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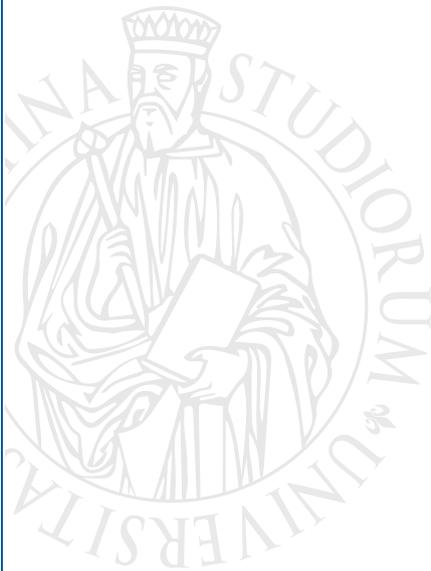
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Women's satisfaction during pregnancy and at delivery in Tuscany (Italy)

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Abstract

The Tuscany region constitutes an excellence at the national level for the quality of its health services. Following the WHO guidelines on the prenatal and childcare services, it has an integrated path targeted at pregnant women, called "birth path", to take care of all clinical and non-clinical aspects of pregnancy, childbirth and postpartum. New mothers' evaluation of the birth path was the object of a specific survey, conducted in Tuscany in 2012-2013, which is analyzed in detail in this paper. Focusing on the association of women's socio-demographic characteristics and overall satisfaction of the care path using multilevel modelling, the main conclusion is that, while the average was high, significant differences in satisfaction levels emerge between women from different socio-demographic groups.

Women's satisfaction at childbirth is generally considered an important indicator of the quality of maternity services, with implications on the health and well-being of the mother and the child. However, the effect of women's characteristics on satisfaction is under-investigated, especially in Italy: our research aims at filling this gap.

Keywords: Tuscany, Italy, childbirth, pregnancy, satisfaction evaluation, birth experience, multilevel models, health system strategies

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Introduction

Italy is, and has been for several decades now, one of the countries with the lowest fertility in the world. The minimum was registered in the mid-nineties, with 1.19 children per woman, with only a very small recovery later on, up to a maximum of 1.46 children per woman in 2010. Tuscany has reached even lower values, with less than one child per woman in 1994-1995, and only slightly more than that in the following years (ISTAT, 2013, 2014).

Because children are rarer, they have also become more precious to their parents and to society. This has important consequences on family life, from childcare to upbringing. Parents' attitude towards the child has put more and more emphasis on safety and protection. This greater attention has translated, among other things, into an increased medicalization of pregnancy (ISTAT, 2006; Wagner, 2001).

Before the twenty-first century, the prenatal care towards the woman and the unborn child that was generally practiced in the most developed countries was not subject to rigorous scientific evaluation, and its clinical validity remained dubious. The demand for improved maternal and perinatal care services led to the adoption of sometimes useless or even harmful interventions, with a considerable waste of resources: the excessive recourse to Caesarean sections in several developed countries is an example (Gibbons et al., 2010).

The trend towards the medicalization of pregnancy, which spread in all Western countries, started to be questioned in the nineties, with the definition and introduction of standards of prenatal care. The World Health Organization defined a model of prenatal care, with a set of guidelines and recommendations for decision-makers and health-care providers, urging them to encourage the awareness and capacity for self-determination of women (empowerment) and to conform to a social model of health, including an integrated and effective communication between the parties involved (Banta, 2003).

Despite this recommendation, not many national or international sample surveys record the point of view of pregnant women - the national survey on maternity care regularly conducted in UK, as well as some national surveys which took place in Australia are rare exceptions (cf. e.g. Dowswell et al., 2001; Hundley et al., 2000; Redshaw & Henderson, 2015; Sutherland et al., 2012; Wardle, 1994). Women's satisfaction with their childbirth experience is often investigated with ethnographic research, qualitative interviews or small descriptive studies (see e.g. Dowswell et al., 2001; Miller & Shriver, 2012; Namey & Lyerly, 2010). Besides, most of these surveys investigate the satisfaction during delivery (cf. e.g. Shields et al., 1998), but only a few cover other aspects of pregnancy, childbirth and postpartum. Nevertheless, all of these surveys show the importance of women's satisfaction as an indicator of the quality of maternity service, with practical implications

both for service providers and decision makers (Hodnett, 2002). Moreover, women's satisfaction may have positive implications for the health and well-being of both themselves and their children (Laurence, 1997; Mackey, 1995; Simkin, 1991, 1992; Slade et al., 1993; Waldenström et al., 1996). Women's satisfaction is usually conceptualized as a global assessment. However, this is a complex and multidimensional concept, influenced by a broad range of objective circumstances, both clinical and technical, but also by expectations (Goodman et al., 2004; Matejić et al., 2014). Several factors influence the woman's satisfaction with respect to the assistance received, but there is no agreement about the sign of their effect (e.g., Dannenbring et al., 1997; Waldenström, 1999). For instance, some researchers have identified a negative correlation between the level of education and the satisfaction of childbirth (women with low levels of education tend to be more satisfied; Dannenbring et al., 1997; Matejić et al., 2014; Waldenström, 1999), while others have found no relationship (Mackey, 1995; Waldenström et al., 2004) or even an inverse one (Wilde-Larsson et al., 2011). Greater satisfaction was sometimes found at older ages (Waldenström, 1999; Waldenström et al., 2004), but not always (Brown & Lumley, 1994; Mackey, 1995; Matejić et al., 2014; Overgaard et al., 2012; Ranta et al., 1995). In Waldenström (1999, 2004) and in Matejić et al. (2014), but not in other studies (Overgaard et al., 2012; Ranta et al., 1995; Waldenström et al., 1996), greater satisfaction characterized higher birth orders. Some studies investigated the association between women's birth experience and citizenship (or its proxies: e.g. country of birth or ethnic origin), but no significant effect was found (Brown & Lumley, 1994; Waldenström et al., 2004). According to the national survey on maternity care in UK, ethnic minorities were significantly more satisfied during antenatal care and less satisfiedd during delivery in 2010, but neither effect was apparently present in 2014 (Redshaw & Heikkila, 2010; Redshaw & Henderson, 2015).

The performance of the maternity pathway has been extensively measured and assessed within the performance evaluation system of the Tuscany region (Italy) (Murante et al., 2015; Nuti et al., 2009). The most recent representative survey, focused on the satisfaction and experience of a sample of 4,598 women who gave birth in Tuscany in 2012-2013, showed, among other things, that women with high education reported higher overall satisfaction, especially for prenatal care. As for the hospital in which the delivery occurred, satisfaction was higher among those who were given an adequate pain relief treatment during delivery (Murante et al., 2015).

The aim of this work is to further explore the data collected through the above-mentioned Tuscan survey in order to advance our knowledge about the association between women's satisfaction and selected socio-demographic characteristics of the woman: her education, age, citizenship, and previous pregnancies. Our representative sample enabled us to investigate not only to satisfaction

during delivery, but also during pregnancy, which should be treated separately (Waldenström et al., 2004). We could also take into account the characteristics of the context where the woman lived or the hospital where she gave birth, and the hierarchical structure of the data. In short, our research questions are: after controlling for the contextual variability and women's experience, what socio-demographic factors affect women's satisfaction, and how? Does the association vary during the period of gestation, and at delivery? We continue by presenting the survey and the measurements used in the analyses. The presentation of the analytical strategy and a description of our results come next. A discussion of the results concludes the paper.

The survey

The present study was based on a representative survey, focused on the satisfaction and experience of the women who gave birth in Tuscany, conducted by the *Management and Health Laboratory* (*MeS*) of the *Scuola Superiore Sant'Anna* of Pisa and commissioned by the Tuscany Region within the Performance Evaluation System of the Tuscan healthcare system. In 2005, the *Management and Health Laboratory* designed and implemented a multi-dimensional performance evaluation system (PES) to measure and monitor indicators of quality, efficiency, appropriateness, continuity of care, patient satisfaction and staff satisfaction across Tuscan healthcare providers (Nuti et al., 2013). In the last few years, thanks to its good performance, the Tuscan PES has been also adopted by 12 other Italian regions (Nuti et al., 2016), and by a few OECD countries (Australia, Austria, Chile, Finland, France, Japan, Mexico, Norway, Spain, UK and USA).

The data used in the present study concern the latest survey on maternity pathway conducted between October 2012 and March 2013 by MeS. Of the 12,355 women who gave birth in Tuscany and were invited to participate, 4,598 responded to the questionnaire (37.2%), exceeding the expected response rate of 25%, in line with the two previous editions of the survey (Murante et al., 2015).

This survey has several merits: it is only one of this kind available for Italy (except for a pseudo-sample survey conducted among foreign women and a small group of Italian women in 2009, see Lauria & Andreozzi, 2011); it collects detailed information about the antenatal, childbirth and post-delivery experience of the women in terms of clinical data, personal experience and socio-demographic characteristics, and it is representative of the resident female population both at the hospital level and at the local health district level. Questions about satisfaction were collected using a Likert-type scaling procedure, with five response categories. All of the 4,598 women who participated in the survey were considered for the analysis of women's satisfaction during delivery,

whereas for the analysis of the satisfaction during prenatal period we excluded the 131 respondents who did not live in Tuscany.

In the sample, the number of women in each of the thirty-four health districts ranged between 14 and 361, with an average of 131. Among the 25 hospitals where women could deliver in Tuscany at that time (now 24), the number of women per hospital varied from 30 to 398, with an average of about 184. Women were between 16 and 50 years old, with a mean age at birth of 34 years (median=35 years). Compared to the Tuscan mean age at birth of 31.7 (ISTAT, 2014), the sample was formed by older women: only 2.9% of respondents were younger than 25, whereas 14.9% were 40 and over, while in Tuscany these proportions were 5.1% and 10.8% respectively (and both about 8.5% at the national level) in 2013 (ISTAT, 2014). Most respondents were at their first pregnancy (51.4%), whereas only a few of them had already had two or more pregnancies. Despite the attention specifically devoted to foreign women, with the use of questionnaires translated into several languages and the overrepresentation of foreigners in the sample list, foreign women ended up by being underrepresented: they were about 10% of the respondents, which is about half of what was expected by looking at the proportion of foreign mothers at delivery in 2013. With regard to educational attainment, the modal class (46.5%) was the upper secondary education. As expected, education was related to citizenship: women coming from strong migration countries were the lowest educated, whereas women from Western (developed) countries were markedly better educated, with almost 73% of them holding a university degree.

Finally, we verified ex-post that the sample of respondents was not significantly different from that of non-respondents, on the basis of the information available in the (random) sample list. Adopting the potential-outcome framework for causal inference (Rubin, 1974), we formalized the statistical issues involved in estimating the effect of participating or not participating in the survey on women's satisfaction. Propensity score matching (Rosenbaum & Rubin, 1983) was used to match individuals between the two groups and impute the missing outcome (namely, women's satisfaction during pregnancy and at delivery) for each of the 12,355 women who refused to participate in the survey. The outcomes of treated and matched control units were compared using nearest neighbour matching with replacement, and causal effects were estimated through the Average Treatment Effect (ATE), which is the average effect of participating in the questionnaire on women's satisfaction (Abadie et al., 2004; Imbens & Rubin, 2015). The average treatment effect did not result significantly different from zero (at 5%) in each phase of the process, showing that the respondents did not appear to be selected in any way. This holds also for the subgroup of foreign women.

Key variables

In the survey, women were asked to rate their overall satisfaction for the assistance received in two phases: in the prenatal period and during their hospitalization for delivery. In both cases, women's assessment was expressed with a five-category Likert-type scale (*Excellent*, *Good*, *Fair*, *Poor*, and *Very poor)*. These two sets of answers were our response variables in the analyses.

Among the covariates, we included, first, some socio-demographic ones: age, education, citizenship and previous pregnancies. The typology of survey response – postal questionnaire, CAWI or CATI - was taken into account, to control for sample selection into one of the three groups of respondents. In addition, each model comprised other covariates specifically related to the women's experience and clinical conditions along each birth path phase. In analysing satisfaction about pregnancy, for instance, as prenatal care and the continuity of care are usually valued, we included also a few specific experience variables:

a) how the staff presented the "birth path" and the services offered by the Local Health Authority;

b) when the woman had received the health book with the prescribed examinations;

c) whether she had visited the hospital before delivery;

d) whether she had attended the course preparing for birth and how she rated it;

e) whether the number of echographies had been lower than three, which is the number that the Tuscany region recommends and supplies for free.

As an indicator of women's clinical condition, we added whether the pregnancy had had a physiological or a pathological evolution.

In the model for childbirth, the additional individual level covariates about women's experience were:

a) whether she had delivered in a hospital out of her Local Health Authority area;

b) whether she had had information about breastfeeding and whether this information was provided consistently by all the staff;

c) the evaluation of pain control;

d) whether the woman had felt alone during labour or delivery;

e) whether there had been skin-to-skin contact with the new-born immediately after delivery;

f) whether the mother and the new-born could stay together during the hospitalization period;

g) whether and how much the woman trusted the doctors, nurses and midwives who assisted her during the hospitalization.

As for clinical data, we added two covariates: whether the woman had had a preterm delivery, and the type of delivery.

These covariates were included in our analyses because prenatal care, educational preparation for birth, and the relationship with their caregiver are important factors in women's experience (e.g. Soltani & Sandall, 2012), and patients' experience is associated with their satisfaction (Cleary et al., 1989; Jenkinson et al., 2002).

Finally, in order to (partly) catch the variability among health districts or hospitals, which has been recognised to influence patients' experience (Veenstra & Hofoss, 2003), we included some second level covariates in our analyses. These contextual variables were ad-hoc indicators derived from the Performance Evaluation System of Health Care of Tuscany for the years 2012-2013 (Nuti & Barsanti, 2013; Nuti & Marcacci, 2013). As for pregnancy, we included two performance indicators at health district level: the first one, the access rate to the counselling of childbearing-aged women, tried to take into account the diffusion of prenatal services in the district; the second variable, the percentage of women who did prenatal screening in the district, looked at the proactivity of service providers. As for childbirth, the contextual level covariate was the percentage of breastfeeding within two hours from delivery in the hospital. We tried to include two more health-district covariates in the models for pregnancy (the percentage of first-child pregnant women who attended at least three prenatal classes, and the rate of conception among girls under 18 per 1000 women aged 12-17), and three more hospital-level covariates in the models for delivery (the Cesarean section rate excluding NTSV - Nulliparous, Term, Singleton, and Vertex - births; the percentage of women who were offered the possibility of a very rapid - within two hours—skin-to-skin contact with their baby; and the woman's evaluation of the capability of health care professionals to work in team). But neither of these proved significant, and we eventually dropped them.

Table 1 – Descriptive statistics.

	mean	st.dev.	*per cent*
Number of women per health district	131.38	86.62	
Number of women per hospital	183.92	91.60	
Educational level			
Primary			*13.27*
Secondary			*46.50*
Tertiary			*40.23*
Citizenship			
Italian			*90.30*
Non-Western country			*8.50*
Western country			*1.20*
Age	34.35	4.91	
<25			*2.90*
>=40			*14.90*
Number of previous pregnancies	0.76	1.18	
0			*51.37*
1			*35.23*
2+			*13.40*
Overall satisfaction towards prenatal services	4.02	0.71	
Overall satisfaction during delivery	4.13	0.88	

Source: own elaboration on survey data.

Analytical strategy

Missing values imputation

Occasionally, some pieces of information were missing. Overall, the explanatory variables had but few missing data: less than 6.5% for each covariate. The missing figures (1,981 on 19 variables, that is about 100 cases per variable, on average) were imputed through the technique of multiple imputation (MI), which is a flexible, simulation-based statistical technique for handling missing data (Rubin 1976, 1987).

The theory underlying the validity of multiple imputation relies on an infinite number of imputations, which avoids the underestimation of the variance of the estimates, and the overstatement of precision occurring with a single imputation approach. Nevertheless, according to Rubin (1987) the asymptotic relative efficiency (RE) of the MI procedure with a finite number of imputations compared with infinite imputations is roughly 95% with five imputations for a missing-information rate as high as 50%. Thus, for obtaining valid inference, we performed twenty imputations through the multivariate imputation using chained equations (MICE), one of the most popular choices used in practice (Raghunathan et al., 2001; van Buuren et al., 1999). The MICE method uses a Gibbs-like algorithm to impute multiple variables sequentially using univariate fully

conditional specifications. Thus, to impute categorical variables, logistic, ordered logistic, or multinomial logistic regressions were used. To impute discrete variables, Poisson regression was used.

Multilevel modelling of overall satisfaction

After imputing missing values, we estimated two separate models: one for pregnancy and one for delivery. Multilevel proportional odds models were chosen, keeping into account the ordinal nature of the items, the hierarchical structure of the phenomenon, and the unbalanced number of interviews by hospital/health district. The estimation of the two random intercept cumulative model without covariate, and the comparison of these with the corresponding models without random effects confirmed the goodness of our choice, because unobserved heterogeneity appeared at the cluster level. Women constituted the lowest level (N=4,467 in the model for pregnancy, and N=4,598 in the model for childbirth), and the 34 health districts (for pregnancy evaluation), or the 25 hospitals (to assess delivery performances) were the second level. This nested (multilevel) procedure allowed us to properly take into account the role of the context in shaping health and other subjective characteristics (Subramanian et al., 2003).

The response variable was the overall satisfaction towards services and assistance during pregnancy and, separately, during delivery (both with C=5 categories). The underlying model is described by the following equation:

$$g(\gamma_{cij}) = \alpha_c - (X'_{ij}\beta + u_j), \quad c = 1,..,C-1$$

where γ_{cij} is the cumulative probability up to the cth category for unit i in cluster j (i.e. health district or hospital), $\gamma_{cij} = \Pr(Y_{ij} \leq y_c)$. α_c is the specific threshold for the cth cumulative probability, and X_{ij} is the vector of first- and second- level covariates. First-level covariates concern women's socio-demographic characteristics, clinical conditions and experience variables, whereas second-level covariates include some evaluation indicators about the health district or hospital.

Then, we also added an interaction term between women's education and the course preparing for birth in the analysis for pregnancy, and between women's education and the evaluation of pain control in the model for delivery, to account for the unbalance in service utilization among different social classes (i.e. the course preparing for birth is usually attended by a lower proportion of foreign women, and low educated women; Lauria et al., 2013; Murante et al., 2015). Other potential interactions of socio-demographics covariates with experience items were tested for both analyses, but eventually dropped because they turned out to be non-significant. Finally, u_j is the random effect for cluster j, which is Normally distributed.

Results

Let us first briefly present some descriptive indicators of women's satisfaction before discussing the results of the analyses (no corresponding table is presented). During pregnancy, the most educated were the most satisfied: their positive evaluation (good or excellent) exceeded by ten percentage points that of the least educated. Plausibly, better-educated women were more involved in prenatal services: for example, only 40.2% of low educated women (i.e. who had primary education or no educational qualification) attended the course preparing for birth, against 62.6% of women with a university degree. Satisfaction during delivery was high, and differed only slightly by educational level: from 81.5% satisfied among low educated women to 82.8% of those who had a secondary education. Few differences emerged between Italian women and women coming from non-Western countries: in both groups, over 80% of women were satisfied during pregnancy and at childbirth. Instead, foreign women coming from other Western countries declared themselves considerably less satisfied. Satisfaction during the prenatal phase and at delivery increased with age, but only slightly. Women with different educational level or citizenship exploited the available services and facilities along the care path in diverse proportion: overall, the better educated and the Italians more than their counterparts. As an example, the percentage of women who asked for epidural anaesthesia during delivery was 56.8% among the highly educated, and just 44.9% among the low educated. The differences are even more pronounced by citizenship: for instance, 57.1% of Italian women, 29.9% of women coming from non-Western countries and 65.5% of women coming from Western countries attended the course preparing for birth.

Assessing overall satisfaction during pregnancy

Table 2 shows model results for women's overall satisfaction towards services and assistance during pregnancy. The main interest was to clarify which socio-demographic factors (if any) were associated with satisfaction during pregnancy. First, women's overall satisfaction increased with age, but not linearly. Second, while foreign women coming from non-Western countries were usually more satisfied than Italian women, the opposite was true for foreign women coming from Western countries (but not significantly so in Models 2 and 3). Third, women's satisfaction increased with educational attainment. Finally, the number of previous pregnancies did not seem to influence women's satisfaction towards prenatal services and assistance even after dropping age from the model. Among women's experience and clinical covariates, only those concerning the presentation of the birth path and the course preparing for birth were significant. Moreover, not only was a positive evaluation of the course preparing for birth associated with higher overall satisfaction, but it was also positively correlated with education. Instead, the women who did not

attend the course were more satisfied than those who attended it, but who did not rate it adequately. To sum up, women who attended the course and appreciated it were all in all more satisfied with prenatal services; if, instead, they had not liked it, they presumably considered it a waste of time, and were even less satisfied than those who did not participate at all (see Table 3).

Among the second-level covariates, both variables - reflecting the diffusion and the proactivity of prenatal services throughout districts - proved non-significant. Taking into account second-level random effects, the differences in the predicted, conditional probabilities were not large, because satisfaction was high in all the health districts. The predicted probabilities varied meaningfully for the different values of the socio-demographic covariates, which implies that personal traits influenced women's overall satisfaction more than the health district of residence (results available upon request).

Table 2 – Estimates and standard errors for the random intercept proportional odds model on the overall satisfaction towards services and assistance during pregnancy.

Response	Overall prenatal satisfaction								
Units: health district	34			34			34		
Units: woman	4467			4467			4467		
	Model 1	S.E.		Model 2	S.E.		Model 3	S.E.	
Fixed Part									
Thresholds									
First	-5.433	0.242	***	-3.732	0.281	***	-2.930	0.531	***
Second	-3.636	0.111	***	-1.908	0.184	***	-1.098	0.488	**
Third	-1.414	0.066	***	0.412	0.168	***	1.238	0.485	**
Fourth	1.331	0.065	***	3.389	0.177	***	4.221	0.489	***
Woman's socio-demographics									
Age (centred at the median age)	0.029	0.007	***	0.033	0.007	***	0.034	0.007	***
Age^2 (centred at the median age)	0.003	0.001	***	0.003	0.001	***	0.003	0.001	***
Citizenship (Ref. Italian)									
Strong migration country	0.264	0.113	**	0.248	0.116	**	0.236	0.116	**
Western Country	-0.511	0.275	*	-0.351	0.276		-0.396	0.278	
Education (Ref. Secondary)									
Primary	-0.227	0.096	**	-0.278	0.098	***	-0.818	0.587	
Tertiary	0.178	0.064	***	0.201	0.065	***	0.905	0.300	***
Number of previous pregnancies	-0.021	0.026		-0.026	0.027		-0.026	0.028	
Woman's experience and clinical conditions							0.086	0.068	
Has visited the birth centre				0.081	0.068		0.208	0.162	
Number of echographies under recommendation				0.254	0.158		-0.093	0.091	
Pathological pregnancy				-0.087	0.091		0.034	0.007	
Presentation of the birth path (Ref. Not at all/Little)							0.367	0.088	

	Coef	SE	Sig	Coef	SE	Sig
Sufficiently	0.375	0.088	***	1.118	0.088	***
Much/Totally	1.126	0.088	***			***
Evaluation of the course preparing for birth (Ref. Very poor/ Poor)				0.859	0.271	
Fair	0.497	0.173	***	1.840	0.241	***
Good/Excellent	1.502	0.153	***	1.738	0.241	***
Not attended the course	1.320	0.156	***			***
Low education # Fair evaluation of the course preparing for birth				0.277	0.687	
Low education # Good/Excellent evaluation of the course preparing for birth				0.470	0.611	
Low education # Not attended the course				0.624	0.603	
High education # Fair evaluation of the course preparing for birth				-0.661	0.362	*
High education # Good/Excellent evaluation of the course preparing for birth				-0.637	0.315	**
High education #Not attended the course				-0.890	0.317	***
Health-district characteristics						
Access rate to the counselling of childbearing-age women				0.000	0.001	
% of prenatal screening				0.005	0.005	
Random Part						
Level: health district						
Variance	0.024	0.013		0.024	0.014		0.023	0.013

Notes:

In Model 3 we controlled also for another individual-level covariate, the typology of response to the questionnaire, but it was not significant.

* p-value<0.10, ** p-value<0.05, *** p-value<0.01

Table 3 – Predicted probability of positive evaluation (*good* and *excellent*) of prenatal services according to education and satisfaction towards the course preparing for birth

	Evaluation of the course preparing for birth			
Education	*Very poor/Poor*	*Fair*	*Good/Excellent*	*Not attended the course*
Primary	0.22	0.29	0.56	0.58
Secondary	0.11	0.41	0.65	0.62
Tertiary	0.42	0.47	0.70	0.63

Assessing the overall satisfaction during delivery

The results for women's overall satisfaction towards services and assistance during delivery are reported in Table 4. In this case, age was not associated with higher satisfaction, whereas

citizenship and education maintained their association, in the same direction. Foreign, non-western women were more satisfied than their counterparts, and so did the highly educated.

Women's experience and clinical covariates proved almost always significant. Having a Caesarean section, for instance, was negatively associated with satisfaction, compared to a vaginal delivery. A lack of information about breastfeeding – or inconsistent information coming from the staff -, as well as an insufficient pain control, the feeling of loneliness during labour or delivery, and the privation of skin-to-skin contact after delivery were all factors that lowered women's satisfaction. At the same time, trust in doctors, nurses and midwives were important variables for higher level of overall satisfaction. Thus, the woman's experience and health during hospitalization and delivery appeared more relevant for the overall satisfaction than that during pregnancy. Finally, in Model 3 the interaction term between education and pain control was found to be significant, and the influence of education seemed to depend on some experience aspects, as suggested earlier. In this case, better-educated women were less satisfied if they had not had an appropriate pain control: in short, highly educated women appear to be a more demanding group, who tend to show appreciation if their expectations are fulfilled, and to express criticism in the opposite case. This hypothesis is corroborated by the percentage of women who asked about the possibility of receiving epidural anaesthesia (56.8% of tertiary-educated women against 44.9% among the low educated, that is a difference of 11.9 percentage points), and the difference between those who actually received epidural anaesthesia (23.8% against 21.5%, merely 2.3%): this divergence probably explains the stronger link between satisfaction and pain control among the highly educated.

Looking at the hospital-level variables, the percentage of women who breastfed within 2 hours from delivery in the hospital was not significant. Taking into account second-level random effects, a greater variability emerged at the hospital level in this analysis than in the previous one, on pregnancy (variance = 0.09 for delivery against 0.02 for pregnancy). Thus, the predicted probabilities for the overall satisfaction varied more among hospitals than among health districts.

Table 4 – Estimates and standard errors for the random intercept proportional odds model on the overall satisfaction towards services and assistance during delivery.

Response	Overall delivery satisfaction								
Units: hospital (birth centre)	25			25			25		
Units: woman	4598			4598			4598		
	Model 1	S.E.		Model 2	S.E.		Model 3	S.E.	
Fixed Part									
Thresholds									
First	-4.284	0.153	***	-2.741	0.234	***	-1.583	1.477	
Second	-3.052	0.116	***	-0.820	0.228	***	0.338	1.475	
Third	-1.630	0.101	***	1.613	0.242	***	2.778	1.478	*
Fourth	0.465	0.098	***	4.933	0.248	***	6.107	1.479	***
Woman's socio-demographics									
Age (centred at the median age)	0.010	0.006	*	0.002	0.007		0.002	0.007	
Citizenship (Ref. Italian)									
Strong migration country	0.098	0.105		0.292	0.116	**	0.288	0.117	**
Western Country	-0.454	0.251	*	-0.488	0.274	*	-0.437	0.278	
Education (Ref. Secondary)									
Primary	0.094	0.088		0.200	0.097	**	0.138	0.133	
Tertiary	0.058	0.061		0.128	0.067	*	0.322	0.094	***
Number of previous pregnancies	0.006	0.025		-0.013	0.027		-0.013	0.027	
Woman's experience and clinical conditions									
Type of delivery (Ref. Vaginal)									
Assisted (with cupping glass or forceps)/Induced				0.006	0.081		0.001	0.082	
Scheduled Caesarean section				-0.448	0.101	***	-0.460	0.101	***
Not scheduled Caesarean section				-0.326	0.106	***	-0.339	0.106	***
Accordant information about breastfeeding (Ref. Yes)									
Somewhat				-0.717	0.073	***	-0.717	0.074	***
No				-1.388	0.108	***	-1.379	0.108	***
No information				-1.482	0.139	***	-1.495	0.139	***
Pain control (Ref. Yes)									
Somewhat				-0.735	0.072	***	-0.608	0.103	***
No				-1.042	0.118	***	-0.845	0.161	***
Alone during labour or delivery				-0.768	0.118	***	-0.757	0.118	***
No skin-to-skin contact after delivery				-0.170	0.098	*	-0.173	0.098	*
Confidence towards doctors (Ref. Not at all/ Not much)									
Quite				0.588	0.160	***	0.575	0.161	***
Much/Very much				1.116	0.163	***	1.116	0.164	***
Confidence towards nurses (Ref. Not at all/ Not much)									
Quite				1.378	0.156	***	1.392	0.156	***
Much/Very much				2.464	0.166	***	2.474	0.167	***
Confidence towards midwives (Ref. Not much/Not at all)									
Quite				1.401	0.185	***	1.407	0.184	***

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	Coef.	SE		Coef.	SE		Coef.	SE	
Much/Very much				2.199	0.182	***	2.211	0.182	***
Low education # Somewhat pain control							0.114	0.212	
Low education # No pain control							0.199	0.325	
High education # Somewhat pain control							-0.364	0.148	**
High education # No pain control							-0.539	0.221	**
Hospital characteristics									
% of breastfeeding within 2 hours from delivery							0.012	0.016	
Random Part									
Level: hospital									
Variance	0.175	0.058		0.092	0.036		0.090	0.036	

Notes:
From Model 2 we controlled also for other three individual-level covariates, preterm delivery, the out-of-Local Health Authority delivery, if the mother and newborn were together during hospital stay, but they were not significant.
In Model 3 we controlled also for another individual-level covariate, the typology of the questionnaire, but it was not significant.
* p-value<0.10, ** p-value<0.05, *** p-value<0.01

Summary and discussion

In our study we addressed women's satisfaction during pregnancy and at delivery which is considered an important indicator of the quality of maternity service (Hodnett, 2002). In particular we investigated the association between women's satisfaction and some socio-demographic characteristics of the woman, namely her educational attainment, her age, her citizenship, and the number of her former pregnancies. Previous studies on this topic are scarce and the link they found between women's satisfaction and their socio-demographic characteristics is not always straightforward (see e.g. Mackey, 1995; Ranta et al., 1995; Waldenström, 1999; Waldenström et al., 2004). In our sample, women's overall satisfaction towards prenatal services and during delivery was generally high, as it is often the case in the evaluation of maternity wards (Brown & Lumley, 1997; Overgaard et al., 2012). Our results confirm the importance of socio-demographic factors in explaining women's satisfaction, both for the prenatal period and during hospitalization for delivery. Satisfaction increases with age during the prenatal period, but women's age does not seem to matter at childbirth, as found in some previous studies (Brown & Lumley, 1994; Overgaard et al., 2012). Instead, both citizenship and the educational level are significant in both phases. Women coming from non-Western countries were more satisfied than Italian women, even if they were less actively involved in prenatal services. A plausible explanation is that women from developing countries have low expectations, on the basis on their previous experiences of health care, and appreciate what they are offered (Yelland et al., 2012). This corroborates Janzen et al. (2006)'s claim that expectations are very important in this domain. Moreover, a positive association between

satisfaction and high education emerges in both models, but women's satisfaction among the better educated intimately depends on the fulfilment of their expectations, as the interaction terms have shown. During hospitalization for delivery, for example, if the pain control had not been appropriate, better-educated women tended to show their disappointment. In this respect, our study confirms the empirical results found by Wilde-Larsson et al. (2011). Finally, the number of previous pregnancies was never significant, as identified in other studies (Overgaard et al., 2012; Waldenström et al., 1996). Compared to the influence of individual socio-demographic characteristics , the variability in women's satisfaction that may be attributed to the context is more limited, but still significant, which confirms the importance of modelling this kind of variability properly (Stubbe et al., 2007; Veenstra & Hofoss, 2003).

Overall, we can conclude that the birth order is not associated with the woman's satisfaction. Instead, the woman's age emerges as significant during pregnancy, but not at delivery. In this case, the prenatal association between age and satisfaction could be driven by the special attention that the Tuscany region devotes to thirty-five and older pregnant women: a tentative conclusion could then be that all in all age and satisfaction are scarcely associated, if at all. The woman's citizenship and her educational level seem to be the most relevant, perhaps the only, socio-demographic characteristics that play a crucial role in determining her satisfaction in both phases.

Two main methodological points emerge from our model. First, the various phases of the process (prenatal and delivery) must be analysed separately, because results may differ, also in the association between satisfaction and the socio-demographic characteristics of the woman. Second, the importance of the context must be emphasized, be that the district where the woman lived or the hospital where delivery took place. In both cases, this contextual level needs to be modelled properly, if the risk of biases in the estimation of what determines women's satisfaction with their "birth path" is to be avoided.

The patients' evaluation of care is a fundamental aspect to be considered when developing targeted policies to enhance patient-centred care (Murray & Frenk, 2000). Our findings suggest that the socio-demographic component should not be underestimated: both the influence of age on the women's satisfaction during pregnancy and the effect of citizenship and education should be addressed by health authorities and decision makers, because the quality of maternity services appears to be differently perceived according to women's socio-demographic characteristics. Analysing satisfaction measures by socio-demographic factors might help organizations to identify areas where services need to be more precisely targeted to the diverse women's characteristics and increase awareness among professionals of the diversity and socio-cultural context of the new mothers in their everyday practices. For example, the different population groups identified from

the study results might require different access policies (e.g. different service hours) to increase the level of participation in prenatal classes, especially for mothers with low education. Another example is the relationship between pain-management actions and education: scientific knowledge alone should not guide the delivery of specific services, and healthcare professionals should also consider the patients' values, needs and preferences in clinical decisions in order to ensure that respectful and responsive care is delivered to the diverse population (Mulley et al., 2012).

This study has also some limitations. A few potentially relevant questions were not asked in the survey, such as those on the newborn's and on their mothers' health, as well as information about the family and the partnership condition, or the length of stay in Italy for foreign women. The lack of these elements may have reduced our capability of explaining part of the difference in satisfaction, and possibly even between hospitals or health districts.

But we would like to conclude by insisting on the merits of our work. Our data come from an ad-hoc, representative survey, which is unique in Italy, it overcomes some of the limitations that are frequently lamented in this field, such as small sample size, the non-representativeness of the sample, the lack of separation of the various stages (antenatal period and childbirth) in the assessment of women's satisfaction (Waldenström et al., 2004). Second, this study contributes to a better understanding of the association between the women's socio-demographic characteristics and their satisfaction towards maternity and counseling services along the birth path, which is particularly important in view of the increased need of evidence to formulate policies in which care is customized according to women's different needs and values.

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