their levels ^[3,6].

Overall, although CA-125 cannot be used as a diagnostic criterion for adenomyosis alone, its potential value cannot be ignored in the multidisciplinary diagnosis and treatment model. Future studies should continue to explore how to optimize the application strategy of CA-125 and its effects in combination with other biomarkers ^[1,7].

2.1. CA-125 expression in the blood of adenomyosis patients

In the study of adenomyosis, several key studies have explored the level changes of CA-125 in patient serum and its clinical significance. Overall, CA-125 levels were increased in patients with adenomyosis compared to healthy individuals. However, the specific degree of elevation and fluctuation range of CA-125 in such patients may vary between the study subjects and methods ^[1,3,7].

Some studies have shown that the mean CA-125 level in adenomyosis patients is generally above the upper limit of normal reference values (usually 35 U/mL), but the specific elevated levels may vary by individual differences and disease activity. For instance, Chen et al. ^[3] reported that levels often exceed 100 U/mL in severe cases, while Liu et al. ^[6] emphasized the variability due to patient-specific factors such as comorbidities and lesion severity. Studies have suggested that some patient's CA-125 levels may be only mildly elevated, while others may be significantly elevated to above 100 U/mL. However, this elevation is not unique to adenomyosis, as other gynecological diseases may also contribute to CA-125 elevation ^[1,7,8]. When exploring the level of CA-125 among different patient groups, studies found that factors such as patient age, disease duration length, lesion site and degree of lesion may all influence the level of CA-125 ^[9]. For example, patients with more disease or a larger range of lesions often have higher CA-125 levels. This may be due to the increased release of CA-125 ^[6,9,10]. Furthermore, changes in CA-125 levels may be even more complicated in patients with complications or complicated with other gynecologic diseases ^[10]. This suggests that, although

elevated CA-125 is associated with adenomyosis, it does not alone serve as a criterion for determining disease severity^[11]. In conclusion, despite the application of CA-125 in adenomyosis, its multifactorial elevated levels and high interpatient variability limit its independent diagnostic role. Therefore, in clinical practice, CA-125 is usually used in combination with other diagnostic methods to improve diagnostic accuracy and comprehensively evaluate the changes in the condition. Future studies need to continue to explore how to more precisely utilize the diagnostic and surveillance value of CA-125 in different patient populations^[3,6,10].

2.2. Test method

The main techniques used for detecting CA-125 include the enzyme-linked immunosorbent assay (ELISA) and the chemiluminescence immunoassay (CLIA)^[12]. Studies comparing these methods suggest that CLIA offers higher sensitivity and automation, making it more suitable for large-scale clinical applications, while ELISA remains a cost-effective and widely available option in resource-limited settings^[13]. Both methods are widely used in clinics and research to detect CA-125 levels in serum. The following is a comparison of the two techniques and their impact on the consistency and comparability of the test results^[14-16].

2.2.1. Enzyme-linked immunosorbent test (ELISA)

(1) Advantage:

- (a) Widely used: ELISA is a mature and widely used technology with a standardized operation process.
- (b) Cost-effectiveness: Relatively low cost, so that it can be implemented in a resource-limited environment.
- (c) Flexibility: Suitable for testing in multiple sample types (such as serum, plasma, etc.).

(2) Disadvantage:

- (a) Sensitivity and specificity: Not as high as some emerging technologies, such as CLIA.
- (b) Complex operation: Multiple steps are required, including incubation and washing, and long operation time.
- (c) Less signal amplification: Low detection sensitivity for low-concentration samples.

2.2.2. Chemiluminescence immunoassay (CLIA)

(1) Advantage:

- (a) High sensitivity and specificity: High sensitivity and specificity chemiluminescence reaction.
- (b) Automation: Usually integrated into a fully automated analyzer, reducing the error of manual operation.
- (c) Fast: Short detection time, suitable for high-throughput sample detection.

(2) Disadvantage:

- (a) High cost: Equipment and reagents are more expensive and may not apply to all laboratories.
- (b) Equipment dependence: Specific instrument platforms are required, limiting the choice of laboratories.

2.2.3. Effect on the consistency and comparability of test results

CLIA usually provides high consistency with automated and accurate assays. However, the test results of ELISA may be more variable due to more steps and artificial variation. Besides, there is also a high comparability of CLIA test results. Direct comparability of CA-125 results, in different laboratories, especially across different testing techniques. Using the same set of standards and calibration procedures is an important means of improving comparability.

When selecting the testing technology, the laboratory should consider the sample processing capacity, cost, equipment availability, and the required test accuracy. For studies involving long monitoring or in clinical applications, consistency and comparability of results are critical. The use of uniform techniques or the development of rigorous standard operating procedures may help to reduce the differences between different detection methods.

2.3. Clinical significance

The clinical significance of CA-125 level in adenomyosis is mainly reflected in the following aspects:

(1) Auxiliary diagnosis and supporting information

Although CA-125 cannot be used alone to confirm adenomyosis, it can provide supportive information to help determine the direction of diagnosis in suspected patients. Combined with imaging examination, CA-125 may provide some reference value for diagnosis.

(2) Disease activity indication

In some cases, increased CA-125 levels may be associated with disease activity, although this is not absolute. Higher CA-125 levels may be associated with more severe symptoms or more extensive lesions.

(3) Assessment of treatment responsiveness

A reduction in CA-125 levels during treatment may indicate a positive response to treatment. This may be helpful in tracking improvements and in evaluating the effectiveness of treatment options.

(4) Disease monitoring

In long-term management, regular monitoring of CA-125 levels may help detect potential disease changes, with limited sensitivity and specificity, but trend changes may still be useful.

(5) Restrictions and the need for caution

Since other benign lesions and physiological conditions (such as menstrual cycle, inflammation, etc.) can also affect CA-125 levels, the results must be used in combination with other clinical information to avoid miscalculation.

Overall, the clinical significance of CA-125 in adenomyosis is limited but can be part of a comprehensive assessment in specific situations to help clinicians develop a more comprehensive treatment and management plan. Its application should always be combined with other diagnostic tools and clinical assessments to ensure accurate and reliable medical judgment.

3. D-dimer in adenomyosis

D-dimer is a fibrin degradation product, the levels of which are often used to assess thrombosis and fibrinolytic activity. In adenomyosis, the measurement of D-dimer is an exploratory area, but some studies have attempted to explore its potential role in inflammation and tissue remodeling processes.

3.1. Potential role of D-dimer in adenomyosis

(1) Inflammatory response indication

Adenomyosis is a disease associated with a chronic inflammatory response. The increased levels of D-dimer may reflect the underlying inflammatory activity and fibrin metabolic changes in patients with adenomyosis.

(2) Assessment of disease severity

Theoretically, the level of D-dimerization may be associated with the disease severity of adenomyosis. Higher D-dimer levels may suggest more extensive tissue damage or more active lesions. However, the clinical evidence for this aspect is still insufficient.

(3) Difference from other diseases

Due to the lack of specificity of D-dimers, measurement of D-dimer level alone is insufficient to diagnose adenomyosis but may provide a clue for disease differentiation in combination with other tests.

3.2. Limitations of the current study

Currently, studies on D-dimer in adenomyosis are limited and mostly small-scale or preliminary studies. Here are the limitations:

(1) Lack of large-scale studies

Most of the existing studies are small samples or observational studies, and a lack of large-scale clinical trials to verify the specific role of D-dimer in adenomyosis.

(2) Low specificity

D-dimer is a common marker of many pathological processes, with low specificity, and it is difficult to define the disease type only through its level changes.

(3) Individual variability

D-dimer levels may be affected by multiple factors such as age, and the presence of other inflammatory or thrombotic diseases, thus having limited value as a single indicator.

3.3. Future research direction

To better understand the role of the D-dimer in adenomyosis, future studies could consider:

(1) Conduct large-scale, multicenter clinical studies to evaluate the potential diagnostic and prognostic value of D-dimers in adenomyosis.

(2) Combined analysis with other biomarkers (e. g. CA-125) to improve diagnostic accuracy.

(3) Explore the correlation between changes in D-dimer level and imaging assessment and improvement of clinical symptoms.

In conclusion, although the use of D-dimer in adenomyosis still needs more research support, its role as a potential biomarker deserves further exploration.

3.4. D-dimer expression in the blood of adenomyosis patients

Regarding the expression changes of D-dimer in patients with adenomyosis, the available studies are relatively limited and the results are not completely consistent. However, several preliminary studies and clinical observations have attempted to analyze the changes in their levels in these patients and the underlying mechanisms behind them.

(1) Higher trend

Some studies have shown that D-dimer levels may be increased in patients with adenomyosis. This change may be related to the increase in fibrin metabolism induced by chronic inflammation. However, because of the lack of specificity of D-dimers, this elevation may similarly reflect other pathological processes, such as concurrent infection or inflammatory diseases.

(2) Relationship with the severity of the disease

Some studies have proposed that D-dimer levels may be associated with the severity of the disease and that higher D-dimer levels may indicate more severe tissue invasion or vascular abnormalities.

3.5. Data consistency across the different studies

Due to the complexity of adenomyosis and the diversity of factors influencing the D-dimer, the issue of data consistency between different studies is more prominent:

(1) Differences in sample size and design

Most of the existing studies are small samples or single-center studies, with small sample sizes and different study designs (such as inclusion criteria and detection methods), resulting in large differences in results.

(2) Factors affecting fibrin metabolism

Individual patient differences, comorbidities, treatment regimen and other factors will affect the D-dimer level and increase the inconsistency of data.

(3) Characteristics under specific pathological conditions

Under specific pathological conditions, the changes in D-dimer levels may show the following characteristics:

(a) Acute onset or complications: D-dimer levels may be significantly increased in the acute episode of adenomyosis or with an increased risk of infection or thrombosis.

(b) Changes after treatment: Some treatments (such as hormonal therapy or surgery) may lead to dynamic

changes in D-dimer levels. For example, in the short term after surgery, the D-dimer may rise and subsequently decline with recovery.

3.6. Summary

In conclusion, further studies are still needed to clarify the specific role of D-dimer and the characteristics of its level changes in adenomyosis. A larger and more rigorous study should be considered to explore their clinical significance in such patients and to try to use it in combination with other biomarkers to improve the accuracy and reliability of diagnosis and monitoring.

3.7. Test method

The detection of D-dimer is usually done by blood tests, mainly the following common methods:

(1) Enzyme-linked immunosorbent test (ELISA)

Features: This method is widely used in clinical laboratories and is favored for its high sensitivity and specificity.

Process: Use an antibody to D-dimer to measure the concentration by color development or luminescence through an enzymatic reaction.

(2) Immunoturbidimetry

Features: This method is relatively fast and is suitable for most conventional laboratories.

Process: D-dimer concentration was calculated from the antigen-antibody reaction.

(3) Fluoroimmunoassay

Features: High sensitivity and specificity, suitable for the need for accurate measurement.

Process: D-dimer level is detected by stimulating the fluorescence signal by laser using fluorescently labeled antibody.

(4) Overall blood analysis method

Features: Fast and convenient, often used for bedside detection.

Process: This method uses specific kits that can be tested within minutes, suitable for clinical settings requiring rapid decision-making.

3.8. Test precautions

(1) Sample processing: Strict blood sample processing is required to avoid hemolysis and other factors that may affect the test results.

(2) Interpretation of results: Comprehensive assessment combined with clinical context, as D-dimer level may be affected by various factors, such as age, pregnancy, and postoperative status.

(3) Comparability between different methods: Different detection methods may have different reference ranges and sensitivity, so the results may not be directly comparable.

In conclusion, the detection methods of D-dimer are diverse, each with its advantages and disadvantages, and clinicians need to choose appropriate methods according to specific situations and comprehensively interpret the results combined with other clinical information.

3.9. Immunometric turbidimetry

Immunoturbidimetry is based on antigen-antibody responses. When the D-dimer in the sample is bound to the specific antibody in the reagent, an immune complex forms, resulting in an increased turbidity of the solution. The D-dimer level in the sample can be quantified. Immunoturbidimetry is widely used because of its high specificity and sensitivity. It can provide reliable quantitative results in a relatively short period. In terms of the limitations, some methods may be affected by the high content of other proteins or substances with high solubility in the sample, resulting in background noise or interference.

3.9.1. Reproducibility

Immunoturbidimetry generally shows good reproducibility under laboratory conditions, especially in automated analyzers, enabling high throughput and high consistency detection. Instrument calibration and reagent batches may affect the repeatability of the results, requiring strict quality control measures.

3.9.2. Clinical utility

- (1) Rapid and high throughput: The obibidimetric method rapidly provides results for hospital laboratories requiring large sample processing.
- (2) High degree of automation: Suitable for integration into automated analysis equipment to reduce human error.
- (3) Relatively low cost: Immunity is more economical than some more complex methods.

3.9.3. Application scenario

- (1) Thrombosis assessment: Often used to assess the risk of VTE in patients.
- (2) Treatment monitoring: Monitoring the efficacy of anticoagulation therapy and use in postoperative or acute condition monitoring.

3.9.4. Limitations

- (1) Specificity: Although sensitive, the D-dimer lacks pathological specificity, and other diseases such as infection and inflammation may also lead to elevated levels, which need to be combined with clinical evaluation.
- (2) Standardization: Kits provided by different equipment and reagent manufacturers may have different test results and need to be standardized and calibrated.

3.9.5. Conclusion

Immunoturbidimetry is commonly used in the clinic to detect D-dimer levels in the clinic because of its rapid, reliable and reproducible nature. In order to optimize its clinical application, enhanced standardization and quality control and comprehensive evaluation combined with other clinical information.

3.10. Clinical significance

D-dimer detection has many important applications and significance in clinical practice, mainly focusing on the following aspects:

- (1) Diagnosis and exclusion of thrombotic disease
 - (a) Venous thromboembolism (VTE): Increased D-dimer levels are often associated with acute venous thrombosis (deep vein thrombosis and pulmonary embolism). Although its specificity is low, a highly sensitive negative predictive value helps to exclude VTE.
 - (b) Clinical strategy: D-dimer is often used in the screening of high-risk populations. If the D-dimer result is negative, it can effectively exclude thrombotic disease and reduce unnecessary imaging tests.
- (2) Anticoagulation therapy was monitored

The dimer can be used to monitor the effect of the anticoagulation therapy. The decrease in D-dimer levels after treatment may indicate good efficacy.
- (3) Auxiliary diagnosis of disseminated intravascular coagulation (DIC)

In DIC, D-dimer levels are usually significantly elevated. By combining other coagulation markers, the D-dimer can be used as an adjunct tool for the diagnosis and severity assessment of DIC.
- (4) Assessment of surgery and after trauma

After surgery and severe trauma, D-dimer levels may increase due to increased tissue damage and the process of fibrinolysis. Therefore, D-dimer testing can help to assess blood coagulation after surgery or

trauma.

(5) Prediction of pregnancy complications

There is a natural tendency to increase the D-dimer levels during pregnancy, but the excessive elevation may indicate the risk of gestational complications, such as preeclampsia or placental abruption.

(6) Risk assessment of cardiovascular events

Some studies have shown that increased D-dimer levels may be associated with an increased risk of cardiovascular disease (myocardial infarction and stroke).

(7) Important considerations

Although D-dimer is very useful for screening and excluding certain diseases, its elevated levels lack specificity because many other conditions (inflammation, infection, trauma, surgery, pregnancy, etc.) can also lead to elevated D-dimer. Therefore, it is necessary to comprehensively evaluate the patient with the history, signs, and other laboratory or imaging findings. Results interpretation considers individual differences and clinical context and avoids a single reliance on D-dimer values to make diagnostic decisions.

In conclusion, D-dimer detection is important in clinical practice and can effectively assist in the diagnosis, monitoring and risk assessment of multiple pathological conditions. However, in order to make accurate clinical judgments, the multifaceted information must be considered comprehensively.

4. Discussion

The application of D-dimer in adenomyosis and other related pathological states needs to be considered, including the biological properties of D-dimer, its changing mechanisms in different disease states, and how this information can be used effectively in the clinic.

4.1. Biological characterization of the D-dimer

The D-dimer is a product of fibrin degradation and is commonly used to assess coagulation and fibrinolytic activities in vivo. Normally, the levels of D-dimers are low, while their levels may be significantly elevated in pathological states, such as thrombosis, severe inflammation, or tissue damage.

4.2. Potential applications in adenomyosis

4.2.1. Diagnosis and monitoring

Challenge: The main symptoms of adenomyosis include excessive menstruation and dysmenorrhea, which are not specific, making it challenging to rely solely on pathological indicators.

Potential: If studies confirm that D-dimers present characteristic changes in patients with adenomyosis, they may provide auxiliary tools for diagnosis.

Dynamic monitoring: lesion progression or efficacy may be assessed by monitoring changes in D-dimer levels.

4.2.2. Pathophysiological understanding

- (1) Local inflammation and hyperplasia: Adenomyosis involves local inflammation caused by the invasion of endometrioid glands and stroma into the myometrium. The D-dimers may reflect the fibrinolytic activity at the lesion.
- (2) Systemic effects: If it changes in adenomyosis, it may reveal the impact of the disease on the systemic coagulation and fibrinolytic system.
- (3) Markers of pathological status: During preeclampsia, the increase of D-dimer often indicates the placental pathological status and systemic intravascular coagulation.
- (4) Clinical decision making: use dynamic changes of D-dimer to guide treatment and prevention measures.
- (5) Inflammatory and thrombotic diseases: Widely used to assist in the diagnosis and exclusion of thrombotic disease by combining other clinical indicators and imaging evaluation with monitoring D-dimer levels in

chronic inflammatory disease as secondary indicators.

5. Clinical utility and research direction

5.1. Clinical integration

The use of the D-dimer as a monitoring indicator in the clinic requires a combination of medical history and other clinical data. A single value may lack sufficient information. Standardized measurement and interpretation criteria are crucial to avoid issues of comparability of different laboratory results.

5.2. Future research

Longitudinal studies of the D-dimer in adenomyosis, especially in other chronic diseases, should be expanded to understand its role in the disease process. Besides, future research should also explore the combined use of D-dimer with other inflammatory and biomarkers to improve the accuracy and effectiveness of its clinical application.

In conclusion, although the application of D-dimer in adenomyosis is not clear, its role in some diseases has been gradually recognized. Future studies may expand the scope of its application in different pathological states and improve its clinical value.

In the diagnosis of adenomyosis, CA-125 and D-dimers are possible biomarkers, each with different properties and potential for clinical application.

6. Potential research limitations

6.1. Comparison of CA-125 and D-dimer

The comparison of CA-125 and D-dimer is shown in **Table 1**.

Table 1. The comparison of CA-125 and D-dimer

	CA-125	D-dimer
Background	CA-125 is a glycoprotein antigen commonly used for ovarian cancer surveillance but is also elevated in a variety of benign lesions.	The D-dimer, as a fibrin degradation product, is commonly used to assess coagulation and fibrinolytic activity.
Sensitivity	CA-125 levels are often elevated in patients with adenomyosis and endometriosis. However, its sensitivity is not very high and may not be evident in early or mild adenomyosis.	In adenomyosis, the sensitivity of the D-dimer has not been fully studied, and its elevation may theoretically reflect enhanced fibrinolytic activity.
Specificity	CA-125 has low specificity because it may be elevated in many benign lesions and other gynecologic diseases (uterine fibroids, pelvic inflammatory diseases).	The specificity of D-dimers is low because multiple pathological states (infection, inflammation, recovery period after surgery) can increase them.
The potential for the combined use	Improve the diagnostic accuracy: Combining CA-125 with the D-dimer may improve the accuracy of the diagnosis of adenomyosis. CA-125 can provide insight into tumor markers, while D-dimers can reflect the underlying metabolic and fibrinolytic activity.	
Complementation	CA-125 is more focused on identifying tumor-related or ectopic endometrial tissue responses, while D-dimers may supplement information on coagulation abnormalities or tissue damage. The synergy may improve the ability to detect the pathological state of specific adenomyosis.	

6.2. Monitoring and management in clinical situations

6.2.1. Diagnosis and evaluation

Initial screening using CA-125 combined with D-dimers to exclude or confirm atypical conditions, especially if imaging findings are unclear.

6.2.2. Treatment follow-up

Treatment response can be assessed by monitoring changes in CA-125, and D-dimer changes may be estive of

fibrinolytic status and tissue recovery.

6.3. Prognostic assessment

The combined dynamic monitoring of CA-125 and D-dimers may be used for prognostic assessment to help predict the direction of the disease or the risk of recurrence.

7. Conclusion

The respective sensitivity and specificity of the CA-125 and D-dimers in the diagnosis of adenomyosis limits the usefulness of their separate application. However, the combination of both biomarkers may provide more comprehensive information on diagnosis, treatment monitoring, and prognostic assessment. However, the clinical application should be interpreted carefully, combined with the comprehensive clinical evaluation and other examination results, to ensure accuracy and reliability. Further studies are important to verify their combined diagnostic value and develop standardized application strategies.

In conclusion, CA-125 and D-dimers are potential biomarkers for adenomyosis. CA-125 has a role in labeling tumors and ectopic lining activity, but its specificity is limited. While D-dimer mainly reflects coagulation and fibrinolytic activities, its specific application in adenomyosis needs to be studied, which could theoretically provide complementary information on the status of the fibrinolytic system.

Combining these two markers, it is possible to improve the diagnostic accuracy of adenomyosis and enhance the understanding of the complexity of the condition through complementary effects. In clinical practice, this combined strategy can help improve diagnosis, treatment monitoring and prognostic evaluation, especially when imaging results are ambiguous or dynamic observation of disease changes is required.

Nonetheless, more studies are needed to validate and refine the specific methods and standards for the combined application to ensure the reliability and operability in different clinical contexts. Ultimately, this will help to provide more precise diagnostic and management strategies for patients in individualized medicine.

The current study suggests that CA-125 and D-dimer may have some potential for application in the diagnosis and management of adenomyosis, with limitations in their respective status and validity.

8. CA-125 and D-dimer in gynecological diseases

CA-125 has been identified in several studies as one of the potential markers of adenomyosis, and its elevation can suggest a similar tumor response or endometriotic activity. Although it shows some diagnostic value in some patients, it is not ideal when used alone due to its wide response and limited specificity in benign and malignant gynecological diseases.

D-dimer, as a commonly used measure of the coagulation–fibrinolytic balance in vivo, it could theoretically reflect the underlying inflammatory or tissue-remodeling activity in adenomyosis.

However, there are still few studies addressing its specific role in adenomyosis, and the evidence for clinical application is inadequate.

8.1. Lack of existing studies

- (1) Small sample size: Due to the limited sample size, the universality and persuasion of the results in many studies are low.
- (2) Lack of unified standards: There are differences in detection methods and interpretation of results among different studies, resulting in poor comparability of results.
- (3) Lack of research on dynamic monitoring: There is a relative lack of long-term research on the dynamic changes and monitoring value during the treatment process.
- (4) Insufficient research on joint application: There is insufficient research on how to effectively combine CA-125 and D-dimer for diagnosis and management.
- (5) Calls for further research: To enhance the contribution of CA-125 and D-dimers in the diagnosis and

management of adenomyosis, prospective, large-scale studies are urgently needed. These studies will help to better define the role of CA-125 and D-dimer in adenomyosis, ultimately facilitating the development of a more precise, personalized diagnosis and treatment strategies.

Disclosure statement

The authors declare no conflict of interest.

References

- [1] Smith J, Brown P, 2020, The Role of CA-125 in Diagnosing Adenomyosis: A Systematic Review. *The Lancet*, 395(10220): 1234–1242.
- [2] Johnson L, Wang H, et al., 2019, D-dimer as a Biomarker in Gynecological Conditions: A Clinical Study. *American Journal of Obstetrics and Gynecology*, 220(2): 234.e1–234.e7.
- [3] Chen Y, Liu S, Zhang P, et al., 2021, Evaluating Biomarkers for Adenomyosis: An Overview of Current Research. *Human Reproduction Update*, 2021, 27(3): 456–472.
- [4] Xie T, Chu B, 2020, Efficacy of Xiaojie Ann Capsule Combined with Trienone in Treatment with Adenomyosis Patients and Its Effect on Their Serum CA125, Progest F-2a. *Maternal and Child Health Care in China*, 38(5): 320–327.
- [5] Liu S, Sun G, Wang F, et al., 2019, The Expression Levels and Clinical Significances of Hsp90a, CEA, and CA199 in Peripheral Blood of Patients with Gastric Cancer. *Anhui Medical Journal*, 37(5): 245–252.
- [6] Chen Y, 2019, Clinical Significance of Serum CA125 Determination in Patients with Adenomyosis and Uterine Fibroids. *Practical Electronic Journal of Gynecologic Endocrinology*, 29(4): 312–318.
- [7] Wang X, Zhao H, Chen X, 2021, Effect of High-Intensity Focused Ultrasound Combined with GnRH-a on Serum CA125, PGF2a, Adiponectin in Patients with Adenomyosis. *Chinese Journal of Family Planning*, 35(2): 87–94.
- [8] Li Y, 2017, Expression of IGF-1, DLL 4, and VEGF in Endometriosis and Their Significance. *Chinese Journal of Obstetrics and Gynecology*, 26(1): 23–29.
- [9] Liu Y, Xu L, Zhu W, 2019, Value of Transvaginal Color Doppler Ultrasound Combined with Glycoantigen 125 in Screening for Adenomyosis. *Chinese Drug and Clinical*, 34(2): 78–85.
- [10] Zou K, Zhu Q, Li Z, et al., 2023, Efficacy of Plus and Subtraction Combined with Low Dose Mifepristone in Patients with Adenomyosis Dysmenorrhea and Its Effect on Serum VEGF and CA125. *The World Journal of Integrated Traditional Chinese and Western Medicine*, 29(7): 487–495.
- [11] Xing Y, 2017, Differential Expression of Cell Cycle Factors Geminin, Cdt 1, P16 and Ki67 in Cervical Intraepithelial Neoplasia Tissues. *Chinese Journal of Obstetrics and Gynecology*, 25(4): 134–139.
- [12] Yang D, 2020, Value of Comprehensive Nursing Intervention in Hysterectomy for the Treatment of Uterine Fibroids and Adenomyosis. *Oriental Medicated Food*, 6: 193–202.
- [13] Hong L, Chen X, 2019, Efficacy of Ultrasound-Guided Radiofrequency Ablation for Adenomyosis and Its Effect on Serum CA125. *Journal of Modern Integrated Traditional Chinese and Western Medicine*, 28(9): 702–709.
- [14] Li X, 2016, Expression and Clinical Significance of P-selectin, MTA 1, and Paxillin in Abdominal Wall Endometriosis and Adenomyosis. *Chinese Journal of Obstetrics and Gynecology*, 24(6): 332–338.
- [15] Yang D, 2016, BCL 2-L12 Expression in Endometrial Cancer and Its Relation to the Clinicopathological Parameters. *Chinese Journal of Obstetrics and Gynecology*, 23(5): 287–292.
- [16] Ding Q, Lu H, Lu Y, et al., 2023, Expression and Clinical Significance of ER Stress-Related Factor Oxygen Modulator Protein 150 in Adenomyosis. *Chinese-Foreign Medical Research*, 30(8): 519–525.

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Research on the Demand for Postpartum Health Management and its Influencing Factors in Yulin

Qiwen Li^{1†}, Sisi Huang^{1†}, Tao Jiang¹, Haijiao Zhang^{2*}

¹School of Humanities and Management, Guilin Medical University, Guilin 541199, Guangxi Province, China

²Health Management Center, Guangxi Nanxishan Hospital, Guilin 541002, Guangxi Province, China

†These authors contributed equally to this work and shared the first authorship

*Corresponding author: Haijiao Zhang, 852676221@qq.com

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Abstract: This study investigated mothers' postpartum health management needs in Yulin City to study ways to improve maternal health management services. An electronic questionnaire survey was conducted on the postpartum follow-up of women in the First People's Hospital of Yulin City, the Red Cross Hospital of Yulin City and the postpartum outpatient clinic of Guinan Hospital of Yulin City. The overall score of postpartum health management needs of the surveyed mothers was (4.34 ± 0.53) points. The average score of the required items was from high to low, which were (4.42 ± 0.56) points in the dimension of neonatal care needs, (4.33 ± 0.68) points in the dimensions of social support needs, and (4.27 ± 0.59) points in the dimensions of maternal physical and mental recovery needs. The main factors influencing the need for postpartum health management were education level, delivery experience, pregnancy complications/complications, and postpartum sleep ($P < 0.05$).

Keywords: Maternal; Postnatal; Health management needs; Influencing factors

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1. Introduction

Since 2010, China's population situation has undergone a turning point, with the total population growth slowing down, the demographic dividend gradually disappearing, and the aging population increasing. To adapt to this changing population development situation, China has continuously optimized the birth policy, from the beginning of the "single second child" (2013) to the "comprehensive second child" (2016) and then to the "three-child policy" (2021), and then gradually shifted to the implementation of the "active birth support policy" ^[1-3]. The adjustment of fertility policy has changed the fertility expectations of women and families, and the change of fertility expectations has led to the strengthening of postpartum health management awareness and demand for women who have given birth for the first time ^[4,5]. In China's public health service system, postpartum health care services mainly include postpartum visit services and postpartum health examinations. The health management services for women in the puerperium are mainly based on postpartum visits, and compared with developed countries such as the United Kingdom and the United States, China only

meets the basic health needs of mothers [6,7].

1.1. Postpartum visits

Foreign countries exert great importance on postpartum visits, and their development started early and matured in continuous improvement and perfection [8]. The United Kingdom has a comprehensive system of postnatal visits, with a dedicated organization and division of labor, and postnatal visits are carried out by health-visiting nurses [8]. The United States has the advantages of comprehensive visit content, integrated evaluation and intervention, flexible visit time limit, and strict access system for visiting personnel [1,2,8]. In China, this group of women is more proactive in postpartum health management because they are more likely to have adverse symptoms such as postpartum complications, mental health problems, and pelvic floor dysfunction than normal-age mothers [9]. High-quality postpartum health management is not only an inevitable requirement for social progress and the development of maternal and child health but also an important measure to realize the “Healthy China” strategy.

1.2. Adjustment of the birth policy in China

The adjustment of birth policy has changed the birth expectations of women and families, and the change of birth expectations has led to the strengthening of postpartum health management awareness and demand for women who have given birth for the first time. For example, the “two-child policy” has promoted the improvement of women’s willingness to have “two children,” and to reduce the risk of reproduction, primiparous women pay more attention to postpartum health management after the first birth [10]. The “two-child policy” and “three-child policy” have encouraged some women over the age of 35 to have children again, and the proportion of elderly women and multiparous women has increased year by year [3,5,7]. Compared with prenatal and intrapartum health care, postpartum health care services are not paid enough attention, and it is difficult for mothers to effectively benefit from postpartum health care services [1]. Failure to achieve an optimal level of postnatal care for individual maternal needs not only increases the incidence of postpartum complications but also affects long-term maternal health and future pregnancy outcomes [1]. Pregnancy and childbirth are particularly important for a woman, and this process is accompanied by very strong physical and psychological stress reactions. If the mother and her family do not pay attention to it, it may increase the probability of postpartum infection, postpartum depression, and other diseases, and then threaten the physical and mental recovery of the mother and the healthy growth of the newborn.

This research mainly aims to the current situation of postpartum health management needs of pregnant women in Yulin City, and studies its influencing factors, to further understand the characteristics of postpartum health management needs of women with different characteristics, and provide a theoretical reference for improving the level of postpartum health management intervention [11]. It is of great significance to investigate the needs of postpartum women in postpartum health management, explore the possible influencing factors, and then put forward constructive suggestions, which is of great significance in improving the health status of postpartum women and promoting the healthy development of newborns.

2. Methods

A four-step process was followed to extract and analyze data from the accreditation reports: (1) data sourcing, (2) data extraction, (3) data labelling, and (4) data analysis (Figure 1).

2.1. Data sourcing

In this study, an electronic questionnaire survey was conducted in the postpartum outpatient clinic of Yulin First People’s Hospital, Yulin Red Cross Hospital, and Yulin Guinan Hospital in March–April 2023 using convenience sampling. Inclusion criteria: maternal age 20 years old and above, full-term delivery with a neonatal weight of 2.5–4 kg, the mother can understand normally and communicate effectively, and voluntarily

participate in this survey. Exclusion criteria: miscarriage, stillbirth, confinement in a confinement center during the puerperium, having a serious organ disease, having a psychiatric disorder.

2.2. Data extraction

It was formulated by consulting a large number of literature, combining the specific local facts of Yulin, and under the guidance of the tutor. This part is composed of the demographic and sociological data of the mother and the data related to the pregnancy and delivery. A total of 14 items included maternal age, education level, marital status, residence situation, per capita monthly household income, mode of delivery, delivery experience, pregnancy complications/complications, infant birth status, infant birth weight, postpartum main caregiver, place of confinement, postpartum depression, and postpartum sleep.

2.3. Data labelling

“Questionnaire on Maternal Postpartum Health Management Needs.” The questionnaire consisted of three different dimensions, namely maternal physical and mental recovery needs, neonatal care needs, and social support needs, with a total of 21 items. Using the Likert 5-level scoring method, the scoring rules are as follows: “very unnecessary” = 1 point, “not needed” = 2 points, “general” = 3 points, “needed” = 4 points, “very needed” = 5 points, the total score is 21–105 points, the higher the score indicates that the greater the mother’s need for postpartum health management, and vice versa.

2.4. Data analysis

The electronic questionnaire is directly imported into SPSS from the background, and SPSS 22.0 statistical software is used for data processing. The mean \pm standard deviation (SD) was used to describe the measurement data, and the number of use cases and composition ratios were used to describe the counting data. The t-test, one-way ANOVA and multivariate logistic regression analysis were used for analysis. Cronbach’s α coefficient was used to analyze the reliability, and $P < 0.05$ indicated that there was a significant difference, and the evaluation of construct validity was mainly carried out by factor analysis.

3. Results

3.1. Scale reliability and validity test

The results showed that the total Cronbach’s α coefficient was 0.943, and the Cronbach’s α dimension coefficients of maternal physical and mental recovery, neonatal care, and social support were all greater than 0.6, indicating good internal consistency.

In this study, the evaluation of construct validity was mainly carried out by factor analysis. The results of the Bartlett sphericity test: the chi-square value is 2113.628, which is larger, which proves that the corresponding P value < 0.05 , so the Bartlett sphericity test is significant. It also shows that the questionnaire data are suitable for exploratory factor analysis. A value of 0.917 for KMO is greater than 0.9, indicating good validity.

3.2. Statistics on the demographic characteristics of the study subjects

Among the 149 women included, 17 (11.4%) were aged 20–25 years old; 26–30 years old, 50 cases (33.6%); 31–35 years old, 43 cases (28.9%); 39 (26.2%) aged 36 years and older. Among the subjects of this study, a college diploma was the most, with 51 cases (12.1%), followed by a bachelor’s degree or above, 42 cases (28.2%); technical secondary school or high school, 38 cases (25.5%); junior high school and below had the least, with 18 cases (12.1%). The study was divided into married and unmarried, divorced or widowed according to marital status. The status of residence is divided into husband and wife living alone and living together with their parents. Among them, 138 cases (92.6%) were married, 11 cases (7.4%) were unmarried/divorced/widowed, 62 (41.6%) lived alone unmarried, and 87 (58.4%) lived with their parents. The

subjects of this study were divided into vaginal delivery and cesarean section according to the mode of delivery. Childbirth experiences are divided into primiparous and multiparous women. Among them, 97 cases (65.1%) had a vaginal delivery and 52 cases (34.9%) had cesarean section, 84 (56.4%) were primiparous women and 65 (43.6%) were multiparous women. Among the 149 subjects in this study, 34 (22.8%) had pregnancy complications and 115 patients (77.2%) had no pregnancy complications. In this survey, 62 cases (41.6%) had mothers-in-law, mothers, or siblings as the main caregivers of postpartum mothers, followed by 43 cases (28.9%) taken care of by the husbands, the number of self-care cases was the same as that of confinement nannies, both of which were 22 cases. Among the 149 subjects in this survey, 29 (29.3%) were pregnant women with postpartum depression, 70 (70.7%) were women without postpartum depression and 50 cases of women who were unsure whether they had postpartum depression were excluded.

3.3. Analysis of maternal postpartum health management needs

The scores of postpartum health management needs in each dimension were neonatal care needs, social support needs, and maternal physical and mental recovery needs from high to low. The results showed that there were statistically significant ANOVA results in the dimensions of neonatal care needs, social support needs, and overall needs scores of mothers of different ages ($P < 0.05$). There were differences in the dimensions of maternal neonatal care needs, social support needs, and overall needs of different age groups. Among them, the lower the age group, the higher the total score of postpartum health management needs, which indicates that the younger the age, the greater the postpartum health management needs.

Table 1. The influence of age factors on maternal postpartum health management needs

Age (years)	Number of cases	Maternal postpartum health management needs score			
		Maternal physical and mental recovery	Neonatal care needs	Social support needs	Total needs score
20–25	17	4.48 ± 0.69	4.62 ± 0.59	4.73 ± 0.39	4.61 ± 0.52
26–30	50	4.36 ± 0.54	4.56 ± 0.51	4.50 ± 0.58	4.47 ± 0.48
31–35	43	4.25 ± 0.52	4.26 ± 0.60	4.20 ± 0.79	4.24 ± 0.56
≥ 36	39	4.09 ± 0.66	3.32 ± 0.48	4.07 ± 0.67	4.16 ± 0.49
F value		2.196	3.599	5.652	4.704
P value		0.091	0.015	0.001	0.004

The results showed that there was a statistically significant ANOVA in the dimension of physical and mental recovery needs among women with different education levels ($P < 0.05$), that is, there were differences in the scores of physical and mental recovery needs among mothers with different education levels. Except for those with a bachelor's degree or above, the lower the education level, the higher the score of physical and mental recovery needs. The results showed that there was no statistically significant t-test analysis of each dimension of maternal needs of different marital statuses ($P > 0.05$), indicating that different marital statuses did not have a great impact on the needs of postpartum health management, but the scores of unmarried, divorced or widowed were higher than those of married people in the overall demand score. There was a statistically significant ANOVA analysis of the physical and mental recovery needs of mothers with different family per capita monthly income levels ($P < 0.05$), that is, there were differences in the scores of physical and mental recovery needs among women with different family per capita monthly income levels. Those with a per capita monthly income of more than 3,000 yuan scored significantly lower than those with a physical and mental recovery needs score of 3,000 yuan or less. In terms of the overall demand score, the lower the per capita monthly income of the family, the higher the score, that is, the greater the need for postpartum health management.

4. Discussion

The results of this study found that the overall score of postpartum health management needs in Yulin City was

(4.34 ± 0.53) points, and the higher the score, the greater the postpartum health management needs. The scores of each dimension of postpartum health management needs were ranked from high to low as neonatal care needs (4.42 ± 0.56) points, social support needs (4.33 ± 0.68) points, and maternal physical and mental recovery needs (4.27 ± 0.59) points. In general, the scores of postpartum health management needs were high in all dimensions, indicating the demand for postpartum health management in Yulin City was relatively strong, and it was recommended to pay attention to the demand for postpartum health management services.

There were differences in the scores of neonatal care needs, social support needs, and overall needs among women of different ages. There was little difference in the total score of postpartum health management needs among women with different education levels, but there were differences in the scores of physical and mental recovery needs, and the lower the education level, the higher the scores of physical and mental recovery needs. The results showed that there was no significant correlation between the per capita monthly income of families and the total score of postpartum health management needs. There were differences in the dimensions of physical and mental recovery needs, neonatal care needs, social support needs, and overall needs among women with different delivery experiences.

Among the different postpartum primary caregivers, the overall score of self-care needs was the highest, followed by mother-in-law, mother or sibling, then husband, and finally confinement nanny. The overall score of self-care needs is the highest, which may be due to the large burden of mothers raising children alone, insufficient postpartum rest, poor physical recovery, and more likely to be “invaded” by loneliness and loss to suffer from depression, and the need for postpartum health management is stronger than that of other women with other postpartum caregivers.

5. Conclusion

Through the investigation of the postpartum health management needs of mothers in Yulin City, this paper found that firstly, there were differences in the postpartum health management needs of women with different ages, education levels, per capita monthly family income, childbirth experience, pregnancy complications/complications, postpartum primary caregivers, postpartum depression, and postpartum sleep. With the increase in maternal age, the demand for postpartum health management has gradually decreased. In terms of the differences in the dimension of maternal physical and mental recovery needs, the lower the education level or the lower the per capita monthly income of the family, the higher the score of this demand dimension, and the greater the demand for postpartum health management. There were significant differences in the dimensions of each need dimension and the total score of the needs of women with different delivery experiences, pregnancy complications, and postpartum primary caregivers. There were significant differences in the physical and mental recovery needs, neonatal care needs, and total needs scores of pregnant women with different postpartum depression and sleep conditions.

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Author contributions

Idea conceptualization – Sisi Huang

Experiment conduction – Tao Jiang

Data analysis and manuscript writing – Qiwen Li, Haijiao Zhang and Tao Jiang

Disclosure statement

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References

- [1] Zhu Y, Sun N, Yin X, et al., 2023, A Longitudinal Study on the Two-Way Relationship Between Postpartum Depression Symptoms and Parenting Self-Efficacy of Chinese Women Under the Background of Fertility Policy Adjustment: An Empirical Survey Based on Hubei Province. *Population and Development*, 29(1): 27–39.
- [2] Tian C, 2020, Investigation and Analysis of Women’s Health Management Expectations and Service Status in the Puerperium, thesis, Peking Union Medical College.
- [3] American College of Obstetricians and Gynecologists, 2018, ACOG Committee Opinion No. 736: Optimizing Postpartum Care. *Obstetrics and Gynecology*, 131(5): e140–e150.
- [4] Li W, 2022, Construction of Puerperal Care Program in Hospital-Led Postpartum Health Care Center, thesis, China Medical University.
- [5] Zou Q, 2017, Research Progress of Postpartum Visit in Foreign Countries. *Chinese Journal of Nursing*, 52(2): 253–256.
- [6] Bo L, 2022, The Relationship Between Socioeconomic Status and Postpartum Depression and Its Policy Recommendations, thesis, China University of Mining and Technology.
- [7] Divin, 2019, Help “Healthy China”, *Maternal and Child Health First. Shanghai Medical Journal*, 42(6): 321–323.
- [8] Zheng Z, Yuan C, Wu F, et al., 2022, Application Status and Prospect of Virtual Reality Technology in Maternal Health Management. *PLA Journal of Nursing*, 39(5): 72–75.
- [9] Xu D, Li X, Zhang L, et al., 2022, Analysis of Factors Related to Multicenter Pregnancy Complications and Maternal and Infant Outcomes in Henan Province from 2016 to 2020. *Chinese Journal of Preventive Medicine*, 23(6): 462–468.
- [10] Liu L, 2019, Influencing Factors of Postpartum Depression in Elderly Women and Their Correlation With Hope Level and Family Function, thesis, Inner Mongolia Medical University.
- [11] Yan P, Xu J, 2021, 2014–2019 Domestic Postpartum Depression Research Status. *China Maternal and Child Health Care*, 36(18): 4381–4384.

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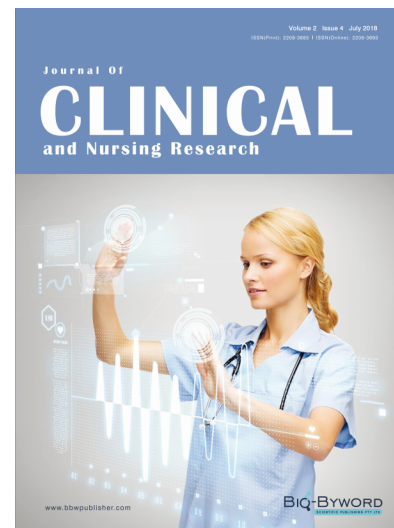
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