ISSN 0973-2063 (online) 0973-8894 (print)
Bioinformation 22(10): 7383-7389 (2026)
©Biomedical Informatics (2026)

BIOINFORMATION
Discovery at the interface of physical and biological sciences
BIOMEDICAL INFORMATICS
www.bioinformation.net
Volume 22(10)
Research Article

Received October 1, 2026; Revised October 31, 2026; Accepted October 31, 2026, Published October 31, 2026
DOI: 10.6026/973206300227383

SJIF 2026 (Scientific Journal Impact Factor for 2026) = 8.478
2022 Impact Factor (2023 Clarivate Inc. release) is 1.9

Declaration on Publication Ethics:
The author's state that they adhere with COPE guidelines on publishing ethics as described elsewhere at https://publicationethics.org/. The authors also undertake that they are not associated with any other third party (governmental or non-governmental agencies) linking with any form of unethical issues connecting to this publication. The authors also declare that they are not withholding any information that is misleading to the publisher in regard to this article.

Declaration on official E-mail:
The corresponding author declares that lifetime official e-mail from their institution is not available for all authors

License statement:
This is an Open Access article which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly credited. This is distributed under the terms of the Creative Commons Attribution License

Comments from readers:
Articles published in BIOINFORMATION are open for relevant post publication comments and criticisms, which will be published immediately linking to the original article without open access charges. Comments should be concise, coherent and critical in less than 1000 words.

Disclaimer:
Bioinformation provides a platform for scholarly communication of data and information to create knowledge in the Biological/ Biomedical domain after adequate peer/editorial reviews and editing entertaining revisions where required. The views and opinions expressed are those of the author(s) and do not reflect the views or opinions of Bioinformation and (or) its publisher Biomedical Informatics. Biomedical Informatics remains neutral and allows authors to specify their address and affiliation details including territory where required.

Edited by Ashwini Dhopte
E-mail: ashwinidhopte@gmail.com
Citation: Jesmin *et al.* Bioinformation 22(10): 7383-7389 (2026)

Predictors of severe acute maternal morbidity (SAMM) at a tertiary hospital in Bangladesh

Mosammat Shahana Jesmin[1,*], Ferdousi Begum[2] & Marjia Begum[2]

[1]Department of Obstetrics and Gynaecology, University Hospital Coventry and Warwickshire NHS Foundation Trust, United Kingdom, Europe; [2]Department of Obstetrics and Gynaecology, Sir Salimullah Medical College Mitford Hospital, Dhaka, Bangladesh, South Asia; *Corresponding author

Affiliation URL:
https://www.uhcw.nhs.uk/
https://ssmcmh.gov.bd/

Author contact:
Mosammat Shahana Jesmin - E -mail: jemijes2020@gmail.com

ISSN 0973-2063 (online) 0973-8894 (print)
Bioinformation 22(10): 7383-7389 (2026)
©Biomedical Informatics (2026)

Ferdousi Begum - E -mail: fbegum9@gmail.com
Marjia Begum - E -mail: drmarjia@yahoo.com

Abstract:
Severe acute maternal morbidity (SAMM), or maternal near miss, describes a woman who nearly died from a life-threatening obstetric complication but survived and it serves as a valuable proxy indicator for maternal mortality. Therefore, it is of interest to identify the predictors of SAMM among women admitted to the Department of Obstetrics and Gynaecology, Sir Salimullah Medical College and Mitford Hospital, Dhaka, over six months. Hence, fifty women meeting near-miss criteria were enrolled and sociodemographic, obstetric, clinical and management data were collected through interview, examination and investigation using a structured questionnaire and analyzed in SPSS version 16.0. The mean age was 28.5±6.97 years; most participants were housewives, rural residents and had not received antenatal care. Obstetric haemorrhage, hypertensive disorders and abortion-related complications were the leading underlying causes and delay in transport and referral was common. Thus, multiparity, poor antenatal care and prior obstetric complications were prominent characteristics among women with SAMM, highlighting the need for strengthened antenatal and referral services.

Keywords: Severe acute maternal morbidity (SAMM), maternal near miss, antenatal care, obstetric haemorrhage

Background:
Severe acute maternal morbidity (SAMM), commonly termed maternal "near miss," refers to a woman who survives a life-threatening complication of pregnancy, childbirth, or the puerperium that would otherwise have resulted in death **[1]**. Because true maternal deaths become less frequent as care improves, near-miss events now occur far more often than deaths and provide a richer window into the quality and gaps of obstetric care **[1, 2]**. Global and regional pooled estimates show that near-miss ratios vary widely across settings, reflecting differences in healthcare access, case definitions and the underlying burden of obstetric risk factors **[2]**. A tertiary-hospital study from India found obstetric haemorrhage to be the leading contributor to SAMM and near-miss cases, with maternal age, parity, gestational age at admission and antenatal history among the key associated risk factors identified through multinomial regression **[3]**. Hospital- and community-based studies from Ethiopia and Somalia have consistently identified absent antenatal care, rural residence, low educational attainment, prior caesarean delivery and delay in decision-making or referral as independent predictors of near-miss morbidity **[4-6]**. A large facility-based surveillance study from an underdeveloped Chinese province similarly reported that advanced maternal age, high parity or nulliparity, inadequate prenatal visits and repeat caesarean section were significantly associated with near-miss occurrence, underscoring that these predictors recur across very different health-system contexts **[7].** Anaemia remains one of the most prevalent and modifiable antecedents of severe maternal morbidity, with pooled global estimates placing its prevalence in pregnancy at over a third of all gravidae and considerably higher in South Asia **[8].** Hypertensive disorders of pregnancy, including pre-eclampsia and eclampsia, complicate a substantial proportion of pregnancies worldwide and remain a principal driver of maternal mortality and near-miss morbidity, particularly where antenatal surveillance and timely antihypertensive or anticonvulsant therapy are inconsistently available **[9]**. Obstetric haemorrhage continues to be the leading single obstetric cause of maternal death worldwide, prompting updated international recommendations on early recognition, uterotonic use and bundled haemostatic management **[10]**. Unsafe or incomplete abortion further adds to this burden, occasionally producing catastrophic surgical complications requiring emergency intervention **[11]**. Delay in reaching or receiving appropriate care compounds these clinical risk factors. Application of the classical "three-delay" framework in tertiary hospital settings has repeatedly demonstrated that delay in transport and delay in decisions to seek care remain major, avoidable contributors to severe maternal outcome, even where referral facilities exist **[12]**. Understanding the cumulative lifetime risk of near-miss morbidity, rather than single-pregnancy risk alone, has also been proposed as a more meaningful population-level indicator of a woman's overall exposure to life-threatening obstetric complications across her reproductive years **[13]**. Therefore, it is of interest to determine the predictors of severe acute maternal morbidity among women admitted to a tertiary-level teaching hospital in Dhaka.

Materials and Methods:
This descriptive cross-sectional study was conducted in the Department of Obstetrics and Gynaecology, Sir Salimullah Medical College and Mitford Hospital (SSMC & MH), Dhaka, over a period of six months, from August 2013 to January 2014. Fifty pregnant women and women within 42 days of delivery who fulfilled the criteria for severe acute maternal morbidity and were admitted during the study period constituted the study population, enrolled consecutively.

Selection criteria:
Inclusion criteria:
Pregnant women and women within 42 days postpartum admitted with any life-threatening obstetric illness necessitating intensive care unit admission were included.

Exclusion criteria:
Women with pre-existing medical disorders such as heart disease, diabetes mellitus, bronchial asthma or hepatitis complicating pregnancy were excluded.

Data collection and study procedure:
Ethical approval was obtained from the institutional ethical review committee prior to commencement and the study was conducted in accordance with the Declaration of Helsinki for medical research involving human subjects. Each participant, or an attending relative in cases of critical illness, was informed verbally about the purpose, procedure and voluntary nature of participation and informed consent was obtained before enrolment; participants retained the right to withdraw at any stage without affecting their clinical care. Data were collected prospectively using a pre-designed, pre-tested structured questionnaire administered through direct interview, physical examination and review of relevant laboratory and ultrasonographic investigations. Variables recorded included sociodemographic characteristics, antenatal care history, parity, past obstetric complications, clinical diagnosis, mode and place of delivery, referral pattern, timing of emergency presentation, identification of delay, critical interventions, organ dysfunction and the underlying cause of near-miss morbidity. Data collection was performed by the principal investigator to maintain uniformity and reduce inter-observer variation and completed questionnaires were checked daily for completeness and internal consistency. Confidentiality of patient information was strictly maintained throughout collection, storage and analysis, with no personal identifiers retained in the final dataset. Data were compiled, coded and analyzed using the Statistical Package for Social Sciences (SPSS), version 16.0 for Windows. Continuous variables were summarized as mean ± standard deviation with range, while categorical variables were expressed as frequencies and percentages and findings were presented in tabular form for descriptive interpretation.

Results:
A total of 50 women with severe acute maternal morbidity (SAMM) were included in the study. The mean age of the participants was 28.5 ± 6.97 years, with an age range of 18–39 years. Most participants were housewives (76.0%) and resided in rural areas (70.0%) and nearly two-thirds (64.0%) had not received antenatal care during the current pregnancy. **Table 1** presents the sociodemographic characteristics of the study participants. The mean age was 28.5 ± 6.97 years and the largest proportion (26.0%) belonged to the 26–30-year age group. Half of the participants had received five years or more of education. Most participants were housewives (76.0%) and lived in rural areas (70.0%). Islam was the predominant religion (74.0%). **Table 2** shows the obstetric characteristics and previous obstetric history of the participants. Nearly two-thirds (64.0%) had not received antenatal care during the current pregnancy. Multiparous women constituted the largest group (56.0%), while 14.0% were grand multiparous. Most participants (70.0%) reported no iron supplementation. Among the 35 women with documented previous obstetric complications, previous abortion and pre-eclampsia were each reported by 60.0%, followed by previous postpartum haemorrhage (31.4%) and eclampsia (22.9%). **Table 3** summarizes the principal laboratory and ultrasonographic findings. The mean haemoglobin concentration was 7.36 ± 1.48 g/dL, ranging from 5 to 10 g/dL. Mean serum creatinine was 1.79 ± 1.44 mg/dL, while mean bilirubin was 6.4 ± 6.7 mg/dL. Hypokalaemia was documented in 8.0% of participants. On ultrasonography, a postpartum bulky uterus was the most frequent finding (30.0%), followed by incomplete abortion (24.0%) and normal findings (22.0%). **Table 4** presents the clinical diagnoses and underlying causes of SAMM. Antepartum eclampsia was the most frequent individual clinical diagnosis (22.0%), followed by incomplete abortion with shock (16.0%) and postpartum haemorrhage due to retained placenta with shock (12.0%). Among the underlying causes, obstetric haemorrhage was the most frequently reported (58.0%), followed by hypertensive disorders (28.0%), abortion (24.0%), other obstetric complications (14.0%) and pregnancy-related infection (10.0%). Multiple underlying causes could be present in the same participant. **Table 5** demonstrates the referral pattern, timing of emergency presentation and delivery characteristics. Almost half of the participants (48.0%) reached the hospital by self-referral, whereas 38.0% were referred from a health complex. Emergency presentation occurred most frequently during the antepartum period (38.0%), followed by presentation before 20 weeks (32.0%). Among participants with documented delivery information, 76.5% delivered in hospital and 23.5% delivered at home. Among those with documented mode of delivery, caesarean section was the most frequent (50.0%). **Table 6** presents delay in care, critical interventions and organ dysfunction among the participants. Transport-related delay was the most frequently identified delay (76.0%), followed by delay in receiving treatment (52.0%) and delay in decision-making (44.0%). Intensive care admission was required in 72.0% of participants, while 70.0% received more than five units of blood or blood products. Cardiovascular dysfunction was the most common life-threatening organ dysfunction (88.0%), followed by renal dysfunction (18.0%). **Table 7** summarizes the treatment modalities used among the 20 participants who experienced postpartum haemorrhage. Oxytocin was the most frequently administered treatment (90.0%), followed by misoprostol (45.0%). Ergometrine, tranexamic acid, balloon/condom catheterization and other uterotonics were each used in 35.0% of cases. Removal of retained products was performed in 30.0%, artery ligation in 25.0% and hysterectomy in 15.0% of affected women.

Table 1: Socio-demographic characteristics of women with severe acute maternal morbidity (n=50)

Variable		Frequency (n)	Percentage (%)
Age (years)	≤20	12	24.0
	21–25	6	12.0
	26–30	13	26.0

	31–35	11	22.0
	>35	8	16.0
	Mean ± SD	28.5 ± 6.97	
	Range	18–39	
Education	<2 years	23	46.0
	3–4 years	2	4.0
	≥5 years	25	50.0
Occupation	Housewife	38	76.0
	Employed	12	24.0
Residence	Rural	35	70.0
	Semi-urban	13	26.0
	Urban	2	4.0
Religion	Islam	37	74.0
	Hinduism	13	26.0

Table 2: Obstetric characteristics and previous obstetric complications of the participants

Variable		Frequency (n)	Percentage (%)
Antenatal care (n=50)	Received	18	36.0
	Not received	32	64.0
Parity (n=50)	Primiparous	15	30.0
	Multiparous (para 2–4)	28	56.0
	Grand multiparous (para ≥5)	7	14.0
Iron supplementation (n=50)	Regular	4	8.0
	Irregular	11	22.0
	None	35	70.0
Previous obstetric complications* (n=35)	Previous abortion	21	60.0
	Previous pre-eclampsia	21	60.0
	Previous postpartum haemorrhage	11	31.4
	Previous eclampsia	8	22.9
	Multiple pregnancy	4	11.4

**Multiple responses permitted.*

Table 3: Laboratory and ultrasonographic findings among women with SAMM

Variable	Frequency (n)	Percentage (%)
Haemoglobin, mean ± SD (range)	7.36 ± 1.48 (5–10)	
RBS, mean ± SD (range)	5.9 ± 4.33 (1.3–15)	
Serum creatinine, mean ± SD (range)	1.79 ± 1.44 (0.8–4.0)	
Bilirubin, mean ± SD (range)	6.4 ± 6.7 (1.2–15)	
SGPT, mean ± SD (range)	86 ± 10.8 (79–100)	
Prothrombin time, mean ± SD (range)	15.66 ± 3.14 (12–19)	
Hypokalaemia	4	8.0
Ultrasonographic findings		
Postpartum bulky uterus	15	30.0
Incomplete abortion	12	24.0
Normal findings	11	22.0
Central placenta previa	6	12.0
Ruptured ectopic pregnancy with adnexal mass/pelvic collection	4	8.0
Type II anterior placenta previa	2	4.0

Table 4: Clinical diagnoses and underlying causes of severe acute maternal morbidity

Variable	Frequency (n)	Percentage (%)
Clinical diagnosis		
Antepartum eclampsia	11	22.0
Postpartum eclampsia with acute renal failure	3	6.0
PPH due to retained placenta with DIC	2	4.0
PPH due to retained placenta with shock	6	12.0
PPH due to retained placenta with severe jaundice	1	2.0
Central placenta previa	6	12.0
Type II anterior placenta previa	2	4.0
Incomplete abortion with shock	8	16.0
Septic abortion with shock	4	8.0
Ruptured uterus	2	4.0
Puerperal sepsis following home delivery	1	2.0
Ruptured ectopic pregnancy with shock	4	8.0
Underlying cause*		
Obstetric haemorrhage	29	58.0
Hypertensive disorders	14	28.0

Abortion	12	24.0
Other obstetric disease or complication	7	14.0
Pregnancy-related infection	5	10.0

**Multiple responses permitted.*

Table 5: Referral pattern, timing of emergency presentation and delivery characteristics

Variable		Frequency (n)	Percentage (%)
Source of referral (n=50)	Self	24	48
	Health complex	19	38
	Health professional	5	10
	Sadar hospital	2	4
Time of emergency (n=50)	Before 20 weeks	16	32
	Antepartum	19	38
	Intrapartum	7	14
	Postpartum	8	16
Place of delivery (n=34)	Hospital	26	76.5
	Home	8	23.5
Mode of delivery (n=26)	Caesarean section	13	50
	Vaginal delivery	7	26.9
	Caesarean hysterectomy	6	23.1

Table 6: Delays, critical interventions and organ dysfunction among women with SAMM

Variable		Frequency (n)	Percentage (%)
Identification of delay*	Delay in transport	38	76
	Delay in receiving treatment	26	52
	Delay in decision-making	22	44
Critical interventions*	Transfusion of >5 units of blood/blood products	35	70
	Admission to intensive care unit	36	72
Organ dysfunction/life-threatening conditions*	Cardiovascular dysfunction	44	88
	Renal dysfunction	9	18
	Coagulation/haematological dysfunction	2	4
	Hepatic dysfunction	2	4

**Multiple responses permitted.*

Table 7: Treatment modalities used for postpartum haemorrhage among affected participants (n=20)

Treatment modality*	Frequency (n)	Percentage (%)
Oxytocin	18	90.0
Misoprostol	9	45.0
Ergometrine	7	35.0
Tranexamic acid	7	35.0
Balloon/condom catheterisation	7	35.0
Other uterotonics	7	35.0
Removal of retained products	6	30.0
Artery ligation	5	25.0
Hysterectomy	3	15.0

**Multiple responses permitted.*

Discussion:

In the present study, the mean age of women with severe acute maternal morbidity was 28.5±6.97 years, with the largest proportion falling in the 26–30-year age band, a pattern that broadly mirrors the age distribution reported by Vandana and Krishnaswamy among tertiary-hospital SAMM and near-miss cases in India, where clustering around the third decade of life was similarly prominent **[3]**. This contrasts somewhat with the Hunan surveillance data of Zhou *et al,* who found advanced maternal age of 30 years or more to be an independent risk factor for near-miss morbidity, suggesting that the relative contribution of age may depend on the background fertility pattern and average age at childbearing within a population **[7]**. The predominance of housewives, rural residents and women with low educational attainment in the present cohort is consistent with findings from Habte and Wondimu and from Dahie, both of whom identified low educational status and rural or peri-urban residence as independent determinants of near-miss morbidity in facility-based case-control studies conducted in Ethiopia and Somalia, respectively **[4, 5]**. Nearly two-thirds of participants in this study had not received antenatal care during the index pregnancy and most had not taken iron supplementation, echoing the observation of Tenaw *et al.* that

absent antenatal care was among the strongest determinants of maternal near-miss in eastern Ethiopian private hospitals **[6]**. The Hunan cohort similarly demonstrated that fewer than five antenatal visits significantly raised the odds of near-miss occurrence, reinforcing antenatal care as a broadly protective, modifiable exposure across different settings **[7]**. This finding is compatible with wider evidence that antenatal-care non-utilization remains disproportionately common across low- and

middle-income countries, limiting opportunities for early identification of anaemia, hypertension and other treatable risk factors before they progress to critical illness **[18]**. Multiparity was common in the present cohort, in keeping with the association between higher parity and near-miss risk reported by Zhou *et al,* while grand multiparity has separately been shown by Dasa *et al* to independently raise the risk of postpartum haemorrhage and other adverse maternal outcomes in a prospective cohort, mirroring the recurrent obstetric-history risk pattern observed in the present series **[7, 19].** The markedly low mean haemoglobin observed among participants reflects the substantial anaemia burden described by Karami *et al* in their global meta-analysis, which reported that more than a third of pregnant women worldwide and a still higher proportion in South Asia, are anaemic, predisposing them to poorer tolerance of obstetric blood loss **[8].** Antepartum eclampsia and postpartum haemorrhage due to retained placenta were the leading individual clinical diagnoses in the present series and hypertensive disorders together with obstetric haemorrhage were the dominant underlying causes of near-miss, a pattern that closely mirrors the global near-miss aetiology summarized by Firoz *et al*, the Indian findings of Singh and Barik and the Hunan surveillance data of Zhou *et al*, all of which identified haemorrhage and hypertensive disease as the two leading drivers of severe maternal outcome and showed a strong statistical association between hypertensive disorders and near-miss occurrence **[2, 14 and 20]**. A recently reported tertiary-centre retrospective maternal-near-miss analysis provides regional context for the obstetric emergencies and health-system challenges described here, although differences in enrolment periods and criteria limit direct prevalence comparisons **[21].** The contribution of incomplete and septic abortion in this cohort is consistent with case reports describing severe abortion-related complications requiring emergency surgical intervention, underscoring that unsafe abortion continues to carry disproportionate morbidity in resource-limited settings **[11]**. Delay in transport was the most frequently identified type of delay in this study, followed by delay in receiving treatment and delay in decision-making, a distribution that aligns closely with the three-delay analysis of Singh and Metgud, who similarly found logistical and referral-related delay to dominate over decision-related delay in tertiary hospital near-miss cohorts and with the South African national audit of Heitkamp *et al*, which emphasized persistent gaps in referral and transport systems as recurring contributors to severe maternal outcome **[12, 15]**. The high proportion of participants requiring more than five units of blood transfusion and intensive care admission observed here corresponds with the ICU-based obstetric cohorts described by Anane-Fenin *et al.* in Ghana and Gupta *et al.* in India, both of which reported similarly heavy reliance on transfusion and critical care support among women with life-threatening obstetric illness in resource-constrained hospitals **[16, 17]**. Finally, the predominance of oxytocin and misoprostol as first-line treatment for postpartum haemorrhage in this cohort, escalating to balloon tamponade and hysterectomy in refractory cases, mirrors the stepwise, bundled-care approach recommended in the updated FIGO guideline on postpartum haemorrhage management **[10]**.

Conclusion:

Severe acute maternal morbidity was most common among rural, poorly educated, multiparous women with inadequate antenatal care and iron supplementation. Obstetric haemorrhage, hypertensive disorders and abortion-related complications were the leading underlying causes, compounded substantially by delay in transport and referral. Strengthening antenatal coverage, timely referral and emergency obstetric readiness is essential to reduce the burden of SAMM in tertiary hospital settings.

Limitations and recommendations:

This single-center study included only 50 women, limiting generalizability. Its cross-sectional design precluded assessment of independent predictors, while recall bias and hospital-based records may have underestimated near-miss morbidity. Future multicenter studies with larger samples and multivariable regression are recommended to identify independent predictors of SAMM and inform targeted antenatal, referral and emergency obstetric care strategies in similar low-resource settings.

References:

[1] Kulkarni R *et al. Indian J Med Res.* 2021 **154**:573. [PMID: 35435342]
[2] Firoz T *et al. BMJ Glob Health.* 2022 **7**:e007077. [PMID: 35387768]
[3] Vandana & Krishnaswamy P. *J Obstet Gynecol India.* 2022 **72**:19. [PMID: 35928071]
[4] Habte A *et al. PLoS One.* 2021 **16**:e0251826. [PMID: 33999941]
[5] Dahie HA. *BMC Pregnancy Childbirth.* 2022 **22**:658. [PMID: 35996082]
[6] Tenaw SG *et al. BMC Pregnancy Childbirth*. 2021 **21**:181. [PMID: 33663429]
[7] Zhou X *et al. BMC Public Health*. 2024 **24**:1092. [DOI: 10.1186/s12889-024-18970-4]
[8] Karami M *et al. Matern Child Health J.* 2022 **26**:1473. [PMID: 35608810]
[9] Antza C *et al. J Hypertens*. 2022 **40**:1257. [PMID: 35762468]
[10] Escobar MF *et al. Int J Gynaecol Obstet*. 2022 **157**:3. [PMID: 35297039]
[11] Anand A *et al. Ann Med Surg (Lond).* 2022 **84**:104933. [PMID: 36582916]
[12] Singh J & Metgud CS. *Indian J Health Sci Biomed Res KLEU*. 2021 **14**:234. [DOI: 10.4103/kleuhsj.kleuhsj_280_20]
[13] Gazeley U *et al. Int J Epidemiol.* 2024 **53**:dyad169. [38110741]
[14] Singh V *et al. Cureus*. 2021 **13**:e12548. [PMID: 33564542]
[15] Heitkamp A *et al. S Afr Med J.* 2022 **112**:769. [PMID: 36214035]
[16] Anane-Fenin B *et al. PLoS One*. 2021 **1**6:e0261974. [PMID: 34972184]
[17] Gupta H *et al. Indian J Crit Care Med*. 2021 **25**:388. [PMID: 34045804]

[18] Tamir TT *et al. PLoS One*. 2025 **20**:e0330596. [PMID: 40824956]
[19] Dasa TT *et al. Front Public Health*. 2022 **10**:959633. [PMID: 36311606]
[20] Zhou X *et al. Front Med (Lausanne)*. 2024 **11**:1415696. [PMID: 39760036]
[21] Sahukar S & Pavanaganga A. *J South Asian Fed Obstet Gynaecol*. 2026 **18**:33. [DOI:10.5005/jp-journals-10006-2851]

Caveat Emptor is applicable among the literate community where required and possible. The publisher, its journal, editors and the internal/external reviewers take adequate steps to check, evaluate, correct, edit, revise and improve content where possible and required.