WHAT MATTERS MOST TO WOMEN IN BREAST BIOPSY? A DISCRETE CHOICE EXPERIMENT IN ITALY

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BACKGROUND

Breast cancer is the most common malignancy among women worldwide, with about 2.3 million new cases and 670,000 deaths in 2022[1]. In Italy, it is the most frequently diagnosed cancer in women, with an estimated 53,000 new cases in 2024[2]. While diagnostic accuracy remains the main clinical goal, international studies[3–8] show that **women also value other aspects of the biopsy experience**, such as pain, type of anesthesia, cosmetic outcomes, risk of complications, and communication of results. These dimensions strongly affect acceptability, satisfaction, and psychological burden, highlighting the **need for patient-centred approaches to diagnostic care**. In Italy, breast care is provided through the National Health Service (NHS), which ensures universal coverage while granting regions autonomy in service organization. When both invasive and minimally invasive procedures are clinically appropriate and equally accurate, **receiving the more invasive option solely because of place of residence raises concerns about equity and patient-centred care**.
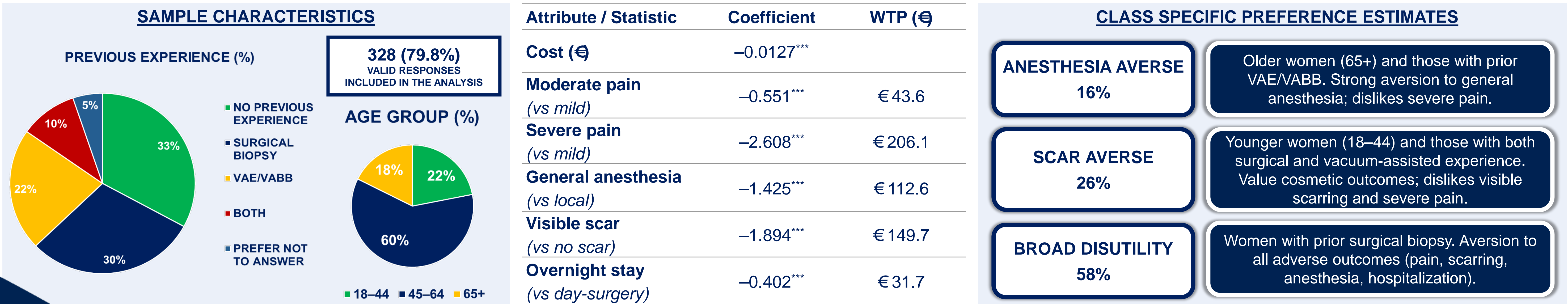
OBJECTIVES

This study aimed to identify the **features of an "ideal" breast biopsy** that maximized patient utility when diagnostic accuracy was held constant. The objectives were to **quantify the relative importance of the aspects women valued in the biopsy experience**, to estimate the trade-offs they were willing to make, including willingness to pay, and to **examine how preferences varied according to age and prior biopsy experience**. The findings can guide clinicians, policymakers, and patient associations in developing diagnostic pathways that are more patient centred, equitable, and consistent with women's values within the Italian NHS.

METHODS

- A **discrete choice experiment (DCE)** was designed following a literature review, clinical consultation with a senior breast radiologist, and discussions with representatives of Europa Donna Italia (EDI), a national patient advocacy organization.

- The experimental design was generated in Ngene (ChoiceMetrics, v1.4) using an orthogonal fractional factorial approach, producing 72 choice sets blocked into 8 versions of 9 tasks each. Each task presented **two unlabeled biopsy alternatives without an opt-out option**.

- Women aged 18 years or older were recruited nationwide through EDI and randomly assigned to one block, with task order randomized within blocks. Respondents chose between **pairs of clinically equivalent biopsy scenarios differing only in attribute levels**. Incomplete questionnaires and implausibly fast completions were excluded.

- Survey data were analyzed under the random utility framework. Preferences were estimated using **mixed logit (MXL) and latent class logit (LCL) models** to capture both continuous and discrete heterogeneity. The cost parameter was treated as continuous, and **willingness to pay (WTP)** for each non-cost attribute was derived from model coefficients with 95% confidence intervals obtained via the delta method.

- The study was approved by the Bocconi University Research Ethics Committee (EA000868).

Attribute	Levels
Post-procedure pain	1. Mild: does not interfere with daily activities; manageable with mild or no painkillers.
	2. Moderate: may initially limit some activities; controllable with over-the-counter or prescribed painkillers.
	3. Severe: significantly interferes with daily activities; requires stronger medication.
Type of anesthesia	1. Local: the patient remains awake; the area is numbed with anesthetic.
	2. General: the patient is fully asleep and unaware.
Presence of scar	1. No visible scar
	2. Visible scar
Hospitalization	1. Same-day discharge
	2. Overnight stay
Cost to the patient	1. €0
	2. €50
	3. €100

RESULTS

SAMPLE CHARACTERISTICS

PREVIOUS EXPERIENCE (%)

328 (79.8%) VALID RESPONSES INCLUDED IN THE ANALYSIS

- NO PREVIOUS EXPERIENCE — 33%
- SURGICAL BIOPSY — 30%
- VAE/VABB — 22%
- BOTH — 10%
- PREFER NOT TO ANSWER — 5%

AGE GROUP (%)

- 18–44 — 22%
- 45–64 — 60%
- 65+ — 18%

Attribute / Statistic	Coefficient	WTP (€)
Cost (€)	−0.0127***	
Moderate pain *(vs mild)*	−0.551***	€ 43.6
Severe pain *(vs mild)*	−2.608***	€ 206.1
General anesthesia *(vs local)*	−1.425***	€ 112.6
Visible scar *(vs no scar)*	−1.894***	€ 149.7
Overnight stay *(vs day-surgery)*	−0.402***	€ 31.7

CLASS SPECIFIC PREFERENCE ESTIMATES

ANESTHESIA AVERSE 16%	Older women (65+) and those with prior VAE/VABB. Strong aversion to general anesthesia; dislikes severe pain.
SCAR AVERSE 26%	Younger women (18–44) and those with both surgical and vacuum-assisted experience. Value cosmetic outcomes; dislikes visible scarring and severe pain.
BROAD DISUTILITY 58%	Women with prior surgical biopsy. Aversion to all adverse outcomes (pain, scarring, anesthesia, hospitalization).

CONCLUSIONS

- **Italian women value minimizing pain, scarring, and anesthesia** when undergoing breast biopsy, beyond diagnostic accuracy alone.

- **Preferences are heterogeneous,** clustering into **three distinct segments** that differ by age and biopsy experience.

- When both invasive and minimally invasive options are clinically appropriate, the **less invasive should be prioritized to promote equitable, patient-centred care**.

- These findings support **developing preference-sensitive, value-based diagnostic pathways** within the Italian NHS.

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