

# Association between maternal satisfaction and other indicators of quality of care at childbirth: a cross-sectional study based on the WHO Standards

## Supplementary file

### Table of contents

Supplementary Appendix 1: STROBE checklist .....	2
Supplementary Appendix 2: List of independent variables (tot = 61 variables) .....	5
Supplementary Appendix 3: Missing cases for the variables of interest .....	7
Supplementary Appendix 4: Flow diagram .....	9
Supplementary Appendix 5: Characteristics of missing cases .....	10
Supplementary Appendix 6: Univariate analysis - association between independent variables and women's overall satisfaction .....	11
Supplementary Appendix 7: Rotated factor solution .....	16
Supplementary Appendix 8: Univariate analysis - association between independent variables and secondary indicators of satisfaction .....	18
Supplementary Appendix 9: Multivariate analysis exploring the association between factors identified by the factor analysis and "women's positive judgement of quality of care received" ..	25
Supplementary Appendix 10: Multivariate analysis exploring the association between factors identified by the factor analysis and "to wish to return to the facility/to recommend it to a friend" .....	26

## Supplementary Appendix 1: STROBE checklist

	Item No	Recommendation	Page
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	1, 2
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	2
<b>Introduction</b>			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	4-5
Objectives	3	State specific objectives, including any prespecified hypotheses	5
<b>Methods</b>			
Study design	4	Present key elements of study design early in the paper	5
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	5-6
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants	5-6
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	6
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	6-7
Bias	9	Describe any efforts to address potential sources of bias	6-7
Study size	10	Explain how the study size was arrived at	5-6

Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	6
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	6-7
		(b) Describe any methods used to examine subgroups and interactions	6-7
		(c) Explain how missing data were addressed	6-7
		(d) If applicable, describe analytical methods taking account of sampling strategy	6-7
		(e) Describe any sensitivity analyses	6-7
<b>Results</b>			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	8-9
		(b) Give reasons for non-participation at each stage	5
		(c) Consider use of a flow diagram	-
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	8-9
		(b) Indicate number of participants with missing data for each variable of interest	6
Outcome data	15*	Report numbers of outcome events or summary measures	9
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	9-15
		(b) Report category boundaries when continuous variables were categorized	9-15
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	9-15

Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	13
<b>Discussion</b>			
Key results	18	Summarise key results with reference to study objectives	15-16
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	17
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	17
Generalisability	21	Discuss the generalisability (external validity) of the study results	16-17
<b>Other information</b>			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	18

\*Give information separately for exposed and unexposed groups.

**Note:** An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is available at [www.strobe-statement.org](http://www.strobe-statement.org)

## Supplementary Appendix 2: List of independent variables (tot = 61 variables)

### Socio-demographic and clinical characteristics

1. Age  $\geq$  35 years
2. High education level (college or above)
3. Born in Italy
4. Italian citizenship
5. Marital status
6. Occupation status
7. Parity
8. Antenatal birthing classes
9. Knowledge of the Respectful Maternity Care Charter
10. Multiple pregnancy

### Provision of care

1. Prompt attention
2. Induction of labour \*  $\beta$
3. Continuous CTG  $\beta$
4. Peridural analgesia  $\beta$
5. Peridural information  $\beta$
6. Non-pharmacological analgesia  $\beta$
7. Cesarean section
8. Vaginal operative delivery
9. Delivery position  $\alpha$
10. Kristeller manoeuvre  $\alpha$
11. Episiotomy  $\alpha$
12. Skin-to-skin
13. Early breastfeeding
14. Breastfeeding information
15. Rooming in
16. Private assistance \*

### Experience of care

1. Immediate information
2. Possibility to move during labour  $\beta$
3. Behave as wishing (vocalize, scream, move) during labour and birth  $\beta$
4. Feeling left alone
5. Possibility to rest after delivery
6. Health workers introduced themselves

7. Effective communication
8. Emotional support
9. Divergent opinion among health workers
10. Listening to women's needs
11. Adequate involvement of women
12. Effective handover
13. Contradictory information
14. Feeling forced to accept care
15. Respect and dignity
16. Privacy
17. Attention to ward's temperature
18. Attention to thirst/hunger feeling
19. Presence of a companion of choice
20. Victim of aggressiveness
21. Victim of abuse
22. Victim of discrimination
23. Respect for cultural and religious needs

#### **Availability of resources**

##### **Human resources**

1. Timely care
2. Women needing more time with health workers
3. Warning signs information

##### **Physical resources**

4. Basic infrastructure of the ward
5. Areas for newborn care
6. Toilets
7. Acoustics
8. Illumination
9. General cleanliness
10. General comfort of the wards
11. Organisation of hospital routine (timings of follow up visits, medications etc) \*
12. Areas for visitors and timing \*

Notes: \* Additional variables, not based on WHO Quality Measures, included for provision and availability of physical resources; <sup>α</sup> variables not included in factor analysis (data generated only by women that had labour); <sup>β</sup> variables not included in factor analysis (data generated only by women that had a vaginal delivery).

Abbreviation: CTG = cardiotocography.

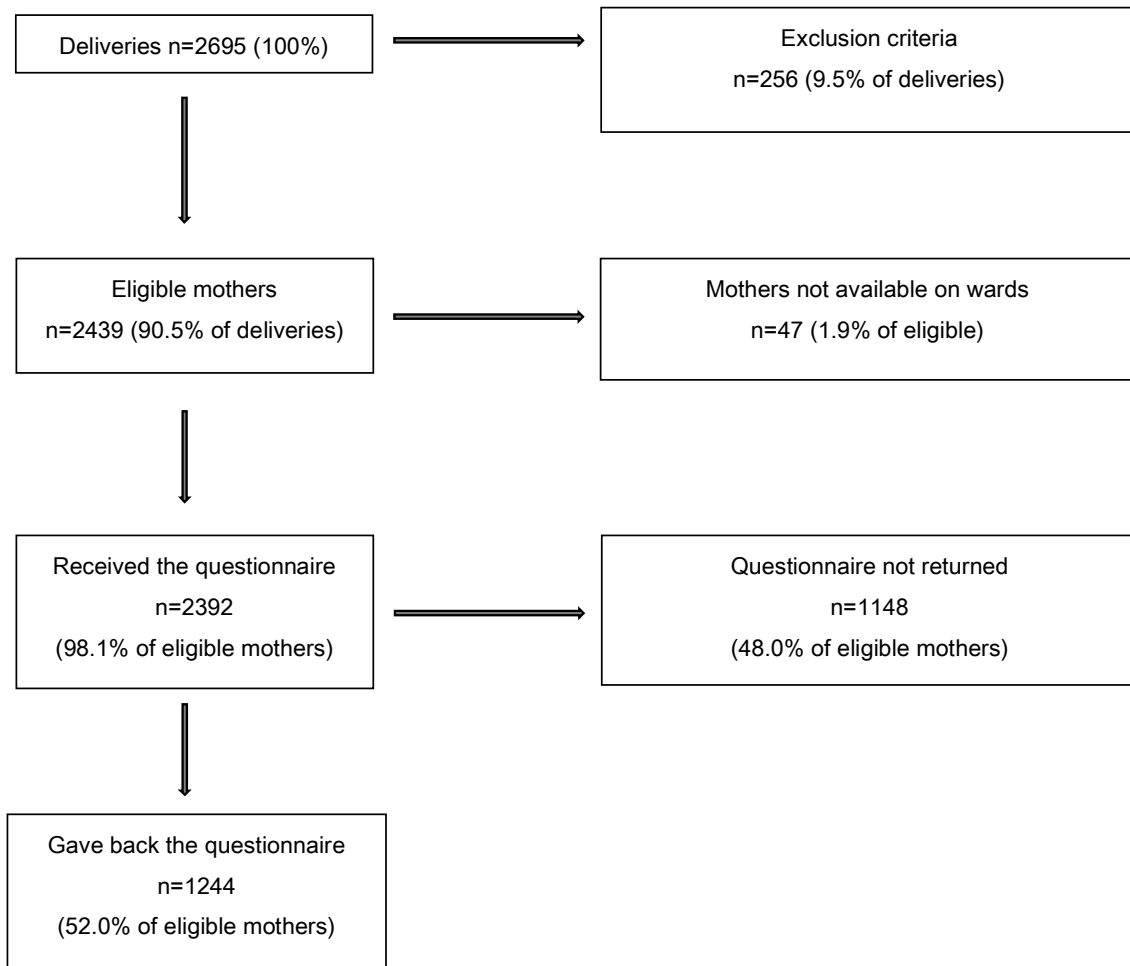
## Supplementary Appendix 3: Missing cases for the variables of interest

Variables	Total	Missing	% Missing
<b>Socio-demographic and clinical characteristics</b>			
Age	1244	0	0
High education level	1244	7	0.6
Born in Italy	1244	4	0.3
Italian citizenship	1244	9	0.7
Marital status	1244	8	0.6
Occupation status	1244	6	0.5
Parity	1244	0	0
Antenatal birthing classes	1244	1	0.1
Knowledge of the Respectful Maternity Care Charter	1244	13	1.1
Multiple pregnancy	1244	0	0
<b>Provision of care</b>			
Prompt attention	1244	2	0.2
Induction of labour	1098	3	0.3
Continuous cardiotocography	1098	2	0.2
Peridural analgesia	1098	2	0.2
Peridural information	575	3	0.5
Non-pharmacological analgesia	1098	0	0
Cesarean section	1244	0	0
Vaginal operative delivery	1244	0	0
Delivery position	959	1	0.1
Kristeller manoeuvre	959	1	0.1
Episiotomy	959	2	0.2
Skin-to-skin	1244	6	0.5
Early breastfeeding	1244	13	1.1
Breastfeeding information	1244	3	0.3
Rooming in	1244	2	0.2
Private assistance	1244	4	0.3
<b>Experience of care</b>			
Immediate information	1244	3	0.2
Feeling free to behave during labour and delivery	1098	2	0.2
Movement during labour	1098	3	0.3
Feeling left alone	1244	2	0.2
Possibility to rest after delivery	1244	2	0.2
Health workers introduced themselves	1244	3	0.2
Effective communication	1244	6	0.5
Emotional support	1244	6	0.5
Divergent opinion among health workers	1244	6	0.5

Listening to women's needs	1244	8	0.6
Adequate involvement of woman	1244	10	0.8
Effective handover	1244	7	0.6
Contradictory information	1244	7	0.6
Feeling forced to accept care	1244	6	0.5
Respect and dignity	1244	6	0.5
Privacy	1244	5	0.4
Attention to ward's temperature	1244	8	0.6
Attention to thirst/hunger feeling	1244	7	0.6
Presence of a companion of choice	1244	6	0.5
Victim of aggressiveness	1244	5	0.4
Victim of abuse	1244	6	0.5
Victim of discrimination	1244	7	0.6
Respect for cultural and religious needs	1244	9	0.7
<b>Availability of resources</b>			
<i>Human resources</i>			
Timely care	1244	6	0.5
Women needing more time with health workers	1244	7	0.6
Warning signs information	1244	2	0.2
<i>Physical resources</i>			
Basic infrastructure of the ward	1244	6	0.5
Areas for newborn care	1244	6	0.5
Toilets	1244	6	0.5
Acoustics	1244	5	0.4
Illumination	1244	6	0.5
General cleanliness	1244	6	0.5
General comfort of the wards	1244	6	0.5
Organisation of hospital routine	1244	6	0.5
Areas for visitors and timing	1244	7	0.6
<b>Indicators of satisfaction with care</b>			
Women's overall satisfaction	1244	14	1.1
Women's positive judgment of the quality of care received	1244	4	0.3
Wish to return to the facility/recommend it	1244	4	0.3



## Supplementary Appendix 4: Flow diagram



## Supplementary Appendix 5: Characteristics of missing cases

	<b>Enrolled N= 1244 (%)</b>	<b>Missing cases N= 1148 (%)</b>	<b>Pearson <math>\chi^2</math> statistic</b>	<b>p value</b>
Primiparous	658 (52.9)	642 (55.9)	24.484	0.12
Multiparous	586 (47.1)	506 (44.1)	24.484	0.12
Normal vaginal birth	839 (67.4)	790 (68.8)	0.5171	0.47
Instrumental vaginal birth	120 (9.6)	111 (9.3)	0.0073	0.93
Cesarean section	285 (22.9)	247 (21.5)	0.7497	0.39
Neonatal unit	145 (11.7)	134 (11.7)	19.837	0.16
Twins	21 (1.7)	26 (2.3)	10.308	0.31

## Supplementary Appendix 6: Univariate analysis - association between independent variables and women's overall satisfaction

Women's overall satisfaction				
	Yes n (%)	No n (%)	Odds ratio (95% CI)	p - value
<b>Socio-demographic and clinical characteristics</b>				
Age (n=1230)				
<35 years old	610 (58.3)	116 (63.4)	Reference	
≥35 years old	437 (41.7)	67 (36.6)	1.24 (0.90-1.72)	0.194
High educational level (n=1228)				
No	480 (45.9)	95 (52.2)	Reference	
Yes	566 (54.1)	87 (47.8)	1.29 (0.94-1.76)	0.116
Born in Italy (n=1223)				
Yes	884 (84.5)	160 (87.9)	Reference	
No	162 (15.5)	22 (12.1)	1.33 (0.83-2.15)	0.237
Citizenship (n=1223)				
Italian	947 (90.8)	196 (93.9)	Reference	
Not Italian	96 (9.2)	11 (6.1)	1.56 (0.82-2.97)	0.178
Occupation status (n=1228)				
Non employed	204 (19.9)	39 (21.4)	Reference	
Employed	838 (80.1)	143 (78.6)	1.10 (0.75-1.62)	0.632
Marital status (n=1226)				
Single/Other	46 (4.4)	5 (2.8)	Reference	
Married/Living with partner	999 (95.6)	176 (97.2)	0.62 (0.24-1.57)	0.312
Parity (n=1230)				
Primiparous	540 (51.6)	110 (60.1)	Reference	
Multiparous	507 (48.4)	73 (39.9)	1.41 (1.03-1.95)	0.033
Antenatal birthing classes (n=1229)				
No	380 (36.3)	59 (32.2)	Reference	
Yes	666 (63.7)	124 (67.8)	0.83 (0.60-1.17)	0.287
Knowledge of the Respectful Maternity Care Charter (n=1222)				
No	872 (83.8)	156 (85.7)	Reference	
Yes	168 (16.2)	26 (14.3)	1.59 (0.74-1.81)	0.525
Multiple pregnancy (n=1230)				
No	1031 (98.5)	179 (97.8)	Reference	
Yes	16 (1.5)	4 (2.2)	0.69 (0.23-2.10)	0.519
<b>Provision of care</b>				
Prompt attention (n=1228)				
No	114 (10.9)	53 (29.0)	Reference	

Yes	931 (89.1)	130 (71.0)	3.33 (2.29-4.84)	<0.001
Induction of labour (n=1090)				
No	677 (73.0)	100 (61.4)	Reference	
Yes	250 (27.0)	63 (38.6)	0.59 (0.41-0.83)	0.003
Continuous cardiotocography (n=1091)				
No	250 (26.9)	38 (23.3)	Reference	
Yes	678 (73.1)	125 (76.7)	0.82 (0.56-1.22)	0.333
Peridural analgesia (n=1091)				
No	567 (61.1)	80 (49.1)	Reference	
Yes	361 (38.9)	83 (50.9)	0.61 (0.44-0.86)	0.004
Peridural information (n=567)				
No	35 (7.5)	19 (19.0)	Reference	
Yes	432 (92.5)	81 (81.0)	2.90 (1.58-5.31)	0.001
Non-pharmacological analgesia (n=1230)				
No	655 (62.6)	110 (60.1)	Reference	
Yes	392 (37.4)	73 (39.9)	0.90 (0.65-1.24)	0.528
Caesarean section (n=1230)				
No	840 (80.2)	113 (61.7)	Reference	
Yes	207 (19.8)	70 (38.3)	0.40 (0.28-0.56)	<0.001
Operative delivery (n=1230)				
No	950 (90.7)	160 (87.4)	Reference	
Yes	97 (9.3)	23 (12.6)	0.71 (0.44-1.15)	0.166
Delivery position (n=593)				
Lithotomy position	586 (69.8)	86 (76.1)	Reference	
Other positions	254 (30.2)	27 (23.9)	1.38 (0.87-2.18)	0.166
Kristeller manoeuvre (n=953)				
No	736 (87.6)	90 (79.6)	Reference	
Yes	104 (12.4)	23 (20.4)	0.55 (0.33-0.91)	0.003
Episiotomy (n=1090)				
No	705 (84.0)	84 (74.3)	Reference	
Yes	134 (16.0)	29 (25.7)	0.55 (0.35-0.87)	0.011
Skin-to-skin (n=1228)				
No	168 (16.1)	56 (30.6)	Reference	
Yes	877 (83.9)	127 (69.4)	2.30 (1.61-3.28)	<0.001
Early breastfeeding (n=1228)				
No	307 (29.6)	73 (40.1)	Reference	
Yes	732 (70.5)	109 (59.9)	1.59 (1.15-2.21)	0.005
Breastfeeding information (n=1230)				
No	315 (30.0)	97 (53.0)	Reference	
Yes	732 (70.0)	86 (47.0)	2.62 (1.91-3.61)	<0.001

Rooming in (n=1230)				
No	122 (11.7)	19 (10.4)	Reference	
Yes	925 (88.3)	164 (89.6)	0.88 (0.53-1.46)	0.619
Private assistance (n=1230)				
No	962 (91.9)	158 (86.3)	Reference	
Yes	85 (8.1)	25 (13.7)	0.56 (0.35-0.90)	0.017
<b>Experience of care</b>				
Immediate information (n=1228)				
No	319 (30.5)	110 (60.1)	Reference	
Yes	726 (69.5)	73 (39.9)	3.43 (2.48-4.74)	<0.001
Feeling free during labour and delivery (n=1091)				
No	172 (18.5)	71 (43.6)	Reference	
Yes	756 (81.5)	92 (56.4)	3.39 (2.39-4.82)	<0.001
Movement during labour (n= 1090)				
No	196 (21.1)	61 (37.4)	Reference	
Yes	731 (78.9)	102 (62.6)	2.23 (1.57-3.18)	<0.001
Feeling left alone (n=1230)				
No	881 (84.2)	92 (50.3)	Reference	
Yes	166 (15.8)	91 (49.7)	0.19 (0.14-0.27)	<0.001
Possibility to rest after delivery (n=1230)				
No	453 (43.3)	123 (67.2)	Reference	
Yes	594 (56.7)	60 (32.8)	2.69 (1.99-3.75)	<0.001
Health workers introduced themselves (n=1229)				
No	314 (30.0)	93 (50.8)	Reference	
Yes	732 (70.0)	90 (49.2)	2.41 (1.75-3.31)	<0.001
Effective communication (n=1227)				
No	83 (7.9)	58 (32.0)	Reference	
Yes	963 (92.1)	123 (68.0)	5.47 (3.73-8.04)	<0.001
Emotional support (n=1227)				
No	150 (14.4)	83 (45.6)	Reference	
Yes	895 (85.6)	99 (54.4)	5.00 (3.56-7.02)	<0.001
Divergent opinion among health workers (n=1227)				
No	972 (93.0)	154 (84.6)	Reference	
Yes	73 (7.0)	28 (15.4)	0.41 (0.26-0.66)	<0.001
Listening to women's needs (n=1225)				
No	176 (16.9)	93 (51.1)	Reference	
Yes	867 (83.1)	89 (48.9)	5.14 (3.69-7.18)	<0.001
Adequate involvement of women (n=1224)				
No	202 (19.4)	100 (55.2)	Reference	
Yes	841 (80.6)	81 (44.8)	5.14 (3.69-7.16)	<0.001

Effective handover (n=1226)				
No	189 (18.1)	72 (39.6)	Reference	
Yes	855 (81.9)	110 (60.4)	2.96 (2.12-4.14)	<0.001
Contradictory information (n=1226)				
No	919 (88.0)	129 (70.9)	Reference	
Yes	125 (12.0)	53 (29.1)	0.33 (0.23-0.48)	<0.001
Feeling forced to accept care (n=1227)				
No	1001 (95.8)	144 (79.1)	Reference	
Yes	44 (4.2)	38 (20.9)	0.17 (0.10-0.27)	<0.001
Respect and dignity (n=1227)				
No	49 (4.7)	33 (18.2)	Reference	
Yes	997 (95.3)	148 (81.8)	4.54 (2.82-7.29)	<0.001
Privacy (n=1228)				
No	82 (7.8)	34 (18.7)	Reference	
Yes	964 (92.2)	148 (81.3)	2.70 (1.75-4.18)	<0.001
Attention to ward's temperature (n=1225)				
No	216 (20.7)	71 (39.2)	Reference	
Yes	828 (79.3)	110 (60.8)	2.47 (1.77-3.45)	<0.001
Attention to thirsty/hunger feeling (n=1226)				
No	163 (15.6)	67 (36.8)	Reference	
Yes	881 (84.4)	115 (63.2)	3.15 (2.23-4.44)	<0.001
Presence of a companion of choice (n=1226)				
No	486 (46.5)	111 (61.0)	Reference	
Yes	559 (53.5)	71 (39.0)	1.80 (1.30-2.48)	<0.001
Victim of aggressiveness (n=1228)				
No	1039 (99.3)	176 (96.7)	Reference	
Yes	7 (0.7)	6 (3.3)	0.20 (0.07-0.59)	<0.001
Victim of abuse (n=1228)				
No	1043 (99.7)	178 (97.8)	Reference	
Yes	3 (0.3)	4 (2.2)	0.13 (0.03-0.58)	0.007
Victim of discrimination (n=1227)				
No	1036 (99.1)	178 (97.8)	Reference	
Yes	9 (0.9)	4 (2.2)	0.39 (0.12-1.27)	0.117
Respect for cultural and religious needs (n=1225)				
No	100 (9.6)	28 (15.5)	Reference	
Yes	944 (90.4)	153 (84.5)	1.73 (1.10-2.72)	0.018
<b>Availability of resources</b>				
Timely care (n=1226)				
No	102 (9.8)	52 (28.6)	Reference	
Yes	942 (90.2)	130 (71.4)	3.69 (2.52-5.41)	<0.001

Women needing more time with health workers (n=1226)				
No	963 (92.2)	141 (77.9)	Reference	
Yes	82 (7.8)	40 (22.1)	0.30 (0.20-0.46)	<0.001
Warning signs information (n=1230)				
No	514 (49.1)	130 (71.0)	Reference	
Yes	533 (50.9)	53 (29.0)	2.54 (1.81-3.58)	<0.001
Basic infrastructure of the ward (n=1229)				
Scarce or sufficient	410 (39.2)	120 (65.9)	Reference	
Good or excellent	637 (60.8)	62 (34.1)	3.00 (2.16-4.19)	<0.001
Areas for newborn care (n=1229)				
Scarce or sufficient	340 (32.5)	106 (57.9)	Reference	
Good or excellent	706 (67.5)	77 (42.19)	2.86 (2.07-3.94)	<0.001
Toilets (n=1229)				
Scarce or sufficient	493 (47.1)	124 (67.8)	Reference	
Good or excellent	553 (52.9)	59 (32.2)	2.36 (1.69-3.29)	<0.001
Acoustics (n=1230)				
Scarce or sufficient	781 (74.6)	171 (93.4)	Reference	
Good or excellent	266 (25.4)	12 (6.6)	4.85 (2.66-8.86)	<0.001
Illumination (n=1229)				
Scarce or sufficient	399 (38.2)	118 (64.5)	Reference	
Good or excellent	647 (61.9)	65 (35.5)	2.94 (2.12-4.08)	<0.001
General cleanliness (n=1229)				
Scarce or sufficient	235 (22.5)	87 (47.5)	Reference	
Good or excellent	811 (77.5)	96 (52.5)	3.13 (2.26-4.33)	<0.001
Comfort of the wards (n=1229)				
Scarce or sufficient	387 (37.0)	120 (65.6)	Reference	
Good or excellent	659 (63.0)	63 (34.4)	3.24 (2.33-4.51)	<0.001
Organisation of hospital routine (n=1229)				
Scarce or sufficient	282 (27.0)	105 (57.4)	Reference	
Good or excellent	764 (73.0)	78 (42.6)	3.65 (2.64-5.04)	<0.001
Areas for visitors and timing (n=1228)				
Scarce or sufficient	637 (61.0)	149 (81.4)	Reference	
Good or excellent	408 (39.0)	34 (18.6)	2.81 (1.90-4.16)	<0.001

## Supplementary Appendix 7: Rotated factor solution

Variables	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Factor 8	Communality
Effective communication (E)	0.84								0.77
Adequate involvement of women (E)	0.79								0.69
Listening to women's needs (E)	0.79								0.69
Respect and dignity (E)	0.72		-0.33						0.70
Emotional support (E)	0.72								0.65
Timely care (R)	0.70								0.59
Effective handover (E)	0.66								0.53
Feeling left alone (E)	-0.62							-0.44	0.65
Women needing more time with HWs (R)	-0.59								0.42
Feeling forced to accept care (E)	-0.57								0.48
Privacy (E)	0.55		-0.30						0.58
Immediate information (E)	0.53								0.43
Prompt attention (P)	0.53								0.39
Divergent opinion among health workers (E)	-0.50		0.32						0.47
Health workers introduced themselves (E)	0.45								0.32
Contradictory information (E)	-0.40	-0.32			-0.34			-0.32	0.59
General comfort of the wards (R)		0.88							0.80
Basic infrastructure of the ward (R)		0.87							0.79
Toilets (R)		0.85							0.76
Areas for newborn care (R)		0.84							0.74
General cleanliness (R)		0.79							0.70
Illumination (R)		0.77							0.64
Acoustics (R)		0.73							0.74
Organisation of hospital routine (R)	0.33	0.71							0.64
Areas for visitors and timing (R)		0.71							0.63



Possibility to rest after delivery (E)	0.40				0.37
Victim of abuse (E)		0.85			0.85
Victim of discrimination (E)		0.78			0.80
Victim of aggressiveness (E)	-0.45	0.72			0.80
Multiple pregnancy (S)		-0.61	-0.53		0.76
Skin-to-skin (P)			0.87		0.79
Early breastfeeding (P)			0.83		0.75
Cesarean section (P)			-0.75	-0.48	0.83
Rooming in (P)		0.40	0.72		0.75
Italian citizenship (S)				0.84	0.80
Born in Italy (S)				0.79	0.71
Occupation status – employed (S)				0.70	0.55
Age ≥35 years (S)				0.52	0.53
Marital status – married/living with partner (S)				0.35	0.42
High education level (S)				0.35	0.35
Multiparity (S)				0.80	0.74
Antenatal birthing classes (S)				-0.75	0.64
Vaginal operative delivery (P)		-0.32		-0.44	0.71
Attention to ward's temperature (E)	0.40			0.51	0.62
Presence of a companion of choice (E)		0.35		0.47	0.45
Attention to thirst/hunger feeling (E)	0.40			0.40	0.61
Warning signs information (R)				0.52	0.41
Respect for cultural and religious needs (E)				-0.47	0.31
Breastfeeding information (P)	0.43	0.34		0.46	0.59
Knowledge of the Respectful Maternity Care Charter (S)				0.37	0.28
Private assistance (P)					0.20

Notes: for simplicity only factor loading >0.3 were reported; Abbreviations: (E) = Experience of care; (P) = Provision of care; (R) = Availability of resources; (S) = Socio-demographic and clinical characteristics.

### Supplementary Appendix 8: Univariate analysis - association between independent variables and secondary indicators of satisfaction

	Women's judgement of quality of care				Wish to return to the facility/to recommend it to a friend			
	Positive n (%)	Negative n (%)	Crude OR (95% CI)	P-value	Yes n (%)	No n (%)	Crude OR (95% CI)	P-value
<b>Socio-demographic and clinical characteristics</b>								
Age (n=1240)					(n=1240)			
<35 years old	651 (58.5)	82 (64.1)	Reference		91 (36.0)	162 (60.0)	Reference	
≥35 years old	461 (41.5)	46 (35.9)	1.26 (0.86-1.85)	0.230	416 (42.2)	571 (57.9)	1.3 (0.98-1.73)	0.075
High educational level (n=1237)					(n=1237)			
No	596 (53.7)	59 (46.5)	Reference		456 (46.3)	126 (50.0)	Reference	
Yes	514 (46.3)	68 (53.5)	1.34 (0.92-1.93)	0.123	529 (53.7)	126 (50.0)	1.16 (0.88-1.53)	0.293
Born in Italy (n=1238)					(n=1238)			
Yes	937 (84.4)	112 (87.5)	Reference		826 (83.9)	223 (88.2)	Reference	
No	173 (15.6)	16 (12.5)	1.29 (0.75-2.24)	0.359	159 (16.2)	30 (11.9)	1.43 (0.95-2.17)	0.092
Citizenship (n=1223)					(n=1233)			
Italian	1002 (90.6)	120 (94.5)	Reference		886 (90.2)	236 (94.0)	Reference	
Not Italian	104 (9.4)	7 (5.5)	1.78 (0.81-3.91)	0.152	96 (9.8)	15 (6.0)	1.70 (0.97-2.99)	0.063
Occupation status (n=1238)					(n=1238)			
Non employed	226 (20.4)	25 (19.5)	Reference		784 (79.6)	203 (80.3)	Reference	
Employed	884 (79.6)	103 (80.5)	0.95 (0.60-1.51)	0.825	201 (20.4)	50 (19.8)	0.96 (0.68-1.35)	0.820
Marital status (n=1236)					(n=1236)			
Single/Other	45 (4.1)	7 (5.5)	Reference		43 (4.4)	9 (3.6)	Reference	
Married/Living with partner	1063 (95.9)	121 (94.5)	1.37 (0.60-3.10)	0.454	940 (95.6)	244 (96.5)	0.80 (0.38-1.68)	0.564
Parity (n=1240)					(n=1240)			

Primiparous	576 (90.6)	79 (94.5)	Reference		516 (52.3)	139 (54.9)	Reference	
Multiparous	536 (9.4)	49 (5.5)	1.09 (0.25-4.75)	0.903	471 (47.7)	114 (45.1)	1.11 (0.84-1.47)	0.449
Antenatal birthing classes (n=1239)					(n=1239)			
No	710 (36.9)	86 (67.2)	Reference		630 (63.9)	166 (65.6)	Reference	
Yes	401 (36.1)	42 (32.8)	0.86 (0.59-1.28)	0.464	356 (36.1)	87 (34.4)	0.93(0.69-1.24)	0.611
Knowledge of the Respectful Maternity Care Charter (n=1231)					(n=1231)			
No	933 (84.6)	104 (81.3)	Reference		820 (83.8)	217 (85.8)	Reference	
Yes	170 (15.4)	24 (18.8)	0.79 (0.49-1.27)	0.328	158 (16.2)	36 (14.2)	1.16(0.79-1.72)	0.454
Multiple pregnancy (n=1240)					(n=1240)			
No	1093 (98.3)	126 (98.4)	Reference		970 (98.39)	249 (98.4)	Reference	
Yes	19 (1.7)	2 (1.6)	1.10 (0.25-4.76)	0.903	17 (1.7)	4 (1.7)	1.09 (0.36-3.27)	0.876
<b>Provision of care</b>								
Prompt attention (n=1238)					(n=1238)			
No	118 (10.6)	50 (39.1)	Reference		83 (8.4)	85 (33.6)	Reference	
Yes	992 (89.4)	78 (60.9)	5.39 (3.60-8.06)	<0.001	902 (91.6)	168 (66.4)	5.50 (3.90-7.76)	<0.001
Induction of labour (n=1093)					(n=1093)			
No	716 (73.6)	62 (51.7)	Reference		643 (73.3)	135 (62.5)	Reference	
Yes	257 (26.4)	58 (48.3)	0.38 (0.26-0.56)	<0.001	234 (26.7)	81 (37.5)	0.61 (0.44-0.83)	0.002
Continuous cardiotocography (n=1094)					(n=1094)			
No	269 (27.6)	20 (16.7)	Reference		242 (27.6)	47 (21.7)	Reference	
Yes	705 (72.4)	100 (83.3)	0.52 (0.32-0.86)	0.011	636 (72.4)	169 (78.2)	0.73 (0.51-1.04)	0.084
Peridural analgesia (n=1094)					(n=1094)			
No	585 (60.1)	62 (51.7)	Reference		527 (60.0)	120 (55.6)	Reference	
Yes	389 (39.9)	58 (48.3)	0.71 (0.49- 1.04)	0.079	351(40.0)	96 (44.4)	0.83 (0.62-1.12)	0.232
Peridural information (n= 574)					(n= 570)			
No	35 (7.0)	19 (26.0)	Reference		34 (7.5)	20 (16.8)	Reference	
Yes	462 (97.0)	54 (74.0)	4.64 (2.48-8.68)	<0.001	417 (92.5)	99 (83.2)	2.48 (1.37-4.49)	0.003
Non-pharmacological analgesia (n=1240)					(n=1240)			

No	696 (62.6)	76 (59.4)	Reference		615 (62.3)	157 (62.1)	Reference	
Yes	416 (37.4)	52 (40.6)	0.87 (0.60-1.27)	0.478	372 (37.7)	96 (37.9)	0.99 (0.74-1.32)	0.941
Caesarean section (n=1240)					(n=1240)			
No	862 (77.5)	94 (73.4)	Reference		783 (79.3)	173 (68.4)	Reference	
Yes	250 (22.5)	34 (26.6)	0.80 (0.53-1.22)	0.299	204 (20.7)	80 (31.6)	0.56 (0.41-0.77)	<0.001
Operative delivery (n=1240)					(n=1240)			
No	1005 (90.4)	115 (89.8)	Reference		885 (89.7)	235 (92.9)	Reference	
Yes	107 (9.6)	13 (10.2)	0.94 (0.51-1.73)	0.847	102 (13.3)	18 (7.1)	1.50 (0.89-2.53)	0.124
Delivery position (n=956)					(n=956)			
Lithotomy position	615 (71.4)	60 (63.8)	Reference		92 (9.3)	36 (14.5)	Reference	
Other positions	247 (28.6)	36 (36.2)	0.71 (0.45-1.11)	0.130	893 (90.7)	213 (85.5)	0.87 (0.61-1.24)	0.444
Kristeller manoeuvre (n=956)					(n=956)			
No	744 (86.3)	83 (88.3)	Reference		674 (86.1)	153 (88.4)	Reference	
Yes	118 (13.7)	11 (11.7)	1.20 (0.62-2.31)	0.593	109 (13.9)	20 (11.6)	1.24 (0.74-2.06)	0.412
Episiotomy (n=955)					(n=955)			
No	713 (82.8)	77 (81.9)	Reference		647 (82.7)	143 (82.7)	Reference	
Yes	148 (17.2)	134 (18.1)	0.94 (0.54-1.64)	0.827	135 (17.3)	30 (17.3)	0.99 (0.64-1.54)	0.981
Skin-to-skin (n=1236)					(n=1236)			
No	201 (18.1)	28 (21.9)	Reference		163 (16.6)	66 (26.3)	Reference	
Yes	907 (81.9)	100 (78.1)	1.26 (0.81-1.97)	0.304	822 (83.4)	185 (73.7)	1.80 (1.30-2.49)	<0.001
Early breastfeeding (n=1229)					(n=1229)			
No	336 (30.5)	49 (38.6)	Reference		290 (29.6)	95 (38.2)	Reference	
Yes	766 (69.5)	78 (64.4)	1.43 (0.98-2.09)	0.064	690 (70.49)	154 (61.9)	1.47 (1.10-1.96)	0.010
Breastfeeding information (n=1239)					(n=1239)			
No	341 (30.7)	73 (57.0)	Reference		275 (27.9)	139 (55.0)	Reference	
Yes	770 (69.3)	55 (43.0)	3.00 (2.07-4.35)	<0.001	711 (72.1)	114 (45.0)	3.15 (2.37-4.19)	<0.001
Rooming in (n=1240)					(n=1240)			
No	132 (11.9)	12 (9.4)	Reference		121 (12.3)	23 (9.1)	Reference	

Yes	980 (88.1)	116 (90.6)	0.77 (0.41-1.43)	0.405	866 (87.7)	230 (90.9)	0.72 (0.45-1.14)	0.162
Private assistance (n=1240)					(n=1240)			
No	1019 (91.6)	111 (86.7)	Reference		911 (92.3)	219 (86.6)	Reference	
Yes	93 (8.4)	17 (13.3)	0.60 (0.34-1.03)	0.066	76 (7.7)	34 (13.4)	0.54 (0.35-0.83)	0.005
<b>Experience of care</b>								
Immediate information (n=1238)					(n=1238)			
No	348 (31.4)	84 (65.6)	Reference		283 (28.7)	149 (58.9)	Reference	
Yes	762 (68.7)	44 (34.4)	2.68 (1.74-4.12)	<0.001	702 (71.3)	104 (41.1)	3.55 (2.67-4.73)	<0.001
Feeling free to behave during labour and delivery (n=1094)					(n=1094)			
No	192 (19.7)	52 (43.3)	Reference		161 (18.3)	83 (38.4)	Reference	
Yes	782 (80.3)	68 (56.7)	3.11 (2.10-4.62)	<0.001	717 (81.7)	133 (61.6)	2.78 (2.01-3.84)	<0.001
Movement during labour (n= 1093)					(n= 1093)			
No	208 (21.4)	49 (40.8)	Reference		180 (18.3)	77 (30.4)	Reference	
Yes	765 (78.6)	71 (59.2)	2.54 (1.71-3.77)	<0.001	697 (70.7)	139 (54.9)	2.15 (1.55-2.96)	<0.001
Feeling left alone (n=1240)					(n=1240)			
No	923 (83.0)	59 (46.1)	Reference		841 (85.2)	141 (55.7)	Reference	
Yes	189 (17.0)	69 (53.9)	0.18 (0.12-0.26)	<0.001	146 (17.8)	112 (44.3)	0.22 (0.16-0.30)	<0.001
Possibility to rest after delivery (n=1240)					(n=1240)			
No	323 (83.0)	59 (46.1)	Reference		413 (41.8)	169 (51.8)	Reference	
Yes	189 (17.0)	69 (53.9)	3.11 (2.08-4.64)	<0.001	574 (58.2)	84 (33.2)	2.79 (2.09-3.74)	<0.001
Heath workers introduced themselves (n=1239)					(n=1239)			
No	344 (31.0)	67 (52.3)	Reference		280 (28.4)	131 (51.8)	Reference	
Yes	767 (69.0)	61 (47.7)	2.45 (1.69-3.54)	<0.001	706 (71.6)	122 (48.2)	2.71 (2.04-3.59)	<0.001
Effective communication (n=1237)					(n=1237)			
No	87 (7.8)	54 (42.5)	Reference		61 (6.2)	80 (31.8)	Reference	
Yes	1023 (92.2)	73 (57.5)	8.70 (5.75-13.16)	<0.001	924 (93.8)	172 (68.2)	7.05 (4.86-10.21)	<0.001
Emotional support (n=1237)					(n=1237)			
No	177 (16.0)	58 (45.7)	Reference		131 (13.3)	104 (41.3)	Reference	

Yes	933 (84.0)	69 (54.3)	4.43 (3.02-6.51)	<0.001	854 (86.7)	148 (58.7)	4.58 (3.36-6.25)	<0.001
Divergent opinion among health workers (n=1237)					(n=1237)			
No	1034 (93.2)	101 (79.5)	Reference		923 (93.7)	212 (84.1)	Reference	
Yes	76 (6.9)	26 (20.5)	0.29 (0.17-0.47)	<0.001	62 (6.3)	40 (15.9)	0.36 (0.23-0.54)	<0.001
Listening to women's needs (n=1235)					(n=1235)			
No	187 (16.9)	84 (66.1)	Reference		145 (14.8)	126 (50.0)	Reference	
Yes	921 (83.1)	43 (33.9)	9.62 (6.45-14.35)	<0.001	838 (85.2)	126 (50.0)	5.78 (4.27-7.83)	<0.001
Adequate involvement of women (n=1233)					(n=1233)			
No	225 (20.3)	78 (61.9)	Reference		177 (18.0)	126 (50.2)	Reference	
Yes	882 (79.7)	48 (38.1)	9.62 (6.45-14.35)	<0.001	805 (82.0)	125 (19.8)	4.58 (3.41-6.16)	<0.001
Effective handover (n=1236)					(n=1236)			
No	205 (18.5)	59 (46.5)	Reference		163 (16.6)	101 (40.1)	Reference	
Yes	904 (81.5)	68 (53.5)	3.83 (2.62-5.60)	<0.001	821 (83.4)	151 (59.9)	3.37 (2.9-4.56)	<0.001
Contradictory information (n=1236)					(n=1236)			
No	971 (87.6)	85 (66.9)	Reference		879 (89.3)	177 (70.2)	Reference	
Yes	138 (12.4)	42 (33.1)	0.29 (0.19-0.43)	<0.001	105 (10.7)	75 (19.8)	0.28 (0.20-0.40)	<0.001
Feeling forced to accept care (n=1237)					(n=1237)			
No	1058 (95.3)	96 (75.6)	Reference		948 (96.2)	206 (81.8)	Reference	
Yes	52 (4.7)	31 (24.4)	0.15 (0.09-0.25)	<0.001	37 (3.8)	46 (18.2)	0.17 (0.11-0.28)	<0.001
Respect and dignity (n=1237)					(n=1237)			
No	46 (4.1)	36 (28.4)	Reference		32 (3.2)	50 (19.8)	Reference	
Yes	1064 (95.9)	91 (71.6)	9.15 (5.63-14.87)	<0.001	953 (96.8)	202 (80.2)	7.37 (4.61-11.78)	<0.001
Privacy (n=1238)					(n=1238)			
No	84 (7.6)	33 (26.0)	Reference		58 (5.9)	59 (23.4)	Reference	
Yes	1027 (92.4)	94 (74.0)	4.29 (2.72-6.76)	<0.001	928 (94.1)	193 (76.6)	4.89 (3.29-7.25)	<0.001
Attention to ward's temperature (n=1235)					(n=1235)			
No	240 (21.7)	50 (39.4)	Reference		199 (20.2)	91 (36.1)	Reference	
Yes	868 (78.3)	77 (60.6)	2.35 (1.60-3.45)	<0.001	784 (79.8)	161 (63.9)	2.23 (1.65-3.01)	<0.001

Attention to thirsty/hunger feeling (n=1236)					(n=1236)			
No	185 (16.7)	46 (36.2)	Reference		138 (14.0)	93 (37.0)	Reference	
Yes	924 (83.3)	81 (63.8)	2.84 (1.91-4.21)	<0.001	847 (86.0)	158 (63.0)	3.61 (2.64-4.94)	<0.001
Presence of a companion of choice (n=1237)					(n=1237)			
No	522 (47.0)	80 (63.0)	Reference		437 (44.4)	165 (65.5)	Reference	
Yes	588 (53.0)	47 (37.0)	1.91 (1.31-2.80)	0.001	548 (55.6)	87 (34.5)	2.38 (1.78-3.17)	<0.001
Victim of aggressiveness (n=1238)					(n=1238)			
No	1102 (99.2)	122 (96.1)	Reference		980 (99.4)	244 (96.8)	Reference	
Yes	9 (0.8)	5 (3.9)	0.20 (0.07-0.60)	0.004	6 (0.6)	8 (3.2)	0.19 (0.06-0.54)	0.002
Victim of abuse (n=1237)					(n=1237)			
No	1106 (99.6)	124 (97.6)	Reference		983 (99.7)	247 (98.4)	Reference	
Yes	4 (0.4)	5 (2.4)	0.15 (0.03-0.68)	0.014	3 (0.3)	4 (1.6)	0.19 (0.04-0.85)	0.030
Victim of discrimination (n=1236)					(n=1236)			
No	1098 (99.0)	125 (98.4)	Reference		976 (99.1)	247 (98.4)	Reference	
Yes	11 (1.0)	2 (1.6)	0.63 (0.14-2.87)	0.545	9 (0.9)	4 (1.6)	0.57 (0.17-1.86)	0.352
Respect for cultural and religious needs (n=1234)					(n=1234)			
No	111 (10.0)	17 (13.5)	Reference		92 (9.3)	36 (14.5)	Reference	
Yes	997 (90.0)	109 (86.5)	1.40 (0.81-2.42)	0.227	893 (90.7)	213 (85.5)	1.64 (1.09-2.48)	0.019
<b>Availability of resources</b>								
Timely care (n=1236)					(n=1236)			
No	106 (9.6)	49 (38.3)	Reference		79 (8.0)	76 (30.0)	Reference	
Yes	1002 (90.4)	79 (61.7)	5.86 (3.90-8.82)	<0.001	904 (92.0)	177 (70.0)	4.91 (3.45-7.00)	<0.001
Women needing more time with health workers (n=1236)					(n=1236)			
No	1026 (92.5)	87 (68.5)	Reference		918 (93.3)	195 (77.4)	Reference	
Yes	83 (7.5)	40 (31.5)	0.18 (0.11-0.27)	<0.001	66 (6.7)	57 (22.6)	0.25 (0.17-0.36)	<0.001
Warning signs information (n=1240)					(n=1240)			
No	557 (50.0)	90 (70.3)	Reference		479 (48.5)	168 (66.4)	Reference	
Yes	555 (50.0)	38 (29.7)	2.36 (1.58-3.51)	<0.001	508 (51.5)	85 (33.6)	2.10 (1.57-2.80)	<0.001

Basic infrastructure of the ward (n=1238)					(n=1238)			
Scarce or sufficient	429 (38.7)	103 (80.5)	Reference		347 (35.2)	185 (73.7)	Reference	
Good or excellent	681 (61.3)	25 (19.5)	6.54 (4.16-10.29)	<0.001	640 (64.8)	66 (26.3)	5.17 (3.79-7.05)	<0.001
Areas for newborn care (n=1238)					(n=1238)			
Scarce or sufficient	358 (32.3)	90 (70.3)	Reference		286 (29.0)	162 (64.3)	Reference	
Good or excellent	752 (67.7)	38 (29.7)	4.98 (3.34-7.42)	<0.001	700 (71.0)	90 (35.7)	4.41 (3.29-5.90)	<0.001
Toilets (n=1238)					(n=1238)			
Scarce or sufficient	518 (46.7)	104 (81.2)	Reference		433 (43.9)	189 (75.0)	Reference	
Good or excellent	592 (53.3)	24 (18.8)	4.95 (3.13-7.84)	<0.001	553 (56.1)	63 (25.0)	3.83 (2.81-5.23)	<0.001
Acoustics (n=1239)					(n=1239)			
Scarce or sufficient	840 (75.6)	118 (92.2)	Reference		729 (73.9)	229 (90.9)	Reference	
Good or excellent	271 (24.4)	10 (7.8)	3.81 (1.97-7.36)	<0.001	258 (26.1)	23 (9.1)	3.52 (2.24-5.53)	<0.001
Illumination (n=1238)					(n=1238)			
Scarce or sufficient	436 (39.3)	85 (66.4)	Reference		369 (37.4)	152 (60.3)	Reference	
Good or excellent	674 (60.7)	43 (33.6)	3.06 (2.08-4.5)	<0.001	617 (62.6)	100 (39.7)	2.54 (1.91-3.37)	<0.001
General cleanliness (n=1238)					(n=1238)			
Scarce or sufficient	242 (21.8)	84 (65.6)	Reference		202 (20.5)	124 (49.2)	Reference	
Good or excellent	868 (78.2)	44 (34.4)	6.85 (4.63-10.13)	<0.001	784 (79.5)	128 (50.8)	3.76 (2.81-5.03)	<0.001
Comfort of the wards (n=1238)					(n=1238)			
Scarce or sufficient	407 (36.7)	103 (80.5)	Reference		327 (33.2)	183 (72.6)	Reference	
Good or excellent	703 (63.3)	25 (19.5)	7.12 (4.52-11.20)	<0.001	659 (66.8)	69 (27.4)	5.34 (3.93-7.27)	<0.001
Organisation of hospital routine (n=1238)					(n=1238)			
Scarce or sufficient	292 (26.3)	96 (75.0)	Reference		245 (24.9)	143 (56.8)	Reference	
Good or excellent	818 (73.7)	32 (25.0)	8.40 (5.51-12.81)	<0.001	741 (75.1)	109 (43.2)	3.97 (2.97-5.29)	<0.001
Areas for visitors and timing (n=1237)					(n=1237)			
Scarce or sufficient	682 (61.5)	111 (86.7)	Reference		581 (59.9)	212 (84.5)	Reference	
Good or excellent	427 (38.5)	17 (13.3)	4.09 (2.42-6.91)	<0.001	405 (41.1)	39 (15.5)	3.79 (2.63-5.45)	<0.001



Supplementary Appendix 9: Multivariate analysis exploring the association between factors identified by the factor analysis and “women’s positive judgement of quality of care received”

Factors (groups of variables)	Odds Ratio	95% Confidence Interval	P value
1) Effective communication, involvement, listening to women's needs, respectful and timely care	41.48	21.72 - 79.18	<0.001
2) Physical structure	20.69	10.75 - 39.83	<0.001
3)Victim of abuse, discrimination, aggressiveness	1.00	0.43 - 2.31	0.994
4) Good neonatal practices	1.21	0.66 - 2.19	0.530
5) Women characteristics	0.93	0.47 - 1.82	0.838
6) Antenatal groups and multiparity	2.44	1.17 - 3.54	0.011
7)Mode of birth, attention to women comfort, and partnership in labour	0.97	0.54 - 1.76	0.932
8)Information on danger signs and women rights	1.32	0.80 - 2.20	0.272

Supplementary Appendix 10: Multivariate analysis exploring the association between factors identified by the factor analysis and “to wish to return to the facility/to recommend it to a friend”

Factors (groups of variables)	Odds Ratio	95% Confidence Interval	P value
1) Effective communication, involvement, listening to women's needs, respectful and timely care	32.75	18.55 - 57.80	<0.001
2) Physical structure	15.70	9.80 - 25.07	<0.001
3)Victim of abuse, discrimination, aggressiveness	0.35	0.17 - 0.70	0.003
4) Good neonatal practices	1.50	0.94 - 2.40	0.074
5) Women characteristics	0.94	0.60 - 1.55	0.811
6) Antenatal groups and multiparity	1.65	1.07 - 2.53	0.022
7)Mode of birth, attention to women comfort, and partnership in labour	2.26	1.41 - 3.62	0.001
8)Information on danger signs and women rights	1.44	0.96 - 2.15	0.074