Research Article

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Maternal Outcomes in Patients with Morbidly Adherent Placenta

Sajida Karamat
Department of Obstetrics and Gynecology, Sughra Shafi Medical Complex, Narowal, Pakistan; salmansandhuskp@gmail.com

Sameen Nasir
Woman Medical Officer, Department of Obstetrics and Gynecology, Tehsil Headquarters Hospital, Hasilpur, Pakistan

Asma Siddique
Consultant Gynecologist and Obstetrician, District Headquarters Hospital, Sheikhupura, Pakistan

Uzma Yaqub
Professor, Department of Obstetrics and Gynecology, Sughra Shafi Medical Complex, Narowal, Pakistan

Noor Azhar
MBBS, Allied Hospital, Faisalabad, Pakistan

Hira Atique
Senior Registrar, Department of Obstetrics and Gynecology, Sughra Shafi Medical Complex, Narowal, Pakistan

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Abstract

Morbidly adherent placenta (MAP), also termed placenta accreta spectrum (PAS), is a serious obstetric condition associated with substantial maternal morbidity, including severe hemorrhage, peripartum hysterectomy, and admission to an intensive care unit (ICU). Timely diagnosis and coordinated management are important components of care. This study assessed maternal outcomes among women with MAP at a single hospital. A descriptive case series was conducted in the Department of Obstetrics and Gynecology, Sughra Shafi Medical Complex, Narowal, Pakistan, from November 2025 to April 2026. Consecutive non-probability sampling was used to enroll 104 pregnant women aged 20–40 years with MAP and a gestational age exceeding 20 weeks. Demographic characteristics, obstetric variables, and maternal outcomes were recorded using a structured form. Data were analyzed using SPSS version 31.0 and summarized as frequencies, percentages, means, and standard deviations. Stratified comparisons were also performed. Mean maternal age was 29.90 $\pm$ 6.03 years. Placenta accreta was the most frequent subtype, accounting for 65.4% of cases, followed by increta (20.2%) and percreta (14.4%). Intraoperative blood loss exceeding 1,500 mL occurred in 38.5% of patients, ICU admission was required in 27.9%, and peripartum hysterectomy was performed in 40.4%. None of the reported stratified associations reached the prespecified significance threshold. These findings demonstrate a substantial burden of maternal morbidity among women treated for MAP at this institution. They support careful perioperative preparation and coordinated obstetric care, although this descriptive case series did not compare management strategies or establish their effectiveness.

Keywords: Intensive Care Units; Maternal Mortality; Obstetric Surgical Procedures; Placenta Accreta; Postpartum Hemorrhage; Pregnancy Outcome

1. INTRODUCTION

Morbidly adherent placenta (MAP), now generally termed placenta accreta spectrum (PAS), is a serious obstetric condition involving abnormal placental attachment to, or invasion of, the uterine wall. Disruption of the normal endometrial–myometrial interface and impaired decidualization contribute to its development. The spectrum includes placenta accreta, placenta increta, and placenta percreta, which describe different degrees of attachment and invasion [1]. Increasing cesarean delivery rates and other uterine procedures have contributed to concern about the growing burden of PAS. Reported frequencies vary substantially between populations because the underlying risk profile and diagnostic criteria are not uniform. Previous cesarean delivery, placenta previa, advancing maternal age, and a history of uterine surgery are recognized clinical risk factors [2].

MAP presents a considerable challenge to obstetric services in Pakistan, particularly when antenatal recognition is delayed and women require care at referral hospitals. A study from Karachi documented PAS among women presenting for delivery and reported substantial maternal and perinatal complications, demonstrating the clinical importance of the condition in that hospital population [3]. Another Pakistani study examined women with placenta previa and described the occurrence of MAP together with adverse fetomaternal outcomes [4]. These observations emphasize the need to identify women at risk and organize appropriate care before delivery whenever possible. However, findings from selected hospital populations should not be interpreted as national prevalence estimates or assumed to represent all maternity services.

Maternal morbidity associated with MAP is driven largely by obstetric hemorrhage, substantial blood loss, the need for transfusion, and urgent surgical intervention. Abnormal placental attachment can prevent normal separation after delivery and may result in severe bleeding if separation is attempted. Hemodynamic instability can develop rapidly, particularly when extensive placental invasion complicates operative management. Studies of abnormal placental adherence among women undergoing cesarean delivery provide additional context for the types of disease encountered in surgical practice [5]. Severe bleeding may necessitate repeated administration of blood products and can be accompanied by coagulopathy, organ dysfunction, and maternal death. These risks make anticipatory planning an important consideration in the management of affected pregnancies [2].

Peripartum hysterectomy may be necessary to control life-threatening hemorrhage and is an established definitive surgical approach in many cases of PAS. Nevertheless, it carries substantial consequences, including possible injury to adjacent organs, prolonged surgery, and loss of the ability to carry a subsequent pregnancy. Evidence comparing conservative management with cesarean hysterectomy describes differences in blood loss, transfusion requirements, and postoperative complications, although treatment selection and disease severity affect interpretation [6]. Fertility-preserving management also raises questions about outcomes in later pregnancies, which have been examined in a separate systematic review and meta-analysis [7]. Timing of delivery, institutional preparedness, and access to multidisciplinary expertise are further considerations when selecting and implementing an appropriate management plan [8].

In addition to hemorrhage and hysterectomy, women with MAP may experience operative complications that require ICU admission and a prolonged hospital stay. Severe bleeding, circulatory instability, coagulation abnormalities, and the need for extensive transfusion can all contribute to critical care requirements. The depth and location of placental invasion are relevant to surgical planning, especially when increta or percreta involves structures close to the bladder, ureters, or other pelvic organs. A systematic review of conservative surgery for PAS examined maternal morbidity associated with uterine-preserving procedures, illustrating the importance of distinguishing operative techniques and patient selection when interpreting outcomes [9]. Critical care requirements should therefore be understood in the context of the patient's condition, the procedure performed, and the resources available.

Hospital-based research from Pakistan has described substantial maternal morbidity in women with MAP, including major obstetric bleeding and the need for operative or intensive care support [10]. A further Pakistani study compared multidisciplinary management with standard care and assessed maternal outcomes, addressing the organization of treatment as well as the clinical burden of the condition [11]. Such reports provide useful local context, but differences in referral patterns, diagnostic criteria, disease severity, and hospital resources can affect the observed complication rates. Comparisons across institutions consequently require careful attention to how patients were selected and how outcomes were defined.

MAP remains an important cause of severe maternal morbidity despite improvements in antenatal imaging, surgical practice, and multidisciplinary management. Outcomes may differ according to the depth and location of placental invasion, the timing of diagnosis, access to blood products, and the experience of the treating team. In resource-constrained settings, delayed referral and limited institutional capacity may further complicate care, particularly when women present with urgent obstetric needs. Local evidence on the frequency and severity of major complications is therefore valuable, although hospital findings can vary substantially between settings. The present study aimed to describe maternal outcomes among patients with MAP at Sughra Shafi Medical Complex, Narowal, with particular attention to massive blood loss, peripartum hysterectomy, and ICU admission. Documenting these outcomes can help characterize the clinical workload

associated with MAP and inform local discussion of service needs. The study was designed to describe outcomes within the treated case series, rather than estimate population prevalence or compare the effectiveness of alternative treatments.

2. METHODS

This descriptive case series was conducted over six months, from November 2025 to April 2026, in the Department of Obstetrics and Gynecology, Sughra Shafi Medical Complex, Narowal, Pakistan. The research synopsis received institutional ethical review committee approval before the study was undertaken. Participants were recruited using consecutive non-probability sampling. The reported sample-size calculation used the World Health Organization calculator, a 95% confidence level, an absolute margin of error of 8%, and an anticipated ICU admission frequency of 22.2% among women with MAP, based on the study by Abbas and colleagues [12]. A total of 104 women were included in the reported case series. The design involved observation of clinical outcomes among affected patients and did not include random allocation or a comparison group without MAP.

Eligible participants were pregnant women aged 20–40 years with MAP who met the study's operational eligibility criteria. Gestational age had to exceed 20 weeks, calculated from the last menstrual period, and women of all parity categories were eligible. The eligibility description also included women with previous cesarean surgery and women with submucosal fibroids. Patients with a documented bleeding disorder, including a known coagulation factor deficiency, were excluded on the basis of their medical records. The stated exclusion criteria additionally covered severe renal disease, described in the protocol using a serum creatinine concentration greater than 2 mg/dL, and liver failure. These criteria defined the clinical population assessed at the study hospital.

The principal outcomes were maternal complications among pregnant women admitted with MAP. The study protocol addressed blood loss, peripartum hysterectomy, ICU admission, and maternal mortality. Massive blood loss was defined as intraoperative blood loss exceeding 1,500 mL. Blood collected in kidney trays was used for volume estimation, with a full tray considered to contain approximately 500 mL. Peripartum hysterectomy was defined as surgical removal of the uterus for uncontrolled hemorrhage; the decision was made by a consultant gynecologist with at least five years of post-fellowship experience. ICU admission was recorded when a patient required high-dose inotropic support, specified as norepinephrine above 10 micrograms per minute, or ventilatory support in the presence of an arterial blood gas pH below 7.25. These operational definitions were used to classify the outcomes recorded during hospital care.

The reported study population comprised 104 women, from whom informed consent was obtained before participation. Participants were informed that their information would be treated confidentially and collected for research purposes. A detailed clinical assessment was performed, and demographic and obstetric characteristics, including age, educational status, residence, gravidity, and parity, were documented. All participants delivered at the same hospital. Maternal outcomes were recorded on a structured data collection form using the prespecified definitions. The variables collected included blood loss in milliliters, hysterectomy, ICU admission, duration of intensive care, and maternal mortality. Clinical care during hospitalization followed the institution's usual treatment protocols. Enrollment in the study did not replace routine clinical assessment or determine the treatment required for an individual patient.

Data were entered and analyzed using IBM SPSS Statistics version 31.0. Quantitative variables were summarized using means and standard deviations, with medians and interquartile ranges also presented for selected characteristics. Categorical variables, including gravidity, parity, educational status, PAS subtype, and maternal outcomes, were summarized as frequencies and percentages. The analysis examined maternal outcomes across strata defined by age, gravidity, parity, educational status, and placental subtype. Chi-square tests were reported for comparisons between these categorical characteristics and the outcome variables. Statistical significance was defined as a p-value ≤ 0.05. The stratified comparisons describe associations within this case series and do not constitute adjustment for multiple potential confounding variables. The results presented focus on massive blood loss, hysterectomy, and ICU admission.

3. RESULTS

The case series included 104 patients with MAP. Their demographic and obstetric characteristics, PAS subtypes, and principal maternal outcomes are summarized in Table 1. Mean maternal age was 29.90 ± 6.03 years, and the median age was 30 years, with an interquartile range of 25–35 years. There were 55 women aged 20–30 years (52.9%) and 49 aged 31–40 years (47.1%). Most participants were multigravida: 89 women (85.6%), compared with 15 primigravida women (14.4%). Mean gravidity was 3.14 ± 1.41, with a median of 3 and an interquartile range of 2–4. With respect to parity, 74 women were classified as multiparous (71.2%) and 30 as primiparous (28.8%). Mean parity was 2.16 ± 0.84, with a median of 2 and an interquartile range of 1–3.

Secondary education was the most frequently reported educational category, accounting for 41 participants (39.4%). Primary education was reported by 26 women (25.0%), no formal education by 19 (18.3%), and higher education by 18 (17.3%). Placenta accreta was the most common PAS subtype, identified in 68 women (65.4%), followed by placenta

increta in 21 (20.2%) and placenta percreta in 15 (14.4%). These distributions describe the composition of the hospital case series rather than the frequency of the condition in the wider pregnant population.

Among the principal maternal outcomes, 40 women (38.5%) experienced massive intraoperative blood loss, defined as more than 1,500 mL. ICU admission was recorded for 29 patients (27.9%), and 42 women (40.4%) underwent peripartum hysterectomy. These outcomes are presented separately in Table 1; the categories may overlap because an individual woman could experience more than one complication or intervention.

Table 1. *Demographic Characteristics, Obstetric Variables, and Maternal Outcomes (n=104)*

Variable	Category or Measure	Frequency (%) / Mean ± SD [Median (IQR)]
Age groups	20-30 years	55(52.9%)
	31-40 years	49(47.1%)
	Age (years)	29.90±6.03 [30 (25 – 35)]
Gravidity	Primigravida	15(14.4%)
	Multigravida	89(85.6%)
	Gravidity	3.14±1.41 [3 (2 –4)]
Parity	Primiparous	30(28.8%)
	Multiparous	74(71.2%)
	Parity	2.16±0.84 [2 (1 – 3)]
Educational status	No formal education	19(18.3%)
	Primary	26(25.0%)
	Secondary	41(39.4%)
	Higher	18(17.3%)
Placenta type	Accreta	68(65.4%)
	Increta	21(20.2%)
	Percreta	15(14.4%)
Maternal outcomes	Massive blood loss	40(38.5%)
	ICU admission	29(27.9%)
	Hysterectomy	42(40.4%)

SD: standard deviation; IQR: interquartile range; ICU: intensive care unit.

Table 2. *Maternal Outcomes Stratified by Demographic and Obstetric Characteristics*

Variable	Category	Blood Loss Yes	Blood Loss No	Hysterectomy Yes	Hysterectomy No	ICU Yes	ICU No
Age (years)	20–30 years	23(41.8%)	32(58.2%)	24(43.6%)	31(56.4%)	12(21.8%)	43(78.2%)
	31–40 years	17(34.7%)	32(65.3%)	18(36.7%)	31(63.3%)	17(34.7%)	32(65.3%)
p-value		0.456		0.474		0.144	
Gravidity	Primigravida	5(33.3%)	10(66.7%)	7(46.7%)	8(53.3%)	3(20.0%)	12(80.0%)
	Multigravida	35(39.3%)	54(60.7%)	35(39.3%)	54(60.7%)	26(29.2%)	63(70.8%)
p-value		0.778		0.592		0.462	
Parity	Primiparous	9(30.0%)	21(70.0%)	14(46.7%)	16(53.3%)	10(33.3%)	20(66.7%)
	Multiparous	31(41.9%)	43(58.1%)	28(37.8%)	46(62.2%)	19(25.7%)	55(74.3%)
p-value		0.259		0.406		0.430	
Educational status	No formal education	6(31.6%)	13(68.4%)	6(31.6%)	13(68.4%)	5(26.3%)	14(73.7%)
	Primary	11(42.3%)	15(57.7%)	7(26.9%)	19(73.1%)	8(30.8%)	18(69.2%)
	Secondary	14(34.1%)	27(65.9%)	17(41.5%)	24(58.5%)	12(29.3%)	29(70.7%)
	Higher	9(50.0%)	9(50.0%)	12(66.7%)	6(33.3%)	4(22.2%)	14(77.8%)
p-value		0.598		0.051		0.928	
Placenta accreta spectrum	Accreta	24(35.3%)	44(64.7%)	30(44.1%)	38(55.9%)	18(26.5%)	50(73.5%)
	Increta	11(52.4%)	10(47.6%)	7(33.3%)	14(66.7%)	6(28.6%)	15(71.4%)
	Percreta	5(33.3%)	10(66.7%)	5(33.3%)	10(66.7%)	5(33.3%)	10(66.7%)
p-value		0.337		0.566		0.863	

Values are n (row %) except p-values. Massive blood loss: >1,500 mL; ICU: intensive care unit.

The stratified comparisons of maternal outcomes by demographic and obstetric characteristics are presented in Table 2.

Massive blood loss occurred in 41.8% of women aged 20–30 years and 34.7% of those aged 31–40 years. Hysterectomy was performed in 43.6% and 36.7% of these age groups, respectively. ICU admission was more frequent in the older group (34.7%) than in the younger group (21.8%). Multigravida women had higher observed frequencies of massive blood loss (39.3%) and ICU admission (29.2%) than primigravida women, whose corresponding frequencies were 33.3% and 20.0%. These descriptive differences did not reach statistical significance in the reported comparisons.

Massive blood loss was more frequent among multiparous women (41.9%) than among primiparous women (30.0%), whereas hysterectomy was more frequent in the primiparous group (46.7% versus 37.8%). Among educational categories, women with higher education had the largest observed proportion undergoing hysterectomy (66.7%). Across PAS subtypes, placenta increta had the highest proportion with massive blood loss (52.4%), while placenta accreta had the highest proportion undergoing hysterectomy (44.1%). None of the reported associations between the stratification variables and maternal outcomes met the prespecified significance threshold. The comparison between education and hysterectomy yielded p=0.051, which remained above 0.05 and should not be described as statistically significant.

4. DISCUSSION

MAP, now widely described as PAS, is associated with substantial maternal morbidity, particularly major hemorrhage, peripartum hysterectomy, and ICU admission. Contemporary guidance emphasizes careful recognition of the condition and preparation for its management, while imaging studies examine the contribution of ultrasound and magnetic resonance imaging to prenatal diagnosis [13, 14]. Delivery timing and the relationship between clinical disease classification and histopathological findings are additional considerations in assessing affected pregnancies [15, 16]. Although diagnostic and surgical approaches have developed, PAS remains challenging, especially when specialist resources are limited [17]. The present case series described 104 women treated at Sughra Shafi Medical Complex, Narowal, focusing on the frequency of major blood loss, hysterectomy, and critical care admission. It provides a local description of morbidity rather than evidence of a treatment effect.

Mean maternal age in this study was 29.90 ± 6.03 years, with 52.9% of women aged 20–30 years and 47.1% aged 31–40 years. The slightly larger younger group may reflect the reproductive-age population served by the hospital; it does not establish that younger age increases the risk of PAS. Reviews of diagnostic standards and management emphasize assessment of the wider obstetric risk profile rather than age alone [18]. Most participants were multigravida (85.6%), with mean gravidity of 3.14 ± 1.41, and 71.2% were multiparous, with mean parity of 2.16 ± 0.84. These findings show that previous pregnancies were common in this case series. Standardized ultrasound markers have also been investigated for prediction of PAS severity, illustrating the importance of distinguishing reproductive history from direct assessment of placental disease [19]. The present stratified comparisons did not identify statistically significant associations of gravidity or parity with the three reported maternal outcomes, but the absence of significance does not establish the absence of a clinically relevant relationship.

Secondary education was the most common educational category (39.4%), followed by primary education (25.0%), no formal education (18.3%), and higher education (17.3%). Educational background may influence access to information and patterns of healthcare use, but the present study did not separately evaluate these pathways. Its education categories therefore cannot explain the mechanisms underlying maternal complications. Placenta accreta accounted for 65.4% of cases, compared with 20.2% for increta and 14.4% for percreta, indicating that the least deeply invasive subtype predominated. More extensive invasion remains relevant to operative difficulty and the potential involvement of adjacent pelvic structures, as discussed in reviews of PAS pathophysiology and management [20]. However, the subgroup findings in this series did not show a statistically significant association between subtype and the reported outcomes.

Massive blood loss exceeding 1,500 mL occurred in 40 women (38.5%). This proportion demonstrates the substantial hemorrhagic burden among the patients treated at the study hospital. Abnormal attachment can make placental separation hazardous, while operative management of extensive disease may itself involve considerable bleeding. Reviews of prenatal diagnosis and management consequently place hemorrhage preparedness at the center of PAS care [17]. Pan and colleagues reported differences in blood loss and transfusion requirements between conservative management and cesarean hysterectomy in their systematic review and meta-analysis [6]. Such findings are relevant to treatment planning, but the present study did not allocate women to alternative strategies or measure their comparative effectiveness. Its observed blood-loss frequency should therefore be interpreted as a description of this clinical population.

A systematic review comparing prenatally and nonprenatally diagnosed PAS found lower blood loss and fewer transfused red-cell units among women diagnosed before delivery [21]. This evidence supports the clinical rationale for antenatal recognition and planned care. The present case series, however, did not report outcomes according to timing of diagnosis and cannot independently confirm that association. Its findings instead indicate the scale of hemorrhage-related needs at the study hospital and the relevance of organizing blood products, operative support, and a coordinated response before surgery whenever the clinical situation permits.

Peripartum hysterectomy was performed in 42 women (40.4%), making it a frequent major intervention in this case

series. In PAS, hysterectomy may be required when bleeding is severe or when definitive surgery is judged appropriate for the extent of disease. It can be lifesaving, but it also involves important consequences, including permanent loss of uterine fertility and the possibility of injury to the urinary tract or other adjacent structures. The PACCRETA prospective study compared conservative management with cesarean hysterectomy and provides a useful reference for considering the different morbidity profiles associated with these approaches [22]. The current results describe the frequency of hysterectomy without establishing whether a different approach would have been suitable for individual patients.

The hysterectomy frequency observed here reflects a substantial operative burden in the study setting. Comparisons with other series nevertheless require caution because the depth and location of invasion, timing of diagnosis, referral practices, institutional protocols, and availability of conservative management may differ. Pan and colleagues reported lower estimated blood loss and fewer ICU admissions with conservative management, alongside greater risks of selected complications, including endometritis and readmission [6]. These differences should not be interpreted as a universal advantage for one strategy, particularly where the original studies differed in patient selection. Appropriate management depends on the clinical circumstances, the woman's preferences where feasible, and the expertise and resources available to the treating team.

ICU admission was required for 29 women (27.9%). This finding indicates an appreciable demand for critical care among patients with MAP at the study institution. The degree of blood loss, circulatory instability, need for vasopressor or ventilatory support, and complexity of surgery can all influence postoperative care requirements. The study's operational definition linked ICU admission to specified forms of organ support, which should be considered when comparing this proportion with reports that use broader admission criteria. Critical care utilization has also been included among maternal outcomes in reviews comparing PAS management strategies [6]. Nevertheless, the present data do not establish which individual clinical factors independently accounted for ICU admission.

The systematic review by Sugai and colleagues associated prenatal recognition of PAS with reduced blood loss and transfusion requirements compared with diagnosis made later [21]. Together with the wider literature, this supports attention to early detection and coordinated preparation. In the current case series, however, the reported tables do not establish the temporal relationship between hemorrhage, hysterectomy, and ICU admission, nor do they show their overlap within individual patients. Consequently, the findings cannot determine whether any one complication or placental subtype independently predicted critical care admission. Addressing that question would require patient-level information and an analysis designed for that purpose.

These findings have practical relevance for hospital services caring for women with MAP, who may present with different degrees of placental invasion and different immediate clinical needs. The observed frequencies of major blood loss, hysterectomy, and ICU admission indicate the importance of recognizing high-risk pregnancies, arranging timely referral, maintaining access to blood products, and coordinating obstetric, anesthetic, surgical, and critical care expertise. Reviews of guidelines and contemporary management emphasize preparedness and treatment in appropriately equipped settings [13, 17, 18]. However, this study did not directly test whether those arrangements reduced morbidity. Their implementation must be considered alongside local resources, available expertise, and the ability to recognize suspected PAS before an obstetric emergency occurs.

Several limitations affect interpretation of this case series. First, it was conducted at a single hospital, and the findings may not generalize to institutions with different referral populations, diagnostic practices, or treatment resources. Second, the total sample and the smaller subtype groups may have provided limited statistical power to detect associations between maternal characteristics, placental invasion, and individual outcomes. Nonsignificant comparisons should therefore not be interpreted as evidence that the groups have equivalent risks. Third, the six-month observation period may not capture longer-term changes in case mix or clinical practice. Fourth, variations in surgical experience and hospital management may have influenced the observed frequencies of hemorrhage, hysterectomy, and ICU admission. Finally, the descriptive design and the absence of a control group prevent conclusions about causality or the effectiveness of specific treatments. Larger multicenter studies with clearly defined outcomes and appropriate comparative analyses would help examine the factors associated with maternal morbidity across different care settings.

5. CONCLUSION

This descriptive case series documented substantial maternal morbidity among women treated for MAP at Sughra Shafi Medical Complex, Narowal. Massive blood loss occurred in 38.5% of patients, peripartum hysterectomy in 40.4%, and ICU admission in 27.9%. These findings answer the study's descriptive objective by quantifying the principal maternal outcomes in the hospital population. They underscore the need for careful assessment and preparation for major obstetric complications. Timely recognition, appropriate referral, and coordinated multidisciplinary care remain relevant clinical priorities, although the study did not establish the effectiveness of these strategies or identify independent predictors of adverse outcomes.

Ethics Approval and Consent to Participate

The research protocol received institutional ethical review committee approval. Informed consent was obtained from participants, and the confidentiality of patient information was maintained.

Data Availability

The aggregate results supporting the reported findings are presented in the tables. Individual participant data are not included in this article.

Author Contributions

Authors contributed equally and approval of the final manuscript.]

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Conflicts of Interest

Authors declare that the do not have any conflict of interests.

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