Factors influencing variation in cesarean section rates among different hospitals in the Palestinian territories

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2019

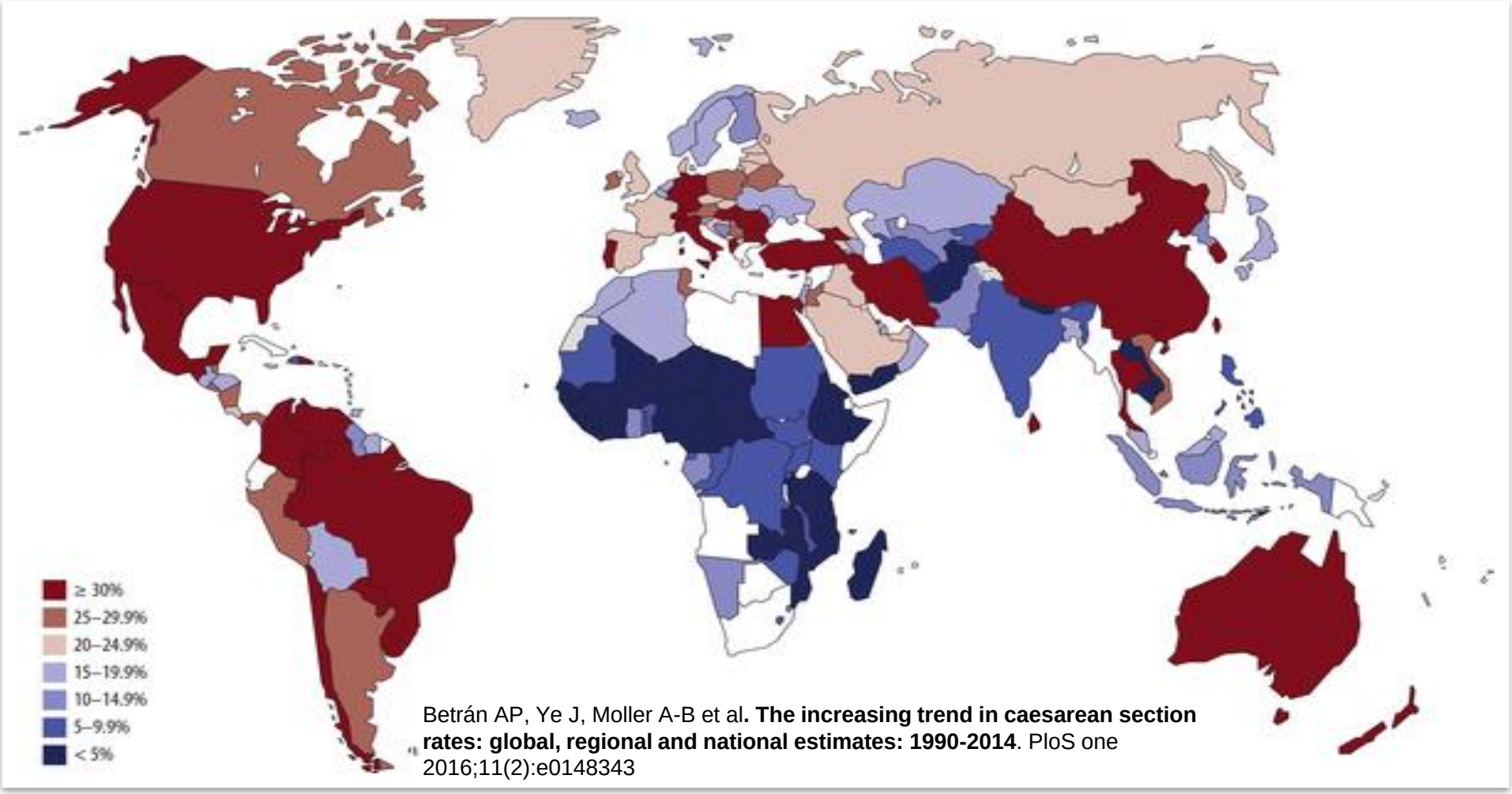
OUTLINE

- Background
- Brief information about Palestine
- Palestinian Perineum and Birth Complications Study
- PAPER I-III
- Study IV
- Clinical implications

BACKGROUND

- Caesarean section is one of the most common surgical procedures worldwide
- Since 2015, the WHO recommends caesarean section should be performed with an appropriate clinical indication only
- The global overall caesarean section rate increased from 12% to 21% between 2000 and 2015

Variations in caesarean section rates

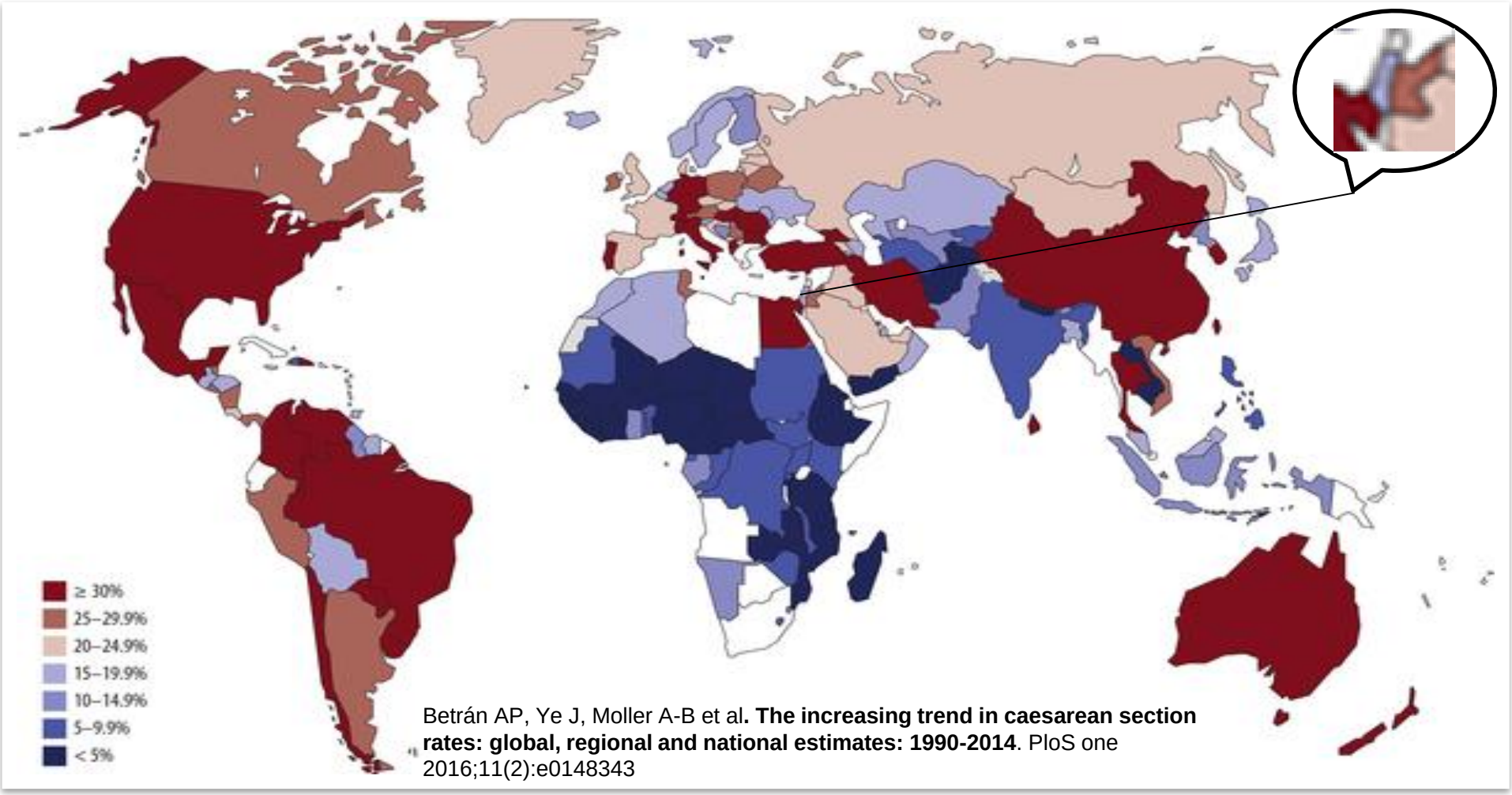


Betrán AP, Ye J, Moller A-B et al**. The increasing trend in caesarean section rates: global, regional and national estimates: 1990-2014**. PloS one 2016;11(2):e0148343

- **Latin America** (40.5%)
- **North America (**32.3%)
- **Europe** (25.0%)
- **Asia** (19.2%)
- **Africa (**7.3%)

Hodin S, Harvard T.H.The Global Epidemic of Unnecessary Cesarean Sections (Part 2), 2017

Variations in caesarean section rates



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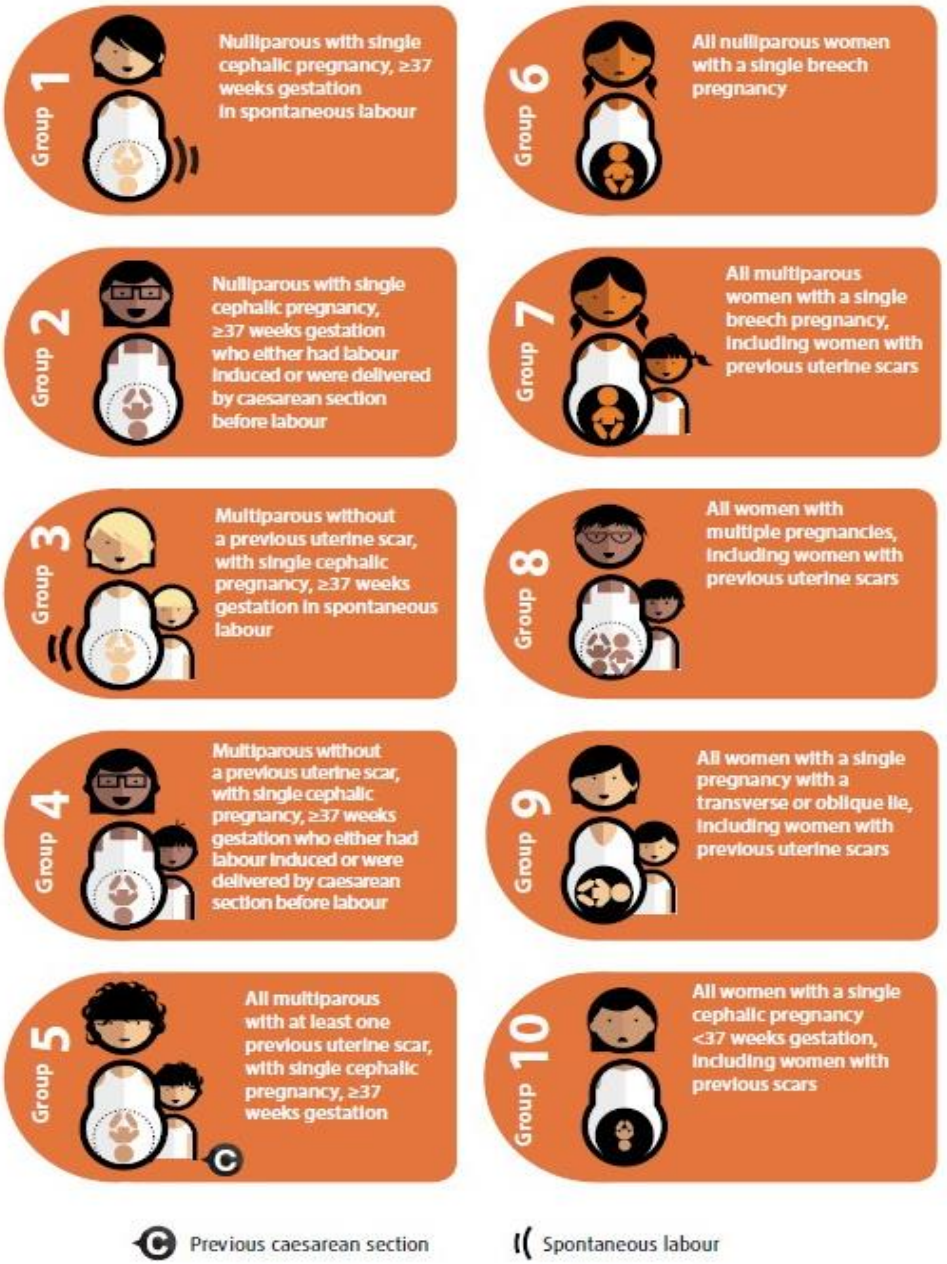
Hodin S, Harvard T.H.The Global Epidemic of Unnecessary Cesarean Sections (Part 2), 2017

Robson Ten Group Classification System

Women classify into 10 groups according to

1. **Parity**
   (Nulliparity/multiparity/multiparity with previous caesarean section)
2. **Number of fetuses**
   (Single/multiple)
3. **Presentation of the fetus**
   (Cephalic/breech/transverse)
4. **Onset of labour**
   (Spontaneous/induced/prelabour caesarean section)
5. **Gestational age**
   (Term, >37wk or preterm, <37 wk)

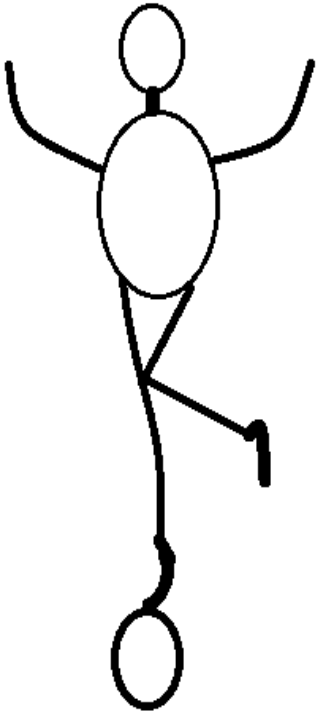
WHO Statement on Caesarean Section Rates, 2017



INFORMATION ABOUT PALESTINE

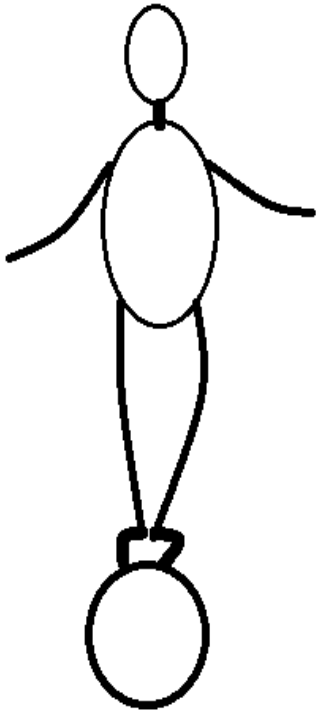
http://www.freeworldmaps.net/asia/palestine/

INFORMATION ABOUT PALESTINE



Gaza strip

2 millions live in 365 km²



West Bank

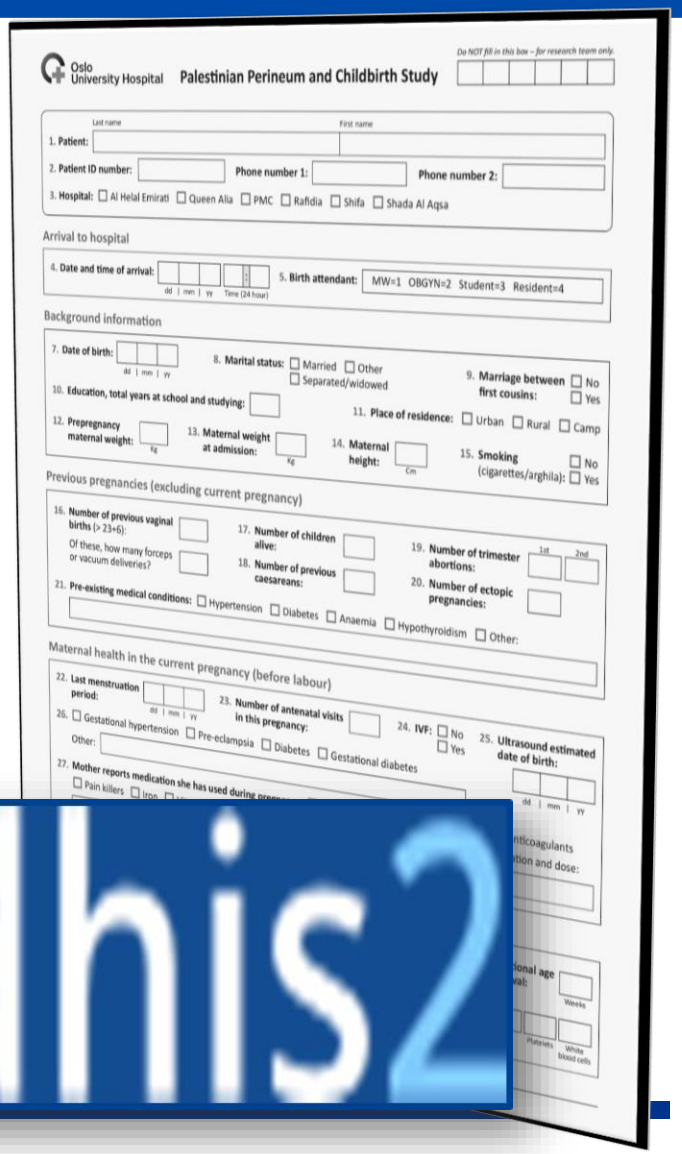
3.5 million live in 5655 km²

Hadil Ali-Masri

PALESTINIAN PERINEUM AND BIRTH COMPLICATIONS STUDY

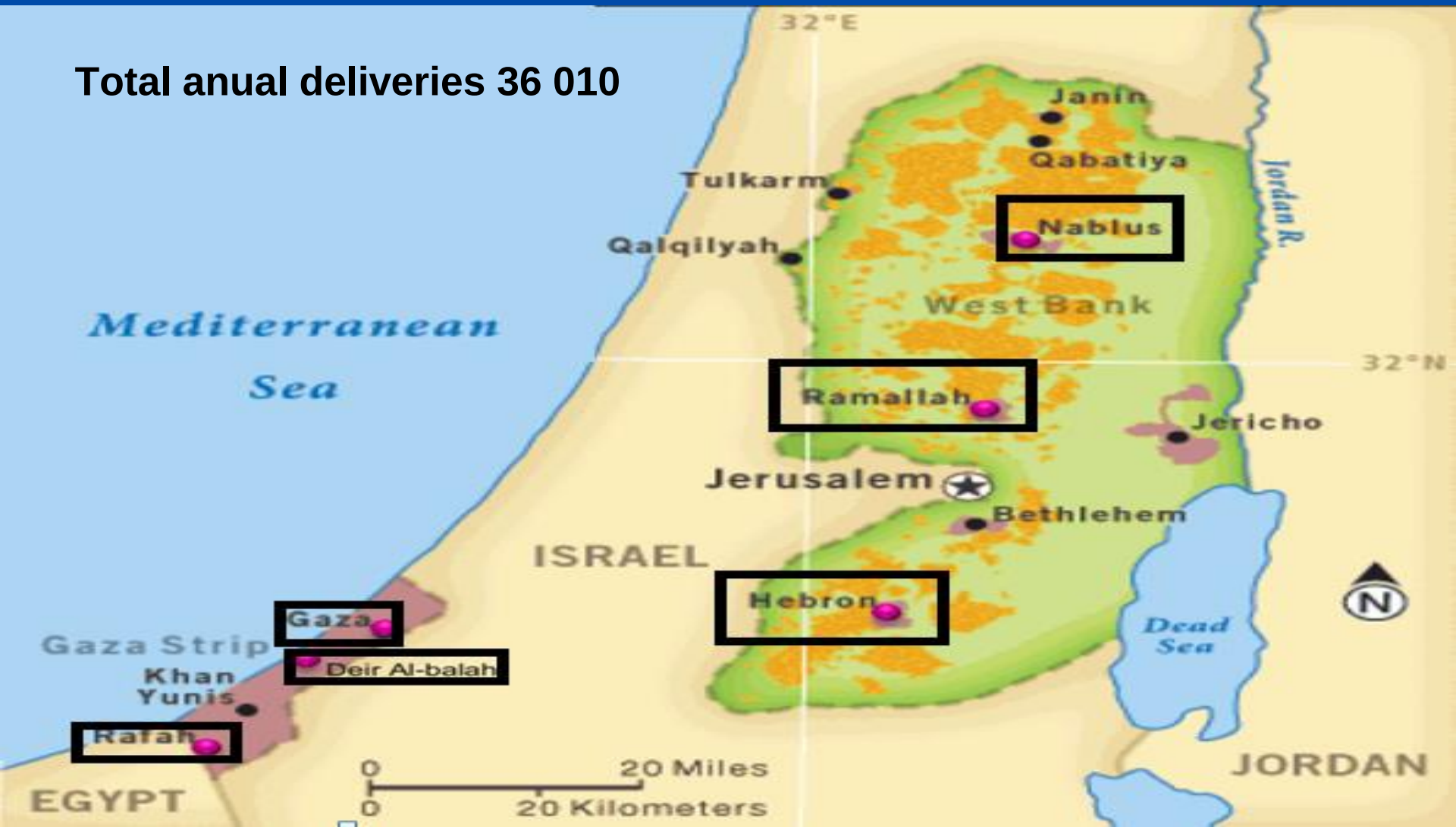
- Prospective data collection
  - 1st March 2015 to 30th April 2017

- Women (N= 75 000)
  - All women scheduled for vaginal deliveries were included
  - Pregnant ≥ 23 weeks or birthweight ≥ 500g



PALESTINIAN PERINEUM AND BIRTH COMPLICATIONS STUDY

Total anual deliveries 36 010



LIST OF PAPERS

1


Open Access Research

BMJ Open

Differences in rates and odds for emergency caesarean section in six Palestinian hospitals: a population-based birth cohort study

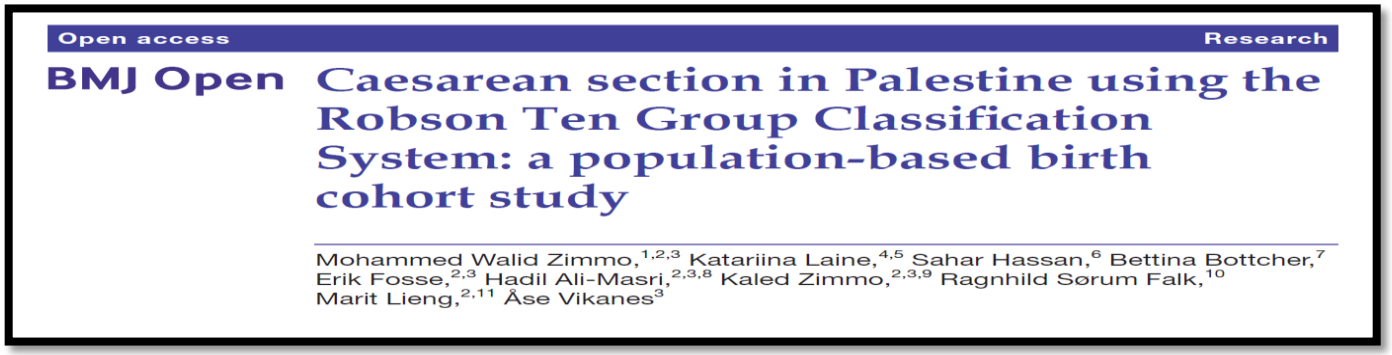
Mohammed Zimmo,[1,2,3] Katariina Laine,[4,5] Sahar Hassan,[6] Erik Fosse,[2,3] Marit Lieng,[2,7] Hadil Ali-Masri,[2,3,8] Kaled Zimmo,[2,3,9] Marit Anti,[10] Bettina Bottcher,[11] Ragnhild Sørum Falk,[12] Åse Vikanes[3]

2

Exploring the impact of indication on differences in rates of emergency caesarean section in six Palestinian hospitals: a population based birth cohort study

Zimmo M, Laine K, Hassan S, Bottcher B, Fosse E, Ali-Masri H, Zimmo K, Falk RS, Lieng M, Vikanes A. Submitted for publication, BMJ Open

3


Open access Research

BMJ Open

Caesarean section in Palestine using the Robson Ten Group Classification System: a population-based birth cohort study

Mohammed Walid Zimmo,[1,2,3] Katariina Laine,[4,5] Sahar Hassan,[6] Bettina Bottcher,[7] Erik Fosse,[2,3] Hadil Ali-Masri,[2,3,8] Kaled Zimmo,[2,3,9] Ragnhild Sørum Falk,[10] Marit Lieng,[2,11] Åse Vikanes[3]

PAPER ONE

Open Access Research

BMJ Open

Differences in rates and odds for emergency caesarean section in six Palestinian hospitals: a population-based birth cohort study

Mohammed Zimmo,[1,2,3] Katariina Laine,[4,5] Sahar Hassan,[6] Erik Fosse,[2,3] Marit Lieng,[2,7] Hadil Ali-Masri,[2,3,8] Kaled Zimmo,[2,3,9] Marit Anti,[10] Bettina Bottcher,[11] Ragnhild Sørum Falk,[12] Åse Vikanes[3]

Zimmo M, Laine K, Hassan S, et al. Differences in rates and odds for emergency caesarean section in six Palestinian hospitals: a population-based birth cohort study. ***BMJ Open* 2018;8:e019509.**

AIMS OF THE STUDY

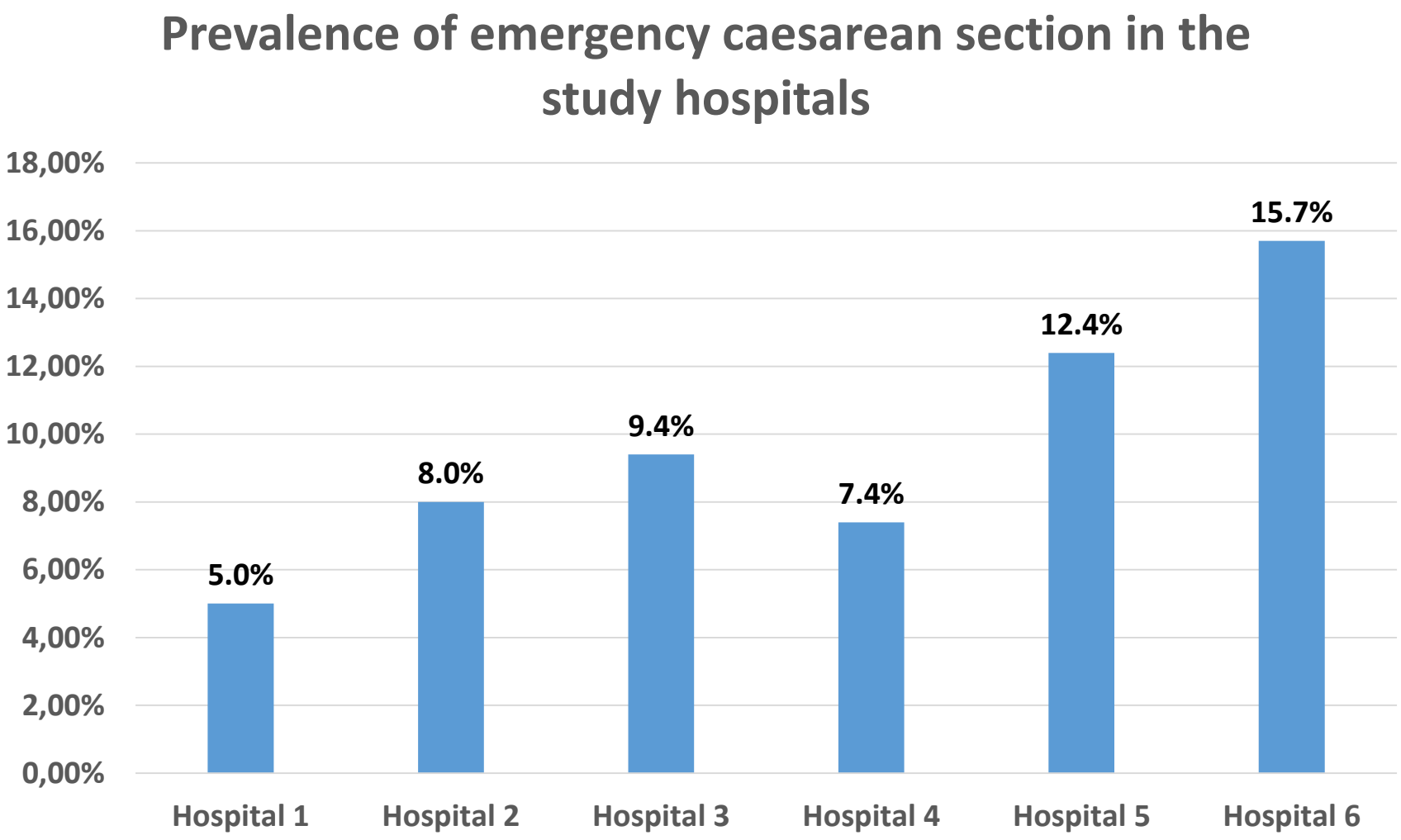
- To explore the prevalence and odds for emergency caesarean section

- To investigate the impact of sociodemographic and obstetric characteristics on differences in odds for emergency caesarean section between the study hospitals

METHODS

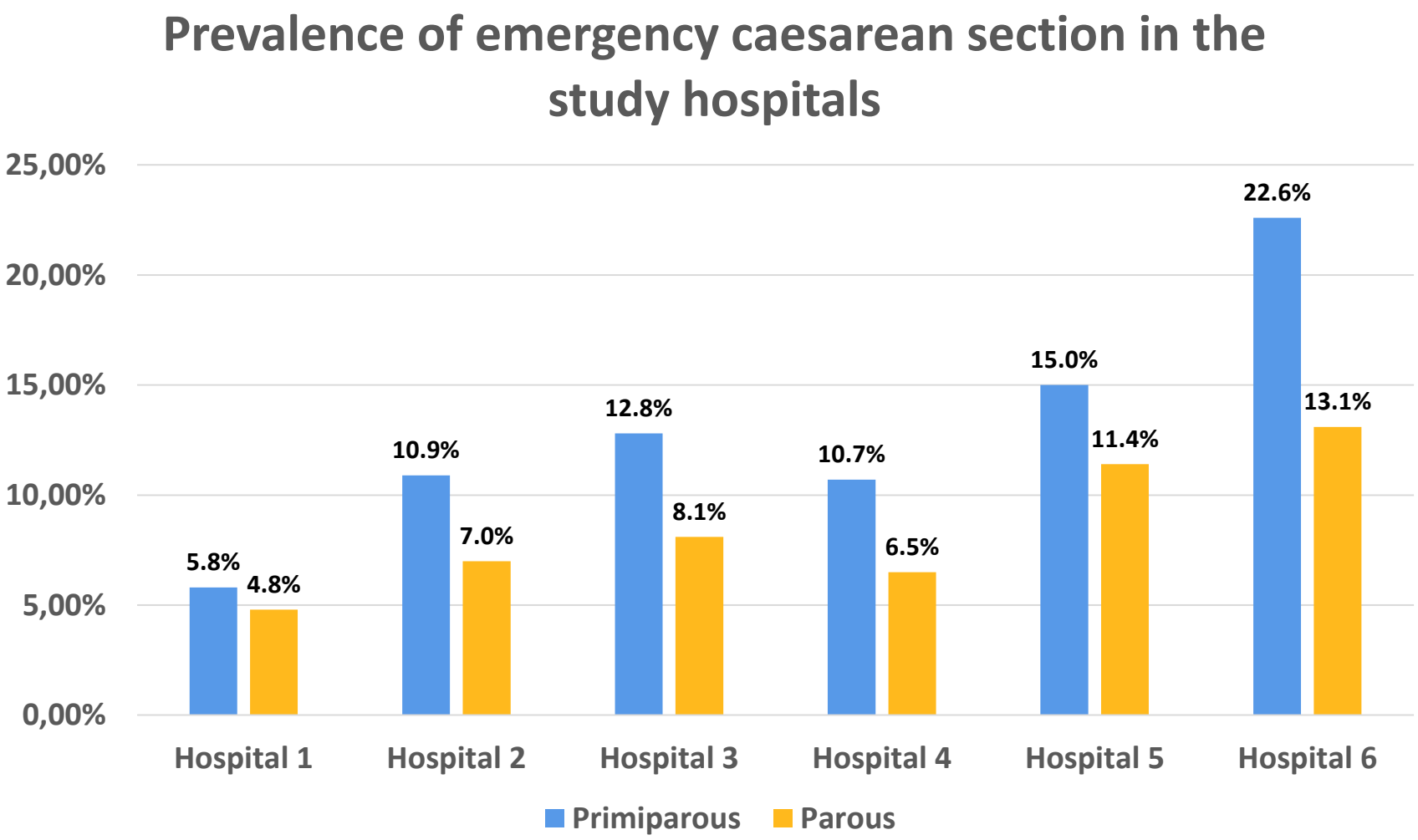
Design	Prospective cohort study
Study hospitals	Three in Gaza and three in the West Bank
Study Population	32 321
Study period	1st March 2015 until 29th February 2016
Main Outcome	Adjusted odds ratio for emergency caesarean section
Statistical methods	Logistic regression (OR, 95% CI)

RESULTS



M. Zimmo 2019

RESULTS


Prevalence of emergency caesarean section in the study hospitals
25,00%
20,00%
15,00%
10,00%
5,00%
0,00%
5.8%
4.8%
10.9%
7.0%
12.8%
8.1%
10.7%
6.5%
15.0%
11.4%
22.6%
13.1%
Hospital 1
Hospital 2
Hospital 3
Hospital 4
Hospital 5
Hospital 6
Primiparous
Parous

Odds Ratios and 95% CIs for emergency Caesarean Section among primiparous women

Hospitals	Crude OR (95% CI)	Model 1 Adj. OR (95% CI)	Model 2 Adj. OR (95% CI)	Model 3 Adj. OR (95% CI)
Hospital 1	Ref.	Ref.	Ref.	Ref.
Hospital 2	1.99 (1.45 to 2.72)	1.90 (1.34 to 2.70)	1.99 (1.44 to 2.75)	1.87 (1.30 to 2.68)
Hospital 3	2.40 (1.81 to 3.17)	2.40 (1.73 to 3.33)	2.43 (1.82 to 3.24	2.47 (1.77 to 3.46)
Hospital 4	1.95 (1.42 to 2.67)	2.33 (1.64 to 3.31)	1.58 (1.11 to 2.25)	1.84 (1.24 to 2.73)
Hospital 5	2.87 (2.11 to 3.91)	2.99 (2.12 to 4.22)	2.49 (1.77 to 3.50)	2.53 (1.74 to 3.70)
Hospital 6	4.75 (3.49 to 6.46)	4.28 (2.94 to 6.22)	4.11 (2.87 to 5.90	3.54 (2.29 to 5.47)

Model 1: Adjusted for sociodemographic characteristics
Model 2: Adjusted for obstetric characteristics
Model 3: Adjusted for sociodemographic and obstetric characteristics

Odds Ratios and 95% CIs for emergency Caesarean Section among parous women

Hospitals	Crude OR (95% CI)	Model 1 Adj. OR (95% CI)	Model 2 Adj. OR (95% CI)	Model 3 Adj. OR (95% CI)
Hospital 1	Ref.	Ref.	Ref.	Ref.
Hospital 2	1.50 (1.23 to 1.83)	1.48 (1.19 to 1.84)	1.38 (1.12 to 1.70)	1.30 (1.04 to 1.63)
Hospital 3	1.75 (1.47 to 2.08)	1.80 (1.48 to 2.20)	1.50 (1.25 to 1.80)	1.53 (1.25 to 1.89)
Hospital 4	1.37 (1.13 to 1.67)	1.39 (1.12 to 1.72)	0.87 (0.70 to 1.09)	**0.81 (0.64 to 1.04)**
Hospital 5	2.56 (2.11 to 3.11)	2.61 (2.11 to 3.23)	1.89 (1.52 to 2.34)	1.70 (1.34 to 2.15)
Hospital 6	2.99 (2.44 to 3.65)	2.28 (1.78 to 2.93)	2.66 (2.12 to 3.34)	1.74 (1.32 to 2.31)

Model 1: Adjusted for sociodemographic characteristics
Model 2: Adjusted for obstetric characteristics
Model 3: Adjusted for sociodemographic and obstetric characteristics

CONCLUSION (PAPER I)

Substantial differences in odds for emergency caesarean section between the study hospitals could not be fully explained by the studied sociodemographic or obstetric characteristics

PAPER TWO

Exploring the impact of indication on differences in rates of emergency caesarean section in six Palestinian hospitals: a population based birth cohort study

Zimmo M, Laine K, Hassan S, Bottcher B, Fosse E, Ali-Masri H, Zimmo K, Falk RS, Lieng M, Vikanes A.

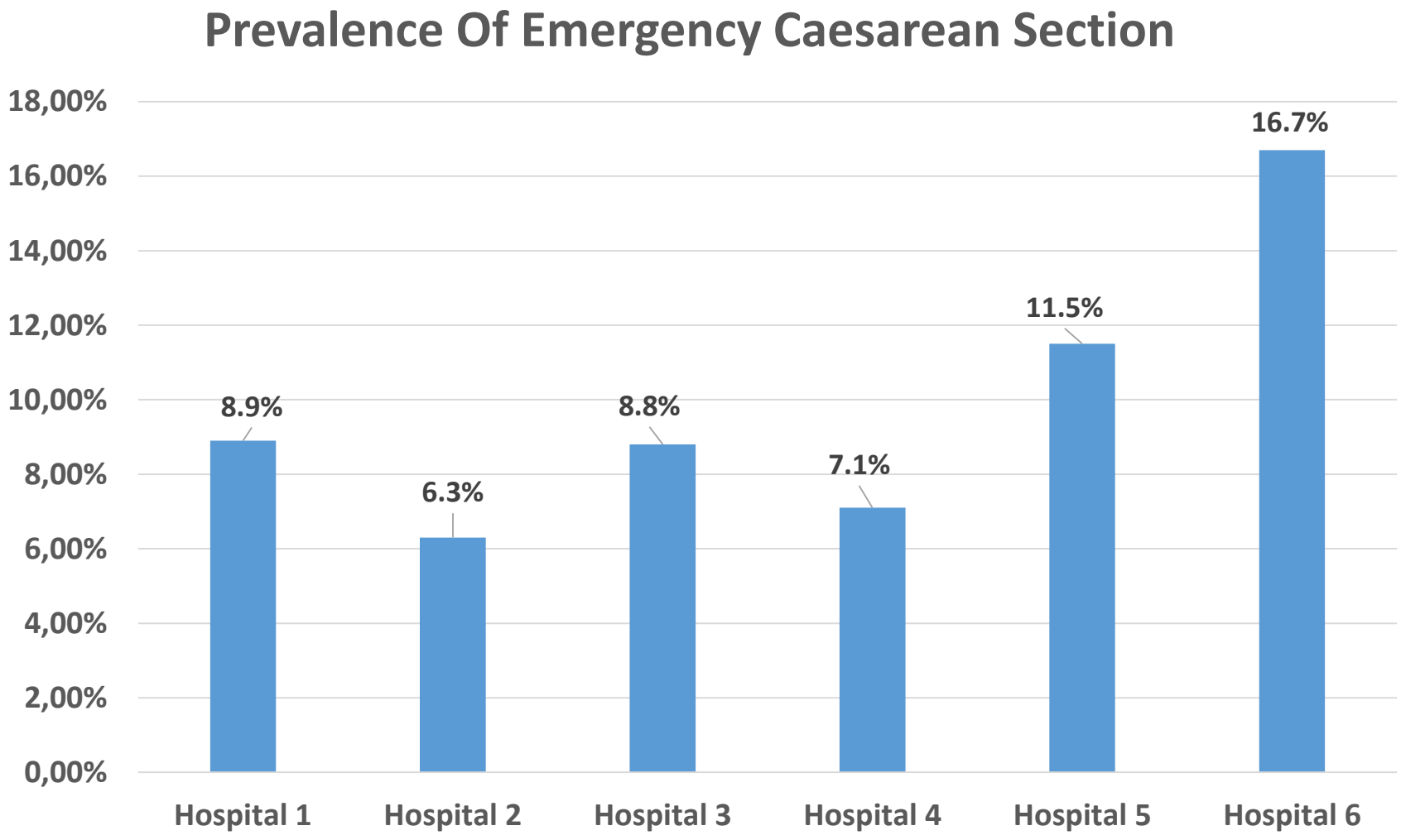
AIMS OF THE STUDY

- To explore the differences in odds for emergency caesarean section between the study hospitals
- To investigate if potential differences can be explained by differences in indications

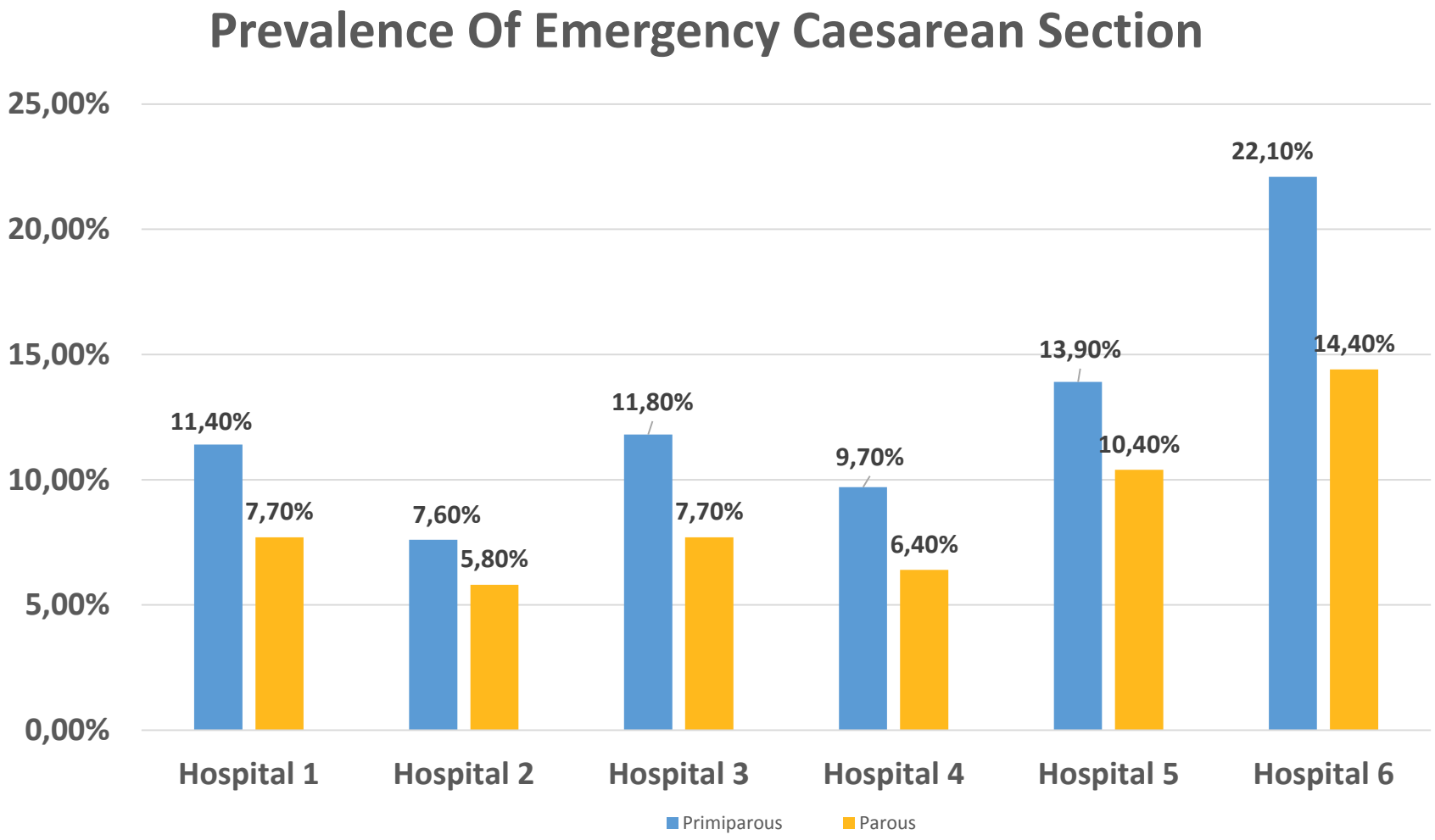
METHODS

Design	**Prospective cohort study**
Study hospitals	Three in Gaza and three in the West Bank
Study Population	51 041
Study period	1st March 2015 until 30th November 2016
Main Outcome	• The inter-hospital variations in odds for emergency caesarean section • The most common indications for emergency caesarean section
Statistical methods	Logistic regression (OR and 95% CI), Nagelkerke R square

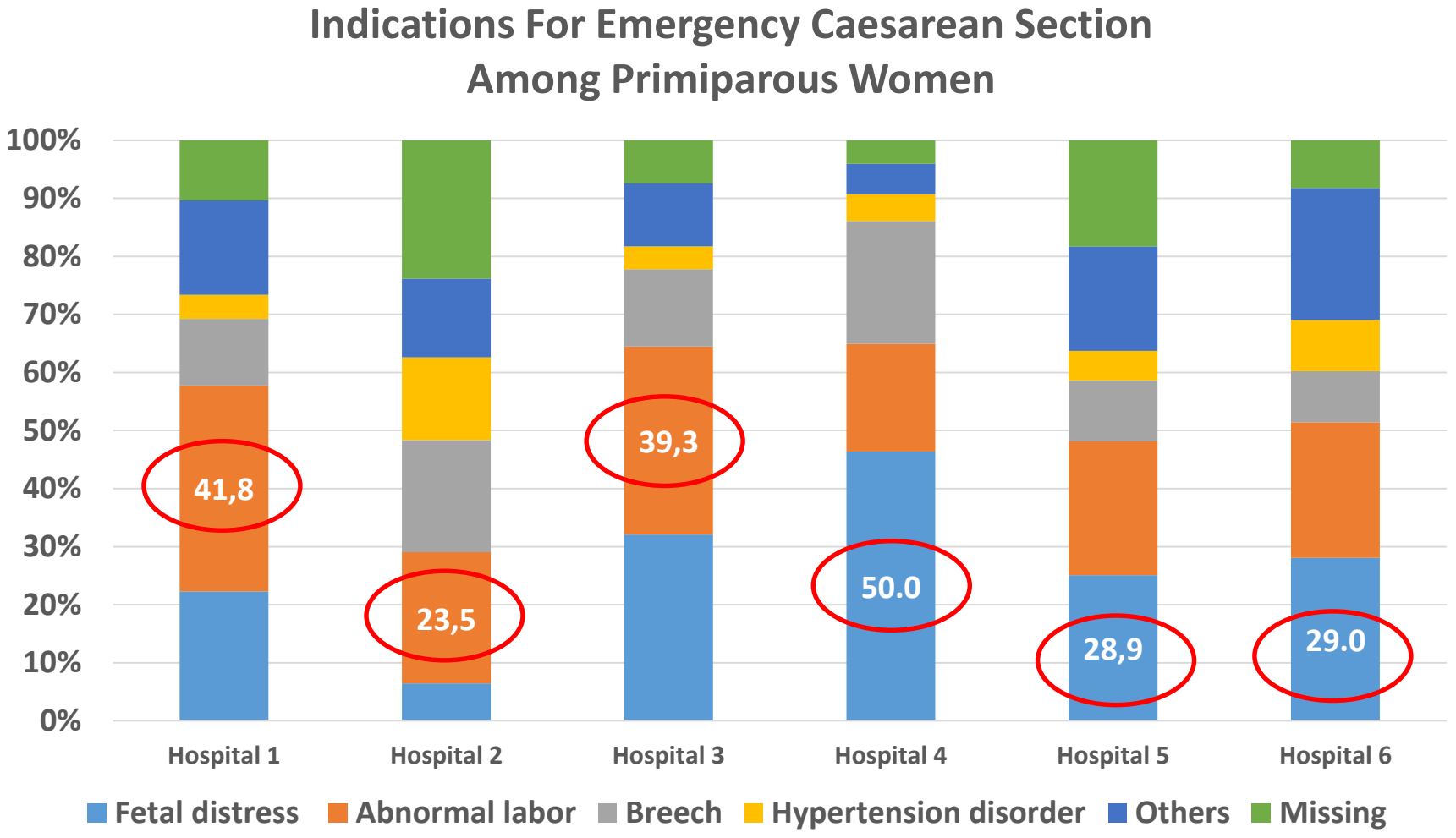
RESULTS


Prevalence Of Emergency Caesarean Section
18,00%
16,00%
14,00%
12,00%
10,00%
8,00%
6,00%
4,00%
2,00%
0,00%
8.9%
6.3%
8.8%
7.1%
11.5%
16.7%
Hospital 1
Hospital 2
Hospital 3
Hospital 4
Hospital 5
Hospital 6

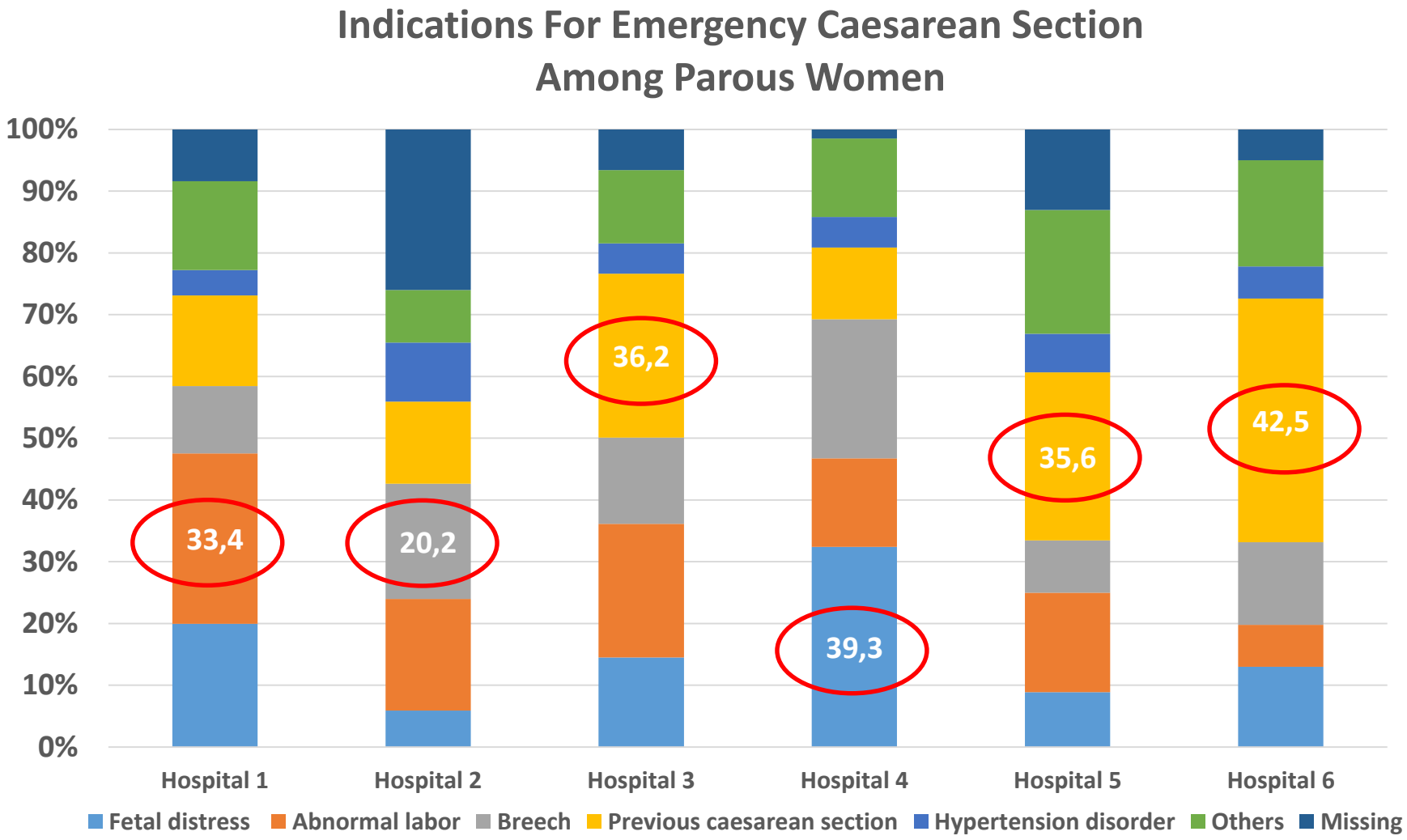
RESULTS


Prevalence Of Emergency Caesarean Section
25,00%
20,00%
15,00%
10,00%
5,00%
0,00%
11,40%
7,70%
7,60%
5,80%
11,80%
7,70%
9,70%
6,40%
13,90%
10,40%
22,10%
14,40%
Hospital 1
Hospital 2
Hospital 3
Hospital 4
Hospital 5
Hospital 6
Primiparous
Parous

RESULTS


Indications For Emergency Caesarean Section
Among Primiparous Women
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
41,8
23,5
39,3
50.0
28,9
29.0
Hospital 1
Hospital 2
Hospital 3
Hospital 4
Hospital 5
Hospital 6
Fetal distress
Abnormal labor
Breech
Hypertension disorder
Others
Missing

RESULTS


Indications For Emergency Caesarean Section
Among Parous Women
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
33,4
20,2
36,2
39,3
35,6
42,5
Hospital 1
Hospital 2
Hospital 3
Hospital 4
Hospital 5
Hospital 6
Fetal distress
Abnormal labor
Breech
Previous caesarean section
Hypertension disorder
Others
Missing

Odds Ratios and 95% CIs for emergency Caesarean Section among primiparous

Hospitals	Crude OR (95% CI)	Model 1 Adj. OR (95% CI)	Model 2 Adj. OR (95% CI)
Hospital 1	Ref.	Ref.	Ref.
Hospital 2	0.64 (0.53 to 0.77)	0.60 (0.49 to 0.74)	1.12 (0.79 to 1.58)
Hospital 3	1.04 (0.89 to 1.22)	0.88 (0.74 to 1.04)	1.06 (0.77 to 1.45)
Hospital 4	0.83 (0.70 to 0.99)	0.84 (0.69 to 1.02)	**0.42 (0.31 to 0.57)**
Hospital 5	1.25 (1.07 to 1.46)	1.18 (0.99 to 1.41)	**2.18 (1.61 to 2.96)**
Hospital 6	2.19 (1.88 to 2.55)	1.88 (1.54 to 2.28)	2.41 (1.70 to 3.40)

Model 1: Adjusted for sociodemographic and obstetric characteristics
Model 2: Adjusted for sociodemographic and obstetric characteristics and emergency caesarean section indications

Odds Ratios and 95% CIs for emergency Caesarean Section among parous women

Hospitals	Crude OR (95% CI)	Model 1 Adj. OR (95% CI)	Model 2 Adj. OR (95% CI)
Hospital 1	Ref.	Ref.	Ref.
Hospital 2	0.74 (0.65 to 0.84)	0.73 (0.64 to 0.85)	**1.94 (1.51 to 2.50)**
Hospital 3	1.00 (0.89 to 1.13)	0.94 (0.83 to 1.06)	0.90 (0.70 to 1.16)
Hospital 4	0.81 (0.72 to 0.92)	0.78 (0.68 to 0.88)	**0.50 (0.40 to 0.63)**
Hospital 5	1.39 (1.23 to 1.56)	1.35 (1.19 to 1.53)	**2.07 (1.61 to 2.67)**
Hospital 6	2.01 (1.78 to 2.26)	1.80 (1.56 to 2.08)	1.77 (1.33 to 2.35)

Model 1: Adjusted for sociodemographic and obstetric characteristics
Model 2: Adjusted for sociodemographic and obstetric characteristics and emergency caesarean section indications

RESULTS

Indications explained the variation in emergency caesarean section prevalence in 58.4% among primiparous, and in 66.4% among parous women

CONCLUSION (PAPER II)

- The differences in odds for emergency caesarean section among study hospitals could not be fully explained by differences in indications

- Main indications among primiparous
  - Fetal distress
  - Abnormal labor

- Main indications among parous
  - Previous caesarean section
  - Fetal distress
  - Abnormal labor
  - Breech presentation

PAPER THREE

Open access Research

BMJ Open

Caesarean section in Palestine using the Robson Ten Group Classification System: a population-based birth cohort study

Mohammed Walid Zimmo,[1,2,3] Katariina Laine,[4,5] Sahar Hassan,[6] Bettina Bottcher,[7] Erik Fosse,[2,3] Hadil Ali-Masri,[2,3,8] Kaled Zimmo,[2,3,9] Ragnhild Sørum Falk,[10] Marit Lieng,[2,11] Åse Vikanes[3]

Zimmo M, Laine K, Hassan S, et al. Caesarean section in Palestine using the Robson Ten Group Classification System: a population-based birth cohort study. ***BMJ Open* 2018;8:e022875.**

AIM OF THE STUDY

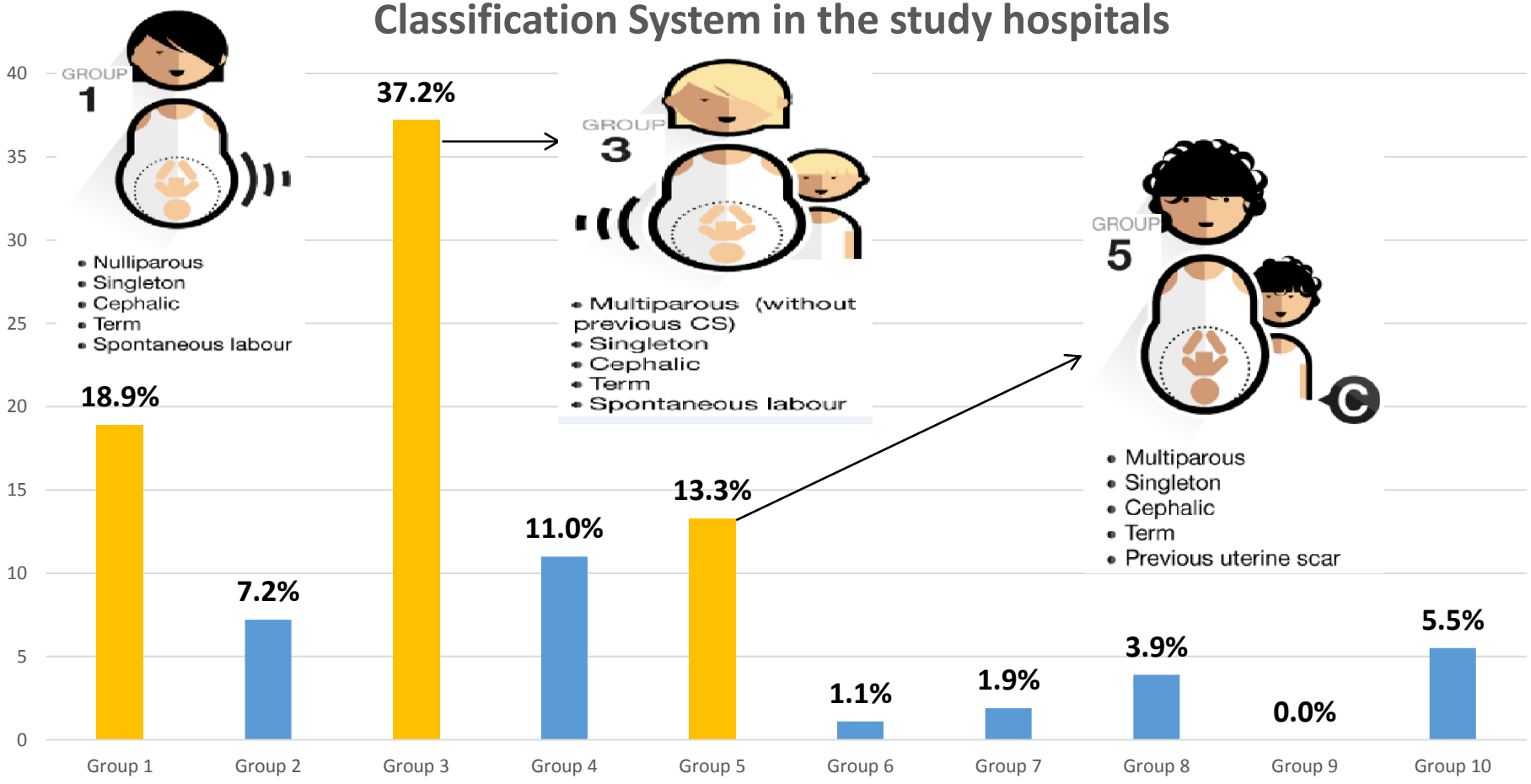
- To identify the main contributors to the overall CS rate by using the Robson Ten Group Classification System

METHODS

Design	Prospective cohort study
Study hospitals	Three in Gaza
Study Population	18 908
Study period	1st January 2016 and 30th April 2017
Main Outcome	The main contributions of each group in the Robson ten group classification system to the overall caesarean section rate
Statistical methods	Descriptive analysis, $\chi 2$ test and one-way ANOVA analysis

RESULTS

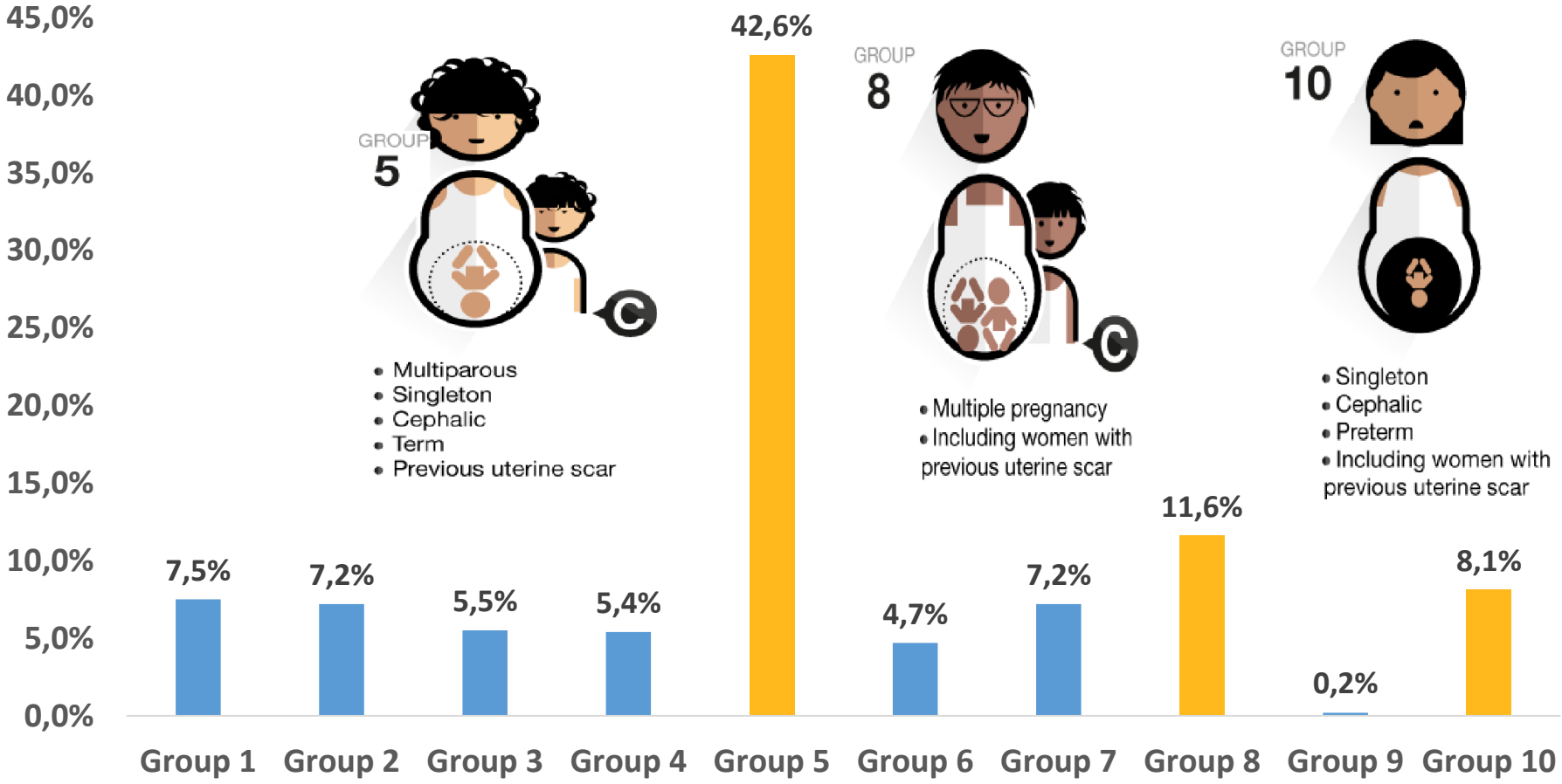
Number of births in each group of the Robson Ten Group Classification System in the study hospitals



M. Zimmo 2019

RESULTS

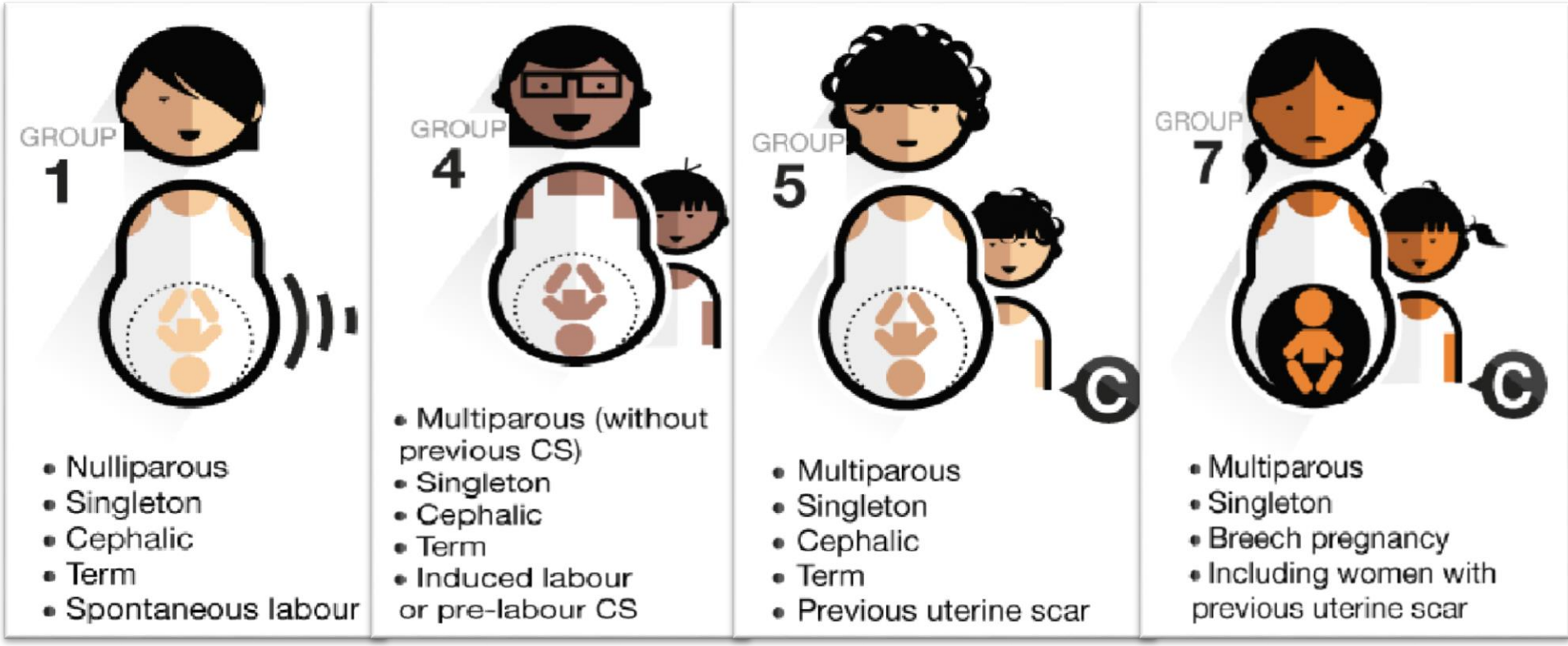
Contribution of each group within the Robson Ten Group Classification System to the overall caesarean section rate



M. Zimmo 2019

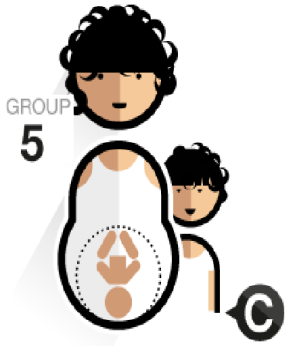
RESULTS

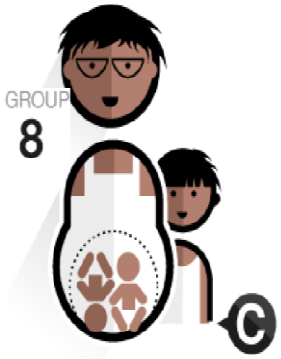
Significant differences in caesarean section rates between study hospitals were found in

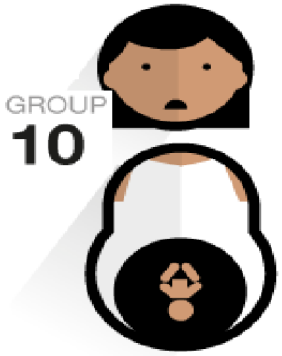


CONCLUSION (PAPER III)

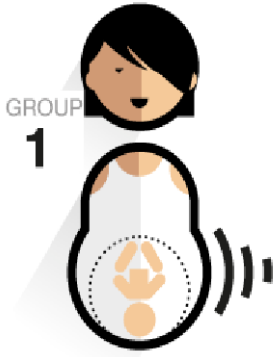
- The largest contributors to the overall caesarean section rate in the study hospitals were women in

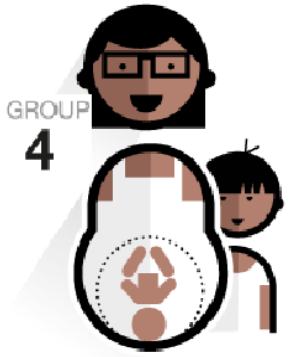


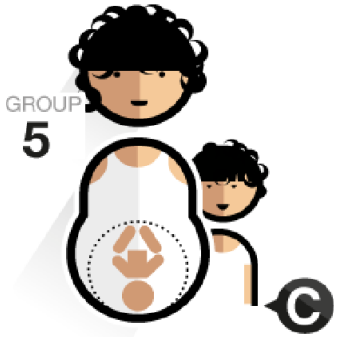




- Significant variations in caesarean section rates between study hospitals were observed in



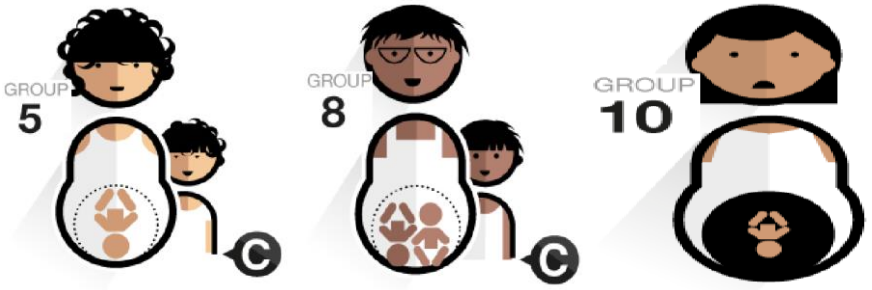




CONCLUSIONS OF THE THREE PAPERS

- Major differences in rates, odds for emergency caesarean section could not be fully explained by differences in
  - Sociodemographic characteristics
  - Obstetric characteristics
  - Indications

- The largest contributors to the overall caesarean section rate in the study hospitals were Robson Groups 5, 8 and 10



STUDY IV

Implementation of the WHO manual for Robson Ten Group Classification System at Al Shifa medical complex

AIMS OF THE STUDY

- To identify the main contributors to the overall caesarean section rate using modified RTGCS in the main referral hospital

- To explore the absolute and relative indications for caesarean section within the modified RTGCS

STUDY FOUR

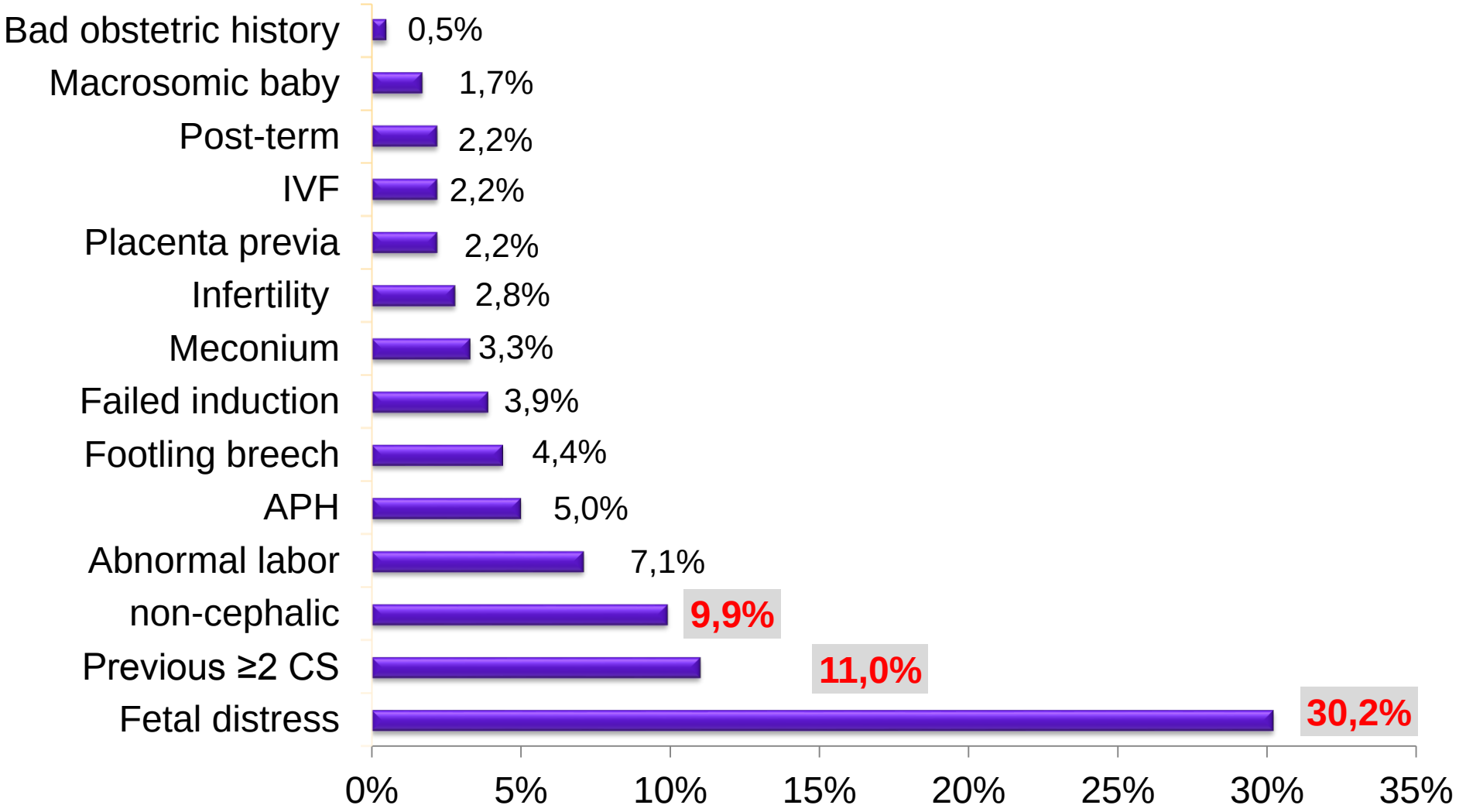
Day ……. Date / / 2019 Department …….

Daily cesarean section reports

Name:	Age:
Diagnosis (parity, gestational age, multiple/singleton, presentation)	
Number of previous CS:	Decision maker:
Onset of labor: □ Spontaneous □ Induction □ Emergency CS □ Elective CS	
Indication of CS:	
Neonatal outcome: □ male □ female	Weight: gram
Residency place:	NICU admission : □ Yes □ No

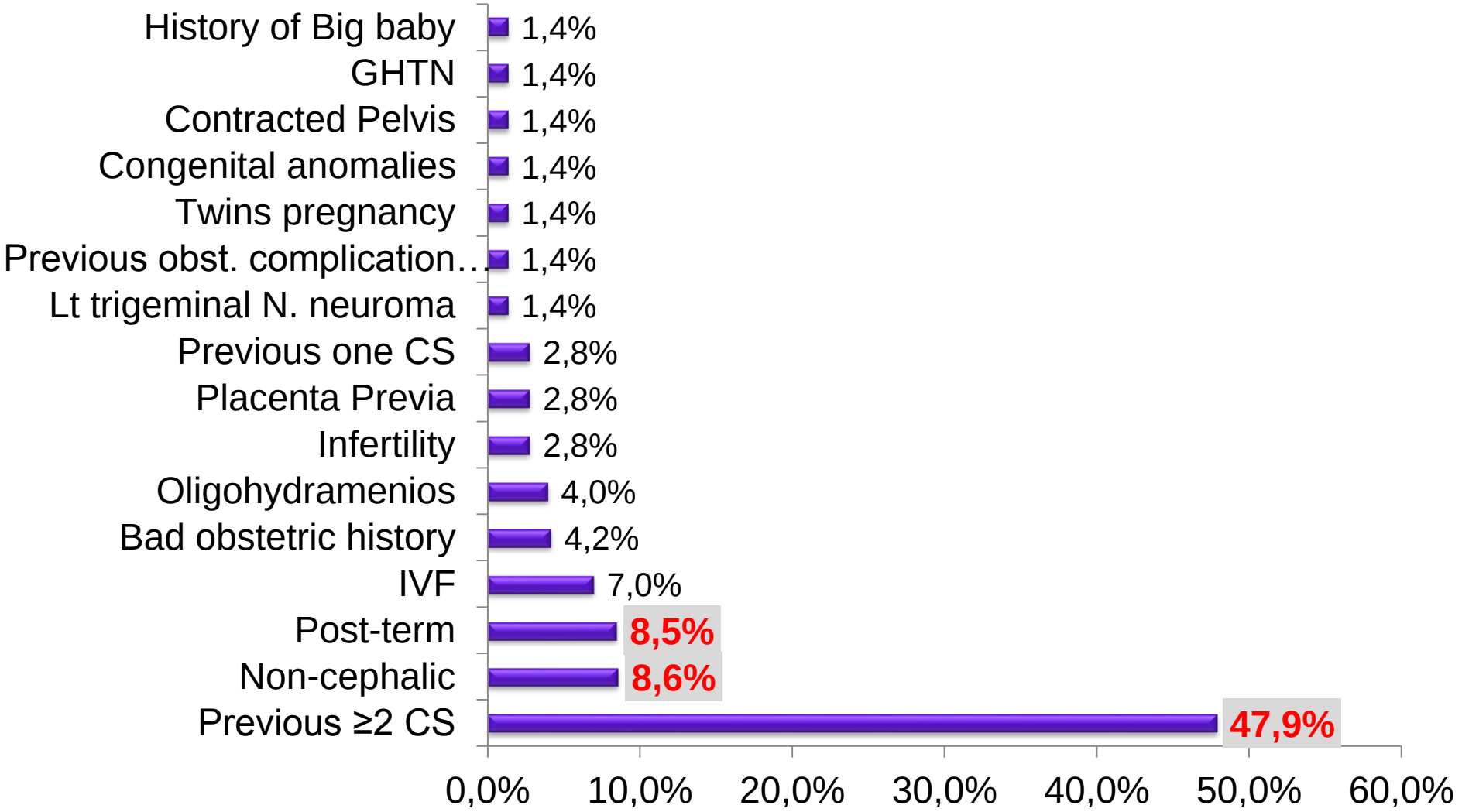
I started data collection for this study in 1st April 2019

Indications of Emergency Caesarean Section (n=824)

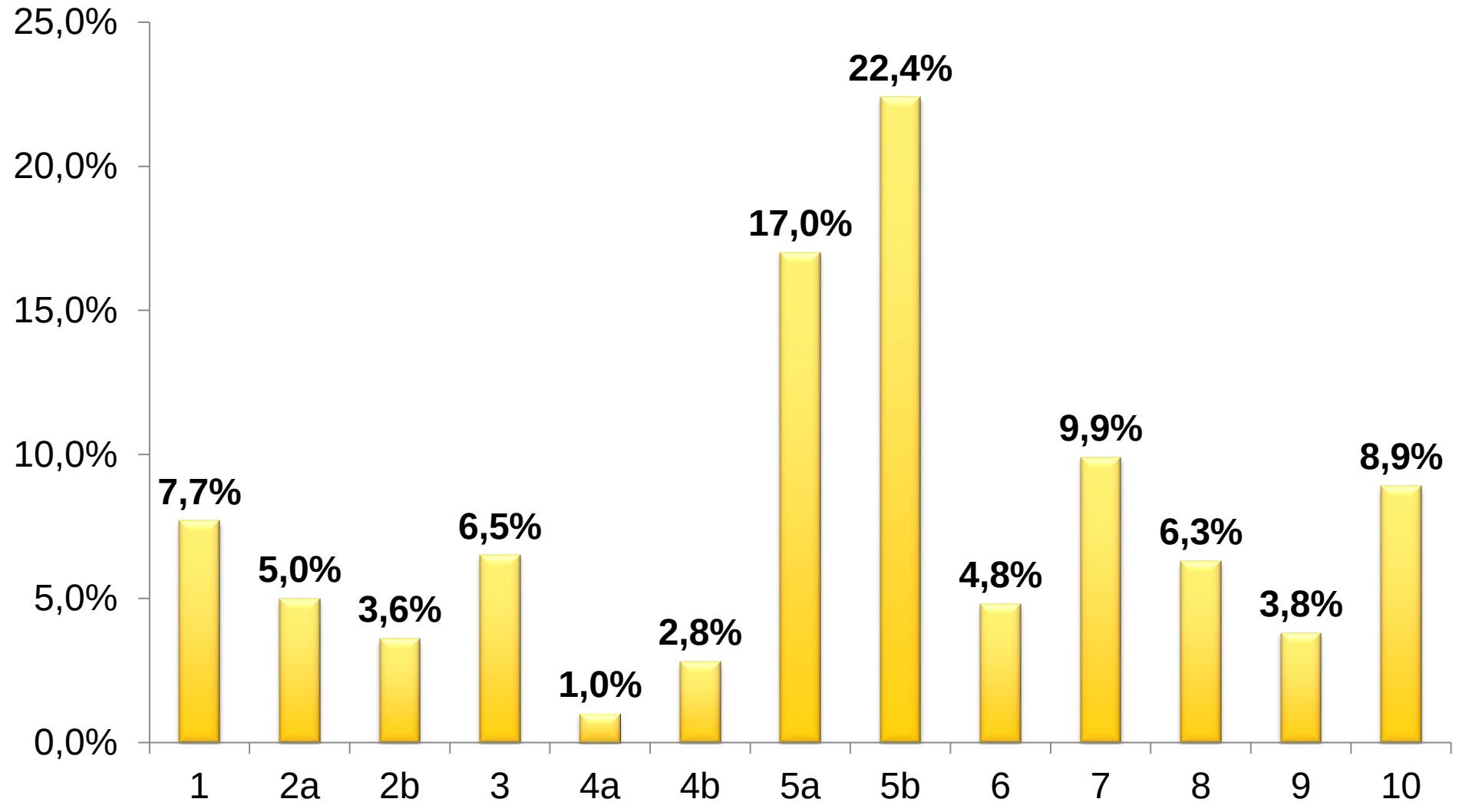


M. Zimmo 2019

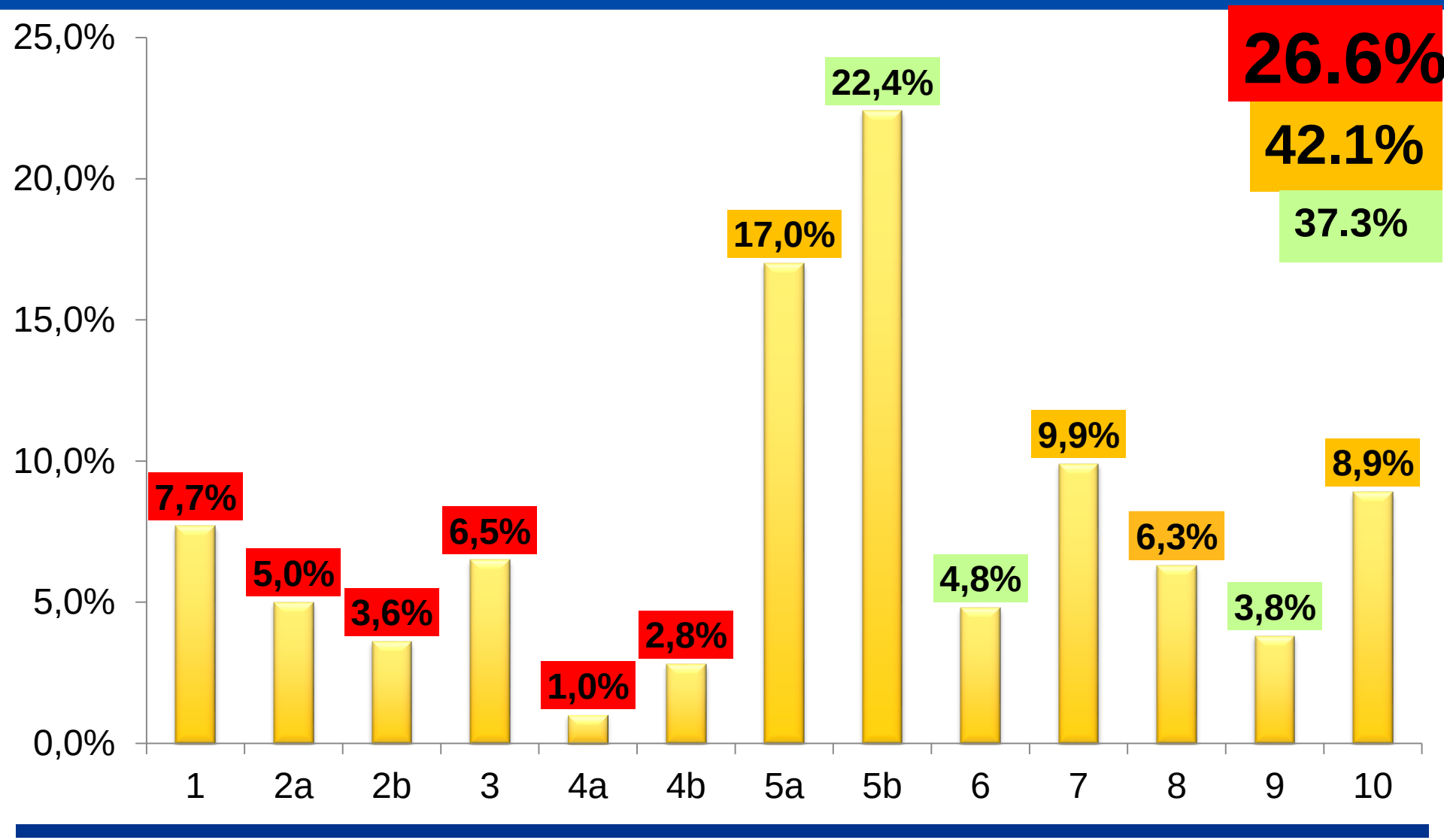
Indications of Elective Caesarean Section (n=406)



Contribution of modified RTGCS groups to the overall Caesarean section rate in Al Shifa medical complex (n=1230)



Contribution of modified RTGCS groups to the overall Caesarean section rate in Al Shifa medical complex (n=1230)



Results

According to the Palestinian obstetrics protocol, caesarean section rate distributed as the following :

37.3%

Need caesarean section-absolute indication

(TGCS 5b, 6 and 9)

Results

According to the Palestinian obstetrics protocol, caesarean section rate distributed as the following :

42.1%

Borderline (**TGCS 5a, 7, 8 and 10**)

Results

	Fetal distress + Abnormal labor	Relative indication	Post-term + PROM + macrocosmic + BOH	Absolute indication
Group 5a	23.9%	16.2%	38.3%	**21.6%**
Group 7	14.0%	2.0%	44.0%	**40.0%**
Group 8	3.1%	18.8%	25.0%	**53.1%**
Group 10	31.1%	0.9%	2.2%	**57.7%**

Results

According to the Palestinian obstetrics protocol, caesarean section rate distributed as the following :

26.6%

Primary caesarean section with cephalic presentation and full term (**TGCS 1-4)**

- **57.3%** due to fetal distress or abnormal labor
- **25.2%** due to absolute indications
- **3.4% due to relative indication**

Results

Overall caesarean sections assessment

1. **53.9% :** Absolute indication
2. **12.7%** : Post-term, PROM, macrocosmic and BOH
3. **23.7%** : Fetal distress or abnormal labor
4. **5.9%** : Relative indications

CLINICAL IMPLICATIONS

1. The national Palestinian obstetric guidelines should be applied equally in all Palestinian hospitals

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CLINICAL IMPLICATIONS

1. The national Palestinian obstetric guidelines should be applied equally in all Palestinian hospitals

2. Continuous and ongoing evaluation of criteria used to set the indications for caesarean section

3. The efforts should be directed towards reducing primary caesarean section and increasing vaginal birth after caesarean section

4. Decision maker should be the most senior staff in primary caesarean section especially in fetal distress and abnormal labor

Thank you

Thank you

STRENGTHS AND LIMITATIONS OF THE THESIS

Strengths	
▪ This study is the largest, prospective cohort study in Palestine ▪ It includes both Gaza and West Bank hospitals ▪ It was the first to explore caesarean section rates in Palestine using the Robson Ten Group Classification System ▪ All women who gave birth in the study hospitals were included (paper III)	

STRENGTHS AND LIMITATIONS OF THE THESIS

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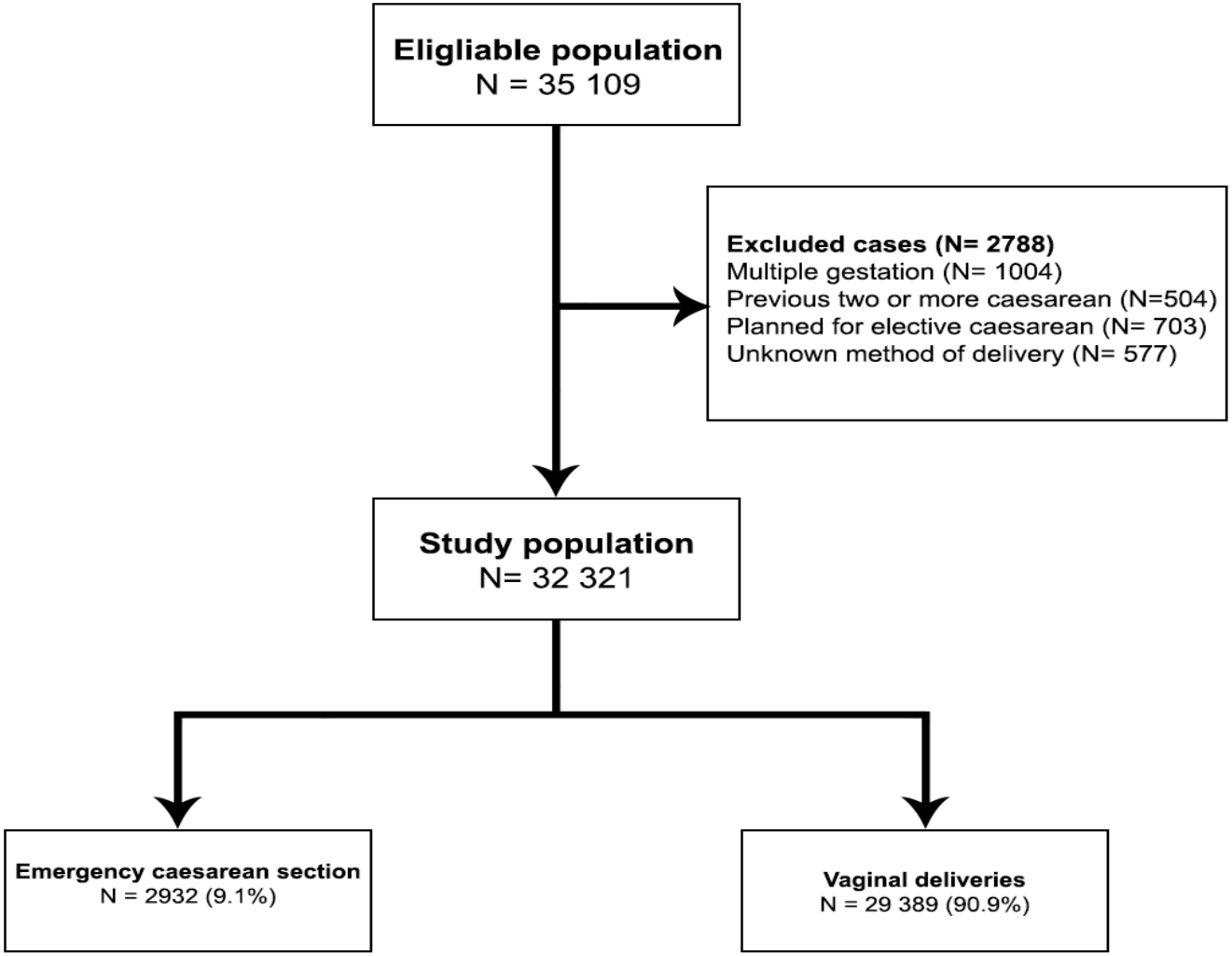
Figure 1: Flow chart of the selected study population, multicenter study from Palestine



(Paper II) Supplementary table 1: Interaction terms between hospitals and BMI, fetal distress and breech presentation calculated by/estimated from logistic regression analysis for emergency caesarean section among parous women*

	Interaction by hospital and BMI†	Interaction by hospital and fetal distress	Interaction by hospital and breech presentation
Hospital 1	Ref.	Ref.	Ref.
Hospital 2	0.89 (0.83-0.96)	0.25 (0.11-0.59)	3.46 (1.55-7.71)
Hospital 3	0.87 (0.81-0.94)	0.97 (0.47-2.01)	5.84 (2.65-12.89)
Hospital 4	0.95 (0.90-1.00)	0.88 (0-55-1.42)	2.34 (1.37-3.99)
Hospital 5	1.04 (0.98-1.10)	0.22 (0.12-0.41)	2.97 (1.18-7.45)
Hospital 6	1.03 (0.96-1.11)	0.37 (0.19-0.72)	9.05 (2.56-32.0)

*BMI Body mass index
†Adjusted for sociodemographic (maternal age, education and pre-pregnancy body mass index) and obstetric characteristics (average number of children alive, history of previous caesarean section and in vitro fertilization treatment) and emergency caesarean section indications (Fetal distress, failure to progress, breech, previous caesarean section, hypertension disorder and others).

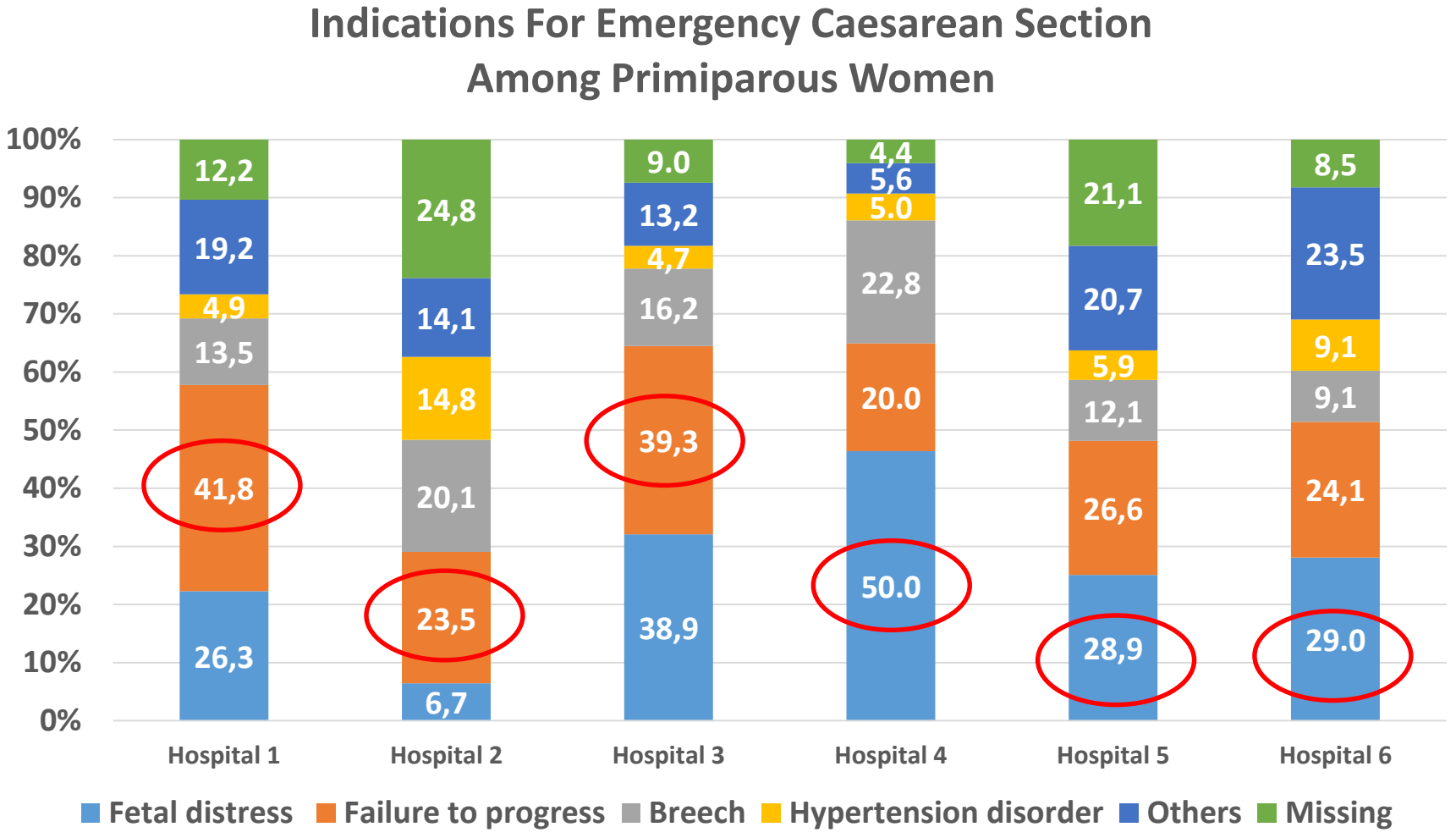
(Paper III) Supplementary table 2 Contributions of each group in the Robson Ten Group Classification System to the overall caesarean section rates in the study hospitals (n=4337)

Robson Ten Group Classification System	All hospitals n (%)*	Hospital 1 n (%)*	Hospital 2 n (%)*	Hospital 3 n (%)*
1	324 (7.5)	113 (12.8)	62 (7.3)	149 (5.7)
2	314 (7.2)	46 (5.2)	51 (6.0)	217 (8.4)
3	239 (5.5)	57 (6.4)	73 (8.5)	109 (4.2)
4	236 (5.4)	23 (2.6)	58 (6.8)	155 (6.0)
5	1846 (42.6)	448 (50.7)	283 (33.1)	1115 (42.9)
6	206 (4.7)	38 (4.3)	23 (2.7)	145 (5.6)
7	312 (7.2)	69 (7.8)	79 (9.2)	164 (6.3)
8	501 (11.6)	45 (5.1)	132 (15.4)	324 (12.5)
9	8 (0.2)	4 (0.5)	2 (0.2)	2 (0.1)
10	351 (8.1)	41 (4.6)	92 (10.8)	218 (8.4)
Total	4337 (100)	884 (100)	855 (100)	2598 (100)

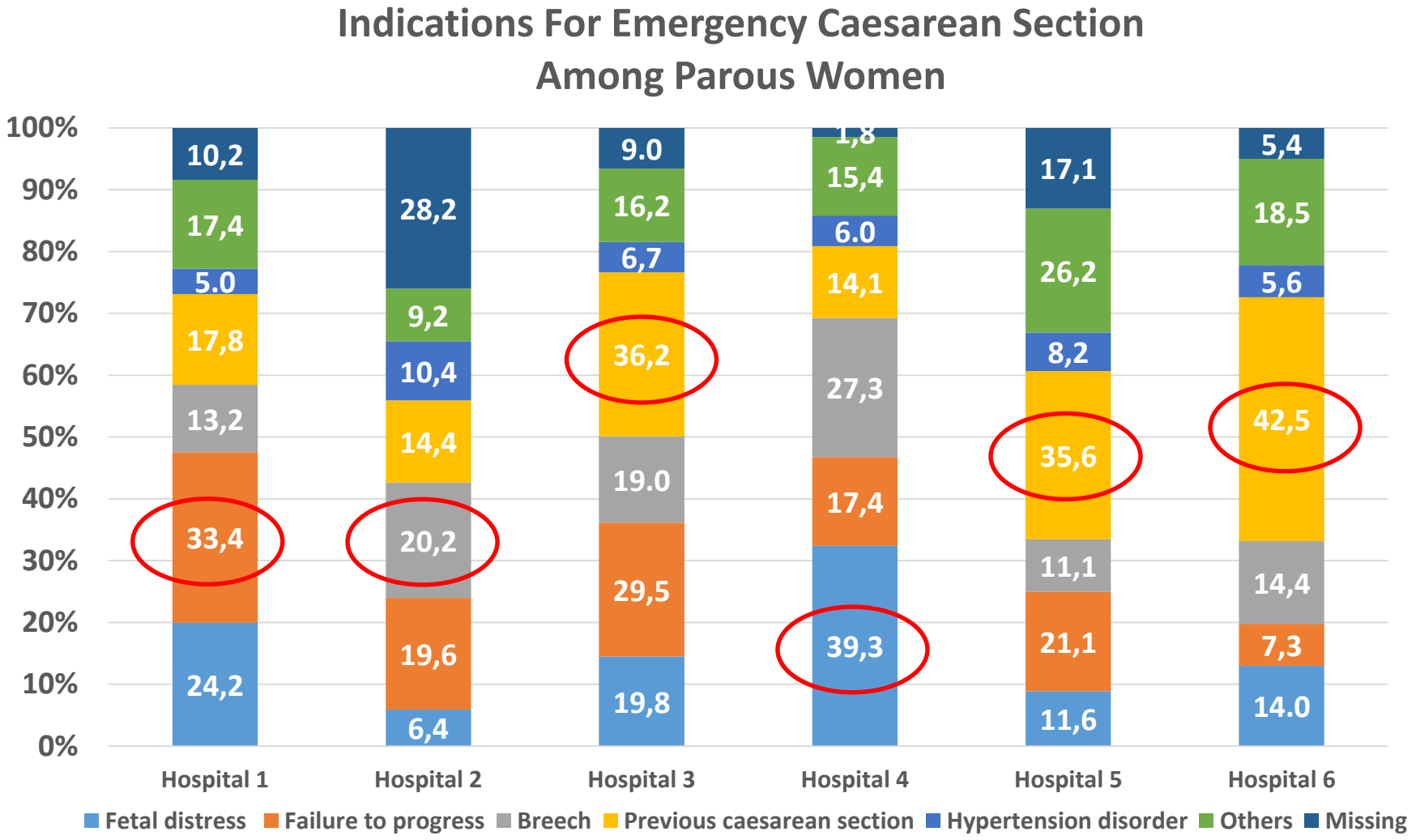
(Paper III) Supplementary table 1 Sociodemographic characteristics of the study population (N=18 908)

	Hospital 1 (N=4283) N (%)	Hospital 2 (N=4069) N (%)	Hospital 3 (N=10 556) N (%)	Total (N=18 908) N (%)
Maternal age				
≤20	1376 (32.1)	2230 (54.8)	2223 (21.1)	5829 (30.8)
21-30	1979 (46.2)	1338 (32.9)	6019 (57.0)	9336 (49.4)
31-40	859 (20.1)	471 (11.6)	2103 (19.9)	3433 (18.2)
>41	69 (1.6)	30 (0.7)	211 (2.0)	310 (1.6)
Education, (years)				
≤12	2513 (58.8)	3006 (73.9)	7080 (67.1)	12 612 (66.7)
13-16	1751 (40.9)	1017 (25.0)	2650 (25.1)	5418 (28.7)
≥17	14 (0.3)	44 (1.1)	820 (7.8)	878 (4.6)
Missing	5	2	6	13
Parity				
Primiparous	1117 (26.1)	1105 (27.2)	3620 (34.3)	5842 (30.9)
Multiparous	3166 (73.9)	2964 (72.8)	6936 (65.7)	13 066 (69.1)
Multiparous with previous vaginal delivery only	2521 (79.6)	2490 (84.0)	5072 (73.1)	10 083 (77.2)
Multiparous with previous one caesarean section	324 (10.2)	268 (9.0)	965 (13.9)	1557 (11.9)
Multiparous with two or more previous caesarean section	321 (10.1)	206 (7.0)	899 (13.0)	1426 (10.9)

RESULTS


Indications For Emergency Caesarean Section
Among Primiparous Women
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
12,2
19,2
4,9
13,5
41,8
26,3
24,8
14,1
14,8
20,1
23,5
6,7
9.0
13,2
4,7
16,2
39,3
38,9
4,4
5,6
5.0
22,8
20.0
50.0
21,1
20,7
5,9
12,1
26,6
28,9
8,5
23,5
9,1
9,1
24,1
29.0
Hospital 1
Hospital 2
Hospital 3
Hospital 4
Hospital 5
Hospital 6
Fetal distress
Failure to progress
Breech
Hypertension disorder
Others
Missing

RESULTS


Indications For Emergency Caesarean Section
Among Parous Women
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
10,2
17,4
5.0
17,8
13,2
33,4
24,2
28,2
9,2
10,4
14,4
20,2
19,6
6,4
9.0
16,2
6,7
36,2
19.0
29,5
19,8
1,8
15,4
6.0
14,1
27,3
17,4
39,3
17,1
26,2
8,2
35,6
11,1
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5,4
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14,4
7,3
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Hospital 1
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Fetal distress
Failure to progress
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Previous caesarean section
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