**Continuity of care on the health of mothers and child in the postnatal period through an Obstetric Clinic’s experience.**

**The fourth trimester and urogynecological conditions: a retrospective cohort study**

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**KEYWORDS**

Postnatal care, women, pelvic disfunctions, urinary incontinence, continuity of care, fourth trimester.

**ABSTRACT**

**OBJECTIVE** To establish and implement a women-centred continuity of midwifery care service specifically focused on urogynecological conditions.

**DESIGN** Observational study was conducted.

**SETTING** R. Guzzardi Hospital – Vittoria (Italy)

**POPULATION** 441 women received midwifery care in the first 40 days after childbirth. The target population consisted of low-risk mothers and newborns who delivered in our hospital during January and December 2022.

**METHODS**. 122 quantitative variables were extracted. A preliminary statistical analysis was conducted, allowing us to describe our sample of women and the results obtained during the first and second check-ups for comparison. Subsequently, using the statistical software, it was possible to correlate the variables, identifying those that were statistically significant.

**MAIN OUTCOME MEASURES**

Improved pelvic floor function, reduced urinary incontinence, and enhanced postnatal care continuity, particularly for immigrant women.

**RESULTS** The cesarean section is associated with a high score in the pelvic-perineal assessment (p value = 0.0069). Higher values of lacerations and/or episiotomy were recorded in induced deliveries (p value= 0.0097). Urgency urinary incontinence, and stress urinary incontinence, are associated with a pelvic floor with poor tone and functionality (I assessment: p value = 0,00371) (II assessment: p value 8.843 e-06). Over 10% of women with urinary disorders at the first check-up achieved complete recovery, while the remaining 4% persisted with urogynaecology symptoms. The tone and functionality of the pelvic floor improved in 15% of cases initially marked by a low score.

**CONCLUSION** Midwife-led care improves women's well-being and empowerment, particularly in postpartum urogynaecological health, supporting recovery and personal development.

1. **INTRODUCTION**

The puerperium is a time of continued, pregnancy-associated adaptation. In the early postpartum period, mothers navigate multiple challenges including physical recovery, changing hormones, sleep disruption, newborn feeding and care, and altered family and professional relationships (Kristin P. Tully 2017).

The most common problems are: sexual problems, breast problems, fatigue, depression, wound problems, urinary and faecal incontinence etc…

A full assessment is recommended within 12 weeks. Care should initially focus on acute needs and risks for morbidity and mortality and then transition to care for chronic conditions and health maintenance (Heather L Paladine et al.).

The American College of Obstetricians and Gynaecologists has recently highlighted the importance of this “fourth trimester” of pregnancy care, suggesting earlier and more comprehensive visits.

Our goal was to establish a postnatal clinic where checked all the women who gave birth in our Hospital “R. Guzzardi” in Vittoria (Ragusa – Italy) to allow continuity of care to our patients after childbirth.

The postnatal clinic provides midwife-assisted care to women and their families to enhance post-birth care.

Midwives have highlighted the importance of establishing a trusting relationship in order to make the woman confident that the midwife care about her unique person and not consider her as just another woman in the crowd (Ludgren and Dahlberg, 2002).

In our area, prior to the establishment of this new clinic, new mothers were discharged without tailored healthcare assistance, leading to a gap in networking between users, particularly affecting low-income women, and the healthcare services available post-hospitalization.

The objectives were:

* increased breastfeeding support;
* establishment of a local network comprising skilled healthcare professionals for patient referral to specialist evaluation;
* assistance to "fragile" users, avoiding any worsening of the conditions themselves;
* identification of new mothers who needed specific pelvic floor rehabilitation treatment.

We aimed to provide a service supporting mothers for up to 40 days post-delivery, including two check-ups within the first 6 weeks.

Other aspects under investigation included::

* **pelvic floor dysfunction**, including urinary and anal incontinence,
* breastfeeding;
* lifestyle;
* sexuality;
* contraception;

Addressing these issues postpartum is crucial for the new mother's short- and long-term health.

By a clinical care point of view, the objectives were:

* continuity of care;
* involvement of the women and informed and conscious choice, care planning;
* increase in rate of exclusively breastfed infants;
* QoL improvement;
* reduction of overbooking of Obstetrics Departments;
* reduction in management costs.
  1. **Objective**

The purpose of this article is to analyse data from obstetric records during outpatient visits, studying correlations between investigated variables about urogynecological conditions.

1. **METHODS**

We performed an observational study using STROBE guidelines.

* 1. **Population**

***Inclusion criteria***

The sample includes 441 women who, after having given birth at our hospital (Riccardo Guzzardi Hospital in Vittoria; Ragusa – Italy) from January to December 2022, visited postnatal clinic, managed by midwives, for the checks scheduled at hospital discharge.

Two checks were organised. The first check within 7-10 days after birth, and the second one 40 days later.

* 1. **Data extraction**

An obstetric record was specially drawn up and compiled by midwives for each patient.

The folder is formed by several sections.

The variables taken into consideration for the data entry were:

maternal age, marital status, educational attainment, position in the profession, branch of economic activity, gender of the newborn, previous full-term pregnancies, systemic pathologies, drugs, surgical interventions, known allergies, clinical course of pregnancy, gestational age at birth in weeks, covid positive swab during birth, mode of labour, induction method, delivery mode, kristeller manoeuvre, shoulder dystocia, expulsion of the placenta, lacerations/episiotomy, indication for caesarean section, contraception, nutrition, psychoactive substances, daily water taken, type and assessment of scar, uterus, lochia, haemorrhoids, urine and bowel function, presence of any type of incontinence, urinary urge control, perineal assessment.

The remaining variables studied pertain to the breastfeeding section, which is not described here.

* 1. **Data analysis**

A spreadsheet was employed to input all chosen variables, comprising 122 variables sourced from the clinical records. The initial analysis focused on examining the sample's characteristics. Among the patients visiting our postnatal clinic, 71% had vaginal deliveries, while the remaining 29% underwent caesarean sections.

74% of patients went into labour spontaneously, 26% were induced. Of the latter, 96% were induced with the use of prostaglandins administered vaginally via a slow-release device. For the remaining 4%, other methods were used such as amiorexi associated with the administration of oxytocin, or mechanical induction with the cervical repairing balloon.

For vaginal births, spontaneous lacerations and the use of episiotomy are represented by:

* I degree tear= 16,55%
* II degree = 57%
* III A = 0%
* IIIB = 0%
* IV = 0%
* Paraclitorid tear= 2%
* Mediolateral episiotomy = 21%
* Medial episiotomy = 1%

1. **RESULTS** 
   1. **Descriptive analysis: clinical outcomes**

At the initial postpartum check-up (7-10 days post-childbirth), 3% of women reported urinary difficulties (dysuria, oliguria, pollakiuria, haematuria) and 21% experienced bowel irregularities (chronic or transient constipation). Midwives recommended a healthy lifestyle, pelvic muscle exercises, and proper nutrition. By the 40-day follow-up, these patients reported near-complete resolution of bowel issues and total improvement in urination.

Additionally, 8% of women experienced urinary incontinence (6% urge incontinence, 2% stress incontinence), with half continuing to have issues at the second check-up. These women were referred to the pelvic floor rehabilitation clinic for further management. A similar approach was taken for the 1% of women reporting gas and faecal incontinence at both check-ups

11% percent of women perceived the urge to urinate associated to urine leakage. 3% did not feel the urge to urinate. At the end of the postpartum period, after being closely monitored by midwives, especially for symptomatic patients, only 4% continued to report the perception of the urge to urinate with leakage, while 96% reported optimal recovery and the absence of signs and symptoms.

During the first examination, 24% of women who recorded a low score related to pelvic floor tone and functionality, with only 9% obtaining a low score during the second examination. The latter group required further specialized evaluation specifically focused on the pelvic floor and its subsequent follow-up. In contrast, 91% of postpartum women reported complete recovery. Throughout their hospital stay and the entire postpartum period, the midwifery staff suggested habits, attitudes, and behaviours to women aimed at preventing, promoting, and safeguarding pelvic-perineal health.

* 1. **Statistical analysis: clinical outcomes**

Subsequently, correlations among selected variables were examined using logarithmic-scale statistical analysis, with only statistically significant correlations reported.

**TYPE OF BIRTH AND EPISODES OF URINARY INCONTINENCE (STRESS/URGENCY/PARADOXICAL INCONTINENCE)**

This model evaluates the association between the dependent variable "mode of delivery" and the independent variable "urinary incontinence." The "mode of birth" is a categorical variable with possible values as follows:

1: vaginal birth;

2: eutocic birth;

3: operative delivery;

4: caesarean section.

For analyses focusing on "caesarean section," this becomes a binary variable, where:

0: birth was not by caesarean section

1: birth was by caesarean section

The "urinary incontinence" variable can take values as follows:

0: no type of incontinence;

1: urge incontinence;

2: stress incontinence;

3: paradoxical neglect.

The association between "**caesarean section**" and "**urinary incontinence at the second check-up**" was analysed. The intercept of 0.306 indicates that as the "caesarean section" variable approaches 1 (representing caesarean delivery), the urinary incontinence value approaches 0, suggesting an absence of incontinence. The angular coefficient, with an absolute value of 0.126, reflects an inverse proportional relationship between the variables, indicating that higher caesarean frequency correlates with lower incontinence. The p-value, below 0.05, confirms statistical significance, as does the t-value of the regressor coefficient, indicating a Type I error of 4.78% and validating the statistical significance of x1 at the 5% level.

**TYPE OF DELIVERY AND PERINEAL ASSESSMENT WITH SCORE <4 OR >= 4 AT THE 1ST AND 2ND CHECKS**

In this model, we investigate "mode of delivery" and "caesarean section" as the dependent variable (y), with "perineal evaluation at the first (or second) check-up" serving as the regressor. The dependent variable retains the values outlined in previous chapters. However, here we define the regressor’s values as follows:

1: perineal evaluation score <4

2: perineal evaluation score ≥4

In this model, we examine the relationship between "**mode of delivery**"(dependent variable y) and "**perineal evaluation at the first check-up**" (regressor). The regressor scores are defined as:

1: indicates a perineal evaluation with a score

<4

2: indicates a perineal evaluation with a score

≥4

A direct correlation is observed between mode of delivery and perineal evaluation, with an angular coefficient of 0.27, suggesting that higher perineal scores (≥4) at the first check-up correlate with a more operative delivery process in terms of caesarean section. Coefficients are statistically significant at the 1% level (p = 0.0069).

However, in vaginal deliveries, an operative birth (e.g., use of vacuum) tends to be associated with a lower perineal score, indicating greater perineal trauma or dysfunction.

Additionally, an inverse association exists between urinary incontinence at the second check-up and caesarean delivery (p = 0.048).

In the linear regression model, the variable **"caesarean section"** is considered as the dependent variable, and the regressor is **"perineal assessment at the first check-up**".

The values that can be assumed are the same as

described in the previous paragraph, keeping in

mind that "caesarean section" is a binary variable.

At the ***first check-up***, the regressor coefficient is 0.215. Looking at the t-value, it can be stated that the coefficient of x1 is statistically significant at a significance level of 1% and a p-value of 0.000026.

At the ***second check-up***, the coefficient is 0.22, with significance at the 1% level and a p-value of 0.004. The analysis indicates a direct correlation: higher perineal assessment values are associated with an increase in caesarean sections.

**PERINEAL EVALUATION SCORE / URINARY STIMULUS CONTROL**

This model examines the correlation between "**score perineal evaluation**" (dependent variable) and "**urinary stimulus control**."

The dependent variable takes values:

* 1: score less than 4
* 2: score greater than or equal to 4

The regressor has a discrete domain represented by the following values which indicate the outcome of the urinary stimulus control:

* 0: no
* 1: yes, with losses,
* 2: yes, without losses.

At the ***first assessment***, the regression model shows a positive slope coefficient, indicating a direct relationship between **urinary stimulus control** and **perineal assessment**. The model is reliable, with a statistically significant p-value of 0.0089 (1% level).

At the ***second assessment***, the positive slope coefficient is 0.19, confirming the direct correlation. The model remains reliable, with a highly significant p-value of 2.512 × 10⁻⁶.

**PERINEAL EVALUATION SCORE / IU**

This model studies the relationship between "**urinary incontinence**" (dependent variable) and "**SCORE perineal evaluation**" (regressor). The dependent variable takes values:

1: score less than 4

2: score greater than or equal to 4

The regressor has a discrete domain represented by the following values which indicate the outcome of the urinary stimulus control

0: no type of incontinence

1: urgent

2: from stress

3: paradoxical neglect

At the **first check-up**, the regression model shows a negative slope coefficient (-0.16), indicating an inverse correlation between **urinary incontinence** and **perineal assessment at the first assessment**. The model is reliable, with a statistically significant p-value of 0.00371 (<0.05) and significance at the 1% level.

At the **second check-up**, the model remains reliable (p-value = 8.843 × 10⁻⁶, <0.05). The slope coefficient is statistically significant at 1%, with a t-value of 4.497. However, model fit is low, with an adjusted R² of 0.042, explaining 4.2% of the variability.

**INDUCED LABOUR AND PRESENCE OF LACERATIONS AND/OR EPISIORRHAPHY**

In this model, the association between the dependent variable "**mode of labour**" and the regressor "**Lacerations/Episiotomy**" is examined. Both variables exhibit discrete dominance, as previously described in the preceding chapters.

The dependent variable is a binary variable that takes a value of 1 or 2:

1: spontaneous;

2: induced.

The regressor, on the other hand, has a wider range of values:

1: I degree;

2: II degree;

3: III A degree;

4: III B degree;

5: III C degree;

6: IV degree;

7: paraclitoral lacerations;

8: right mediolateral episiotomy;

9: median episiotomy.

The results of the model correlating the **mode of labour** with the **presence of tears and/or episiotomy** highlight the existing direct relationship between the two variables. Observing the p-value, it is noted to be 0.0097, indicating that the regressor is statistically significant at a confidence level of 1%. In fact, the Type I error is 0.97%, a very low value, making the result of the model reliable. An identical result can be obtained by conducting a hypothesis test on the significance of the slope coefficient.

1. **DISCUSSION** 
   1. **Main Finding**

From the conducted statistical analysis, it emerges that all women in the postpartum period exhibited a complete recovery in relation to difficulties related to urination (dysuria, oliguria, pollakiuria, haematuria) identified during the initial assessment. Initially, 14% of women reported discomfort regarding urinary control (11% reported urgency to urinate associated with urine leakage, while 3% did not feel any urinary stimulus). Only 4% continued to report this disturbance. A halving of urinary incontinence episodes was observed. Tonus and function of the pelvic floor improved in 15% of cases initially marked with a low score.

These results enabled the early identification of situations requiring the intervention of additional specialists, such as gynaecologists,

urologists, rehabilitative midwives, psychologists, etc., and/or the initiation of a pelvic floor rehabilitation and re-education program. Enhanced collaboration among health care providers may improve the focus of clinical interactions to address the interrelated health issues most important to women. (Kristin P Tully et al.)

All patients reported almost complete restoration of regular bowel habits.

According to the linear regression model, an increase in the variable related to caesarean section is associated with a decrease in the prevalence of urinary incontinence at the second check-up.

From an analytical perspective, a direct correlation arises between the caesarean section procedure and a high score in the pelvic-perineal assessment both at the initial check and during the postpartum follow-up.

Complete control of urinary stimulus without the presence of urine leakage was more common in women who had received a perineal assessment with a high score, indicating the presence of good functionality and tone of pelvic muscles, and revealing a direct correlation between these two variables. This trend was further confirmed during the second assessment.

Good perineal tone and effective functionality within a week of childbirth are directly correlated with a lower likelihood of developing urgency urinary incontinence and, even more so, stress urinary incontinence. The presence of paradoxical incontinence is associated with a lower score for perineal and pelvic functionality. Perineal assessment and related urinary disorders, even after obstetric evaluation at the end of the postpartum period, exhibit a similar trend, with results indicating an overall improvement in perineal assessment scores and a reduction in the incidence of evaluated urinary disorders (urgency urinary incontinence, stress urinary incontinence, paradoxical incontinence).

Through data extrapolation and correlating the labour mode (spontaneous or induced) with lacerations and/or episiotomy occurrence, a direct relationship between these variables has emerged. Higher values of lacerations and/or episiotomy were recorded in the case of induced deliveries.

Perineal laceration from childbirth represents a significant cause of maternal morbidity because it results in several short and long-term consequences for women’s health, such as pain and the potential for bleeding, infection, intestinal and urinary disorders, damage to the pelvic floor and sexual alterations. (Huber M et al.)

The study’s findings highlight the importance of postpartum care continuity provided by midwives.

High quality postnatal care provides consistent information, the recognition of the women's personal and cultural contexts, and the continuity of care needed to facilitate trusting relationships. (Finlayson K et al.)

The assisted user base comprises a proportion of immigrant women, particularly those of African origin.

Among migrant women in particular, continuity of care has been rated as an important factor in establishing trusting relationships. (Fair F. et al.)

Culturally sensitive and individualized postnatal care with continuity should therefore be prioritized. (Ingegerd Hildingsson et al.)

* 1. **Strengths and Limitations**

*Strengths*

* **Postnatal Care Continuity**:

Woman-centred midwifery care improved postpartum well-being and urogynaecological health.

* **Pelvic Health Improvement**:

Monitoring and guidance enhanced pelvic floor function in 15% of low-scoring cases.

* **Early Issue Detection:**

Early assessments enabled rapid referral to specialists, improving integrated care.

* **Symptom Resolution**:

96% achieved full recovery from urinary issues, with intestinal disorders nearly resolved by follow-up.

* **Personalized Support**:

Culturally sensitive care-built trust, notably among migrant women.

* **Statistical Significance**:

Strong correlations (e.g., delivery type, episiotomy, lacerations, perineal tone etc…) with very low p-values.

* **Patient Empowerment:**

Active involvement in care planning enhanced autonomy.

* **Effective Monitoring:**

Dual postpartum assessments enabled timely interventions

*Limiting Factors*

* **Resource Constraints:**

Limited availability of trained midwives and specialists may hinder the continuity of postnatal care.

* **Access to Care:**

Geographic and socio-economic barriers may restrict access to specialized services.

* **Cultural and Language Barriers:**

Cultural differences and language barriers may hinder communication, especially with migrant women.

* **Service Integration:**

Coordinating care among various specialists (gynaecologists, urologists, midwives, psychologists) requires robust systems, which may be lacking.

* **Individual Variability:**

Variations in health status, recovery rates, and personal circumstances may affect outcomes.

Additionally, the study focused on low-risk pregnancies, and the inability to offer home visits due to midwife shortages.

Finally, the use of a new midwifery record introduces potential biases.

* 1. **Interpretation of results**
* **Improved Urogynecological Health**:

Continuous, woman-centred postnatal care significantly improves women’s urogynecological health and overall well-being.

* **Pelvic Floor Recovery:**

Persistent midwifery support leads to significant pelvic floor tone and function improvements in 15% of cases initially scored low.

* **Early Identification and Specialist Referral**:

Early postpartum evaluations facilitate the prompt identification and referral of health issues to appropriate specialists, promoting integrated care.

* **Recovery of Urinary and Intestinal Symptoms:**

Optimal recovery was achieved in 96% of women without urinary symptoms, alongside nearly complete resolution of intestinal issues by follow-up completion.

* **Personalized Care:**

Personalized, culturally sensitive support fosters trust, notably benefiting migrant women.

* **Significant Correlations in Delivery Outcomes:**

Statistically significant correlations were observed between delivery type, episiotomy, laceration incidence, and perineal tone, with low p-values indicating robust associations.

* **Patient Empowerment:**

Active involvement of patients in care planning enhances their autonomy and sense of control.

* **Effective Health Monitoring:**

Dual assessments at 7–10 days and 40 days postpartum allow for precise health monitoring and enable timely interventions

**CONCLUSION**

In conclusion, the study validates that the provision of continuous care by midwives fosters well-being and the potential for personal development in individual women and may consequently contribute to empowerment for mothers and newborn and this has been demonstrated, while considering the limitations, regarding the urogynaecology health of the postpartum woman.

To improve healthcare services for postpartum women, further studies are needed to better define diagnosis and treatment protocols and understand how healthcare provision influences health outcomes for mothers, newborns, and families.

The task of healthcare systems is to develop individualized care plans that facilitate transitions from obstetrical to primary care after delivery to propose a new paradigm for postpartum care, the “fourth trimester”.

**DECLARATION SECTION**

**AUTHOR CONTRIBUTIONS**

PC conceived the study, set up data collection together with MB and VI, and contributed to data collection and manuscript writing. MB and VI conducted the statistical analysis and participated in manuscript writing. RoGi, ES, GG, CC collaborated in data collection. PT and RiGi supervised the work as Department Directors.

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**CONFLICT OF INTEREST STATEMENT**

The authors have no relevant financial, personal, political, intellectual or religious conflicts of interest to declare.

**DATA AVAILABILITY STATEMENT**

The data supporting the findings of the study are available upon request from the corresponding author.

**ETHICS APPROVAL**

Ethics approval was not required for this study; however, informed consent was obtained during the initial check for data processing, ensuring privacy compliance.

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