Section: Microbiology

Original Research Article

PREVALENCE OF ANTIPHOSPHOLIPID ANTIBODIES IN PREGNANT MOTHERS WITH BAD OBSTETRIC HISTORY

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ABSTRACT

Background: Antiphospholipid Syndrome(APS) is an autoimmune disorder associated with thrombotic complications and adverse pregnancy outcomes. Bad Obstetric History(BOH) during pregnancy due to APS include Recurrent miscarriages, IUGR, Preterm deliveries and Still birth. **Materials and Methods:** A cross sectional study was conducted among the pregnant mothers with BOH who attended Rheumatology OPD. After obtaining informed consent ,venous Blood Samples was collected from patients coming to Clinical Immunology Lab in Institute of Rheumatology, Madras Medical College and RGGGH a tertiary care hospital. After collecting samples, Anti cardiolipin antibodies(ACL) and Anti β2 Glycoproteins I was estimated using ELISA and Lupus Anticoagulants(LAC) was estimated using Dilute Russel Viper Venom Time(DRVVT). **Result:** Among the 353 study participants, most of them belonged to the age group of 26–30 years (40.23%). Recurrent abortion was the most common adverse obstetric outcome, observed in 352 (99.72%) women, followed by stillbirth in 49 (13.88%), intrauterine fetal loss in 29 (8.22%), and neonatal death in 8 (2.27%) women. ACL IgM antibodies was positive in 33 (9.35%) cases, while ACL IgG positivity was observed in 15 (4.25%) cases. Anti-β2 glycoprotein IgM antibodies was positive in 23 (6.52%) women and IgG antibodies in 14 (3.97%) women. Lupus anticoagulant positivity was detected in 5 (16.13%) out of 31 tested samples. **Conclusion:** The present study demonstrates a significant prevalence of antiphospholipid antibodies among pregnant women with bad obstetric history, with recurrent abortion being the most common clinical manifestation. ACL and anti-β2 glycoprotein IgM antibodies was more commonly detected than IgG antibodies. Early screening and identification of antiphospholipid antibodies in women with BOH may help in timely therapeutic intervention and improved pregnancy outcomes.

INTRODUCTION

Antiphospholipid syndrome(APS) is an autoimmune disease characterised by persistence of autoantibodies against phospholipid binding proteins associated with thrombosis or obstetric complications.[1] APS can be primary if it occurs as an isolated condition or secondary if occurs with other autoimmune diseases like Systemic lupus erythematosus.[1] APS is often associated with Autoantibodies positivity like Anticardiolipin antibodies (ACL), β2 Glycoprotein antibodies I(β2GPI) and Lupus anticoagulants(LAC) and pregnancy complication like recurrent fetal loss, IUGR and still births.[1] Obstetric Antiphospholipid syndrome(OAPS) is characterised by placental damage caused by autoantibodies against antiphospholipids and inflammatory responses associated with complement cascade. This is the reason that explains the recurrent fetal loss ,IUGR and still births during pregnancy.[1] Pre pregnancy counselling is an important factor for better outcome in case of pregnant mothers with bad obstetric history.[2] Pre pregnancy counselling also helps in risk assessment of maternal and neoanatal morbidity and mortality.[2] Thrombotic events and triple positivity are the two main predictors of poor outcome in pregnant mothers with Bad obstetric history.[2] Combined use of Low molecular weight Heparin(LMWH) and Aspirin is the mainstay of treatment for better pregnancy outcome.

Antiphospholipids are involved in the pathogenesis of obstetric complications by triggering inflammatory process and thrombotic events.[3] ACL,β2GPI and LAC are the major antibodies responsible for pathogenesis and are part of diagnostic criteria. These antibodies are associated

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with other autoimmune disorders like Systemic Lupus Erythematosus, Sjogren's syndrome and also other conditions like malignancy, infections and neurological disorders. Antiphospholipid antibodies (APLA) along with thrombotic symptoms are required for diagnosis of APS.

Epidemiology of APS depends on the ethnic variation influenced by the environmental and genetic factors.[3] Studies reveal that APLA is more often positive in infertile women. One of the hypothesis related to APS in infertile women is that APLA interferes with the endometrial decidualization thereby impairing embryo implantation.[3] In OAPS , eclampsia and pre eclampsia is the most life threatening condition . LAC is more commonly associated with the fatal pregnancy outcomes.[3] There is statistically analysed strong association between Bad obstetric history and Antibody positivity. It is important to screen the pregnant mother for Antiphospholipid antibody so that intervention can be started at the earliest and to increase successful pregnancy outcome.

Aim & Objectives

Aim: To estimate Antiphospholipid antibodies in pregnant mothers with Bad Obstetric History(BOH).

Objectives:

- To estimate Antiphospholipid antibodies-Anti Cardiolipin Antibodies (IgM and IgG), β2 Glycoprotein (IgM and IgG) and Lupus Anticoagulants in pregnant mothers with Bad Obstetric History.
- To analyse the Antibody positivity with the clinical parameters.

MATERIALS AND METHODS

Study settings: This Study was conducted was conducted in the Clinical Immunology Lab,Institute of Rheumatology,Madras Medical College and Rajiv Gandhi Government General Hospital(RGGGH),a Tertiary Care Centre over a period of 8 months from August 2025 to April 2026.

Study Population: The study included pregnant women above 18 years of age attending the Rheumatology Outpatient Department (OPD) and Clinical Immunology Laboratory with a history of adverse obstetric outcomes.

Inclusion Criteria

- Pregnant women aged more than 18 years
- Women with bad obstetric history such as:
- Recurrent abortions
- Stillbirth
- Intrauterine fetal loss
- Unexplained neonatal death

Exclusion Criteria

- Pregnant women who were unwilling to participate in the study

Sample Size: A total of 353 pregnant women with bad obstetric history was included in the study.

Study Procedure: After obtaining informed written consent, detailed clinical history regarding obstetric complications was collected from all participants. 5 mL of venous blood was collected aseptically under sterile precautions.

The collected blood samples was processed in the Clinical Immunology Laboratory. Serum was separated by centrifugation and stored appropriately until analysis.

Laboratory Investigations

The following antiphospholipid antibodies was estimated:

Anticardiolipin antibodies (ACL) IgM and IgG was estimated using Enzyme Linked Immunosorbent Assay (ELISA)

Anti-β2 Glycoprotein I antibodies (β2GPI) IgM and IgG using ELISA

Lupus anticoagulant (LAC) using Dilute Russell Viper Venom Time (DRVVT)

All tests was performed according to standard laboratory protocols and manufacturer instructions.

Data Collection and Analysis: Clinical and laboratory data was entered into Microsoft Excel and analyzed using appropriate statistical methods. Results was expressed as frequencies, percentages, and proportions.

Ethical Consideration: The study was approved by the Institutional Ethics Committee of Madras Medical College and Rajiv Gandhi Government General Hospital, Chennai. Written informed consent was obtained from all study participants prior to sample collection.

RESULTS

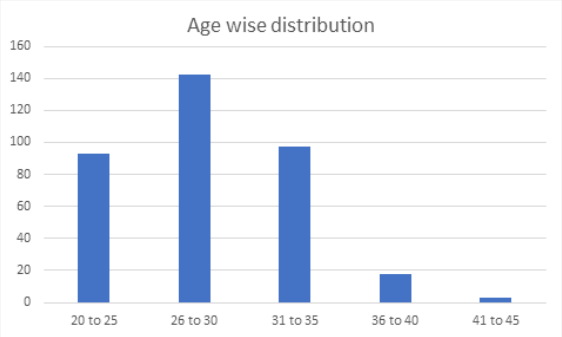

Table 1: age wise distribution of patients with bad obstetric history(n=353)

Age	N	Percentage%
20 to 25	93	26.35%
26 to 30	142	40.23%
31 to 35	97	27.48%
36 to 40	18	5.10%
41 to 45	3	0.85%
Total	353	

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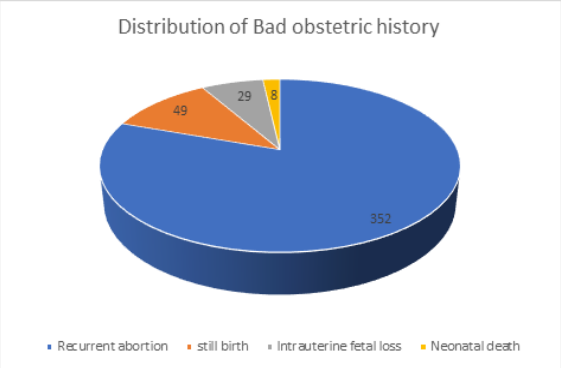
As shown in the above table, 353 pregnant women came with Bad obstetric history, out of which 40.23% of them falls under age group of 26 to 30 and 0.85% of them falls under age group of 41 to 45.

Table 2: Distribution of bad obstetric history

Bad obstetric history	n	Percentage
Recurrent abortion	352	99.72%
still birth	49	13.88%
Intrauterine fetal loss	29	8.22%
Neonatal death	8	2.27%
Total	353	

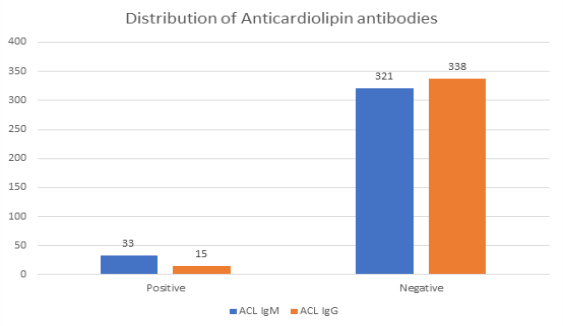


Among the 353 pregnant mothers with bad obstetric history included in the study, recurrent abortion was the most common presentation, observed in 352 cases (99.72%). Stillbirth was reported in 49 cases (13.88%), while intrauterine fetal loss was seen in 29 cases (8.22%). Neonatal death was the least common adverse obstetric outcome, accounting for 8 cases (2.27%).

The findings indicate that recurrent abortion constituted the predominant component of bad obstetric history in the study population.

Table 3: Distribution of Anti Cardiolipin antibodies

	ACL	
	IgM n(%)	**IgG n(%)**
Positive	33(9.35)	15(4.25)
Negative	321(90.93)	338(95.75)
Total	353	



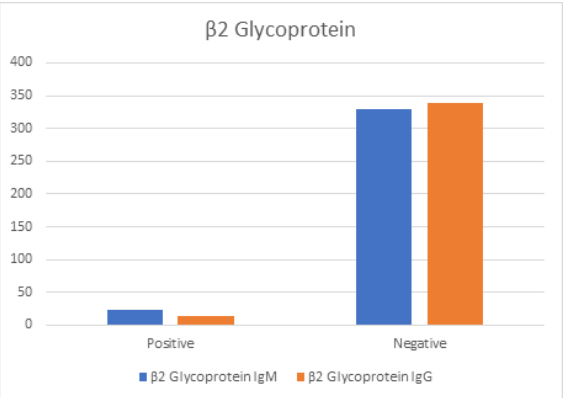
Out of the 353 pregnant mothers with bad obstetric history included in the study, anticardiolipin (ACL) IgM antibodies were positive in 33 cases (9.35%), while 321 cases (90.93%) were negative.

For ACL IgG antibodies, positivity was observed in 15 cases (4.25%), whereas 338 cases (95.75%) were negative.

The results demonstrate that ACL IgM positivity was more frequently detected than ACL IgG positivity among the study participant.

Table 4: distribution of β2glycoprotein antibodies

	β2 Glycoprotein	
	IgM n(%)	**IgG n(%)**
Positive	23(6.52%)	14(3.97%)
Negative	330(93.48%)	339(96.03%)
Total	353(100%)	353(100%)



The above table shows the distribution of β2 glycoprotein antibodies among the study participants. Out of 353 pregnant mothers with bad obstetric history, β2 glycoprotein IgM antibodies were positive in 23 (6.52%) cases and negative in 330 (93.48%) cases. β2 glycoprotein IgG antibodies were positive in 14 (3.97%) cases, while 339 (96.03%) cases was negative. The findings indicate that IgM positivity was more common than IgG positivity among the study population.

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Table 5: distribution of lupus anticoagulant antibodies positivity

LAC	n(%)
Positive	5(16.13%)
Negative	26(83.87%
Total	31(100%)

Out of the 31 pregnant women with bad obstetric history included in the study, lupus anticoagulant (LAC) positivity was detected in 5 cases (16.13%), while 26 cases (83.87%) was negative for LAC. The findings indicate that a notable proportion of women with adverse obstetric outcomes were positive for lupus anticoagulant, suggesting a possible association between LAC and pregnancy complications.

Table 6: association of bad obstetric history with antibody positivity

Bad obstetric history	Total case(n)	Antibody positivity n(%)
Recurrent abortion	353	53(15.01%)
Still birth	42	9(21.43%)
Intrauterine fetal loss	30	3(10%)
Neonatal death	8	4(50%)

Among the different bad obstetric outcomes, antibody positivity was most frequently observed in mothers with neonatal death (50.00%), followed by stillbirth (21.43%), recurrent abortion (15.01%), and intrauterine fetal loss (10.00%). The above findings suggest a possible association between antiphospholipid antibody positivity and adverse pregnancy outcomes in pregnant women with bad obstetric history.

Statistical result: The above findings are analysed using Fisher-Freeman-Halton Exact test, p value was <0.047, which showed statistically significant association between Bad obstetric history and antibody positivity as p value is<0.05.

DISCUSSION

Bad obstetric history (BOH) is a major concern in obstetric practice because it not only affects maternal health but also causes significant emotional and psychological stress to the affected families. Recurrent pregnancy loss, stillbirth, intrauterine fetal death, and neonatal death are the most common adverse outcomes seen in women with BOH. Among the various causes implicated, antiphospholipid antibodies (APLA) have been identified as the most important acquired causes of recurrent fetal loss and pregnancy complications. The present study was undertaken to determine the prevalence of antiphospholipid antibodies in pregnant women with BOH and to evaluate their association with adverse pregnancy outcomes.

In our study, most of the women belonged to the age group of 26–30 years (40.23%), followed by 31–35 years (27.48%) and 20–25 years (26.35%). Only 0.85% belonged to the age group 41 to 45. This finding indicates that BOH is more common among women in the active reproductive age group. Similar findings have been reported by Rai et al, who observed that recurrent pregnancy loss is more common among women between 25 and 35 years of age.[4] This is because women in this age group have more conception rates and repeated exposure to pregnancy-related complications.

Among the different manifestations of BOH observed in this study, recurrent abortion (99.72%) was the most common finding followed by Stillbirth (13.88%), intrauterine fetal loss (8.22%) and neonatal death (2.27%). These findings are similar to the studies conducted by Branch et al, and Lockshin MD et al, who reported recurrent miscarriage and fetal loss as the major clinical manifestations associated with antiphospholipid syndrome.[5] Antiphospholipid antibodies can lead to thrombosis of placental vessels, defective placentation, and placental insufficiency, which ultimately compromise fetal growth and survival.

On evaluation of anticardiolipin (ACL) antibodies among women with BOH, ACL IgM antibodies were positive in 33 (9.35%) women, whereas ACL IgG antibodies were positive in 15 (4.25%) women. The higher prevalence of IgM antibodies compared to IgG antibodies suggests immune activation which contribute to adverse pregnancy outcomes. These observations were reported by Kutteh et al., who demonstrated an increased prevalence of anticardiolipin antibodies among women with recurrent pregnancy loss. The study highlighted that these antibodies interfere with trophoblastic function causing decreased placental circulation, which leads to repeated fetal wastage.[6]

Anticardiolipin antibodies are the most commonly detected antiphospholipid antibodies in women with recurrent miscarriages as observed by Rai et al,[4] The lower prevalence of ACL IgG antibodies observed in our study compared to IgM antibodies is similar to the findings reported by Branch DW et al., who suggested that IgM antibodies are more associated with obstetric manifestations, whereas IgG antibodies are associated with severe thrombotic complications.[4]

The present study further assessed anti-β2 glycoprotein I antibodies, which are considered highly specific markers for APS. β2 glycoprotein IgM antibodies were positive in 23 (6.52%) women, while IgG antibodies were positive in 14 (3.97%) women. Most participants tested negative for both antibodies. Similar findings have been reported by

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Miyakis S et al., who emphasized the association of anti-β2 glycoprotein I antibodies with recurrent fetal loss and placental thrombosis.[7]

The higher prevalence of β2 glycoprotein IgM antibodies compared to IgG antibodies observed in our study may indicate recent or active autoimmune activity contributing to pregnancy complications. These antibodies cause endothelial injury, complement activation, and placental thrombosis, leading to impaired placental perfusion and fetal compromise. However, the comparatively lower prevalence of anti-β2 glycoprotein antibodies suggests that BOH is multifactorial in origin, and other factors such as chromosomal abnormalities, hormone imbalance, uterine anomalies, infections, and genetic causes may also contribute to adverse pregnancy outcomes.

The findings of our study emphasize the importance of screening women with BOH for antiphospholipid antibodies, especially anticardiolipin and anti-β2 glycoprotein antibodies. Early identification of antibody-positive women can help clinicians to start treatment with low-dose aspirin and heparin therapy, which has been shown to improve placental circulation and significantly leads to successful pregnancy outcomes.

The prevalence of LAC positivity observed in the present study (16.13%) is similar to the study conducted by Lockshin et al who reported that lupus anticoagulant is one of the strongest predictors of adverse pregnancy outcomes in women with antiphospholipid syndrome.[5]

Our study evaluated the association between different types of bad obstetric history and antiphospholipid antibody positivity among pregnant women. Antibody positivity was highest among mothers with neonatal death (50.00%), followed by stillbirth (21.43%), recurrent abortion (15.01%), and intrauterine fetal loss (10.00%). These findings indicate a possible role of antiphospholipid antibodies in adverse pregnancy outcomes.

In our study, the highest antibody positivity was observed among cases with neonatal death. Antiphospholipid antibodies are known to cause placental thrombosis, endothelial dysfunction, and impaired uteroplacental blood flow, which can lead to severe fetal compromise and neonatal mortality. Similar findings were reported by Rai et al., who observed a strong association between antiphospholipid antibodies and late pregnancy complications including fetal death and neonatal loss.[4]

Stillbirth cases in the present study also showed a comparatively higher rate of antibody positivity (21.43%). This observation is consistent with the study by Branch et al., who reported that antiphospholipid antibodies are significantly associated with late fetal loss and stillbirth. The pathogenic mechanism involves thrombotic occlusion of placental vessels resulting in chronic placental ischemia and fetal demise.

Recurrent abortion was the most common bad obstetric outcome observed in the study and showed antibody positivity in 15.01% of cases. Recurrent pregnancy loss is considered one of the hallmark manifestations of antiphospholipid syndrome. Similar prevalence rates have been documented in studies by Kutteh and colleagues, who found significantly increased antiphospholipid antibody positivity among women with recurrent miscarriages compared to healthy pregnant controls.

Intrauterine fetal loss showed comparatively lower antibody positivity (10.00%) in the current study. Although lower than other adverse outcomes, the presence of antiphospholipid antibodies still suggests a possible autoimmune contribution to fetal loss. Comparable findings were reported in studies conducted by Levine et al., where antiphospholipid antibodies were identified as an independent risk factor for fetal loss and placental dysfunction.

The association between bad obstetric history and antibody positivity in the present study was found to be statistically significant by Fisher–Freeman–Halton Exact test ($p = 0.046$). This statistically significant association supports the role of antiphospholipid antibodies in the pathogenesis of adverse pregnancy outcomes. Early screening and identification of antiphospholipid antibodies in women with bad obstetric history may therefore aid in timely therapeutic intervention and improved maternal and fetal outcomes.

CONCLUSION

The findings of the study support the role of antiphospholipid antibodies in the pathogenesis of pregnancy morbidity through mechanisms such as placental thrombosis, endothelial dysfunction, and impaired uteroplacental circulation. Statistical analysis using Fisher–Freeman–Halton Exact test demonstrated a significant association between bad obstetric history and antibody positivity, indicating the clinical importance of these antibodies in adverse pregnancy outcomes.

Early screening for antiphospholipid antibodies in women with recurrent pregnancy complications may help in prompt diagnosis and timely therapeutic intervention. Appropriate management with anticoagulant therapy such as low-dose aspirin and heparin can improve maternal and fetal outcomes in affected patients. Therefore, routine evaluation for antiphospholipid antibodies should be considered in women presenting with bad obstetric history.

Overall, the study emphasizes the importance of antiphospholipid antibody testing as an essential component in the evaluation of recurrent pregnancy loss and other adverse obstetric outcomes, thereby contributing to improved reproductive care and prognosis.

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