

GRAND MULTIPARITY AS THE DOMINANT CORRELATE OF NON-INSTITUTIONAL DELIVERY AMONG WOMEN DISCHARGED IN LATENT LABOR AT A PHILIPPINE TERTIARY HOSPITAL

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Abstract

Background. Non-institutional delivery remains a preventable source of maternal and neonatal morbidity in the Philippines. Grand multiparity accelerates labor progression and is a recognized risk factor for delivery outside healthcare facilities. The labor pattern correlates of non-institutional delivery at a Philippine tertiary emergency department have not been systematically characterized.

Methods. A cross-sectional analytical study was conducted at Zamboanga City Medical Center (ZCMC), a Department of Health retained tertiary government hospital in Zamboanga City, Philippines, from January 1, 2023, to December 31, 2024, using emergency room (ER) records and structured telephone interviews. Eligible participants were pregnant women discharged during the latent phase of labor who subsequently delivered outside the facility. Advanced cervical dilation at ER discharge was defined a priori as ≥ 6 cm. The primary outcome was non-institutional delivery. Bivariate associations were assessed using Fisher's exact test, with odds ratios (OR) and 95% confidence intervals (CI). This report follows the STROBE guideline for cross-sectional studies.

Results. Of an initial 5,270 records, 1,514 (28.7%) were excluded for unreachable outcome data, leaving 1,336 classified records; of these, 41 (3.1%) were non-institutional deliveries. Grand multiparity was significantly associated with increased odds of non-institutional delivery (OR 3.76, 95% CI 1.41–10.03; $p = 0.018$), while nulliparity was associated with reduced odds (OR 0.36, 95% CI 0.17–0.74; $p = 0.004$); given the low overall incidence of non-institutional delivery (3.1%), this comparison was estimated to have approximately 55% power. Maternal age of 35 years or older (OR 1.16, 95% CI 0.45–3.02; $p = 0.796$) and advanced cervical dilation at discharge (OR 0.35, 95% CI 0.04–2.76; $p = 0.317$) were not significantly associated with non-institutional delivery. Mean age of women with non-institutional delivery was 26.1 ± 7.3 years, and teenagers comprised 19.5% of this group.

Conclusion and Implications. Parity, not maternal age or cervical dilation at discharge, was the primary correlate of non-institutional delivery in this setting. These findings support consideration of

parity-stratified triage protocols, investment in ER labor documentation, and community-level rapid labor recognition programs targeting grand multiparous women, pending confirmation in larger, multivariable-adjusted, multicenter studies.

Keywords: Emergency room, Grand multiparity, Labor patterns, Non-institutional delivery, Obstetric triage, Philippines

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Research Highlights

What is the current knowledge?

- Grand multiparity is a recognized risk factor for non-institutional delivery, and delivery outside a facility carries elevated risk of postpartum hemorrhage and absence of skilled birth attendance.
- The latent phase discharge threshold used in obstetric triage is generally applied uniformly, without adjustment for parity.
- In the Philippines, non-institutional deliveries persist despite national gains in facility-based delivery, particularly where tertiary capacity is geographically concentrated and transport is a barrier.
- Evidence characterizing the specific labor pattern correlates of non-institutional delivery among women discharged from a Philippine tertiary ER is limited.

What is new in this study?

- Grand multiparity was associated with a nearly fourfold increase in the odds of non-institutional delivery, while nulliparity was protective, in a two-year cohort from a Philippine tertiary ER.
- Maternal age and cervical dilation at ER discharge, the variables more commonly used in routine triage, were not significantly associated with the outcome, confirming parity, not maternal age or cervical dilation at discharge, as the primary statistical correlate of non-institutional delivery in this cohort.
- A substantial share of the initial sampling frame (28.7%) was unreachable for outcome confirmation, a documentation and follow-up gap that itself has direct relevance to ER quality improvement in similar settings.
- The findings support exploring parity-adjusted discharge thresholds as a testable hypothesis for Philippine tertiary ER triage, pending confirmation in larger, adjusted, multicenter studies.

INTRODUCTION

The onset and progression of labor represent critical junctures in obstetric triage. Active labor is conventionally defined by regular uterine contractions at 3- to 5-minute intervals with progressive cervical dilation (Greulich & Tarrant, 2007; Zhang et al., 2010). The clinical threshold separating the latent from the active phase has been revised upward in recent years, with latent phase duration varying substantially by parity, as detailed in the Literature Review below (Cohen & Friedman, 2023; Peisner & Rosen, 1986; Zhang et al., 2010). This variability directly affects ER triage decisions on admission or discharge during early labor.

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Premature discharge during the latent phase carries documented risks. Early discharge from obstetric services is associated with increased rates of postpartum hemorrhage and unplanned readmission (Fischer et al., 2016; Metcalfe et al., 2018). Delivery outside institutional settings is associated with postpartum hemorrhage, neonatal hypothermia, and absence of skilled birth attendance (Goudar et al., 2015; Ye et al., 2020). In resource-limited settings, the absence of emergency obstetric care and delays in care-seeking further compound these risks (Haws et al., 2015; Kruk et al., 2016). Grand multiparity and prior cesarean delivery have been identified as risk factors for adverse outcomes associated with non-institutional delivery (Zwart et al., 2015).

In the Philippines, facility-based delivery is a national policy priority under the Department of Health (DOH) Safe Motherhood Program (Department of Health [DOH], 2008). Despite recorded gains in facility delivery rates nationally, non-institutional deliveries persist in areas where tertiary hospital capacity is geographically concentrated, and transport barriers are significant (DOH, 2008; Philippine Statistics Authority [PSA] & ICF, 2023). Zamboanga City Medical Center (ZCMC), a Department of Health retained tertiary hospital, is the primary referral center for obstetric emergencies in the Zamboanga Peninsula. As the region's only DOH retained tertiary obstetric referral center, ZCMC absorbs a disproportionately high volume of obstetric referrals from a catchment area marked by geographic dispersion, limited pre-hospital emergency transport, and low-income populations across the Peninsula's constituent provinces and island municipalities structural constraints that increase reliance on ER triage decisions and heighten the clinical stakes of discharge timing during the latent phase. A proportion of women who seek obstetric consultation at the ZCMC Emergency Room (ER) during the latent phase are discharged and subsequently deliver outside the facility. The labor patterns documented at ER discharge and their association with subsequent non-institutional delivery have not been systematically characterized. This study aimed to determine the association between labor pattern variables at ER discharge and non-institutional delivery among women who sought obstetric consultation between January 1, 2023, and December 31, 2024. We hypothesized that increasing parity, rather than maternal age or cervical dilation at ER discharge, would be the primary correlate of non-institutional delivery in this cohort.

LITERATURE REVIEW

Labor Progression, Parity, and Latent Phase Duration

The clinical definition of the latent phase has shifted substantially from its original formulation. Friedman's original labor curve placed the latent to active transition at 3 to 4 cm dilation (Friedman, 1978). This threshold was later revised upward: normal labor, particularly among nulliparous women, progresses more slowly than the Friedman curve assumed, extending the latent phase to roughly 6 cm (Zhang et al., 2010). This boundary remains clinically contested, and its definition materially affects triage decisions (Cohen & Friedman, 2023). Latent phase duration also varies systematically with

parity, averaging approximately 20 hours in nulliparous women and 14 hours in multiparous women (Cheng et al., 2019; Peisner & Rosen, 1986). This literature establishes that labor progression is not parity neutral, the physiological basis for the parity stratified triage question this study investigates.

Risks of Premature Emergency Room Discharge

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A separate line of evidence addresses what happens when women are discharged before labor is definitively established. Systematic reviews of early discharge after childbirth, and after cesarean delivery specifically, found consistent associations with postpartum hemorrhage and unplanned readmission tied to discharge timing rather than to the index procedure (Fischer et al., 2016; Metcalfe et al., 2018). Neither review was conducted in a Philippine or comparably resource-limited emergency department, nor examined discharge specifically during the antepartum latent phase, the scenario this study addresses; the direction of risk they describe nonetheless motivates closer scrutiny here.

Maternal and Neonatal Outcomes of Non-institutional Delivery

International evidence on delivery outside health facilities is more directly relevant to this study's outcome. A systematic review and meta-analysis of maternal and neonatal outcomes among women delivering outside health facilities found elevated rates of postpartum hemorrhage and neonatal complications relative to facility-based deliveries, even though most such deliveries were term, cephalic presenting pregnancies a profile that closely mirrors this study's cohort (Ye et al., 2020). Registry based surveillance similarly documents persistent gaps in adverse outcome capture outside routine facilities (Goudar et al., 2015). Reviews of delayed newborn care and maternal care quality in low and middle income countries frame these gaps as structural rather than purely individual failures (Haws et al., 2015; Kruk et al., 2016). A large, population-based Dutch cohort study identified grand multiparity specifically, not general demographic risk, as a determinant of severe maternal morbidity among out-of-facility deliveries, a pattern this study's data reproduce in a different health system (Zwart et al., 2015). A Canadian case-control study of near miss and maternal mortality likewise implicated parity-related factors, reinforcing that this association is not unique to any single health system (Andrade et al., 2018).

Non-institutional Delivery in the Philippine Health System

The national policy backdrop for this study is the DOH's Safe Motherhood Program, established to reduce maternal and neonatal mortality by expanding facility-based delivery (DOH, 2008). Successive rounds of the Philippine National Demographic and Health Survey document real gains in skilled birth attendance nationally, but these gains are not evenly distributed, and areas with concentrated tertiary capacity and significant transport barriers, of which the Zamboanga Peninsula is one, continue to report non-institutional deliveries at rates that a purely national average view would understate (PSA & ICF, 2023). The PhilHealth Maternity Care Package's case rate structure, most recently amended under Circular 2024 0012, was designed around routine facility-based delivery and does not explicitly account for latent-phase monitoring stays, a gap that is directly relevant to the parity-based discharge question this study raises (PhilHealth, 2024). Because reimbursement under this case rate is tied to the completed delivery episode rather than to the duration of antepartum observation, and because sustained latent-phase monitoring requires continuous nursing and obstetric staffing that many ER units are not resourced to provide on a per-patient basis, neither the current payment structure nor prevailing ER staffing models create a facility-level incentive to retain women for extended latent-phase monitoring

before discharge. Comparable Philippine evidence characterizing the specific labor-pattern correlates of non-institutional delivery at the point of ER discharge, rather than delivery-location choice more broadly, is scarce, particularly in Mindanao; this is the gap the present study addresses.

METHODS

Study Design, Setting, and Reporting

A cross-sectional analytical study was conducted at ZCMC, a Department of Health retained tertiary government hospital in Zamboanga City, Philippines. Initial cervical examinations at ER presentation are routinely performed by resident physicians as part of standard obstetric triage at this facility. A cross-sectional design was selected because it permits efficient estimation of the association between labor pattern variables documented at a single point in time (ER discharge) and subsequent delivery outcome within a defined study period, without requiring prospective follow-up infrastructure; this design can establish statistical association but not temporal sequence or causality, a limitation revisited in the Limitations section. The study period was January 1, 2023, to December 31, 2024, a two year period. This report follows the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) checklist for cross-sectional studies.

Study Population and Eligibility Criteria

The study population comprised all pregnant women evaluated at the ER for obstetric consultation who were discharged during the latent phase of labor and subsequently delivered outside the facility during the study period. Women were excluded if they were: (1) admitted during the active phase of labor; (2) known to have a planned home birth or pre-arranged delivery at another facility; or (3) had irrecoverably incomplete records after all data recovery efforts were exhausted. The exclusion flow across these criteria is presented in Table 1.

Sample Size Estimation

The minimum required sample size was calculated using the single proportion prevalence formula (OpenEpi, Version 3), with a preliminary estimated prevalence of non-institutional delivery of 3.1% derived from a review of ER logbooks prior to formal data collection, a 95% confidence level ($Z = 1.96$), and a margin of error of 5%. This yielded a minimum required sample of 47 non-institutional delivery cases. The achieved study sample of 1,336 classified records, including 41 non-institutional deliveries, exceeded this minimum requirement. A post hoc power calculation based on the observed proportions of non-institutional delivery among grand multiparous (5/52, 9.6%) versus non grand multiparous (36/1,284, 2.8%) women indicated that the achieved sample provided approximately 55% power to detect this difference at $\alpha = 0.05$ (two proportion z test approximation); a sample of approximately 94 grand multiparous women roughly 1.8 times the 52 observed would have been required to achieve 80% power for this specific comparison, indicating the study was underpowered to detect this low prevalence outcome despite exceeding the overall minimum sample size requirement.

Data Collection Procedure

Emergency room records of all pregnant women evaluated during the study period were reviewed for eligibility. A standardized data extraction form was used to retrieve maternal sociodemographic characteristics, obstetric history, and cervical examination findings at the time of ER discharge. Outcome data, including the date and time of delivery, mode of delivery, and maternal and neonatal outcomes, were obtained through structured telephone interviews. This telephone contact consisted of a single structured item confirming where, when, and how the participant ultimately delivered following ER discharge, rather than a multi-item scaled instrument; given this narrow, factual scope, formal psychometric pretesting was not undertaken. Contact was initiated using cellphone numbers recorded in the medical chart. When contact could not be established, the research team sought assistance from Barangay Captains to locate participants. Records for which complete data could not be obtained after all contact attempts were exhausted were excluded from the analysis; the potential for geographic selection bias introduced by this exclusion, particularly among patients from remote or island municipalities with limited mobile signal coverage, is addressed further in the Limitations section. The time interval between the last documented ER cervical examination and delivery was plotted on the WHO Partograph for each participant.

Data Collection Instrument and Reliability

A structured data extraction form captured variables across four domains: (1) maternal sociodemographic characteristics; (2) obstetric history; (3) labor and cervical parameters at ER discharge; and (4) maternal and neonatal outcomes. Advanced cervical dilation at ER discharge was operationally defined a priori as ≥ 6 cm, and grand multiparity was operationally defined a priori as parity ≥ 5 ; these definitions were applied consistently throughout data extraction and analysis. Face validity was assessed by an external obstetrician who evaluated item clarity, comprehensiveness, and clinical appropriateness. Prior to full data collection, inter rater reliability was established through a pilot exercise in which an obstetrician (reference standard) and three trained research assistants independently extracted data from 10 sample records. Research assistants completed a structured one-day training on obstetric record abstraction before the reliability exercise. Agreement was quantified using Cohen's kappa; a minimum kappa of 0.61 (substantial agreement) was required before full data collection commenced. Percent agreement was calculated as the proportion of concordant rating pairs relative to the total number of observations, expressed as a percentage.

Statistical Analysis

Continuous variables were summarized as means with standard deviations. Categorical variables were reported as frequencies and percentages. Denominators vary across variables in Tables 2 and 3 because source ER records did not consistently document every field for every participant; the number of records with available data for each variable (n) is reported alongside each estimate. Bivariate associations between selected factors and non-institutional delivery were assessed using Fisher's exact test for all categorical variables. Odds ratios (OR) with 95% confidence intervals (CI) and two-sided p-values were computed. Statistical significance was set at $p < 0.05$. All analyses were performed using Excel and Epi Info. No power calculation for the bivariate comparisons beyond the initial sample size estimation was performed; the resulting confidence intervals should be read with this in mind, particularly for the advanced dilation comparison, which was based on only 14 records. Multivariable logistic regression to adjust for potential confounders, such as maternal age and travel distance or time to the facility, was not performed in this analysis; this limitation of the bivariate approach used here is addressed further in the Limitations section.

Ethical Considerations

The study protocol was reviewed and approved by the ZCMC Ethics Review Board (ERB Protocol No. 2021 44, approved October 27, 2023, valid October 18, 2023 to October 18, 2024) prior to initiating any study activity. Access to patient medical records was authorized through a formal written request to the hospital's Data Privacy Officer, consistent with the Philippine Data Privacy Act of 2012 (Republic Act No. 10173). Verbal informed consent was obtained from all participants before the telephone interview. Participants were informed of the voluntary nature of their participation, the study objectives, and their right to withdraw at any time without consequence. The verbal consent procedure was reviewed and approved by the same Ethics Review Board (ERB), given the remote telephone-based data collection modality. All records were de-identified using numeric participant codes. Physical records were stored in a locked cabinet accessible only to the principal investigator. Digital files were maintained on password-protected media. All study data will be destroyed five years after study completion through secure shredding and permanent digital deletion.

Use of Artificial Intelligence Tools

No artificial intelligence tool, including large language models, was used in the study design, data collection, statistical analysis, or interpretation of results; all analytic decisions and conclusions are the author's own. Consensus, an AI-assisted academic search tool, was used during manuscript preparation to help identify and cross-check relevant published literature; all cited sources were independently verified by the author before inclusion. Grammarly was used for grammar, clarity, and language editing support during manuscript drafting and formatting to journal specifications. Neither tool contributed to study conception, data analysis, or the substantive scientific content of this manuscript, and their use was confined to language and literature search assistance under the author's full review and direction.

RESULTS

Study Sample and Exclusion Flow

A total of 5,270 records were identified through the ER logbook during the study period. After applying all eligibility criteria, 1,336 records were classified as institutional or non-institutional delivery. Of these, 41 (3.1%) were non-institutional deliveries and 1,295 (96.9%) were institutional deliveries. The stepwise exclusion of the 3,934 records between initial identification and the final classified sample is presented in Table 1; the largest single exclusion category, 1,514 records (28.7% of the initial sample), was records for which complete outcome data could not be obtained despite all contact attempts, a limitation discussed further below. Given the low overall incidence of non-institutional delivery (3.1%), the study was estimated to have limited statistical power for some subgroup comparisons, as detailed in Methods (Sample Size Estimation).

Table 1.

Exclusion flow from initial record identification to final classified sample

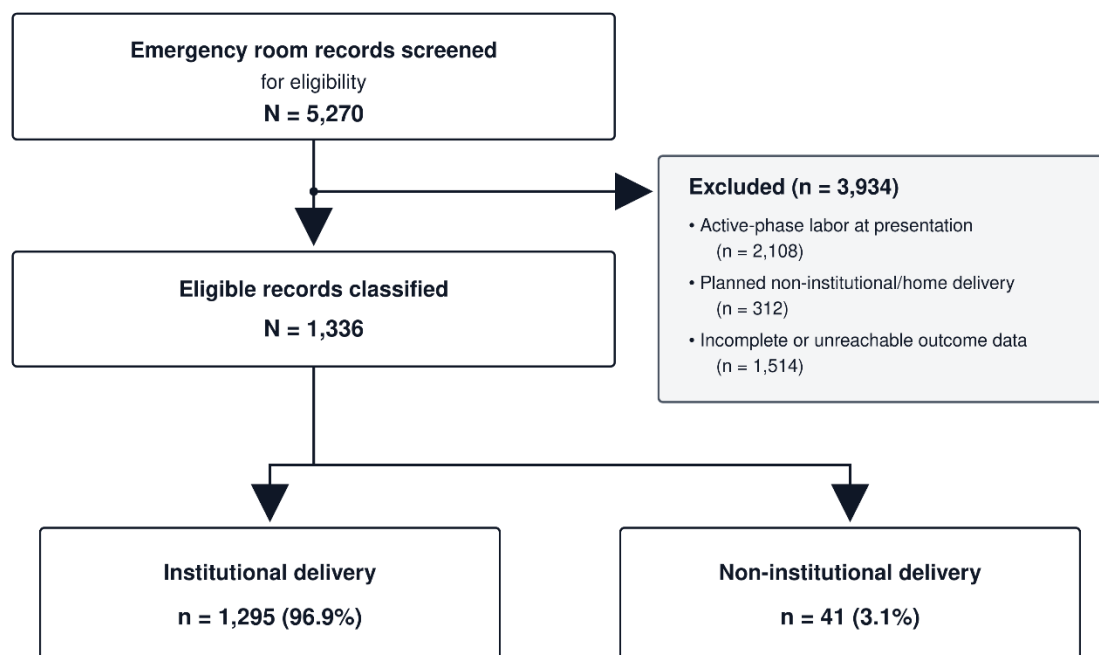
Step	Records (n)	Reason for Exclusion
Initial ER records identified	5,270	—
Excluded: admitted in active phase of labor	2,108	Not eligible (active phase at presentation)
Excluded: planned home birth/delivery at another facility	312	Not eligible (pre-arranged non-hospital delivery)
Excluded: irrecoverable incomplete records	1,514	Could not obtain complete data after all contact attempts
Final classified sample	1,336	Included in analysis
Institutional delivery	1,295 (96.9%)	—
Non-institutional delivery	41 (3.1%)	Primary outcome group

Note. — = not applicable.

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Figure 1.

STROBE Participant Flow diagram



Sociodemographic Characteristics

Among the 41 women with non-institutional delivery, the mean age was 26.1 ± 7.3 years, ranging from 14 to 44 years. The majority (68.3%; 28/41) were aged 20 to 34 years. Teenagers (age <20 years) comprised 19.5% (8/41) of the non-institutional delivery cohort, a proportion that warrants attention given this age group's vulnerability to care-seeking barriers and delays in recognizing labor. Women aged 35 years or older comprised 12.2% (5/41). On bivariate analysis, advanced maternal age (≥ 35 years) was not significantly associated with non-institutional delivery (OR 1.16, 95% CI 0.45 to 3.02; $p = 0.796$). Sociodemographic and obstetric characteristics are summarized in Table 2.

Obstetric Characteristics

Among women with non-institutional delivery, 25.0% (10/40) were nulliparous, 62.5% (25/40) were multiparous, and 12.5% (5/40) were grand multiparous (parity ≥ 5). On bivariate analysis, nulliparity was associated with significantly lower odds of non-institutional delivery (OR 0.36, 95% CI 0.17 to 0.74; $p = 0.004$), while grand multiparity was associated with significantly higher odds (OR 3.76, 95% CI 1.41 to 10.03; $p = 0.018$). These two associations were not adjusted for each other or for maternal age; because grand multiparity and older maternal age tend to co-occur, the independent contribution of each cannot be isolated from this bivariate analysis alone. Term gestational age was documented in 96.9% (31/32) of non-institutional deliveries; one preterm delivery was recorded. All records with documented fetal presentation were cephalic (22/22; 100.0%).

Labor Patterns at Emergency Room Discharge

Of the labor pattern variables specified in the study protocol, only cervical dilation and a derived phase of labor classification could be analyzed with sufficient data traceability. Cervical effacement and the duration of labor were not consistently recorded in the ER charts in a form that permitted complete statistical analysis; this documentation gap is further addressed in the Discussion. Among non-institutional deliveries with documented cervical findings, nearly all were classified as being in the latent phase of labor at ER discharge. One record documented full cervical dilation (10 cm) at discharge (discussed below). When cervical dilation was dichotomized as advanced labor (≥ 6 cm) versus less than 6 cm, advanced cervical dilation was not significantly associated with non-institutional delivery (OR 0.35, 95% CI 0.04 to 2.76; $p = 0.317$), though this estimate is based on very small absolute numbers (14 records total with advanced dilation across both groups) and must be interpreted with caution.

This single case of full dilation discharge likely reflects either a documentation error or a lapse in clinical assessment at ER discharge; either way, it falls outside accepted triage standards and warrants institutional review of the ER discharge workflow, independent of the individual case.

Maternal and Neonatal Outcomes

Among records with available outcome data, nearly all documented pregnancies were at term, and all documented fetal presentations were cephalic. A slight male predominance was observed among newborns (52.9%; 18/34). Among records with documented neonatal outcomes, 97.4% (37/38) were live births; one neonatal death was recorded. Structured data fields for postpartum hemorrhage, maternal morbidity, maternal mortality, Apgar scores, and specific neonatal complications were absent from most ER source records and therefore could not be reported as distinct outcome variables. This

absence reflects a systematic documentation deficit in the ER records system: the ER charts were not designed to capture structured post-delivery outcome fields for women who were discharged and later returned to the facility or delivered elsewhere. This absence should not be interpreted as evidence that these outcomes did not occur.

Summary of Bivariate Analysis

Across all variables assessed by bivariate analysis, parity-related variables were the only factors significantly associated with non-institutional delivery. Grand multiparity was associated with increased odds and nulliparity with reduced odds. Maternal age and cervical dilation were not significant at the $p < 0.05$ threshold. Results are presented in Table 3.

Table 2.

Sociodemographic and obstetric characteristics of women with non-institutional delivery (n = 41)

Variable	n/N (%)
Age, mean $\pm$ SD (years)	26.1 $\pm$ 7.3
Age range (years)	14-44
Teenage (<20 years)	8/41 (19.5%)
20-34 years	28/41 (68.3%)
≥ 35 years	5/41 (12.2%)
Nulliparous	10/40 (25.0%)
Multiparous (parity 1-4)	25/40 (62.5%)
Grand multiparous (parity ≥ 5)	5/40 (12.5%)
Term pregnancy (≥ 37 weeks)	31/32 (96.9%)
Preterm pregnancy (<37 weeks)	1/32 (3.1%)
Cephalic presentation	22/22 (100.0%)
Male newborn	18/34 (52.9%)
Female newborn	16/34 (47.1%)
Livebirth	37/38 (97.4%)
Neonatal death	1/38 (2.6%)

Note. Denominators (N) vary across variables due to missing data in source ER records; N is the number of records with available data for that variable, not the full cohort of 41. SD = standard deviation.

Table 3.

Bivariate analysis of selected factors associated with non-institutional delivery

Factor	Institutional (n=1,295)	Non-institutional (n=41)	OR (95% CI)	p-value
Age ≥ 35 years	138	5	1.16 (0.45 3.02)	0.796
Nulliparous	618	10	0.36 (0.17 0.74)	0.004*
Grand multiparous	47	5	3.76 (1.41 10.03)	0.018*
Advanced labor (≥ 6 cm)	13	1	0.35 (0.04 2.76)	0.317

Note. Bivariate p values based on Fisher's exact test; not adjusted for other covariates. * Statistically significant at $p < 0.05$. OR = odds ratio; CI = confidence interval.

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DISCUSSION

Principal Findings

This cross-sectional study characterized labor patterns and sociodemographic factors associated with non-institutional delivery among women presenting to the ZCMC ER over a two-year period. The overall rate of non-institutional delivery among classified records was 3.1%. Parity was the dominant correlate: grand multiparity was associated with a nearly fourfold increase in the odds of non-institutional delivery, while nulliparity was protective. Maternal age and cervical dilation at ER discharge were not significantly associated with non-institutional delivery. The analysis of labor pattern variables was constrained by incomplete documentation of effacement and labor duration in ER records.

Parity as the Primary Determinant

The association between grand multiparity and non-institutional delivery is physiologically coherent and consistent with the broader obstetric literature. Grand multiparous women characteristically experience more rapid labor progression, shorter latent phases, and a higher frequency of precipitate labor (Zhang et al., 2010). A woman discharged during what is clinically assessed as the latent phase may deliver rapidly once contractions intensify, with insufficient time to return to a facility. This is a recognized mechanism of unplanned out-of-facility delivery in both high-income and low-resource settings (Zwart et al., 2015), directionally consistent with the present findings from a Philippine tertiary center.

The protective effect of nulliparity follows the same mechanistic logic: nulliparous women have extended latent and active phases, providing a longer window between ER discharge and delivery. This extended interval increases the probability that a nulliparous woman will recognize labor progression and return to the facility before delivery. The finding that nulliparity was significantly associated with institutional delivery (OR 0.36; $p = 0.004$) provides empirical support for a clinically observed pattern. Taken together, the data are consistent with the possibility that uniform cervical dilation thresholds applied across all parities for discharge decisions may not adequately capture risk: a grand multiparous woman at 3 to 4 cm dilation may occupy a different clinical trajectory from a nulliparous woman at the same dilation.

Cervical Dilation and Labor Phase at Discharge

The non-significant association between advanced cervical dilation (≥ 6 cm) at discharge and non-institutional delivery (OR 0.35; $p = 0.317$) should not be read as evidence that dilation is clinically irrelevant: the small absolute count of women with documented advanced dilation (14 records across both groups; one non-institutional) severely limits power, and the estimate is imprecise. That nearly all non-institutional deliveries were documented in the latent phase at discharge is consistent with published evidence that inappropriate latent phase discharge is a proximal cause of unplanned out-of-facility delivery (Cheng et al., 2019; Metcalfe et al., 2018).

That effacement, fetal station, and duration of labor could not be analyzed represents a missed opportunity to characterize labor pattern risk more completely. These variables constitute the basis of the WHO Partograph and are the parameters most useful for predicting imminent delivery (World Health Organization, 2018). Their absence from ER records is itself a finding with direct clinical significance, independent of any specific statistical association.

The single full dilation discharge documented in Results reflects a system-level vulnerability in ER triage rather than an isolated case, exposing patients to preventable risk and the institution to medico-legal liability; workload, documentation, and supervision at the point of discharge warrant institutional-level review.

Maternal and Neonatal Outcomes

The near-universal cephalic presentation, term gestational age, and 97.4% livebirth rate among non-institutional deliveries suggest that this cohort was not uniformly high-risk by standard antepartum stratification at the time of ER presentation. These proportions are broadly consistent with outcomes reported in systematic reviews of non-institutional delivery in low- and middle-income country settings, which document predominantly term pregnancies but elevated rates of postpartum hemorrhage and neonatal complications compared with facility-based controls (Ye et al., 2020). The fact that postpartum hemorrhage, Apgar scores, and specific neonatal complications could not be captured in this study likely represents an undercount of adverse events, not a true absence. The one neonatal death identified among records with available outcome data reinforces the clinical significance of non-institutional delivery in this setting.

Comparison with Philippine and Regional Context

The 3.1% non-institutional delivery rate documented at ZCMC reflects a setting where the substantial majority of classified women reached the facility for delivery, which is consistent with overall progress toward the Philippine DOH's Safe Motherhood Program targets under Administrative Order 2008 0029.¹² Nationally, the proportion of births attended by skilled health personnel has increased over successive Philippine National Demographic and Health Surveys (PSA & ICF, 2023). However, the absolute count of 41 non-institutional deliveries occurring over two years at a single tertiary center serving a population with known transport barriers and economic vulnerability is not negligible. The Zamboanga Peninsula faces geographic dispersion, low-income catchment populations, and constraints on pre-hospital emergency transport that constitute structural drivers of non-institutional delivery independent of any individual clinical factor. These structural drivers mirror those reported in other Philippine settings, where parity, transport access, and local ordinance enforcement have been identified as consistent correlates of non-institutional or home delivery, including in the neighboring province of

Zamboanga Sibugay (Amit et al., 2022; Kanamori et al., 2021; Modillas et al., 2024; Shimazaki et al., 2013).

The proportion of teenagers (19.5%) in the non-institutional delivery cohort is notable. Young women face compounding barriers to obstetric care-seeking: economic dependence, limited health literacy, non-recognition of labor onset, and social deterrents to institutional delivery (Haws et al., 2015; PSA & ICF, 2023). The Philippine Adolescent Health and Development Program addresses some of these barriers, but its integration with obstetric triage at tertiary ER level remains inconsistent.

Limitations

This study has several limitations. The bivariate associations reported in this study were not adjusted for other plausible confounders, including distance to the facility, socio-economic status, and transport availability, and should be interpreted with this caveat in mind. The cross-sectional design establishes association but not causation. Of 5,270 initial ER records, 1,514 (28.7%) were excluded because complete outcome data could not be obtained after all contact attempts; this substantial loss could bias the results if non-contact was related to delivery location for example, women who delivered outside the facility may have been harder to reach by phone, which would tend to underestimate the true non-institutional delivery rate and bias the parity associations. Patients residing in more remote, rural, and island municipalities of the Zamboanga Peninsula catchment area may be disproportionately represented among these unreachable records because of poorer mobile signal coverage, and may also carry higher underlying rates of non-institutional delivery, which would bias the reported estimates in an unpredictable direction. This cannot be resolved with the available data and is flagged as a priority for prospective designs with active tracking. Missing data for cervical effacement, fetal station, labor duration, postpartum hemorrhage, Apgar scores, and neonatal complications in the ER record system, which was not designed to capture, constrained the analysis and likely understates adverse outcomes. Telephone interview data are subject to recall and self-report bias, and non-contact of some eligible participants may have introduced selection bias as described above. The bivariate associations reported for parity and maternal age were not adjusted for one another or for other plausible confounders such as travel distance or time to the facility, socio-economic status, and transport availability; because grand multiparity is associated with older maternal age, the independent contribution of each variable could not be isolated in this analysis, and the point estimates should be interpreted as unadjusted associations. The sample of 41 non-institutional deliveries, while exceeding the pre-specified minimum, limits statistical power for subgroup analyses. The study was conducted at a single tertiary center, and findings may not be directly generalizable to primary care facilities or rural health units. Future prospective studies addressing the documentation, adjustment, and follow-up gaps outlined above would strengthen the evidence base for parity-stratified triage thresholds.

CONCLUSIONS

Grand multiparity was the most significant factor associated with non-institutional delivery among women presenting to the ZCMC Emergency Room during 2023 to 2024, with an odds ratio of 3.76 (95% CI 1.41 to 10.03; $p = 0.018$). Nulliparity was significantly protective (OR 0.36; $p = 0.004$). Maternal age and advanced cervical dilation at ER discharge were not significantly associated with non-institutional delivery, though the latter finding was limited by small numbers. These results support consideration of parity-stratified ER triage protocols in Philippine government tertiary hospitals, standardization of ER labor documentation through abbreviated partograph completion, and community-level rapid labor recognition programs for grand multiparous women, pending confirmation

in larger, multivariable-adjusted, multicenter studies. PhilHealth benefit reform to cover latent phase monitoring for high-risk parity groups and the tracking of non-institutional delivery as a routine clinical governance indicator are offered as the most operationally actionable, though still hypothesis-level, recommendations arising from this study.

RECOMMENDATIONS AND IMPLICATIONS

Practical/ Clinical

These findings support development of parity-stratified ER triage protocols at ZCMC and comparable Philippine government tertiary hospitals, for consideration alongside evidence from larger, multicenter studies. A lower cervical dilation admission threshold for grand multiparous women, given their physiologically accelerated labor trajectory, is one option this data is consistent with. Uniform discharge thresholds that do not account for parity sit uneasily with both this study's findings and WHO guidance on partograph use in labor monitoring, though confirmation in a larger, adequately powered sample would strengthen the case for a specific threshold change.

Standardization of ER labor documentation would directly address a limitation of this study and is worth consideration as an institutional and national policy priority. The inability to analyze effacement, fetal station, and duration of labor in this study directly limits the strength of its conclusions. Similar documentation gaps have been reported in obstetric records across DOH retained hospitals in the Philippines (PSA & ICF, 2023). Abbreviated, standardized ER partograph completion, integrated into the existing ER chart or electronic health record, is operationally feasible without additional equipment.

Community-level rapid labor recognition programs could be considered for grand multiparous women in low-income urban and peri-urban barangays of the Zamboanga Peninsula. Barangay Health Workers (BHWs) are an existing, trained cadre with community-level access. Incorporating rapid labor recognition for multiparous women into BHW training curricula, with protocols for facilitating immediate transport, directly addresses the mechanism by which grand multiparous women deliver outside facilities: unrecognized or rapidly progressive labor with insufficient time to reach a hospital. This approach is consistent with evidence from systematic reviews of community based skilled birth attendant training and transport facilitation in comparable settings (Sibley & Sipe, 2016; Tunçalp et al., 2015).

Policy

The PhilHealth Maternity Care Package benefit structure may warrant review regarding latent-phase monitoring for high-parity patients. If financial barriers cause women to avoid or delay hospital admission or return when labor accelerates after initial ER discharge, the reimbursement system could inadvertently place the highest-risk parity group at the greatest financial disadvantage. Expansion of PhilHealth coverage to include latent phase monitoring admissions for grand multiparous women would be consistent with the direction of PhilHealth Circular 2024 0012 on case rate reforms and with the DOH's universal health care commitments under Republic Act No. 11223, though this single center study of 41 cases is not, by itself, sufficient grounds for a national benefit change; it is offered here as a hypothesis worth testing in policy relevant research rather than a proven recommendation.

ZCMC's clinical governance processes could consider tracking non-institutional delivery as a routine indicator, with regular audits of ER discharge decisions against subsequent delivery location, stratified by parity and cervical dilation at discharge, as a continuous quality-monitoring mechanism. This would

be consistent with the DOH Implementing Rules and Regulations for RA 11223 on the establishment of quality assurance mechanisms in government hospitals.

Future Research

Prospective, multicenter studies employing multivariable logistic regression, adjusting for maternal age, parity, travel distance or time to the facility, socio-economic status, and transport availability, are needed to confirm whether grand multiparity remains an independent correlate of non-institutional delivery, and to prospectively test parity-stratified ER triage protocols before wider adoption.

List of Abbreviations

BHW: Barangay Health Worker

CI: confidence interval

DOH: Department of Health

ER: emergency room

ERB: Ethics Review Board

OR: odds ratio

RA: Republic Act

SD: standard deviation

STROBE: Strengthening the Reporting of Observational Studies in Epidemiology

WHO: World Health Organization

Declarations

Ethics approval and consent to participate. This study was approved by the Zamboanga City Medical Center Ethics Review Board (ERB Protocol No. 2021 44) on October 27, 2023, with approval valid from October 18, 2023, to October 18, 2024. Verbal informed consent was obtained from all participants before the telephone interview; this consent procedure, including its verbal and remote format, was reviewed and approved by the same committee.

Consent for publication. Not applicable. No individually identifiable patient data are reported.

Availability of data and materials. The de-identified dataset supporting the conclusions of this article is available from the corresponding author on reasonable request, subject to institutional data sharing approval.

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