TURKEY'S RISING TREND IN CAESAREAN SECTION: WHO ARE THESE WOMEN?

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1. Introduction

C-section can be a lifesaving operation when either mother or her infant face problems before or during labor and delivery. However, it is riskier than vaginal delivery and the complications during cesarean section such as infections, anesthesia and bleeding can be fatal. Besides, it requires a longer recovery period when compare to vaginal births.

All over the world, cesarean deliveries have been started to be given high priority since higher levels of cesarean section rate has become a worldwide phenomenon. Indeed, optimal cesarean rate which was recommended by WHO in 1985 [1] as 15 percent, has been exceeded long since in both industrialized and developing countries and its validity has been questioned recently due to the exponentially increasing number of cesarean births in the world [2]. Among developed countries such as USA (32 percent), Switzerland (32 percent) and Germany (29 percent), has higher rates for cesarean section showing a rising trend [3]. In Italy (40 percent), cesarean rate is at its highest level compared to other European countries. The unprecedented popularity of cesarean section is being experienced in developing countries as well. Brazil, Mexico and Jamaica are some of those countries.

The significant increase in the incidence of cesarean deliveries in many developing countries may be an indication of reduced maternal and infant morbidity and mortality [4]. However, there is no information whether maternal or child health has benefited from this growth [5]. Besides, cesarean section is a major surgery and therefore carry potential risks [4,6] and may be hazardous especially when it is medically unnecessary and should be done only when the health of the mother or baby is at risk. Accordingly, in USA mortality due to cesarean section has been estimated as 41 per 100,000 live births whereas it has been increased to 160-220 per 100,000 in developing countries [7-8].

Turkey is one of the countries performing high levels of cesarean section, especially in the last five years. The number of cesarean section deliveries has increased from 8.1 percent in 1993 to 37 percent in 2008 among all births. This proportion has reached 41 percent as of 2008 when hospital-based deliveries has been considered.

This study examines the estimates of cesarean delivery in Turkey and provides a understanding of the association between cesarean section and some selected variables, namely, pregnacy-related factors, women's characteristics and background characteristics, using the data from demographic and health survey conducted between 1993-2008.

2. Materials and Method

The study is based on data from 1993, 1998, 2003 and 2008 Turkey Demographic and Health Survey (TDHS) in collabration with Macro International as well as Ministry of Health and State Planning Organization. The aim of those surveys, which are one of the demographic and health surveys conducted in many developing countries since 1984, is to provide an understanding of health and population trends in Turkey with a nationally representative data on fertility, family planning, maternal and child health and nutrition.

For TDHS-1993, 10,631 households were selected. Although the coverage of survey sample was 10,631 households, at the time of survey only 8,900 were available for interview. Out of these 8,900, survey was successfully completed with 8,619 households. Among the interviewed households, 6,862 eligible women were identified, of whom 95 percent (6,519 women) were interviewed. The overall response rate for TDHS-1993 was 92 percent (HUIPS, 1994). The sample size of TDHS-1998 was 9,970 households. However, at the time of survey, 8,596 households were regarded as available for household interview. Out of which 8,059 households were successfully interviewed (94 percent). Among the interviewed households, 9,468 women were identified as eligible for individual interview, of which 8,576 women were successfully interviewed (91 percent) (HUIPS, 1999). The target sample size of TDHS-2003 was 13,049. Nevertheless, 11,659 households were found to be available. Among these, interviews were completed with 10,836 households (93 percent) in which 8,447 women were eligible for individual questionnaire. In TDHS-2003, 8,075 (96 percent) women were successfully interviewed out of 8,447. For TDHS-2008 13,521 households were selected and 11,911 were considered as occupied. Of these, 10,525 households were successfully interviewed. 8,003 women were identified as eligible for individual interviews. However, interviews were successfully completed with 7,405 women (92.5 percent) (HUIPS, 2009).

There ara two main types of questionnaires used in these surveys: Household Questionnaire and Ever-Married Women (15-49) Questionnaire. Household Questionnaire was used to enumerate all usuall members of and visitors to the selected households and collect information relating to the socioeconomic position of the households. In addititon to the provison of basic demographic data for Turkish households, information needed to identify the women eligible for individual interviews were collected. Individual Questionnaire was designed to gather information on reproduction, marriage, contraception, pregnancy and breastfeeding, immunisation and health, fertility preferences, husband's background and status of woman, values, attitudes and beliefs and anthropometry [9-12]. In TDHS-1998, two additional questionnaires for never-married women and for husbands were used. It should be mentioned that before the field study of each survey, questionnaires were reviewed and revised in line with the needs of country.

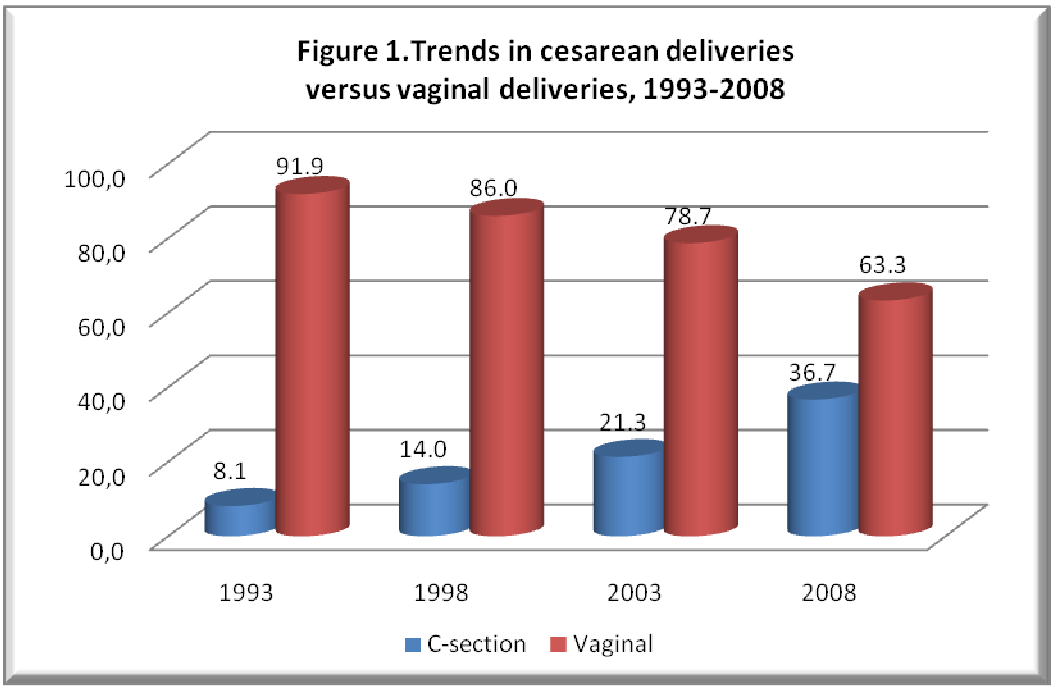
Levels and trends in the prevalence cesarean deliveries have been examined through socio-demographic and healthcare characteristics. Maternal age, birth order, birth weight, number of antenatal visits, place of delivery, multiple births, education, mother tongue, history of abortion/stillbirth, health insurance, residence, region and wealth index have been used in descriptive analysis.

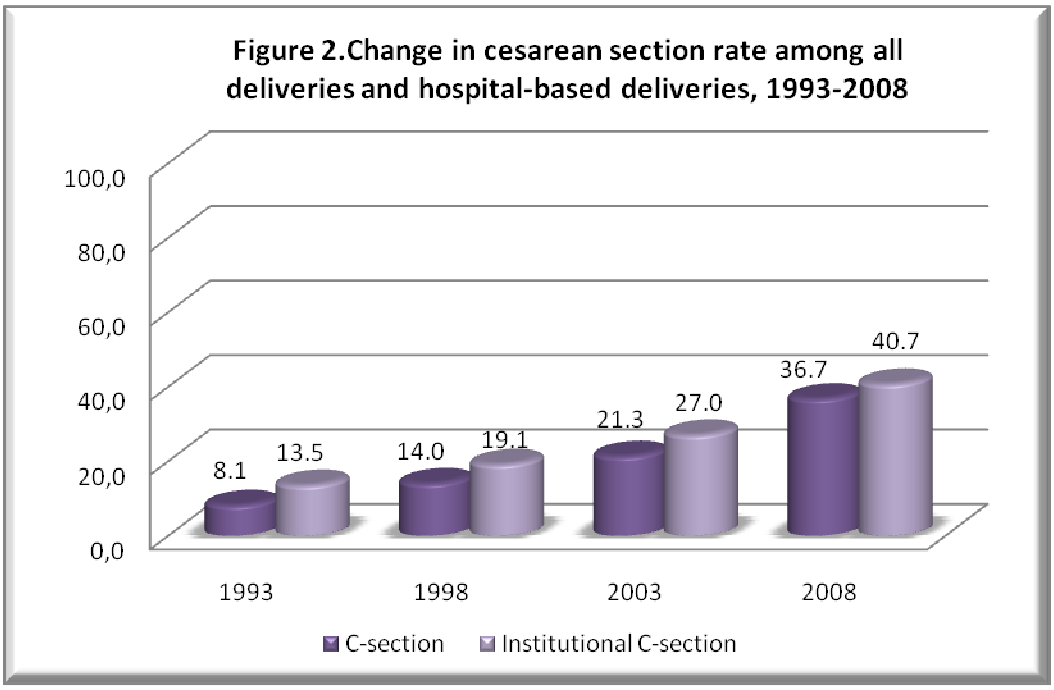
Logistic regression analysis have been conducted based on institutional deliveries to investigate the socio-demographic and medical determinants of cesarean section over vaginal delivery. Multiple births have not been used in multivariate analysis since it has been found to be highle correlated with birth order mainly due to the fact that majority of multiple births have the first birth order.

3. Results

3.1. Descriptive results

Turkey has been experiencing an apparent increase in cesarean deliveries during the last 15 years. The results of latest demographic and health survey conducted in 2008 have indicated that vaginal births have decreased from 92 percent to a level of 63 percent between 1993-2008 (Figure 1). On the other hand, within the same period, cesarean section rate, which was only 8 percent in 1993, has accounted for 37 percent of all births occured in five years preceding the survey. When hospital-based deliveries are taken into consideration, this rate has reached 41 percent as of 2008, indicating three-fold increase in cesarean deliveries for a 15-year period (Figure 2). Indeed, the proportion cesarean deliveries occured in a health facility obviously higher than all cesarean births.





Descriptive analysis on the basis of some selected variables has shown that cesarean rate is on rise for all sub-population groups (Table 1). Resgarding residential rate for cesarean section, in urban areas as well as in rural the number of women having their infants born by cesarean section have increased fourfold in a 15-year period. Moreover, in each survey, the percentage of cesarean deliveries in urban areas have always been above the national average. In terms of region, women in the West region have higher cesarean rates. On the other hand, in the East, women have been less likely to deliver their babies by cesarean section. Although a rising trend of cesarean section is also a matter of fact in East region, cesarean section rate has always been lower than more developed regions. Indeed, the gap between the eastern part and the rest of the country is conspicuous. Regarding wealth index, the proportion of cesarean section amon women living in households ın the highest wealth quintile has been found to be 49 percent and 62 percent in 2003 and 2008, respectively. Indeed, as household welfare rises, the number of cesarean deliveries also increase.

Education is an another socio-demographic characteristic which seems to have an impact on cesarean deliveries. As women become more educated, they are more likely to deliver their babies by cesarean section. Concerning TDHS-2008, cesarean rate for women with at least high school education is 2.3 times higher than uneducated women and 1.5 times higher than the overall rate. When mother tongue is taken into consideration, level of cesarean section is prominently differentiates between women who speak Turkish and that of Kurdish. Accordingly, 45 percent of women who have reported their monther tongue as Turkish had their babies born by cesarean section whereas this belongs to 26 percent for Kurdish women regarding the results of most recent survey. Furthermore, there is a close association

between age at birth and cesarean deliveries. Teenage mothers are less likely to deliver by cesarean section when compared to women in older age groups, and this trend has not change much during the last 15 years. Not suprisingly, the proportion of cesarean deliveries is greater for women over 35 since they are at high-risk group. Moreover, cesarean section is negatively associated with birth order. In other words, cesarean deliveries are more common among first births of mothers and it reaches 47 percent in 2008, which is 3.4 times higher than that of 1993. On the other hand, as birth order increases the proportion of births delivered by cesarean section has substantially decreased.

Table 1. Levels and trends of cesarean section by selected variables on the basis of institutional deliveries

	1993		**1998**		**2003**		**2008**	
	%	**n**	%	**n**	%	**n**	%	**n**
Residence								
Urban	14.1	1626	21.9	1737	29.8	2334	44.1	2330
Rural	12.0	611	12.8	775	19.9	912	30.6	783
Region								
West	17.4	799	25.3	894	33.5	1232	47.6	1129
South	10.5	373	20.8	341	26.2	440	43.1	407
Central	11.4	536	14.2	662	23.5	721	44.0	729
North	15.6	239	17.1	226	36.2	217	46.9	188
East	8.7	291	12.7	388	15.9	637	22.2	660
Wealth Index*								
Poorest	NA	NA	NA	NA	14.7	548	25.4	606
Poorer	NA	NA	NA	NA	16.9	658	32.8	751
Middle	NA	NA	NA	NA	25.4	681	40.7	684
Richer	NA	NA	NA	NA	28.8	764	49.1	572
Richest	NA	NA	NA	NA	49.1	595	61.6	500
Education								
No education/Incomp. primary educ.	12.7	468	13.1	415	15.6	536	26.4	558
First level primary	12.9	1457	17.0	1708	23.0	1828	37.9	1574
Second level primary	14.4	224	28.5	270	26.3	286	39.8	314
High school and higher	25.3	88	48.7	118	50.0	597	59.8	666
Mother tongue								
Turkish	13.6	1995	19.7	2113	29.5	2616	45.0	2395
Kurdish	11.2	183	15.1	328	15.7	528	25.8	608
Other	16.2	58	18.7	70	21.2	103	29.4	110
Health insurance								
Not covered by health insurance	10.8	996	15.4	1120	20.6	1129	34.0	505
Covered by health insurance	15.6	1236	22.0	1375	30.5	2106	42.0	2598

Table 1. Levels and trends of cesarean section by selected variables on the basis of institutional deliveries (continued)

	1993		1998		2003		2008	
	%	n	%	n	%	n	%	n
Abortion/stillbirth								
No	12.9	1433	20.2	832	26.7	2186	41.4	2207
Yes	14.6	805	18.5	1680	27.6	1061	39.0	906
Age at birth								
<20	8.7	363	9.9	370	14.5	410	30.0	305
20-34	14.0	1743	20.1	1985	28.4	2578	40.8	2548
35-49	20.0	131	27.6	157	33.2	258	52.6	260
Birth order								
1	13.9	954	21.6	1037	31.7	1269	46.5	1165
2-3	14.1	937	18.7	1099	26.1	1479	40.5	1443
4-5	10.6	214	15.4	251	19.2	310	27.2	360
6+	11.0	132	8.8	125	15.6	189	29.9	145
Multiple births								
No	13.2	2171	18.3	2446	26.4	3190	40.1	3020
Yes	22.6	66	48.6	66	65.5	56	61.2	93
Number of antenatal care								
0-1	8.9	642	8.0	659	10.1	667	15.8	326
2-5	11.5	842	14.7	880	21.6	1190	29.7	936
6+	19.3	738	31.3	934	40.1	1352	50.7	1844
Place of delivery								
Public sector	12.5	2088	16.0	2208	23.1	2700	36.2	2410
Private sector	28.7	144	42.3	296	47.3	532	56.7	696
Birth weight								
Low (<2500g)	NA	NA	20.3	262	40.1	306	51.6	316
Normal (2500-3999g)	NA	NA	20.3	1484	28.3	2140	41.9	2243
High (>4000g)	NA	NA	23.1	327	26.3	340	38.5	299
Not weighted at birth	NA	NA	8.7	317	9.4	269	9.0	134
Total	13.5	2237	19.1	2512	27.0	3246	40.7	3113

Source: *HUIPS, 1994; HUIPS, 1999, HUIPS, 2004 and*

* Wealth index is not available for 1998 and 1993 but it can be estimated from the data.

To deliver multiple babies, cesarean section may be a much safer method and in Turkey, more than half of women who have multiple births, have a cesarean section in the last decade. However, the rate of c-sections for single births has increased substantially and suprisingly, it is more than cesarean rates for multiple births in 2003-2008. Antenatal visits are also important in determining the rising trend of cesarean section. The greater the

number of antenatal care received during pregnancy, the higher the level of cesarean deliveries. When women make at most one antenatal visit, they are less prone to cesarean deliveries than those making six or more visits.

Regarding place of delivery, the practice of cesarean section is said to be more common in private health facilities when compared to hospitals in public sector and, this pattern has not change for 15 years, instead it has followed a rising trend. The results of TDHS-2008 have revealed that more than half of deliveries handled in private health institutions have ended in cesarean section while this proportion is 36 percent in public hospitals, which is also at high levels. On the other hand, the difference between public and private health facilities observed in previous years in terms of performing cesarean section seems to be closing in the future.

Proportion of cesarean deliveries among all births are given in Annex 1.

3.2. Multivariate results

Table 2 shows the results of logistic regression used to understand the impact of covariates on the likelihood of delivering by cesarean section rather than vaginal devlivery. Model 1 examines the effect of preganancy-related factors. In Model 2, individual characteristics of women are consired jointly with the variables in the former model and Model 3, which is the final model, includes all the variables used in descriptive analysis, except multiple births. The reason of such an exclusion has been explained in Materials and Methods section. Table 2 presents the odd ratios and the significancy of selected variables estimated from logistic regression.

It has been revealed that pregnancy-related factors have been significantly associated with cesarean section (Model 1). Among women between the ages of 35-49, the likelihood of having cesarean section increases and is 4 times higher compared to those aged less than 20 (P=0.000). Besides, birth order is an another factor on type of delivery being cesarean section or not. The chance of babies with first order (OR=1.95) being delivered by cesarean is twice as much as the ones with higher birth order. In terms of birth weight, women are significantly more prone to undergo cesarean section when they are under the risk of delivering low or high birth weight infants. Moreover, there is a significant association between antental care and cesarean births. The higher the number of antenatal visits, the greater the tendency of women to have cesarean section. Indeed, cesarean section is four times more likely to be preferred by women receiving at least six antenatal care when compared to those of receving no antenatal care or making only one visit. Place of delivery is another important determinant of cesarean births. Delivering in a private health institution raises the likelihood of occurance of cesarean section. When women have given birth in a

private health facility, their risk of having cesarean section is 2 times higher than delivering in a public health facility.

Table 2. Effect of selected variables on cesarean section

	MODELS		
	MODEL 1	**MODEL 2**	**MODEL 3**
Age at birth	*	*	*
<20	*1,000*	*1,000*	*1,000*
20-34	1,683*	1,602*	1,613*
35-49	4,277*	4,048*	4,138*
Birth order	*	**	**
1	1,948**	1,475	1,461
2-3	1,521	1,223	1,156
4-5	0,869	0,788	0,775
6+	*1,000*	*1,000*	*1,000*
Birth weight	*	*	*
Low (<2500g)	1,841*	1,907*	1,966*
Normal (2500-3999g)	*1,000*	*1,000*	*1,000*
High (>4000g)	1,001	1,028	1,057
Number of antenatal care	*	*	*
0-1	*1,000*	*1,000*	*1,000*
2-5	2,031*	2,002*	1,835**
6+	4,335*	3,795*	3,257*
Place of delivery	*	*	*
Public sector	*1,000*	*1,000*	*1,000*
Private sector	1,997*	1,894*	1,852*
Education		**	
No education/Incomp. primary educ.		*1,000*	*1,000*
First level primary		0,894	0,867
Second level primary		1,003	0,972
High school and higher		1,453	1,267
Mother tongue		**	
Turkish		1,442**	1,057
Kurdish		*1,000*	*1,000*
Other		0,891	0,676
History of abortion/stillbirth			
No		1,058	1,038
Yes		*1,000*	*1,000*
Health insurance			
Not covered by health insurance		*1,000*	*1,000*
Covered by health insurance		1,124	1,092

Table 2. Effect of selected variables on cesarean section (continued)

	MODELS		
	MODEL 1	**MODEL 2**	**MODEL 3**
Residence			
Urban			1,164
Rural			*1,000*
Region			*
West			1,821*
South			2,310*
Central			1,973*
North			2,294*
East			*1,000*
Wealth index			
Poor			*1,000*
Middle			0,971
Rich			1,250
Nagelkerke R^2	0,138	0,156	0,172
Wald F	17,547*	12,286*	9,831*

Reference categories are italic.
Differences are significant at: *p < 0.01; **p < 0.05; otherwise differences are not significant

Education and mother tongue are also associated with cesarean delivery (Model 2) and pregnancy-related variables continue to be significant determinants. Although mothers having higher levels of education are more inclined to undergo a caesarean procedure, there is no significant relationship between cesarean and education. In the final model, region has been found to be consistently and strongly associated with cesarean section in addition to the factors in the first model. Women residing in socia-economically more advantaged regions are twice as much as more prone to prefer giving birth by cesarean compared to those in less developed region.

4. Conclusion

This study documents the rising trend of cesarean section between the period of 1993 and 2008 and examines the determinants of cesarean section by utilizing the data obtained from the most recent demographic and health survey. Multivariate logistic regression analysis has shown that private health facilities, higher number of antental visits, older maternal age, low birth weight, living in regions other than the East and birth order have been found to be important determinants of cesarean section. On the other hand, there has not been a significant correlation between education and cesarean section although previous studies [13-14] have stated that education of women has an explanatory role in cesarean deliveries. Educated women tend to delay childbearing and this results in the increasing their likelihood of having cesarean section [4,15]. Besides, TDHS-2008 results have also revealed that age patterns of fertility are changing in Turkey as childbearing is increasingly postponed to later

ages [12], indicating an increase in cesarean section. Moreover, place of delivery has been the most important determinant of cesarean section in this study. It is a conspicuous fact that women have become more vulnerable to cesarean section when private health facility has been chosen as the place of delivery. On the other hand, in Turkey cesarean section is becoming an increasingly common method of delivering babies in public hospitals as well and the difference between public and private health facilities observed in previous years in terms of performing cesarean section seems to be closing in the future.

Turkey has already exceeded the optimal level of 15 percent recommended by WHO [1] by mid 90s and as of 2008 it has reached one of the most highest rates observed in European countries. Indeed, the recent level of cesarean section attained between the period of 1993-2008 in sub-population groups as well as nationwide is alarming. Although perinatal deaths has been reduced in Turkey [12], women and their infants may still suffer from rising cesarean levels. Besides, an increasing cesarean section rate results in economic burden on medical delivery system. Therefore, measures should be taken in order to eliminate unnecessary cesarean sections. In fact, some countries have attained reduced cesarean rates without increasing perinatal or maternal morbidity [4-5]. In Turkey, Ministry of Health has made an attempt to lower cesarean section and in line with this it has issued a circular in 2010 [16] to reduce elective cesarean section. It states that maternal demand will not be a sufficient reason for cesarean section. Furthermore, inclusion of midwives in delivery process increased midwifery staffing may help to decrease cesarean section rates [17]. Finally, more detailed studies mainly focused on cesarean section should be conducted in order to plan and implement appropriate policies.

5. References

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6. ANNEXES

ANNEX 1. Levels and trends of cesarean section by selected variables on the basis of institutional deliveries

	1993		1998		2003		2008	
	%	n	%	n	%	n	%	n
Residence								
Urban	10.2	2235	17.7	2150	25.6	2718	41.7	2475
Rural	4.9	1500	7.8	1283	12.9	1405	24.3	988
Region								
West	14.0	995	22.1	1025	30.8	1340	46.0	1174
South	6.6	591	14.5	487	20.8	554	39.8	441
Central	7.3	833	11.9	791	21.0	810	43.3	741
North	10.4	359	14.4	268	31.4	250	44.8	197
East	2.7	957	5.7	862	8.7	1168	16.1	911
Wealth Index								
Poorest	NA	NA	NA	NA	7.8	1035	18.1	852
Poorer	NA	NA	NA	NA	12.8	872	30.1	818
Middle	NA	NA	NA	NA	22.2	779	39.7	709
Richer	NA	NA	NA	NA	26.6	827	48.5	579
Richest	NA	NA	NA	NA	47.8	611	60.9	506
Education								
No education/Incomp. primary educ.	4.4	1362	5.9	925	7.6	1097	18.9	781
First level primary	9.3	2032	13.8	2104	19.9	2107	35.5	1691
Second level primary	13.0	248	27.4	281	24.7	306	38.8	322
High school and higher	23.7	93	46.9	123	48.7	613	59.5	669
Mother tongue								
Turkish	9.6	2823	16.7	2498	26.7	2895	44.0	2457
Kurdish	2.5	810	6.4	775	7.7	1070	18.2	866
Other	9.3	102	8.2	160	13.8	158	23.2	140
Health insurance								
Not covered by health insurance	5.1	2094	9.6	1794	13.9	1671	29.0	592
Covered by health insurance	11.8	1627	18.8	1606	26.4	2440	38.3	2862
Abortion/stillbirth								
No	7.3	2510	14.8	1134	20.9	2794	37.5	2446
Yes	9.6	1225	13.5	2299	22.1	1329	34.7	1017
Age at birth								
<20	5.4	585	7.4	499	11.5	518	26.6	344
20-34	8.5	2867	14.9	2682	22.5	3248	37.0	2811
35-49	9.2	284	17.2	252	24.0	357	45.4	308

ANNEX 1. Levels and trends of cesarean section by selected variables on the basis of institutional deliveries (continued)

	1993		1998		2003		2008	
	%	n	%	n	%	n	%	n
Birth order								
1	10.8	1226	18.9	1188	28.8	1397	44.6	1214
2-3	8.7	1513	13.8	1484	21.6	1791	37.7	1563
4-5	4.4	515	9.0	429	11.3	528	21.9	448
6+	3.0	481	3.3	333	7.2	407	18.3	237
Multiple births								
No	7.9	3655	13.3	3352	20.7	4055	36.1	3363
Yes	18.7	80	39.4	81	54.0	68	57.0	100
Number of antenatal care								
0-1	3.4	1680	3.9	1334	5.2	1308	9.8	527
2-5	8.3	1174	12.1	1069	18.8	1366	26.9	1035
6+	16.6	858	29.6	988	38.5	1408	49.9	1882
Place of delivery								
Home	0.0	1495	0.0	921	0.0	876	0.1	336
Public sector	12.5	2088	16.0	2208	23.1	2700	36.2	2410
Private sector	28.7	144	42.3	296	47.3	532	56.7	696
Birth weight								
Low (<2500g)	NA	NA	19.5	273	37.7	325	50.7	321
Normal (2500-3999g)	NA	NA	19.1	1576	27.4	2217	41.4	2276
High (>4000g)	NA	NA	21.0	359	25.1	356	37.0	311
Not weighted at birth	NA	NA	2.5	1090	2.5	1029	3.0	420
Total	8.1	3735	14.0	3433	21.3	4123	36.7	3463