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ORIGINAL RESEARCH

Women's real-time pain and stress during medical abortion: An ecological momentary assessment study

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Abstract

Introduction: Knowledge on women's pain and stress experiences during medical abortion is scarce and evidence mainly relies on retrospective reports, which are prone to recall bias. Hence, our objective was to study real-time self-reported pain and stress throughout the medical abortion process, their fluctuation over time, and to examine whether age, parity, gestational age, adverse childhood events (ACE), and contextual factors (e.g., analgesics intake, bleeding) were associated with pain and stress.

Material and Methods: This one-group, single center, exploratory cohort study (conducted 2020–2023) used ecological momentary assessment (EMA). A population-based sample of women ≥18 years of age presenting for first trimester medical abortion at ≤9th week of gestation was approached after mifepristone intake. Sixty women aged 30.40 ± 6.61 years were included in this study. EMA commenced with mifepristone intake and entailed four prompts per day over a consecutive 7-day period. Main outcomes included self-reported pain and stress measured using visual analog scales (VAS). Secondary outcomes were clinical and demographic data as well as psychological measures. Data were analyzed using multilevel models.

Results: Reported pain and stress varied not only throughout the abortion process but also between women, showing an increase on Day 3 (misoprostol intake) and a gradual decrease thereafter. While age, gestational age, and parity were not significantly related to pain, higher self-reported stress, more bleeding, more analgesic intake, and a higher number of ACEs were associated with higher pain levels. Higher stress levels, in turn, were associated with more ACEs, parity, analgesics intake, treatment-related events, and weekdays.

Conclusions: Our results highlight large interindividual variations in women's pain and stress experiences during first trimester medical abortion and thus emphasize the need for individualized counseling and pain treatment. Screening for ACEs, along

Abbreviations: ACE, adverse childhood events; EMA, ecological momentary assessment; VAS, visual analog scales.

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with using event-based EMA protocols for future pain-management research, may promote tailored care.

KEYWORDS
adverse childhood events, ecological momentary assessment, medical abortion, pain, stress

1 | INTRODUCTION

Since their introduction in 1988, medical abortions are estimated to make up the majority of induced abortions in Western countries.[1] Medical abortions involve mifepristone intake followed by at-home misoprostol 36–48 h later.[2] While this protocol is safe, accepted, and highly effective for early gestation,[3–5] it is also known to potentially cause heavy bleeding, substantial pain,[6,7] and possibly distress due to concerns about side effects and anticipated pain.[8–11]

While effective pain and stress management is pivotal for improving access to and tolerability of medical abortion,[12,13] women's pain and stress experiences, particularly their predictors, trajectories, and interplay, remain underresearched in this context.[4,14,15] Several factors, such as gestational age, parity, women's age,[16,17] prior traumatic experiences,[18] and contextual factors like social support,[19] have been associated with pain. Stress, however, has been studied less in medical abortion. Stress in this context is understood as a particular relationship between the person and the environment that is subjectively appraised by the person as taxing or exceeding their resources and endangering well-being.[20] Only a few studies assess self-reported stress (e.g.,[21] for preabortion stress), and even fewer associate it with pain. When they do, the findings align with research in other fields, indicating a link between stress and pain.[22] Generally, knowledge on women's medical abortion experiences relies on retrospective interviews[23] or daily symptom diaries,[2,12,24] both of which are susceptible to recall bias. Even daily diaries often reflect end-of-day summaries rather than real-time experiences or depend on women remembering to complete them throughout the day. Moreover, these methods fail to capture real-time fluctuations in pain and stress.

Only recently have studies employed text messaging to examine pain during medical abortion in real-time.[25–27] While these studies provide insights into pain trajectories, they begin only at the point of misoprostol intake on day 2 or 3, neglecting the period between mifepristone and misoprostol, in which up to 44% of women already report abdominal pain.[28] Also, by focusing exclusively on pain intensity and analgesic intake, they fail to account for women's stress experiences and for other explanatory factors, as well as for the dynamic interactions between pain trajectories, stress trajectories, and contextual and psychological variables.

To examine women's real-time pain and stress trajectories throughout the medical abortion process and to identify critical points—marked by peaks in self-reported pain and stress at the individual level—this exploratory study employed ecological momentary assessment (EMA), a smartphone-based diary method. Data collection began with the intake of mifepristone at the abortion clinic and continued for 1 week. In addition, we examined whether demographic and clinical factors, including age, parity, gestational age, and traumatic childhood experiences, as well as contextual factors (e.g., analgesics intake, bleeding, study day) were associated with pain and stress, and their fluctuation over time.

Key message

Real-time tracking revealed substantial variation in women's pain and stress during medical abortion, influenced by bleeding, analgesic use, and adverse childhood experiences. These findings provide new knowledge to guide more personalized counseling and targeted pain management strategies.

2 | MATERIAL AND METHODS

This EMA study is reported in accordance with the recommendations of the adapted STROBE Checklist for Reporting EMA Studies (CREMAS[29]).

2.1 | Participants and Procedure

Women were recruited between 2020 and 2023 at the Gynmed Clinic for Abortion and Family Planning, Vienna, Austria. Inclusion criteria were (1) undergoing medical abortion before the 9th week of gestation (≤63 days gestation), (2) ≥18 years of age, and (3) possession of a smartphone (Android or iOS). Exclusion criteria included estimated cognitive impairment, and insufficient German language proficiency. Eligible women were approached by clinic staff only after mifepristone intake and informed about the study. The patient flow is displayed in Supporting Material A. The medical abortion regimen followed the approved protocol of 600 mg oral mifepristone (Mifegyne®) and 2 × 200 μg oral misoprostol (Cyprostol®) at home 36–48 h later (see https://ec.europa.eu/health/documents/community-register/2007/2007061427908/anx_27908_en.pdf). Women were also dispensed three tablets of 600 mg ibuprofen each and one tablet of 50 mg codeine as a backup; they were advised by clinic staff to self-administer analgesia based on their own pain experience, taking medication whenever they felt it was necessary.

The study protocol was approved by the Medical University ethics committee (No. 1625/2019, date: July 15, 2019); participation was voluntary, and participants did not receive any remuneration. Upon providing written consent, participants filled out baseline paper-pencil questionnaires on-site. Participants were not specifically trained for the EMA protocol but received in-depth information about the procedure, and had on-site assistance if questions arose. After registering via a personalized link and QR-Code in the browser-based, Android/iOS compatible software *ELMO* (*ELectronic MOod*, https://elmo.wien, programmed by FOX medialab & design, https://fox.co.at/), participants selected whether they wanted to receive prompts via SMS or WhatsApp, and completed the first set of EMA-questions on-site using their own smartphone. The subsequent push messages (SMS or WhatsApp) each contained a link to the online questions in fixed order: assessment of events since the last prompt, momentary stress, pain, and analgesic intake (see measures). We used an interval-based prompting strategy spanning over a consecutive 7-day period, which started post intake of mifepristone at the Gynmed Clinic (Day 1) and automatically terminated 1 week later. Day 1 encompassed three data entries: a self-initiated data entry upon registration (on-site) and two consecutive prompts. Days 2–7 each entailed four prompts. Prompts were sent semi-randomly throughout the day (8.30–9.30, 12.00–13.30, 16.00–18.00, 20.30–22.00), and each data entry was time-stamped (see Figure 1). If participants did not react to the initial prompt, they received a reminder after 30 min and could postpone entries for up to 60 min. To reduce participant burden and/or reactivity, prompts, including three reminders, automatically ceased after three consecutive nonresponses, hence terminating study participation. The response latency (i.e., time elapsed from prompt to response) averaged 15 min (SD = 16.15 min), and participants needed around 4 min (SD = 4.94 min) to complete a data entry.

2.2 | Measures

2.2.1 | Sociodemographic and clinical

Women's age, relationship status, number of children, level of education, country of origin, prior abortions, level of certainty ("How sure are you now about your decision to terminate the pregnancy?", VAS, 0–100), number of days to reach the decision for abortion, prior use of contraception, and general desire for children were assessed on-site. In addition, participants' gestational age and parity were recorded by clinic staff.

2.2.2 | Traumatic childhood experiences

The 10-item Adverse Childhood Experiences Questionnaire (ACE[30]) was used on-site to document the occurrence of traumatic childhood events such as abuse, neglect, separation from a parent, and violence. A sum score was calculated with higher values indicating a higher number of ACEs.

2.2.3 | Self-reported pain and stress

Visual Analog Scale (VAS, 0–100) was used to assess momentary self-reported pain and stress, with higher values indicating higher momentary pain and stress since the last data entry. VAS is

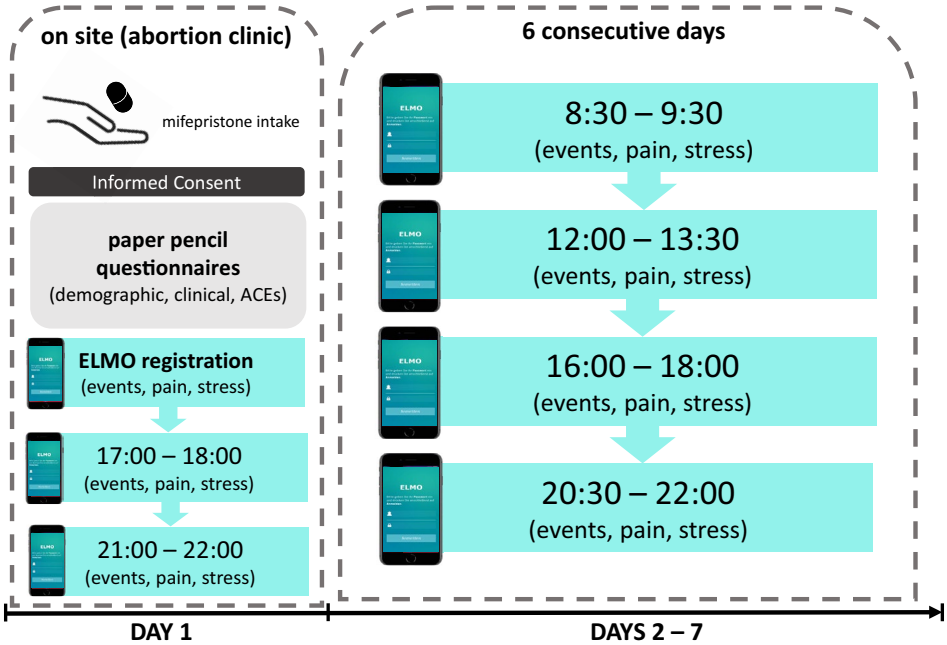

FIGURE 1 Women's pain and stress during medical abortion—study protocol and measures.

commonly used and validated for assessing subjectively experienced stress (e.g.,[31,32]) and pain.[33]

2.2.4 | Events since last data entry

Participants reported events related to the medical procedure and general events that had occurred since the last prompt using free-text entries. Given the exploratory design and the limited knowledge about factors influencing medical abortion experiences, open-ended questions enabled participants to share a broader range of experiences, helping us capture unanticipated but potentially relevant influences.

Based on inductive content analysis,[34,35] events were categorized as follows: treatment-related events, bleeding, somatic symptoms, and improvements in condition. Details regarding the coding procedure and the categories are provided in Supporting Material B (incl. Table S1).

2.2.5 | Analgesics

Intake of analgesics (yes = 1, no = 0) as well as type of substance (e.g., ibuprofen) and dosage were recorded for the time frame since the last prompt. Additionally, participants indicated whether they perceived the analgesic as helpful (VAS, 0 = not at all–100 = very).

2.3 | Data analyses

We computed linear multilevel models using RStudio, version 4.4.0[36] with the package lme4.[37] We specified separate 3-level models (observations nested within days nested within individuals) for self-reported pain and stress as dependent variables. The multilevel modeling proceeded in a stepwise manner: empty random-intercept model, conditional model including all covariates and the focal variables with fixed effects, conditional model with additional random effects. Further details regarding the analyses (e.g., further R-packages, model structure, centering, inclusion of random slopes) are reported in Supporting Material C.

Covariates included time of day (centered on 12 pm) and weekday (weekday = 0, weekend = 1). Focal variables on the person level included participants' age, gestational age, parity, and ACEs, whereas focal variables on the momentary level included study day, analgesic intake and contextual variables. Specifically, we examined whether treatment-related events, bleeding, and improvement in condition (categorized from event-related data entries; 0 = not reported, 1 = reported, see Supporting Material B) since the last time point were associated with pain or stress. For stress, we additionally included reports of somatic symptoms (0 = not reported, 1 = reported). Moreover, for models with momentary pain as the outcome, we additionally included self-reported stress since the last data entry as a focal variable. We used maximum likelihood for model estimation with listwise deletion in case of missing values. We report unstandardized β coefficients, which indicate the change score in the outcome by a 1-unit increase in the independent variable. The Satterthwaite method was used to test significance using lmerTest.[38] All *p*-values were from two-sided tests and results were deemed statistically significant at $p < 0.05$. Model comparisons were undertaken by means of chi-squared statistics, which compare the reduction in deviance as a measure of model fit. As a

TABLE 1 Sociodemographic and clinical characteristics of the overall sample ($N = 60$).

Baseline characteristics		Range
Age (years), M (SD)	30.40 (6.61)	18–44
Highest degree, *n* (%)		
Vocational training	18 (30)	
High school diploma	20 (33)	
University degree	22 (37)	
Relationship status[a], *n* (%)		
Single	14 (24)	
In relationship	45 (76)	
Number of children, *n*, %		
0	31 (52)	
1	9 (15)	
2	17 (28)	
3–4	3 (5)	
Country of origin, *n* (%)		
Austria	50 (83)	
Germany	4 (7)	
Other	10 (10)	
Gestational age (days), M (SD)	44.87 (5.101)	32–58
Parity, *n* (%)		
Nulliparous	31 (52)	
Multiparous	29 (48)	
Prior abortion—yes, *n* (%)	9 (15)	
Used contraception, *n* (%)		
Never	15 (25)	
Occasionally	16 (27)	
Always	29 (48)	
Certainty about abortion (VAS), Md (IQR)	100.00 (4.00)	0–100
Number of days to reach abortion decision, M (SD)	9.11 (5.73)	1–33
ACEs[a], Md (IQR)	1 (3)	0–9
EMA data		
Self-reported pain (VAS), Md (IQR)	28.00 (49.00)	0–100
Self-reported stress (VAS), Md (IQR)	12.00 (59.00)	0–100

Abbreviations: ACE, adverse childhood events; EMA, ecological momentary assessment; IQR, interquartile range; Md, median; VAS, visual analog scale (0 = not at all, 100 = very much).

[a]Reports from 1 participant are missing.

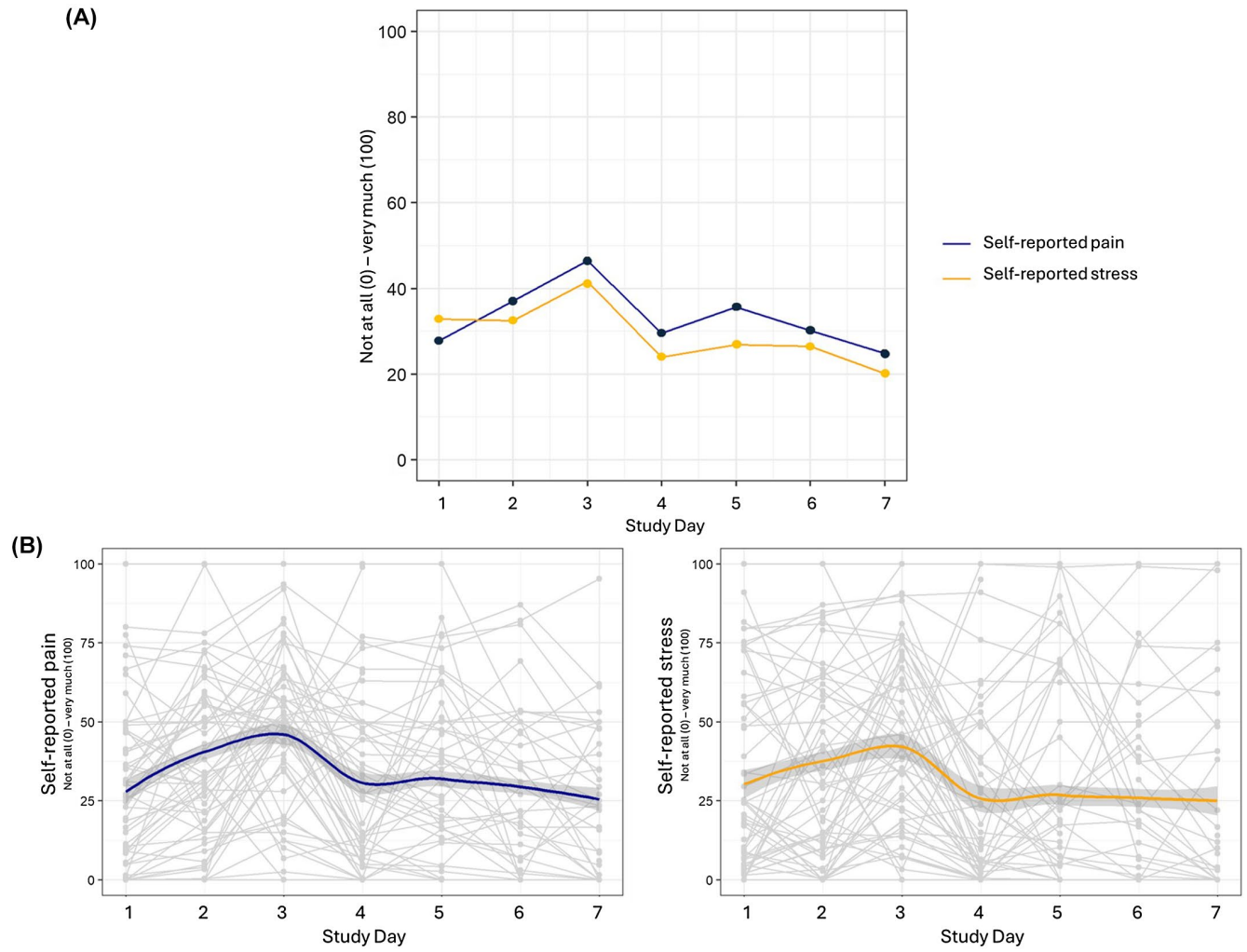

FIGURE 2 Daily trajectories of self-reported pain and stress in daily life (A) averaged across all patients, (B) displaying each patient's trajectory (gray) and averaged across all individuals. Based on $N = 60$. Smoothed curve in panel B based on loess regression.

measure of effect size, we report *pseudo-R^2*, representing the change in residual variance or intercept variance with (σ^2 reference model − σ^2 conditional model)/σ^2 reference model.[39] Data analysis was performed from October to December 2024.

3 | RESULTS

Eighty-four women provided at least the first data entry in ELMO. However, $n = 24$ women were further excluded due to extremely low compliance with the study protocol (see Supporting Material A for the full patient flow and Supporting Material D for details regarding participant attrition and compliance, Figure S1). Thus, 60 women ($M_{age} = 30.40$, $SD_{age} = 6.61$, range: 18–44 years) were included in the final data analyses. Table 1 displays participants' demographic and clinical characteristics and the averaged descriptive statistics of self-reported pain and stress.

From a total of 1620 possible data entries during the whole study period, 40.25% ($n = 652$) did not receive a response resulting in an overall compliance rate of 59.75% ($n = 968$). While the first 4 days were characterized by a response/compliance rate of 71.78% ($n = 646$), it was reduced to 44.72% ($n = 322$) in the remaining 3 days (see Supporting Material D).

As displayed in Figure 2, self-reported pain and stress, on average, showed the highest values on day three (i.e., intake of misoprostol), whereas pain and stress gradually decreased until the end of the study period. Importantly, pain and stress trajectories varied substantially both within (i.e., from moment to moment and day to day) and between individuals (see Supporting Material E for details, Figure S2). The intraclass correlation coefficients were 0.27 for pain and 0.46 for stress. This indicates that 27% and 46% of the variability in pain and stress was due to differences between individuals while the remaining variance was explained by differences between days and moments.

Overall, 58 women (96.6%) reported intake of analgesics at least once during the study period, while analgesics intake was reported in 16.93% ($n = 162$) of all the data entries; that is, most women reported analgesic intake on one or two occasions. If analgesics were taken, they were perceived as rather helpful (median = 68.50; IQR, 49.50–88.00). Ibuprofen was taken most frequently (86.25%, $n = 138$), while paracetamol (4.38%, $n = 7$), codeine (1.25%, $n = 2$), and

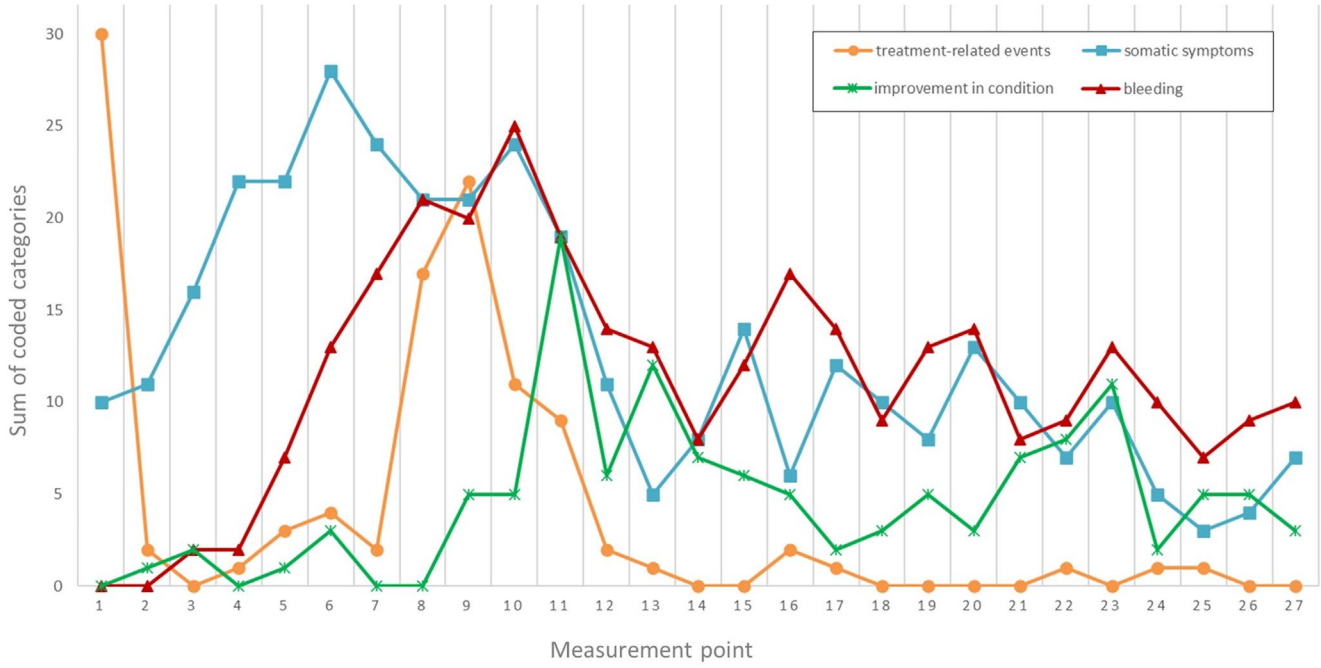

FIGURE 3 Trajectories of contextual events (coded categories from free-text entries) across all measurement points of the study period. Displayed are coded categories from open-text answers (see Supporting Material B) averaged across all $N = 60$ patients.

other analgesics or combinations thereof (8.13%, $n = 13$) were taken only seldom. Figure 3 displays the number and trajectories of contextual events (treatment-related events, bleeding, somatic symptoms, improvements in condition).

3.1 | Self-reported pain

Detailed results are displayed in Table 2. Analyses revealed that reports of bleeding, and analgesics intake since the previous time point were associated with higher self-reported pain and explained 0.8% ($\chi^2 = 7.32$ (1), $p = 0.007$) and 12.7% ($\chi^2 = 108.66$ (3), $p < 0.001$) of the residual variance, respectively. Self-reported stress since the previous time point was associated with higher pain levels and explained 1.2% of the residual variance ($\chi^2 = 63.08$ (1), $p < 0.001$). Moreover, women with more ACEs reported higher pain levels in daily life during medical abortion and explained 10.1% of the variance at the person level ($\chi^2 = 13.57$ (2), $p = 0.001$). No other variables were significantly associated with self-reported pain.

3.2 | Self-reported stress

Detailed results are displayed in Table 2. Analyses showed that treatment-related events were associated with higher stress, explaining 2.5% of residual variance ($\chi^2 = 18.85$ (1), $p < 0.001$). Similarly, analgesic intake was associated with higher stress levels, explaining 9.06% of the residual variance ($\chi^2 = 43.48$ (3), $p < 0.001$). Furthermore, a higher number of ACEs was associated with higher stress, and parity was associated with lower self-reported stress in daily life. ACEs explained 21.3% ($\chi^2 = 11.69$ (1), $p < 0.001$) and parity 6.8% ($\chi^2 = 9.41$ (1), $p = 0.002$) of person-level variance. Moreover, stress decreased throughout the study period, and participants reported lower stress on weekends. Study day and weekday explained 0.02% ($\chi^2 = 6.49$ (1), $p = 0.01$) and 0.4% ($\chi^2 = 7.88$ (1), $p = 0.005$) of the residual variance. No other variables were significantly associated with self-reported stress.

4 | DISCUSSION

This is the first study to use EMA to track women's experiences throughout the entire process of first trimester medical abortion. Starting with mifepristone intake and continuing for six consecutive days, we found that self-reported pain and stress varied notably not only throughout the abortion process but also between women. Moderate pain and stress levels were observed on Day 1 (mifepristone), followed by a marked increase on Day 3 (misoprostol), and by a gradual decline over the next 3 days. Additional analyses revealed key factors on person- and momentary-levels explaining this inter- and intra-individual variability.

Consistent with past research,[7,25–27] we found a peak in self-reported pain following misoprostol intake on Day 3. This aligns with the pharmacokinetics of oral misoprostol, which increases uterine tonus and consequently, painful cramping approx. 30 min post intake.[40] Although 75% of women expel the conceptus 24 h later,[41] pain can persist for 72 h in 20% of cases.[27] Our data corroborate this pattern, suggesting that pain, to varying degrees, may accompany women throughout the entire medical abortion process, as do contextual events such as bleeding and somatic symptoms. Notably,

TABLE 2 Multilevel models for self-reported pain and stress.

	Pain			Stress		
Predictors	***b***	**95% CI**	***p***	***b***	**95% CI**	***P***
Intercept	38.08	31.54–44.62	<0.001	44.04	35.18–52.90	<0.001
Time	0.11	−0.15–0.38	0.404	−0.15	−0.44–0.15	0.328
Self-reported stress (pmc)	**0.25**	**0.19–0.31**	**<0.001**			
Treatment-related events (pmc)	−2.27	−6.81–2.27	0.327	**11.16**	**6.17–16.16**	**<0.001**
Bleeding (pmc)	**4.41**	**1.22–7.61**	**0.007**	**3.21**	−0.31–6.73	0.074
Improvement in condition (pmc)	−1.26	−5.39–2.88	0.551	2.05	−2.57–6.68	0.384
Study day	−0.93	−1.94–0.09	0.073	**−1.47**	**−2.60–−0.34**	**0.011**
Weekday	0.36	−3.84–4.57	0.865	**−6.70**	**−11.36–−2.04**	**0.005**
Analgesic intake (pmc)	**20.93**	**15.74–26.12**	**<0.001**	**11.60**	**5.42–17.78**	**<0.001**
Gestational age (GMC)	−0.46	−1.27–0.35	0.264	−0.23	−1.39–0.93	0.698
Age (GMC)	0.09	−0.62–0.80	0.806	0.29	−0.73–1.31	0.576
Parity	−6.55	−16.09–2.98	0.178	**−16.25**	**−29.80–−2.71**	**0.019**
ACEs (GMC)	**2.55**	**0.60–4.51**	**0.010**	**5.18**	**2.40–7.97**	**<0.001**
Somatic symptoms (pmc)				3.26	−0.16–6.67	0.062
Random effects						
σ^2	282.64			335.93		
τ_{00}	$158.23_{\text{Patient: Study day}}$			$198.81_{\text{Patient: Study day}}$		
	203.15_{Patient}			434.96_{Patient}		
τ_{11}	$140.08_{\text{Patient. Analgesic intake}}$			$240.12_{\text{Patient. Analgesic intake}}$		
ρ_{01}	-0.43_{Patient}			-0.19_{Patient}		
ICC	0.57			0.66		
N	59_{Patient}			59_{Patient}		
	$7_{\text{Study day}}$			$7_{\text{Study day}}$		
Observations	933			933		
Marginal R^2/conditional R^2	0.193/0.655			0.161/0.718		

Note: Time was centered on 12 pm, Study day = 0 (first day) to 6 (last day), Weekday = 0 (weekday)/1(weekend), Parity = 0 (nulliparous)/1 (multiparous), ACEs = Adverse childhood events, GMC = grand mean centered, pmc = person mean centered. Models are based on $N = 59$, since one woman did not report ACEs. Significant associations ($p < 0.05$) are marked in bold.

we also observed that, on average, moderate—although varying—pain levels were reported already after mifepristone intake (Day 1), which aligns with cramping-related pain in 11%–60% of women post mifepristone.[42]

Among explanatory factors, more intense bleeding (due to more uterine cramping[41]), higher self-reported stress since the last prompt, prior analgesic intake, and ACEs were associated with higher pain levels. The link between stress and pain—while rarely researched in the context of abortion (e.g.,[22])—is established (e.g.,[43]). In particular, acute stress may modulate pain perception and thus contribute to interindividual differences in pain.[44] Similarly, the number of ACEs—for example, childhood abuse and neglect—was strongly associated with increased pain. ACEs are known to cause alterations of the hypothalamic–pituitary–adrenal (HPA) axis, resulting in blunted cortisol secretion,[45] and the amygdala, resulting in hypersensitivity to threats.[46] As such, individuals with ACEs are more susceptible to greater physical pain[47] as well as to pain complications and pain catastrophizing.[48]

Unlike past research, however, we found no associations between pain and parity,[6,8,16] gestational age,[3] or women's age.[17] This inconsistency may be due to our EMA protocol. Studies using similar, yet scaled-down, protocols[25,27] are not directly comparable to our research as they did not consider predictors of pain beyond analgesic intake. Also, variations in abortion regimens, such as higher doses of misoprostol (800 μg vs. 400 μg used here) and different routes of administration (vaginal, buccal, oral[14]), may account for discrepancies.

Further, we found that analgesic intake was linked to higher pain scores at the subsequent prompt which may be attributed to a heightened preoccupation with pain. However, participants, on average, rated analgesia as rather helpful. Almost all participants used analgesia, predominantly ibuprofen (with only two reporting backup codeine use)—a slightly higher rate than in prior text-messaging studies[27] (85%). The provision of dispensed analgesics likely contributed to the increased intake.[49] However, as the precise timing and dosage of analgesia relative to pain reports were

not consistently documented, conclusions regarding analgesic effectiveness remain limited. The observed discrepancy between participants rating analgesia as helpful yet reporting higher pain following intake warrants further investigation. Future studies employing event-based EMA protocols[50] may enable more accurate evaluation of analgesic efficacy and allow exploration of additional pain-related factors, such as pain catastrophizing and pain expectations.[48,51]

Considering that stress was prevalent already on Day 1, our findings align with prior qualitative research, which emphasizes the emotional challenges associated with mifepristone intake.[11,52] Mifepristone intake may trigger concerns about side effects, the procedure's effectiveness, and anticipated pain.[8] In our study, stress, like pain, peaked on Day 3, and persisted through Day 7, possibly reflecting 'normal' day-to-day stress levels.[53] Higher stress levels were associated with treatment-related events (e.g., the clinic visit), analgesic intake, more ACEs, and by weekdays compared to weekends. In contrast, women with children (higher parity) reported lower stress, and stress declined as the treatment progressed.

Given the limited data on self-reported stress in medical abortion, contextualizing our findings is challenging. Qualitative studies[54] indicate that insufficient information on pain and bleeding can heighten stress. In our sample, higher stress correlated with treatment-related events, including consultations or medication intake, suggesting that even with thorough counseling, aspects of medical abortion continue to evoke stress—whether by triggering fears, doubts, or reminders of previous obstetric or gynecological experiences.[55] Similar to pain, women with more ACEs showed greater vulnerability to stress, consistent with research linking childhood adversities to heightened sensitivity to stressful events[45] and unintended pregnancies.[56] Given that ACEs predict pre-abortion stress,[21] screening during counseling may enable tailored support, particularly for survivors of childhood sexual abuse, the strongest predictor of trauma.[57] Having children may buffer stress, as prior labor experience can aid coping. Higher stress on weekdays (consistent with general EMA research[58]) suggests that scheduling abortions outside workdays could improve well-being, potentially also due to more readily available partner support on weekends compared to weekdays.

This study's strengths include the use of EMA to capture real-time pain and stress during medical abortion. However, as an exploratory study, this work is limited by its smaller sample size, which permitted detection of medium but not smaller effects. Furthermore, high rates of missed responses after Day 3 (misoprostol intake), coinciding with fewer treatment events and lower stress (Supporting Material E), suggest participants may have perceived the abortion as complete, indicating that a shorter, flexible data collection period could reduce participant burden. Nonetheless, given elevated stress and pain from the outset, future studies should start data collection at mifepristone intake. A preclinic baseline was not feasible, as the study could only begin when women presented at the clinic for medical abortion; however, such a baseline could clarify changes in stress and pain associated with clinic visits, recognizing that women may already experience heightened stress upon presentation. Future studies should also account for women's pain histories, including chronic pain conditions and regular analgesic use. Finally, as an observational study, causal inferences remain limited.

5 | CONCLUSION

Our study highlights the highly individualized nature of women's pain and stress experiences during medical abortion, emphasizing the need for personalized counseling. Uncertainties and fears related to treatment, particularly among those with a history of childhood trauma, should be addressed proactively. Targeted pre-abortion screening for ACEs and addressing trauma-related vulnerabilities may enhance safety and patient satisfaction, and could make some individuals opt for a procedural abortion. Future research should use EMA with event-based tracking of analgesic intake and assess pain catastrophizing, control, and impairment. Overall, tailored counseling is crucial to support women's physical and emotional well-being during medical abortion.

AUTHOR CONTRIBUTIONS

All authors fulfill the criteria for authorship. Conceptualization: CF, AF, ODK, JXK; Data curation and analysis: AF, ACF; Methodology: AF, CF, ODK; Writing—original draft: AF, ACF, CF. Project administration and resources: CF, AF; Investigation, validation, writing, review and editing: all authors.

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CONFLICT OF INTEREST STATEMENT

The authors declare that they have no conflict of interest with regard to this study.

DATA AVAILABILITY STATEMENT

Research data are not in the public domain as it contains sensitive patient data. Data may be requested by contacting the corresponding author.

ETHICS STATEMENT

The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008. This study has been approved by the ethics committee of the Medical University of Vienna (vote no. 1625/2019, date: July 15, 2019). Clinical trial registration: As this study does not constitute a clinical trial, the study design and analysis plans were not pre-registered.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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