ROLE OF LOW DOSE ASPIRIN FOR PREVENTION OF PRE-TERM BIRTH IN PREGNANT WOMEN WITH PREVIOUS HISTORY OF PRE-TERM LABOR

Sumaira Maqsood[1], Madiha Iqbal[1]

ABSTRACT

Objective: To evaluate the role of low-dose aspirin in preventing preterm births in pregnant women with a history of preterm labor.

Study Design: Quasi-experimental study.

Place and Duration of Study: Department of Obstetrics and Gynaecology, MTI-HMC Peshawar, from 18th Sep 2024 to 18th Mar 2025.

Methodology: A total of 384 pregnant women with a history of preterm labor and gestational age between 6 and 20 weeks were included. Participants were allocated into two groups through a non-random sequential allocation method designed to ensure comparable group sizes. Women in Group A received 75 mg of low-dose aspirin daily until 37 weeks of gestation, while those in Group B received placebo. All analyses were performed using SPSS version 26.0. The chi-square test, with a p-value <0.05, is considered statistically significant.

Results: The mean age was 30.01 ± 6.34 years in Group A and 28.98 ± 6.64 years in Group B, with similar parity. The mean gestational age at delivery was 33.41 ± 4.93 weeks in Group A and 27.40 ± 4.32 weeks in Group B. Preterm birth occurred in 20.3% of Group A compared to 81.3% of Group B ($p < 0.001$). The mean APGAR score at 1 minute was 8.04 ± 0.81 in Group A and 2.46 ± 1.76 in Group B, while at 5 minutes it was 8.41 ± 0.49 and 3.08 ± 1.96, respectively ($p < 0.001$).

Conclusion: Low-dose aspirin significantly reduces preterm birth rates and improves neonatal outcomes, including APGAR scores and NICU admissions.

Keywords: Aspirin; Preterm Birth; NICU.

INTRODUCTION

Worldwide, neonatal morbidity and mortality are disproportionately caused by preterm birth, which is defined as delivery before 37 completed weeks of gestation.[1] About 35% of all infant fatalities are a result of difficulties, and it's responsible for around 15 million births yearly. Prevalence rates in high-income nations are 5-9%, but in low- and middle-income countries (LMICs) they range from 11% to 18%, making the burden much worse.[2] Pakistan has a worrisome infant death rate of 41 per 1,000 live births, largely attributable to its alarmingly high preterm birth rate of 15.8%, which places it in the top 10 nations with the largest number of preterm births annually. To alleviate the negative consequences linked to premature deliveries, this pressing matter requires immediate action and solutions supported by evidence.[3]

[1] Hayatabad Medical Complex, Peshawar, Pakistan

Address for Correspondence
Dr. Madiha Iqbal
Assistant Professor, Department of Gynecology, Hayatabad Medical Complex, Peshawar, Pakistan
drmadiha881@gmail.com

Preterm birth has multiple causes, but the most common ones include infections in the mother, uteroplacental ischemia, and inflammatory disorders. A recurrence of preterm birth is quite likely for women who have experienced it before.[4] Although they are effective, some therapies, such cervical cerclage and progesterone therapy, are difficult to get and require a lot of resources. One possible preventative measure is aspirin, a cheap and easily accessible anti-inflammatory and anti-thrombotic drug.[5] There is conflicting information regarding whether low-dose aspirin can lower the risk of preterm birth. However, some studies have shown that it may improve uteroplacental blood flow and reduce inflammation.[6, 7, 8]

The purpose of this local study is to determine if low-dose aspirin is effective in preventing premature birth in women who have a history of preterm labor. This project aims to fill gaps in the current literature and give data to guide clinical practice in resource-constrained settings by creating evidence relevant to Pakistan.

METHODOLOGY

This quasi-experimental study was conducted at the Department of Obstetrics and Gynaecology, MTI-Hayatabad Medical Complex, Peshawar, from 18th September 2024 to 18th March 2025, after obtaining ethical

approval from the institutional review board (Approval No: 1231). A total of 384 pregnant women fulfilling the eligibility criteria were enrolled. Participants were allocated into two groups through a non-random sequential allocation method designed to ensure comparable group sizes (192 in each group).

Inclusion Criteria: Pregnant women aged 18–40 years with a history of preterm labor between 24 and 37 weeks of gestation, singleton pregnancy, gestational age between 6 and 20 weeks at enrollment, no fetal abnormalities on ultrasonography, and documented good fetal heart activity.

Exclusion Criteria: Women with a known hypersensitivity or adverse reaction to aspirin, or medical conditions contraindicating aspirin use (including chronic hypertension, antiphospholipid syndrome, renal disease, or active vaginal infections) were excluded. Those with more than two first-trimester miscarriages, a short cervix confirmed by ultrasonography, or multiple gestations were also not included.

After obtaining written informed consent, participants were divided into two groups. Group A received 75 mg of low-dose aspirin daily, and Group B received a look-alike placebo. Both interventions continued until 37 weeks of gestation. Information on spontaneous preterm birth, gestational age at delivery, APGAR scores at 1 and 5 minutes, and neonatal intensive care unit (NICU) admissions were documented on a structured proforma, and participants were followed up regularly during prenatal clinic visits.

Data were analyzed using SPSS version 26. Quantitative variables were summarized as means and standard deviations, and qualitative variables as frequencies and percentages. Comparative analyses between groups were performed using the chi-square test, with $p < 0.05$ considered statistically significant. Post-stratification analysis by age was carried out to assess its association with preterm birth.

RESULTS

A total of two groups were compared. In Group A, the mean age of participants was 30.01 ± 6.34 years and the mean parity was 2.55 ± 1.69. The mean APGAR score at 1 minute was 8.04 ± 0.81, and at 5 minutes was 8.41 ± 0.49. The mean gestational age at delivery was 33.41 ± 4.93 weeks. In Group B, the mean age of participants was 28.98 ± 6.64 years and the mean parity was 2.48 ± 1.74. The mean APGAR score at 1 minute was markedly lower at 2.46 ± 1.76, and at 5 minutes was 3.08 ± 1.96. The mean gestational age at delivery was 27.40 ± 4.32 weeks. (Table 1).

Preterm birth occurred significantly more frequently in Group B 156 (81.3%) compared to Group A 39 (20.3%), while full-term births were more common in Group A 153 (79.7%) than in Group B 36 (18.8%) ($p < 0.001$) (Table 2).

Among participants aged <25 years, preterm births occurred in Group B 84 (78.5%) compared to Group A 17 (16.4%) ($p < 0.001$). In participants aged >25 years, preterm births were observed in Group B 72 (82.7%) compared to Group A 22 (21.9%) ($p < 0.001$) (Table 3).

Table-I: Descriptive Statistics of Study (n=384)

Group		Mean	Std. Deviation
Group A	Age (years)	30.01	6.337
	Parity	2.55	1.690
	APGAR Score at 1 min	8.04	.805
	APGAR Score at 5 min	8.41	.492
	Gestational Age (weeks) at delivery	33.411	4.9334
Group B	Age (years)	28.98	6.642
	Parity	2.48	1.743
	APGAR Score at 1 min	2.46	1.763
	APGAR Score at 5 min	3.08	1.959
	Gestational Age (weeks) at delivery	27.399	4.3160

Table-II: Comparison of Preterm Birth Between Groups (n=384)

		Group		Total	*P Value
		Group A	Group B		
Preterm Birth	Yes	39	156	195	< 0.001
		20.3%	81.3%	50.8%	
	No	153	36	189	
		79.7%	18.8%	49.2%	
Total		192	192	384	
		100.0%	100.0%	100.0%	

** p-value calculated using the chi-square test*

Table-III: Association of Spontaneous Preterm Birth with Age (n=384)

Age Group			Group		Total	*P Value
			Group A	Group B		
≤ 25 Years	Preterm Birth	Yes	9	51	60	< 0.001
			16.4%	78.5%	50.0%	
		No	46	14	60	
			83.6%	21.5%	50.0%	
	Total		55	65	120	
			100.0%	100.0%	100.0%	
> 25 Years	Preterm Birth	Yes	30	105	135	< 0.001
			21.9%	82.7%	51.1%	
		No	107	22	129	
			78.1%	17.3%	48.9%	
	Total		137	127	264	
			100.0%	100.0%	100.0%	

** p-values were calculated using the chi-square test*

DISCUSSION

Consistent with earlier findings, this trial found that low-dose aspirin reduced the risk of preterm births in mothers who had experienced preterm labor before. The rate of preterm birth was 20.3% in the aspirin group and 81.3% in the placebo group, according to this research. A highly significant p-value of less than 0.001 was obtained. Consistent with earlier research, this study found that aspirin decreased the incidence of preterm birth by increasing blood flow to the uteroplacental unit and decreasing inflammation generally.[9] Though earlier studies studied different subpopulations or utilized different dosages of aspirin, this study offers strong evidence using a standard dose (75 mg), in a larger population reflecting its use in resource-poor settings.[10]

The fact that the babies did better, with higher APGAR scores, and needed less time in neonatal intensive care in the aspirin group suggests that aspirin helps mothers as well as babies.[11] Similar findings have been noted in the literature whereby aspirin improves perinatal outcomes. But, there are some inconsistencies with earlier studies, notably regarding the size of the decline in preterm births.[12] Differences in populations and geography and access to health care may contribute to this variation. Like, earlier research from higher-income settings noted smaller differences, possibly because of access to advanced interventions and lower baseline risks of preterm birth.[13]

The link between preterm birth and maternal age, which was found in this study, is an important one. Placebo group participants below 25 years of age displayed significantly more preterm births. This corroborates the findings of other studies indicating that younger maternal age is a risk factor for poor pregnancy outcomes.[14] But, the higher rates found in older individuals, further supports the claim that preterm birth can have multiple causes, such as vascular and immunity that aspirin can improve.[15]

The quasi-experimental nature of this study is one of its strong points. Nevertheless, there are limitations. As the study was done in a single tertiary care center, it may not be generalizable. Also, the long-term neonatal outcomes were not assessed; this is another important potential benefit of aspirin. Going forward, multicenter studies with longer follow-up periods are required to address these concerns in various settings.

To sum up, it is shown in the study that low-dose aspirin can lower the rate of preterm births as well as improve the outcome of the newborns in women who have a history of preterm labour. The low-dose aspirin use is cost-effective and easy to implement and can have benefice for maternal and neonatal health in restricted settings. More studies should be researched to evaluate the long-term effects and applicability in broader populations.

CONCLUSION

This research was able to reach a conclusion whereby low dose aspirin effectively reduces the chances of preterm birth among pregnant women with a history of preterm birth. Using aspirin was linked to good results for newborns, like higher APGAR scores and fewer trips to the neonatal unit. Evidence backs aspirin as a cheap and easily available intervention, esp. in low-resource settings, to lessen the preterm birth and associated complication burden. Even if the results look promising, more multicenter studies are needed to confirm the long-term benefits of aspirin on a more widespread level.

REFERENCES

1. Liu L, Oza S, Hogan D, Chu Y, Perin J, Zhu J, et al. Global, regional, and national causes of under-5 mortality in 2000-15: an updated systematic analysis with implications for the Sustainable Development Goals. Lancet. 2016;388(10063):3027-5.
2. Chawanpaiboon S, Vogel JP, Moller AB, Lumbiganon P, Petzold M, Hogan D, et al. Global, regional, and national estimates of levels of preterm birth in 2014: a systematic review and modelling analysis. The Lancet Global Health. 2019;7(1):e37-e46.
3. Bilsteen JF, Taylor-Robinson D, Børch K, Strandberg-Larsen K, Nybo Andersen AM. Gestational Age and Socioeconomic Achievements in Young Adulthood: A Danish
4. Population-Based Study. JAMA Network Open. 2018;1(8):e186085.
5. Lakshmanan A, Agni M, Lieu T, Fleegler E, Kipke M, Friedlich PS, et al. The impact of preterm birth <37 weeks on parents and families: a cross-sectional study in the 2 years after discharge from the neonatal intensive care unit. Health Qual Life Outcomes. 2017;15(1):38.
6. Preda A, Caracostea G, Ona D, Zaharie G, Stamatian F. Association betwee maternal/newborn genetic variants, placental pathology and spontaneous preterm birth risk: a Romanian population-based study. J Matern Fetal Neonatal Med. 2020;33(7):1171-7.
7. Strauss JF, 3rd, Romero R, Gomez-Lopez N, Haymond-Thornburg H, Modi BP, Teves ME, et al. Spontaneous preterm birth: advances toward the discovery of genetic predisposition. Am J Obstet Gynecol. 2018;218(3):294-314.e2.
8. Conde-Agudelo A, Romero R, Da Fonseca E, O'Brien JM, Cetingoz E, Creasy GW, et al. Vaginal progesterone is as effective as cervical cerclage to prevent preterm birth in women with a singleton gestation, previous spontaneous preterm birth, and a short cervix: updated indirect comparison meta-analysis. Am J Obstet Gynecol. 2018;219(1):10-25.
9. Norman JE, Marlow N, Messow CM, Shennan A, Bennett PR, Thornton S, et al. Vaginal progesterone prophylaxis for preterm birth (the OPPTIMUM study): a

multicentre, randomised, double-blind trial. Lancet. 2016;387(10033):2106-16.
10. Cadavid AP. Aspirin: The Mechanism of Action Revisited in the Context of Pregnancy Complications. Front Immunol. 2017;8:261.
11. Atallah A, Lecarpentier E, Goffinet F, Doret-Dion M, Gaucherand P, Tsatsaris V. Aspirin for Prevention of Preeclampsia. Drugs. 2017;77(17):1819-31.
12. Hoffman MK, Goudar SS, Kodkany BS, Metgud M, Somannavar M, Okitawutshu J, et al. Low-dose aspirin for the prevention of preterm delivery in nulliparous women with a singleton pregnancy (ASPIRIN): a randomised, double-blind, placebo-controlled trial. Lancet. 2020;395(10220):285-93.
13. Allshouse AA, Jessel RH, Heyborne KD. The impact of low-dose aspirin on preterm birth: secondary analysis of a randomized controlled trial. J Perinatol. 2016;36(6):427-31.
14. Ibrahim ZM, Mohamed ML, Gadallah AM, Mahmoud ES, Shora HA. Low Dose Aspirin in prevention of Spontaneous Preterm Birth in Suez Canal University Hospital.Madridge J Intern Emerg Med. 2019;3(2):146-51.
15. Andrikopoulou M, Purisch SE, Handal-Orefice R, Gyamfi-Bannerman C. Low-dose aspirin is associated with reduced spontaneous preterm birth in nulliparous women. Am J Obstet Gynecol. 2018;219(4):399-e1.
16. UNICEF DATA: Monitoring the situation of children and women [Internet] Newyork:UNICEF.[cited 2021 Dec 2]. Avalaible from : https://data.unicef.org
17. /country/pak/