THE EGYPTAIN POPULATION AND FAMILY PLANNING REVIEW.
ISSR., CAIRO UNIV., VOL (27), No. 1,1993.

The Impact of Education on Fertility According to Region and Contraceptive Use

By

Dr. Youssef M. Mahgoub *Dr. Mounira A. Hussein*

Introduction:

The impact of mother's educational level on the number of children ever born (CEB) for women not wanting more children is investigated using data of Pan Arab Project for Child Development (PAPCHILD) 1992. We had analyzed similar data for a total of 7288 women not wanting more children for the Egyptian Fertility Survey (EFS) 1980. Similar data analysis was introduced for a total of 5127 women not wanting more children for Contraceptives Prevelance Survey(CPS) 1984. Recently, we added one more such analysis for a total of 4974 fecund women who do not want more children for Demographic and Health Survey (DHS) 1988. In the previous studies, number of living children was used as a measure to fertility. Here, number of children ever born is used as a measure to fertility. Data on children ever born (CEB) suffer from some limitations, namely; the memory lapse, especially for older women who have passed their reproductive ages a long time ago, and omission of children who had died short time after birth, and those who got married and left their parents. Global odds ratios are utilized in these data sets and comparison of their findings is highlighted. The definition and interpretation of global odds ratios are emphasized. Different models for global odds ratios are tested. Some policy implications are suggested.

Methodology

Global odds ratios are defined as:

$$\psi_{ij} = \frac{\sum_{a\le i}\sum_{b\le j}\Pi_{ab}\ \sum_{a>i}\sum_{b>j}\Pi_{ab}}{\sum_{a>i}\sum_{b\le j}\Pi_{ab}\ \sum_{a\le i}\sum_{b>j}\Pi_{ab}^{2}}$$

for $i=1,2,\ldots\ldots,r\text{-}1$ (*rows*) , $j=1,2,\ldots\ldots,c\text{-}1$ (*columns*).

where Π_{ij} *denotes the population proportion in the cell* (i , j) *and* $\sum_{i=1}^{r}\sum_{j=1}^{c}\Pi_{ij}=1$.

Dr. Youssef M. Mahgoub is an Assistant Professor , Demography and Biostatistics Dept., ISSR. Cairo University .

Dr. Mounira A. Hussein is an Assistant Professor, College of Commerce , Menoufia University.

Each global odds ratio can be expressed as a ratio of odds of cumulative events as:

$$\psi_{ij} = \frac{odds\ [c_1 \leq i/c_2 \leq j]}{odds\ [c_1 \leq i/c_2 > j]} = \frac{odds\ [c_2 \leq j/c_1 \leq i]}{odds\ [c_2 \leq j/c_1 > i]}$$

where odds for an event E are $\frac{p(E)}{1-p(E)}$ and r and c denote to the row and column

classifications respectively and P $(c_1=i , c_2 =j) = \Pi_{ij}$. Thus, in Table 1, the global odds ratio at <Secondary/<University and 2-3/4-5 cutpoint has the following interpretation. The odds on having at least secondary education given that the number of living children is at most three is 8.955 times the odds on having at least secondary education given that the number of living children is at least four. It has also the following interpretation. The odds on having at most three living child given that the level of education is at least secondary is 8.955 times the odds on having at most three living children given that the level of education is at most primary. Note that less than (<) university is equivalent to secondary.

Numerical Example :

A: PAPCHILD 1992, National Level:

A sample of total of 5248 fecund women who do not want more children are cross classified by (1) number of children ever born and (2) their educational level. We have categorized number of children ever born in order to avoid zero entries as well as to better handle the data. It is easy to show that merging two rows or two columns do not affect the magnitudes or the variance covariance matrices of the global odds ratios , but it just deletes some of these global odds ratios. Table 1 shows the observed cell counts and global odds ratios for the data of PAPCHILD 1992, National Level. It is clear that global odds ratios are increasing as number of children ever born increases. This trend is true for all the educational levels considered here, but the rate of increase gets higher as the educational level gets higher. As for columns, global odds ratios decrease as the educational level decreases except for the first cutpoint ψ_{11} (2.2007) which is less than ψ_{21} (2.477), which means that women whose educational level is university or more tend to have two or more children more than those whose educational levl is secondary. However, the difference is not that clear. It may be explained also by the fact that having one child is not acceptable yet as an ideal family size.

Results :

Here, we are interested in models of the form : $\ln \psi_{ij} = X \beta$, where X is a design matrix. SAS (5) uses WLS method to test the significance of different global odds ratios. Obviously , the null hypothesis is that each global odds ratio equals to one , which is equivalent to no association at the corresponding location. Figure A-1 shows the results for ' First Row Effect' for the global odds ratios in the first row National Level. These results show that ψ_{11}, ψ_{12} and ψ_{13} are highly significant, i.e they are different from one which means that there are significant associations at these locations.

A = The National Level

Table 1 : Observed Cell Counts and Global Odds Ratios for Women not Wanting More Children (PAPCHILD 1992), National Level.

Level Of Education	Number of Children Ever Born 0-1	2-3	4-5	6+	Total
University +	17	215	40	4	276
	(2.201)*	(9.907)	(35.204)		
< University	38	461	146	15	660
	(2.477)	(8.955)	(30.836)		
< Secondary	21	259	205	109	594
	(2.234)	(5.692)	(8.023)		
< Primary	14	229	310	267	820
	(1.586)	(3.559)	(4.055)		
No. Education	71	634	888	1305	2898
Total	161	1798	1589	1700	5248

* Global odds ratios are in parentheses

The test statistic for goodness of fit for equal global odds ratios within the first row, which follows a chi-squared distribution with 3 degrees of freedom, has a value of 45.54 (P-value=0.0001), thus the model has to be rejected. Testing for linear trend, the chi-square test statistic is 3.46 with one degree of freedom (P-value=0.0630), therefore the linear trend is accepted.

Figure A-2 presents the results of the Second Row Effect. The chi-square test statistic has a value of 153.57 with 3 degrees of freedom (P-value=0.0001), thus the model that all global odds ratios in the second row equal to a constant has to be rejected. It is also clear that all global odds ratios in the second row are significantly different from one.The test for linear trend has a chi-square value of 15.48 with one degree of freedom (P-value=0.0001), thus the linear trend has to be rejected. Figure A-3 presents the results of the 'Third Row Effect'. The chi-square test statistic for testing that all global odds ratios in the third row are equal to a constant has a value of 258.88 with 3 degrees of freedom, thus the model of equal global odds ratios has to be rejected.

Figure A-1: First Row Effect , National Level.

ANALYSIS OF VARIANCE TABLE

SOURCE	DF	Chi-square	Prob
INTERCEPT	3	45.54	0.0001
RESIDUAL	0	0.00	1.0000

ANALYSIS OF INDIVIDUAL PARAMETERS

Effect	Parameter	Estimate	Standard Error	Chi-square	prob
INTERCEPT	1	2.201	0.582	14.32	0.0002
	2	9.907	1.656	35.81	0.0001
	3	55.204	17.762	3.93	0.0475

ANALYSIS OF CONTRASTS

Contrast	DF	Chi-square	Prob
Test of Linear Trend	1	3.46	0.0630

Furthermore, all global odds ratios in this row are significantly different from one, indicating the existance of negative associations at the corresponding locations. The test for linear trend has a value of 47.54 with one degree of freedom (P-value=0.0001), thus the linear trend has to be rejected. Figure A-4 presents the results of the 'Fourth Row Effect'. The chi-square test statistic for testing that all global odds ratios in the fourth row are equal to a

constant has a value of 347.47 with 3 degrees of freedom, thus the model of equal global odds ratios has to be rejected. Furthermore, all global odds ratios in this row are significantly different from one, indicating negative associations at the corresponding locations. The test for linear trend has a value of 49.49 with one degree of freedom (P-value=0.0001), thus the linear trend has to be rejected.

Figure A-2: Second Row Effect , National Level.

ANALYSIS OF VARIANCE TABLE

SOURCE	DF	Chi-square	Prob
INTERCEPT	3	153.57	0.0001
RESIDUAL	0	0.00	1.0000

ANALYSIS OF INDIVIDUAL PARAMETERS

Effect	Parameter	Estimate	Standard Error	Chi-square	prob
INTERCEPT	1	2.477	0.422	34.50	0.0001
	2	8.955	0.770	135.42	0.0001
	3	30.836	7.212	18.28	0.0001

ANALYSIS OF CONTRASTS

Contrast	DF	Chi-square	Prob
Test of Linear Trend	1	15.48	0.0001

Figure A-3: Third Row Effect , National Level.

ANALYSIS OF VARIANCE TABLE

SOURCE	DF	Chi-square	Prob
INTERCEPT	3	258.88	0.0001
RESIDUAL	0	0.00	1.0000

ANALYSIS OF INDIVIDUAL PARAMETERS

Effect	Parameter	Estimate	Standard Error	Chi-square	prob
INTERCEPT	1	2.234	0.359	38.63	0.0001
	2	5.692	0.375	230.85	0.0001
	3	8.023	0.787	103.87	0.0001

ANALYSIS OF CONTRASTS

Contrast	DF	Chi-square	Prob
Test of Linear Trend	1	47.54	0.0001

Figure A-4: Fourth Row Effect , National Level.

ANALYSIS OF VARIANCE TABLE

SOURCE	DF	Chi-square	Prob
INTERCEPT	3	347.47	0.0001
RESIDUAL	0	0.00	1.0000

ANALYSIS OF INDIVIDUAL PARAMETERS

Effect	Paramcter	Estimate	Standard Error	Chi-square	prob
INTERCEPT	1	1.586	0.256	38.47	0.0001
	2	3.559	0.213	279.00	0.0001
	3	4.055	0.270	225.37	0.0001

ANALYSIS OF CONTRASTS

Contrast	DF	Chi-square	Prob
Test of Linear Trend	1	49.49	0.0001

B-Urban Egypt.

Table 2 shows the observed cell counts and global odds ratios for the data of Popchild 1992, Urban Egypt. The results are similar to those for National Level (Table 1). It is clear that global odds ratios are increasing as number of children ever born increases. This trend is true for all the educational levels considered here, but the rate of increase gets higher as the educational level gets higher. As for columns, global odds ratios decrease as the educational level decreases except for the first cutpoint ψ_{11} (1.761) which is less than ψ_{21} (1.889), which means that women whose educational level is university or more tend to have two or more children more than those whose educational level is secondary. Again It may be explained by the fact that having one child is not acceptable yet as an ideal family size. Again, the difference is not that sound.

Table 2 : Observed Cell Counts and Global Odds Ratios for Women not Wanting More Children (PAPCHILD 1992), Urban.

Level Of Education	Number of Children Ever Born 0-1	2-3	4-5	6+	Total
University +	13	199	43	3	249
	(1.761)*	(7.778)	(25.386)		
< University	21	320	106	13	460
	(1.889)	(7.070)	(18.177)		
< Secondary	11	182	156	64	413
	(1.581)	(4.900)	(6.826)		
< Primary	9	138	159	114	420
	(1.257)	(4.018)	(4.307)		
No. Education	22	178	284	300	784
Total	76	1017	739	494	2326

* Global odds ratios are in parentheses

Figure B-1: First Row Effect , Urban.

ANALYSIS OF VARIANCE TABLE

SOURCE	DF	Chi-square	Prob
INTERCEPT	3	36.67	0.0001
RESIDUAL	0	0.00	1.0000

ANALYSIS OF INDIVIDUAL PARAMETERS

Effect	Parameter	Estimate	Standard Error	Chi-square	prob
INTERCEPT	1	1.7609	0.5499	10.25	0.0014
	2	7.778	1.4282	29.66	0.0001
	3	25.386	14.8038	2.94	0.0864

ANALYSIS OF CONTRASTS

Contrast	DF	Chi-square	Prob
Test of Linear Trend	1	2.55	0.1104

Figure B-2: Second Row Effect , Urban.

ANALYSIS OF VARIANCE TABLE

SOURCE	DF	Chi-square	Prob
INTERCEPT	3	100.20	0.0001
RESIDUAL	0	0.00	1.0000

ANALYSIS OF INDIVIDUAL PARAMETERS

Effect	Paramcter	Estimate	Standard Error	Chi-square	prob
INTERCEPT	1	1.889	0.444	18.07	0.0001
	2	7.070	0.741	90.92	0.0001
	3	18.177	4.702	14.94	0.0001

ANALYSIS OF CONTRASTS

Contrast	DF	Chi-square	Prob
Test of Linear Trend	1	11.98	0.0005

Figure B-3: Third Row Effect , Urban.

ANALYSIS OF VARIANCE TABLE

SOURCE	DF	Chi-square	Prob
INTERCEPT	3	140.64	0.0001
RESIDUAL	0	0.00	1.0000

ANALYSIS OF INDIVIDUAL PARAMETERS

Effect	Parameter	Estimate	Standard Error	Chi-square	prob
INTERCEPT	1	1.581	0.3750	17.77	0.0001
	2	4.900	0.4396	124.24	0.0001
	3	6.826	0.8936	58.34	0.0001

ANALYSIS OF CONTRASTS

Contrast	DF	Chi-square	Prob
Test of Linear Trend	1	30.92	0.0001

Figure B-4: Fourth Row Effect , Urban.

ANALYSIS OF VARIANCE TABLE

SOURCE	DF	Chi-square	Prob
INTERCEPT	3	137.78	0.0001
RESIDUAL	0	0.00	1.0000

ANALYSIS OF INDIVIDUAL PARAMETERS

Effect	Parameter	Estimate	Standard Error	Chi-square	prob
INTERCEPT	1	1.2570	0.3228	15.16	0.0001
	2	4.0178	0.3890	106.69	0.0001
	3	4.3069	0.4577	88.53	0.0001

ANALYSIS OF CONTRASTS

Contrast	DF	Chi-square	Prob
Test of Linear Trend	1	32.94	0.0001

Figure B-1 presents the results of the 'First Row Effect'. The chi-square test statistic for testing that all global odds ratios in the first row are equal to a constant has a value of 36.67 with 3 degrees of freedom, thus the model of equal global odds ratios has to be rejected. Furthermore, ψ_{11} and ψ_{12} are different from one, indicating negative associations at the corresponding locations. Although ψ_{13} is large (25.386) its standard error is large too (14.804), therefore, it is not significantly different from one. The test for linear trend has a value of 2.55 with one degree of freedom (P-value=0.1104), thus the linear trend has to be accepted. Figure B-2 presents the results of the 'Second Row Effect'. The chi-square test statistic for testing that all global odds ratios in the second row are equal to a constant has a value of 100.20 with 3 degrees of freedom, thus the model of equal global odds ratios has to be rejected. Furthermore, all global odds ratios in this row are significantly different from one, indicating negative associations at the corresponding locations. The test for linear trend has a value of 11.98 with one degree of freedom (P-value=0.0005), thus the linear trend has to be rejected.

Figure B-3 presents the results of the 'Third Row Effect'. The chi-square test statistic for testing that all global odds ratios in the third row are equal to a constant has a value of 140.64 with 3 degrees of freedom, thus the model of equal global odds ratios has to be rejected. Furthermore, all global odds ratios in this row are significantly different from one, indicating negative associations at the corresponding locations. The test for linear trend has a value of 30.92 with one degree of freedom (P-value=0.0001), thus the linear trend has to be rejected.

Figure B-4 presents the results of the 'Fourth Row Effect'. The chi-square test statistic for testing that all global odds ratios in the fourth row are equal to a constant has a value of 137.78 with 3 degrees of freedom, thus the model of equal global odds ratios has to be rejected. Furthermore, all global odds ratios in this row are significantly different from one, indicating negative associations at the corresponding locations. The test for linear trend has a value of 32.94 with one degree of freedom (P-value=0.0001), thus the linear trend has to be rejected.

C-Rural.

Table 3 shows the observed cell counts and global odds ratios for the data of PAPCHILD 1992, Rural. The results are similar to those for National Level (Table 1). It is clear that global odds ratios are increasing as number of children ever born increases. This trend is true for all the educational levels considered here, but the rate of increase gets higher as the educational level gets higher. As for columns, global odds ratios decrease as the educational level decreases except for the two cutpoints ψ_{12} (6.920) which is less than ψ_{22} (10.597),and ψ_{13} (18.539) which is less than ψ_{23} (60.204) which means that women whose educational level is university or more tend to have two or more children more than those whose educational levl is secondary. Again It may be explained by the fact that having three children or less is

not acceptable yet as an ideal family size in rural areas.

Table 3 : Observed Cell Counts and Global Odds Ratios for Women not Wanting More Children (PAPCHILD 1992), Rural.

Level Of Education	Number of Children Ever Born 0-1	2-3	4-5	6+	Total
University +	4	16	6	1	27
	(6.042)*	(6.920)	(18.538)		
< University	17	141	40	2	200
	(4.191)	(10.597)	(60.204)		
< Secondary	10	77	49	45	181
	(3.746)	(5.899)	(6.405)		
< Primary	5	91	151	153	400
	(1.965)	(2.573)	(2.734)		
No. Education	49	456	604	1005	2114
Total	85	781	850	1206	2922

* Global odds ratios are in parentheses.

Figure C-1 presents the results of the 'First Row Effect'. The chi-square test statistic for testing that all global odds ratios in the first row are equal to a constant has a value of 6.86 with 3 degrees of freedom (p_value =0.0764), thus the model of equal global odds ratios is accepted. Furthermore, ψ_{12} is different from one, indicating negative association at the corresponding location. Although ψ_{11} is large (6.042) its standard error is large too (3.343), therefore, it is not significantly different from one. Also, ψ_{13} (18.539) is too large, its standard error is large too (18.905), therefore, it is not significantly different form one.

Figure C-2 presents the results of the 'Second Row Effect'. The chi-square test statistic for testing that all global odds ratios in the second row are equal to a constant has a value of 43.84 with 3 degrees of freedom, thus the model of equal global odds ratios has to be rejected.

Furthermore, the global odds ratios ψ_{21} and ψ_{22} are significantly different from one, indicating negative associations at the corresponding locations. But ψ_{23} is large (60.204) its standard error is large too (35.068), thus it is not significantly different from one, The test for linear trend has a value of 2.55 with one degree of freedom (P-value=0.1100), thus the linear trend is accepted.

Figure C-3 presents the results of the 'Third Row Effect'. The chi-square test statistic for testing that all global odds ratios in the third row are equal to a constant has a value of 88.39 with 3 degrees of freedom, thus the model of equal global odds ratios has to be rejected. Furthermore, all global odds ratios in this row are significantly different from one, indicating negative associations at the corresponding locations. The test for linear trend has a value of 4.39 with one degree of freedom (P-value=0.0361), thus the linear trend has to be rejected.

Figure C-4 presents the results of the 'Fourth Row Effect'. The chi-square test statistic for testing that all global odds ratios in the fourth row are equal to a constant has a value of 167.00 with 3 degrees of freedom, thus the model of equal global odds ratios has to be rejected. Furthermore, all global odds ratios in this row are significantly different from one, indicating negative associations at the corresponding locations. The test for linear trend has a value of 2.61 with one degree of freedom (P-value=0.1064), thus the linear trend is accepted.

Figure C-1: First Row Effect , Rural.

ANALYSIS OF VARIANCE TABLE

SOURCE	DF	Chi-square	Prob
INTERCEPT	3	6.86	0.0764
RESIDUAL	0	0.00	1.0000

ANALYSIS OF INDIVIDUAL PARAMETERS

Effect	Parameter	Estimate	Standard Error	Chi-square	prob
INTERCEPT	1	6.042	3.3342	3.27	0.0707
	2	4.920	3.0521	5.14	0.0234
	3	18.539	18.905	0.96	0.3268

ANALYSIS OF CONTRASTS

Contrast	DF	Chi-square	Prob
Test of Linear Trend	1	0.44	0.5091

Figure C-2: Second Row Effect , Rural.

ANALYSIS OF VARIANCE TABLE

SOURCE	DF	Chi-square	Prob
INTERCEPT	3	43.84	0.0001
RESIDUAL	0	0.00	1.0000

ANALYSIS OF INDIVIDUAL PARAMETERS

Effect	Parameter	Estimate	Standard Error	Chi-square	prob
INTERCEPT	1	4.191	1.097	14.60	0.0001
	2	10.597	1.773	35.74	0.0001
	3	60.204	35.068	2.95	0.0860

ANALYSIS OF CONTRASTS

Contrast	DF	Chi-square	Prob
Test of Linear Trend	1	2.55	0.1100

Figure C-3: Third Row Effect , Rural.

ANALYSIS OF VARIANCE TABLE

SOURCE	DF	Chi-square	Prob
INTERCEPT	3	88.39	0.0001
RESIDUAL	0	0.00	1.0000

ANALYSIS OF INDIVIDUAL PARAMETERS

Effect	Parameter	Estimate	Standard Error	Chi-square	prob
INTERCEPT	1	3.746	0.869	18.58	0.0001
	2	5.899	0.671	77.20	0.0001
	3	6.405	1.017	33.66	0.0001

ANALYSIS OF CONTRASTS

Contrast	DF	Chi-square	Prob
Test of Linear Trend	1	4.39	0.0361

Figure C-4: Fourth Row Effect , Rural.

ANALYSIS OF VARIANCE TABLE

SOURCE	DF	Chi-square	Prob
INTERCEPT	3	167.00	0.0001
RESIDUAL	0	0.00	1.0000

ANALYSIS OF INDIVIDUAL PARAMETERS

Effect	Parameter	Estimate	Standard Error	Chi-square	prob
INTERCEPT	1	1.965	0.439	20.01	0.0001
	2	2.573	0.224	131.42	0.0001
	3	2.734	0.253	117.38	0.0001

ANALYSIS OF CONTRASTS

Contrast	DF	Chi-square	Prob
Test of Linear Trend	1	2.61	0.1064

D: Urban Governorates.

Table 4 shows the observed cell counts and global odds ratios for the data of PAPCHILD 1992, Urban Governorates. The results are similar to those for National Level (Table 1). It is clear that global odds ratios are increasing as number of children ever born increases. This trend is true for all the educational levels considered here, but the rate of increase gets higher as the educational level gets higher. As for columns, The global odds ratios in the first column are almost identical which may be explained by the fact that having at most one child is not acceptable yet as an ideal family size in urban governorates.

Table 4 : Observed Cell Counts and Global Odds Ratios for Women not Wanting More Children (PAPCHILD 1992), Urban Governorates.

Level Of Education	Number of Children Ever Born 0-1	2-3	4-5	6+	Total
University +	10 (2.086)*	110 (8.815)	14 (15.243)	2	136
< University	11 (1.890)	159 (8.172)	44 (26.995)	2	216
< Secondary	10 (1.907)	109 (5.157)	93 (7.039)	29	241
< Primary	7 (2.023)	72 (4.847)	78 (4.253)	50	207
No. Education	7	64	124	96	291
Total	45	514	353	179	1091

* Global odds ratios are in parentheses

Figure D-1 presents the results of the 'First Row Effect'. The chi-square test statistic for testing that all global odds ratios in the first row are equal to a constant has a value of 18.66 with 3 degrees of freedom, thus the model of equal global odds ratios has to be rejected. Furthermore, ψ_{11} and ψ_{12} are different from one, indicating negative associations at the corresponding locations. Although
ψ_{13} is large (15.243) its standard error is large too (10.932), therefore, it is not significantly different from one. The test for linear trend has a value of 1.45 with one degree of freedom (P-value=0.2288), thus the linear trend has to be accepted. Figure D-2 presents the results of the 'Second Row Effect'. The chi-square test statistic for testing that all global odds ratios in the second row are equal to a constant has a value of 64.76 with 3 degrees of freedom, thus the model of equal global odds ratios has to be rejected. Furthermore, all global odds ratios in this row are significantly different from one, indicating negative associations at the corresponding locations. The test for linear trend has a value of 11.29 with one degree of freedom (P-value=0.0008), thus the linear trend has to be rejected.

Figure D-3 presents the results of the 'Third Row Effect'. The chi-square test statistic for testing that all global odds ratios in the third row are equal to a constant has a value of 45.03 with 3 degrees of freedom, thus the model of equal global odds ratios has to be rejected. Furthermore, all global odds ratios in this row are significantly different from one, indicating negative associations at the corresponding locations. The test for linear trend has a value of 3.32 with one degree of freedom (P-value=0.0682), thus the linear trend is accepted.

Figure D-4 presents the results of the 'Fourth Row Effect'. The chi-square test statistic for testing that all global odds ratios in the fourth row are equal to a constant has a value of 55.58 with 3 degrees of freedom, thus the model of equal global odds ratios has to be rejected. Furthermore, all global odds ratios in this row are significantly different from one, indicating negative associations at the corresponding locations. The test for linear trend has a value of 4.43 with one degree of freedom (P-value=0.0352), thus the linear trend has to be rejected.

Figure D-1: First Row Effect , Urban Governorates.

ANALYSIS OF VARIANCE TABLE

SOURCE	DF	Chi-square	Prob
INTERCEPT	3	18.66	0.0003
RESIDUAL	0	0.00	1.0000

ANALYSIS OF INDIVIDUAL PARAMETERS

Effect	Parameter	Estimate	Standard Error	Chi-square	prob
INTERCEPT	1	2.086	0.774	7.27	0.0070
	2	8.815	2.415	13.32	0.0003
	3	15.243	10.932	1.94	0.1632

ANALYSIS OF CONTRASTS

Contrast	DF	Chi-square	Prob
Test of Linear Trend	1	1.45	0.2288

Figure D-2: Second Row Effect , Urban Governorates.

ANALYSIS OF VARIANCE TABLE

SOURCE	DF	Chi-square	Prob
INTERCEPT	3	45.03	0.0001
RESIDUAL	0	0.00	1.0000

ANALYSIS OF INDIVIDUAL PARAMETERS

Effect	Parameter	Estimate	Standard Error	Chi-square	prob
INTERCEPT	1	1.890	0.579	10.67	0.0011
	2	8.172	1.303	39.34	0.0001
	3	26.995	13.774	3.84	0.0500

ANALYSIS OF CONTRASTS

Contrast	DF	Chi-square	Prob
Test of Linear Trend	1	3.32	0.0682

Figure D-3: Third Row Effect , Urban Governorates.

ANALYSIS OF VARIANCE TABLE

SOURCE	DF	Chi-square	Prob
INTERCEPT	3	64.76	0.0001
RESIDUAL	0	0.00	1.0000

ANALYSIS OF INDIVIDUAL PARAMETERS

Effect	Parameter	Estimate	Standard Error	Chi-square	prob
INTERCEPT	1	1.907	0.625	9.30	0.0023
	2	5.157	0.681	57.41	0.0001
	3	7.039	1.439	23.94	0.0001

ANALYSIS OF CONTRASTS

Contrast	DF	Chi-square	Prob
Test of Linear Trend	1	11.29	0.0008

Figure D-4: Fourth Row Effect , Urban Governorates.

ANALYSIS OF VARIANCE TABLE

SOURCE	DF	Chi-square	Prob
INTERCEPT	3	55.58	0.0001
RESIDUAL	0	0.00	1.0000

ANALYSIS OF INDIVIDUAL PARAMETERS

Effect	Parameter	Estimate	Standard Error	Chi-square	prob
INTERCEPT	1	2.023	0.844	5.75	0.0165
	2	4.847	0.749	41.87	0.0001
	3	4.253	0.724	34.50	0.0001

ANALYSIS OF CONTRASTS

Contrast	DF	Chi-square	Prob
Test of Linear Trend	1	4.43	0.0352

E- Urban Lower.

Table 5 shows the observed cell counts and global odds ratios for the data of PAPCHILD 1992, Urban Lower. In this data set there is no observations in the cell (University+ , 6+), therefore, we added the educational level University+ to <University and called that category 'secondary+' in order to avoid zero counts. Also there is no observations in the category '0' children ever born , i.e, there is no woman with parity in urban lower. Moreover, a few women (15) had given birth to only one child which results in the existance of zero counts in some cells. Thus, we added the category '1' to the category '2-3' as shown in table 5. The global odds ratios in this table show the same trend that was seen earlier, i.e, thses global odds ratios increase as either number of children ever born or the educational level increase.

Table 5: Observed Cell Counts and Global Odds Ratios for Women not Wanting More Children (Popchild 1992), Urban Lower.

Level Of Education	Number of Children Ever Born 1-3	4-5	6+	Total
Secondary+	136	36	5	177
	(6.795)	(15.609)		
< Secondary	43	39	17	99
	(4.266)	(6.123)		
< Primary	43	50	32	125
	(3.140)	(4.058)		
No Education	79	92	108	279
Total	301	217	162	680

* Global odds ratios are in parentheses

Figure E-1: First Row Effect , Urban Lower.

ANALYSIS OF VARIANCE TABLE

SOURCE	DF	Chi-square	Prob
INTERCEPT	2	24.93	0.0001
RESIDUAL	0	0.00	1.0000

ANALYSIS OF INDIVIDUAL PARAMETERS

Effect	Parameter	Estimate	Standard Error	Chi-square	prob
INTERCEPT	1	6.795	1.372	24.53	0.0001
	2	15.609	7.239	4.65	0.0311

Figure E-2: Second Row Effect., Urban Lower.

ANALYSIS OF VARIANCE TABLE

SOURCE	DF	Chi-square	Prob
INTERCEPT	2	39.33	0.0001
RESIDUAL	0	0.00	1.0000

ANALYSIS OF INDIVIDUAL PARAMETERS

Effect	Parameter	Estimate	Standard Error	Chi-square	prob
INTERCEPT	1	4.266	0.709	36.18	0.0001
	2	6.123	1.504	16.58	0.0001

Figure E-3: Third Row Effect , Urban Lower.

ANALYSIS OF VARIANCE TABLE

SOURCE	DF	Chi-square	Prob
INTERCEPT	2	43.01	0.0001
RESIDUAL	0	0.00	1.0000

ANALYSIS OF INDIVIDUAL PARAMETERS

Effect	Parameter	Estimate	Standard Error	Chi-square	prob
INTERCEPT	1	3.140	0.523	36.04	0.0001
	2	4.058	0.775	27.39	0.0001

Figures E-1, E-2, and E-3 present the results of the first, second, and third row effects respectively. The chi-square test statistics for testing that global odds ratios in each row are significant, thus the model of equal global odds ratios has to be rejected. Furthermore, all global odds ratios in this table are significantly different from one, indicating negative associations at the corresponding locations.

F : Rural Lower.

Table 6 presents the results for PAPCHILD (1988) data, Rural Lower. In this data set, the cell '<university/6+' has zero counts. Therefore, we added University+ to <University in order to avoid zero counts . The global odds ratios in the three columns are increasing as both the educational level and number of children ever born increase which is expected and seen before for the above data sets.

Table 6 : Observed Cell Counts and Global Odds Ratios
for Women not Wanting More Children.
(PAPCHILD 1992) , Rural Lower.

Level of Education	Number of Children Ever Born 0-1	2-3	4-5	6+	TOTAL
< University& University +	17	129	32	1	179
	(4.369)	(11.043)	(114.979)		
< Secondary	8	53	38	32	131
	(4.212)	(5.393)	(5.701)		
< Primary	2	69	114	95	280
	(2.020)	(2.346)	(2.593)		
No Education	31	337	410	559	1337
Total	58	588	594	687	1927

Figures F-1, F-2, and F-3 present the results of the first, second, and third row effects respectively. The chi-square test statistics for testing that global odds ratios in each row are significant, thus the model of equal global odds ratios has to be rejected. Furthermore, all global odds ratios in this table, except ψ_{13}, are significantly different from one, indicating negative associations at the corresponding locations.

Figure F-1: First Row Effect , Rural Lower.

ANALYSIS OF VARIANCE TABLE

SOURCE	DF	Chi-square	Prob
INTERCEPT	3	31.65	0.0001
RESIDUAL	0	0.00	1.0000

ANALYSIS OF INDIVIDUAL PARAMETERS

Effect	Parameter	Estimate	Standard Error	Chi-square	Prob
INTERCEPT	1	4.369	1.311	11.11	0.0009
	2	11.043	2.207	25.03	0.0001
	3	114.979	115.439	0.99	0.3192

ANALYSIS OF CONTRASTS

Contrast	DF	Chi-square	Prob
Test of Linear Trend	1	0.92	0.3379

Figure F-2: Second Row Effect , Rural Lower.

ANALYSIS OF VARIANCE TABLE

SOURCE	DF	Chi-square	Prob
INTERCEPT	3	64.55	0.0001
RESIDUAL	0	0.00	1.0000

ANALYSIS OF INDIVIDUAL PARAMETERS

Effect	Parameter	Estimate	Standard Error	Chi-square	Prob
INTERCEPT	1	4.212	1.149	13.43	0.0002
	2	5.393	0.717	56.60	0.0001
	3	5.701	1.089	27.41	0.0001

ANALYSIS OF CONTRASTS

Contrast	DF	Chi-square	Prob
Test of Linear Trend	1	0.98	0.3222

Figure F-3: Third Row Effect , Rural Lower.

ANALYSIS OF VARIANCE TABLE

SOURCE	DF	Chi-square	Prob
INTERCEPT	3	117.06	0.0001
RESIDUAL	0	0.00	1.0000

ANALYSIS OF INDIVIDUAL PARAMETERS

Effect	Parameter	Estimate	Standard Error	Chi-square	Prob
INTERCEPT	1	2.020	0.542	13.92	0.0002
	2	2.346	0.241	94.77	0.0001
	3	2.593	0.296	76.62	0.0001

ANALYSIS OF CONTRASTS

Contrast	DF	Chi-square	Prob
Test of Linear Trend	1	0.96	0.3282

G: Urban Upper

Table 7 shows the observed cell counts and global odds ratios for the data of PAPCHILD 1992, Urban Upper. In this data set there is no women with zero number of children ever born.

Figure G-1 presents the results of the 'First Row Effect'. The chi-square test statistic for testing that all global odds ratios in the first row are equal to a constant has a value of 8.97 with 3 degrees of freedom, thus the model of equal global odds ratios has to be rejected. Furthermore, ψ_{11} and ψ_{13} are not significantly different from one, while ψ_{12} is significantly different from one. The test for linear trend has a value of 0.90 with one degree of freedom (P-value=0.3432), thus the linear trend has to be accepted. Figure G-2 presents the results of the 'Second Row Effect'. The chi-square test statistic for testing that all global odds ratios in the second row are equal to a constant has a value of 27.17 with 3 degrees of freedom, thus the model of equal global odds ratios has to be rejected. Furthermore, all global odds ratios in this row are significantly different from one, indicating negative associations at the corresponding locations. The test for linear trend has a value of 6.42 with one degree of freedom (P-value=0.0316), thus the linear trend has to be rejected.

Table 7 : Observed Cell Counts and Global Odds Ratios for Women not Wanting More Children (PAPCHILD 1992), Urban Upper.

Level Of Education	Number of Children Ever Born 1	2-3	4-5	6+	Total
University +	2 (1.119)*	51 (9.187)	9 (27.718)	1	63
< University	6 (2.134)	68 (6.081)	37 (15.757)	6	117
< Secondary	1 (1.555)	30 (5.034)	24 (6.710)	18	73
< Primary	1 (1.047)	24 (3.799)	31 (4.054)	32	88
No. Education	6	44	68	96	214
Total	16	217	169	153	555

* Global odds ratios are in parentheses

Figure G-3 presents the results of the 'Third Row Effect'. The chi-square test statistic for testing that all global odds ratios in the third row are equal to a constant has a value of 33.76 with 3 degrees of freedom, thus the model of equal global odds ratios has to be rejected. Furthermore, all global odds ratios in this row are significantly different from one, indicating negative associations at the corresponding locations. The test for linear trend has a value of 8.79 with one degree of freedom (P-value=0.0030), thus the linear trend has to be rejected.

Figure G-4 presents the results of the 'Fourth Row Effect'. The chi-square test statistic for testing that all global odds ratios in the fourth row are equal to a constant has a value of 35.16 with 3 degrees of freedom, thus the model of equal global odds ratios has to be rejected. Furthermore, all global odds ratios in this row ,except ψ_{31}, are significantly different from one, indicating negative associations at the corresponding locations. The test for linear trend has a value of 10.60 with one degree of freedom (P-value=0.0011), thus the linear trend has to be rejected.

Figure G-1: First Row Effect , Urban Upper.

ANALYSIS OF VARIANCE TABLE

SOURCE	DF	Chi-square	Prob
INTERCEPT	3	8.97	0.0297
RESIDUAL	0	0.00	1.0000

ANALYSIS OF INDIVIDUAL PARAMETERS

Effect	Parameter	Estimate	Standard Error	Chi-square	prob
INTERCEPT	1	1.119	0.860	1.70	0.1929
	2	9.187	3.282	7.84	0.0051
	3	27.718	28.071	0.97	0.3432

ANALYSIS OF CONTRASTS

Contrast	DF	Chi-square	Prob
Test of Linear Trend	1	0.90	0.3432

Figure G-2: Second Row Effect , Urban Upper.

ANALYSIS OF VARIANCE TABLE

SOURCE	DF	Chi-square	Prob
INTERCEPT	3	27.17	0.0001
RESIDUAL	0	0.00	1.0000

ANALYSIS OF INDIVIDUAL PARAMETERS

Effect	Parameter	Estimate	Standard Error	Chi-square	prob
INTERCEPT	1	2.134	1.085	3.87	0.0492
	2	6.081	1.215	25.07	0.0001
	3	15.757	6.300	6.26	0.0124

ANALYSIS OF CONTRASTS

Contrast	DF	Chi-square	Prob
Test of Linear Trend	1	6.42	0.0316

Figure G-3: Third Row Effect , Urban Upper.

ANALYSIS OF VARIANCE TABLE

SOURCE	DF	Chi-square	Prob
INTERCEPT	3	33.76	0.0001
RESIDUAL	0	0.00	1.0000

ANALYSIS OF INDIVIDUAL PARAMETERS

Effect	Parameter	Estimate	Standard Error	Chi-square	prob
INTERCEPT	1	1.555	0.795	3.82	0.0505
	2	5.034	0.936	28.91	0.0001
	3	6.709	1.615	17.26	0.0001

ANALYSIS OF CONTRASTS

Contrast	DF	Chi-square	Prob
Test of Linear Trend	1	8.79	0.0030

Figure G-4: Fourth Row Effect , Urban Upper.

ANALYSIS OF VARIANCE TABLE

SOURCE	DF	Chi-square	Prob
INTERCEPT	3	35.16	0.0001
RESIDUAL	0	0.00	1.0000

ANALYSIS OF INDIVIDUAL PARAMETERS

Effect	Parameter	Estimate	Standard Error	Chi-square	prob
INTERCEPT	1	1.047	0.549	3.64	0.0563
	2	3.799	0.740	26.39	0.0001
	3	4.054	0.810	25.03	0.0001

ANALYSIS OF CONTRASTS

Contrast	DF	Chi-square	Prob
Test of Linear Trend	1	10.60	0.0011

H : Rural Upper

Table 8 shows the observed cell counts and global odds ratios for the data of PAPCHILD 1992, Rural Upper. In this data set, there is no observations in the cell 'University+, 6+', therefore, we added the category University+ to <University. The trend of the global odds ratios is expected and seen before . However, the magnitudes of the global odds ratios are generally low. Moreover, ψ_{11} (3.652) and ψ_{13} (27.653) are not significantly different from one.

Table 8 : Observed Cell Counts and Global Odds Ratios for Women not Wanting More Children, (PAPCHILD 1992), Rural Upper.

Level of Education	Number of Children Ever Born 0-1	2-3	4-5	6+	Total
<University& University +	4 (3.652)	28 (8.074)	14 (27.653)	2	41
<Secondary	2 (2.720)	24 (6.579)	11 (7.096)	13	50
<Primary	3 (1.816)	22 (2.872)	37 (2.676)	58	120
No Education	18	119	194	446	777
Total	27	193	256	519	995

Figure H-1 presents the results of the 'First Row Effect'. The chi-square test statistic for testing that all global odds ratios in the first row are equal to a constant has a value of 11.4(with 3 degrees of freedom, thus the model of equal global odds ratios has to be rejected. As in 'Urban Upper', ψ_{11} and ψ_{13} are not significantly different from one, while ψ_{12} is significantly different from one. The test for linear trend has a value of 1.44 with one degree of freedom (P value=0.2308), thus the linear trend has to be accepted. Figure H-2 presents the results of th 'Second Row Effect'. The chi-square test statistic for testing that all global odds ratios in th second row are equal to a constant has a value of 23.22 with 3 degrees of freedom, thus th model of equal global odds ratios has to be rejected. Furthermore, all global odds ratios in th row are significantly different from one, indicating negative associations at the correspondi

locations. The test for linear trend has a value of 3.63 with one degree of freedom (P-value=0.0567), thus the linear trend is accepted.

Figure H-3 presents the results of the 'Third Row Effect'. The chi-square test statistic for testing that all global odds ratios in the third row are equal to a constant has a value of 48.44 with 3 degrees of freedom, thus the model of equal global odds ratios has to be rejected. Furthermore, all global odds ratios in this row are significantly different from one, indicating negative associations at the corresponding locations. The test for linear trend has a value of 1.13 with one degree of freedom (P-value=0.2876), thus the linear trend is accepted.

Figure H-1: First Row Effect , Rural Upper.

ANALYSIS OF VARIANCE TABLE

SOURCE	DF	Chi-square	Prob
INTERCEPT	3	11.40	0.0098
RESIDUAL	0	0.00	1.0000

ANALYSIS OF INDIVIDUAL PARAMETERS

Effect	Parameter	Estimate	Standard Error	Chi-square	Prob
INTERCEPT	1	3.652	2.057	3.15	0.0758
	2	8.074	2.558	9.96	0.0016
	3	27.653	20.056	1.90	0.1680

ANALYSIS OF CONTRASTS

Contrast	DF	Chi-square	Prob
Test of Linear Trend	1	1.44	0.2308

Figure H-2: Second Row Effect , Rural Upper.

ANALYSIS OF VARIANCE TABLE

SOURCE	DF	Chi-square	Prob
INTERCEPT	3	23.22	0.0001
RESIDUAL	0	0.00	1.0000

ANALYSIS OF INDIVIDUAL PARAMETERS

Effect	Parameter	Estimate	Standard Error	Chi-square	Prob
INTERCEPT	1	2.720	1.294	4.42	0.0355
	2	6.579	1.468	20.09	0.0001
	3	7.096	2.047	12.01	0.0005

ANALYSIS OF CONTRASTS

Contrast	DF	Chi-square	Prob
Test of Linear Trend	1	3.63	0.0567

Figure II-3: Third Row Effect , Rural Upper.

ANALYSIS OF VARIANCE TABLE

SOURCE	DF	Chi-square	Prob
INTERCEPT	3	48.44	0.0001
RESIDUAL	0	0.00	1.0000

ANALYSIS OF INDIVIDUAL PARAMETERS

Effect	Parameter	Estimate	Standard Error	Chi-square	Prob
INTERCEPT	1	1.816	0.755	5.79	0.0161
	2	2.872	0.483	35.31	0.0001
	3	2.676	0.430	38.67	0.0001

ANALYSIS OF CONTRASTS

Contrast	DF	Chi-square	Prob
Test of Linear Trend	1	1.13	0.2876

Contraceptives use.

In the following, we will investigate the relationship between the educational level and number of children ever born in light of contraceptives use. It should be pointed out that, the question about contraceptives use was addressed to currently married ,non pregnant, fecundl women. The sample sizes for nonusers are relatively low. The lowest sample size is 77 observations in 'Urban Upper'. It is worth noting that, whenever the sample size is low there is a larger likelihood for the existance of empty cells. Therefore, we will focus on analyzing data for 'Urban', 'Rural', and 'Urban Governorates' where the sample sizes for both users and nonusers are relatively reasonable.

I- Urban Users.

Table 9 shows the observed cell counts and global odds ratios for the data of PAPCHILD 1992, Urban Users. In this data set, there is no women with zero children ever born. The global odds ratios are increasing as number of children ever born increases. As for columns, the global odds ratios in both the second and the third column are increasing as the level of education increases. But this trend does not hold true in the first column which may be explained by the fact that having 'at most three' children ever born is not acceptable yet as an ideal family size for 'Urban Users'.

Figure I-1 presents the results of the 'First Row Effect'. The chi-square test statistic for testing that all global odds ratios in the first row are equal to a constant has a value of 30.22 with 3 degrees of freedom, thus the model of equal global odds ratios has to be rejected. Furthermore, ψ_{11} and ψ_{12} are significantly different from one, while ψ_{13} is not significantly different from one. The test for linear trend has a value of 2.20 with one degree of freedom (P-value=0.1377), thus the linear trend has to be accepted. Figure I-2 presents the results of the 'Second Row Effect'. The chi-square test statistic for testing that all global odds ratios in the second row are equal to a constant has a value of 77.17 with 3 degrees of freedom, thus the model of equal global odds ratios has to be rejected. Furthermore, all global odds ratios in this row are significantly different from one, indicating negative associations at the corresponding locations. The test for linear trend has a value of 10.45 with one degree of freedom (P-value=0.0012), thus the linear trend has to be rejected.

Table 9 : Observed Cell Counts and Global Odds Ratios for Women not Wanting More Children (PAPCHILD 1992), Urban Users.

Level Of Education	Number of Children Ever Born 1	2-3	4-5	6+	Total
University +	8	170	31	3	212
	(2.788)*	(7.467)	(21.417)		
< University	5	255	90	11	361
	(1.650)	(7.033)	(17.049)		
< Secondary	8	138	123	53	322
	(2.472)	(5.280)	(6.695)		
< Primary	2	90	122	85	299
	(1.722)	(4.205)	(4.366)		
No. Education	6	120	199	207	532
Total	29	773	565	359	1726

* Global odds ratios are in parentheses

Figure I-3 presents the results of the 'Third Row Effect'. The chi-square test statistic for testing that all global odds ratios in the third row are equal to a constant has a value of 102.58 with 3 degrees of freedom, thus the model of equal global odds ratios has to be rejected. Furthermore, all global odds ratios in this row are significantly different from one, indicating negative associations at the corresponding locations. The test for linear trend has a value of 9.26 with one degree of freedom (P-value=0.0023), thus the linear trend has to be rejected.

Figure I-4 presents the results of the 'Fourth Row Effect'. The chi-square test statistic for testing that all global odds ratios in the fourth row are equal to a constant has a value of 96.68 with 3 degrees of freedom, thus the model of equal global odds ratios has to be rejected. Furthermore, all global odds ratios in this row are significantly different from one, indicating negative associations at the corresponding locations. The test for linear trend has a value of 8.09 with one degree of freedom (P-value=0.0044), thus the linear trend has to be rejected.

Figure I-1: First Row Effect , Urban Users.

ANALYSIS OF VARIANCE TABLE

SOURCE	DF	Chi-square	Prob
INTERCEPT	3	30.22	0.0001
RESIDUAL	0	0.00	1.0000

ANALYSIS OF INDIVIDUAL PARAMETERS

Effect	Parameter	Estimate	Standard Error	Chi-square	prob
INTERCEPT	1	2.788	1.177	5.61	0.0178
	2	7.467	1.451	26.49	0.0001
	3	21.417	12.521	2.93	0.0872

ANALYSIS OF CONTRASTS

Contrast	DF	Chi-square	Prob
Test of Linear Trend	1	2.20	0.1377

Figure I-2: First Row Effect , Urban Users.

ANALYSIS OF VARIANCE TABLE

SOURCE	DF	Chi-square	Prob
INTERCEPT	3	77.17	0.0001
RESIDUAL	0	0.00	1.0000

ANALYSIS OF INDIVIDUAL PARAMETERS

Effect	Parameter	Estimate	Standard Error	Chi-square	prob
INTERCEPT	1	1.650	0.622	7.04	0.0080
	2	7.033	0.823	72.97	0.0001
	3	17.049	4.742	12.93	0.0003

ANALYSIS OF CONTRASTS

Contrast	DF	Chi-square	Prob
Test of Linear Trend	1	10.45	0.0012

Figure I-3: First Row Effect , Urban Users.

ANALYSIS OF VARIANCE TABLE

SOURCE	DF	Chi-square	Prob
INTERCEPT	3	102.58	0.0001
RESIDUAL	0	0.00	1.0000

ANALYSIS OF INDIVIDUAL PARAMETERS

Effect	Parameter	Estimate	Standard Error	Chi-square	prob
INTERCEPT	1	2.472	1.034	5.71	0.0168
	2	5.280	0.558	89.72	0.0001
	3	6.695	0.980	46.70	0.0001

ANALYSIS OF CONTRASTS

Contrast	DF	Chi-square	Prob
Test of Linear Trend	1	9.26	0.0023

Figure I-4: First Row Effect , Urban Users.

ANALYSIS OF VARIANCE TABLE

SOURCE	DF	Chi-square	Prob
INTERCEPT	3	96.68	0.0001
RESIDUAL	0	0.00	1.0000

ANALYSIS OF INDIVIDUAL PARAMETERS

Effect	Parameter	Estimate	Standard Error	Chi-square	prob
INTERCEPT	1	1.722	0.795	4.70	0.0302
	2	4.205	0.494	72.41	0.0001
	3	4.366	0.543	64.74	0.0001

ANALYSIS OF CONTRASTS

Contrast	DF	Chi-square	Prob
Test of Linear Trend	1	8.09	0.0044

J- Urban Nonusers.

Table 10 shows the observed cell counts and global odds ratios for the data of PAPCHILD 1992, Urban Nonusers. In this data set, there is no women with zero children ever born. There is no obsevation in the cell 'University+/6+', thus, we added 'University+' to '<University'. Also, this data set has only two women who had given birth to one child. The global odds ratios are increasing as both number of children ever born and level of education increase.

Table 10: Observed Cell Counts and Global Odds Ratios for Women not Wanting More Children (PAPCHILD 1992), Urban Nonusers.

Level Of Education	Number of Children Ever Born 1-3	4-5	6+	Total
Secondary+	46	13	1	61
	(9.825)	(32.601)		
< Secondary	20	30	7	57
	(4.434)	(9.726)		
< Primary	25	26	19	70
	(4.875)	(5.632)		
No Education	23	49	68	140
Total	115	118	95	328

* Global odds ratios are in parentheses

Figures J-1, J-2, and J-3 present the results of the first, second, and third row effects respectively. The chi-square test statistics for testing that global odds ratios in each row are significant, thus the model of equal global odds ratios has to be rejected. Furthermore, all global odds ratios in this table are significantly different from one, indicating negative associations at the corresponding locations.

Figure J-1: First Row Effect , Urban Nonusers.

ANALYSIS OF VARIANCE TABLE

SOURCE	DF	Chi-square	Prob
INTERCEPT	2	8.98	0.0112
RESIDUAL	0	0.00	1.0000

ANALYSIS OF INDIVIDUAL PARAMETERS

Effect	Parameter	Estimate	Standard Error	Chi-square	prob
INTERCEPT	1	9.825	3.294	8.89	0.0029
	2	32.601	33.136	0.97	0.3252

Figure J-2: Second Row Effect , Urban Nonusers.

ANALYSIS OF VARIANCE TABLE

SOURCE	DF	Chi-square	Prob
INTERCEPT	2	17.97	0.0001
RESIDUAL	0	0.00	1.0000

ANALYSIS OF INDIVIDUAL PARAMETERS

Effect	Parameter	Estimate	Standard Error	Chi-square	prob
INTERCEPT	1	4.434	1.100	16.25	0.0001
	2	9.726	3.813	6.50	0.0108

Figure J-3: Third Row Effect , Urban Nonusers.

ANALYSIS OF VARIANCE TABLE

SOURCE	DF	Chi-square	Prob
INTERCEPT	2	19.73	0.0001
RESIDUAL	0	0.00	1.0000

ANALYSIS OF INDIVIDUAL PARAMETERS

Effect	Parameter	Estimate	Standard Error	Chi-square	prob
INTERCEPT	1	4.875	1.320	13.64	0.0002
	2	5.632	1.510	13.92	0.0002

K- Rural Users.

Table 11 shows the observed cell counts and global odds ratios for the data of PAPCHILD 1992, Rural Users. In this data set, there is no women with zero children ever born. The global odds ratios are increasing as number of children ever born education increases. But this trend does not hold true for columns one and two.This table has five cells in which only one observation per cell is reported. This fact had led to the existence of many insignificant global odds ratios as shown below.

Table 11 : Observed Cell Counts and Global Odds Ratios for Women not Wanting More Children (PAPCHILD 1992); Rural Users.

Level Of Education	Number of Children Ever Borr 1	2-3	4-5	6+	Total
University +	1	12	5	1	19
	(7.894)*	(5.362)	(11.823)		
< University	1	110	29	1	141
	(1.801)	(10.988)	(60.762)		
< Secondary	1	50	35	23	109
	(1.648)	(6.609)	(8.088)		
< Primary	1	56	98	88	243
	(1.056)	(2.999)	(3.177)		
No. Education	8	226	335	512	1081
Total	12	454	502	625	1593

* Global odds ratios are in parentheses

Figure K-1 presents the results of the 'First Row Effect'. The chi-square test statistic for testing that all global odds ratios in the first row are equal to a constant has a value of 4.53 with 3 degrees of freedom, thus the model of equal global odds ratios is accepted. Furthermore, ψ_{11} and ψ_{13} are not significantly different from one, while ψ_{12} is significantly different from one.

Figure K-2 presents the results of the 'Second Row Effect'. The chi-square test statistic for testing that all global odds ratios in the second row are equal to a constant has a value of 26.19 with 3 degrees of freedom, thus the model of equal global odds ratios has to be rejected. The global odds ratios ψ_{21} and ψ_{23} are significantly different from one, indicating negative associations at the corresponding locations. The global odds ratio ψ_{22} is significantly different from one. The test for linear trend has a value of 1.85 with one degree of freedom (P-value=0.1739), thus the linear trend is accepted.

Figure K-3 presents the results of the 'Third Row Effect'. The chi-square test statistic for testing that all global odds ratios in the third row are equal to a constant has a value of 52.07 with 3 degrees of freedom, thus the model of equal global odds ratios has to be rejected. The global odds ratio ψ_{31} is not significantly different from one, while ψ_{32} and ψ_{33} are significantly different from one indicating negative associations at the corresponding locations. The test for linear trend has a value of 9.98 with one degree of freedom (P-value=0.0016), thus the linear trend has to be rejected.

Figure K-4 presents the results of the 'Fourth Row Effect'. The chi-square test statistic for testing that all global odds ratios in the fourth row are equal to a constant has a value of 95.92 with 3 degrees of freedom, thus the model of equal global odds ratios has to be rejected. The global odds ratio ψ_{41} is not significantly different from one, while ψ_{42} and ψ_{43} are significantly different from one indicating negative associations at the corresponding locations. The test for linear trend has a value of 8.26 with one degree of freedom (P-value=0.0041), thus the linear trend has to be rejected.

Figure K-1: First Row Effect , Rural Users.

ANALYSIS OF VARIANCE TABLE

SOURCE	DF	Chi-square	Prob
INTERCEPT	3	4.53	0.2096
RESIDUAL	0	0.00	1.0000

ANALYSIS OF INDIVIDUAL PARAMETERS

Effect	Parameter	Estimate	Standard Error	Chi-square	prob
INTERCEPT	1	7.894	8.455	0.87	0.3505
	2	5.362	2.663	4.05	0.0441
	3	11.823	12.162	0.94	0.3310

ANALYSIS OF CONTRASTS

Contrast	DF	Chi-square	Prob
Test of Linear Trend	1	0.07	0.7854

Figure K-2: Second Row Effect , Rural Users.

ANALYSIS OF VARIANCE TABLE

SOURCE	DF	Chi-square	Prob
INTERCEPT	3	26.19	0.0001
RESIDUAL	0	0.00	1.0000

ANALYSIS OF INDIVIDUAL PARAMETERS

Effect	Parameter	Estimate	Standard Error	Chi-square	prob
INTERCEPT	1	1.801	1.403	1.65	0.1993
	2	10.988	2.189	25.20	0.0001
	3	60.762	43.357	1.96	0.1611

ANALYSIS OF CONTRASTS

Contrast	DF	Chi-square	Prob
Test of Linear Trend	1	1.85	0.1739

Figure K-3: Third Row Effect , Rural Users.

ANALYSIS OF VARIANCE TABLE

SOURCE	DF	Chi-square	Prob
INTERCEPT	3	52.07	0.0001
RESIDUAL	0	0.00	1.0000

ANALYSIS OF INDIVIDUAL PARAMETERS

Effect	Parameter	Estimate	Standard Error	Chi-square	prob
INTERCEPT	1	1.648	1.104	2.23	0.1356
	2	6.609	0.952	48.18	0.0001
	3	8.088	1.756	21.21	0.0001

ANALYSIS OF CONTRASTS

Contrast	DF	Chi-square	Prob
Test of Linear Trend	1	9.98	0.0016

Figure K-4: Fourth Row Effect , Rural Users.

ANALYSIS OF VARIANCE TABLE

SOURCE	DF	Chi-square	Prob
INTERCEPT	3	95.92	0.0001
RESIDUAL	0	0.00	1.0000

ANALYSIS OF INDIVIDUAL PARAMETERS

Effect	Parameter	Estimate	Standard Error	Chi-square	prob
INTERCEPT	1	1.056	0.649	2.65	0.1038
	2	2.999	0.346	74.99	0.0001
	3	3.177	0.390	66.37	0.0001

ANALYSIS OF CONTRASTS

Contrast	DF	Chi-square	Prob
Test of Linear Trend	1	8.26	0.0041

L- Rural Nonusers.

Table 12 shows the observed cell counts and global odds ratios for the data of PAPCHILD 1992 Rural Nonusers. In this data set there is no women with zero children ever born. There is only one woman who had given birth to one child.

Table 12: Observed Cell Counts and Global Odds Ratios for Women not Wanting More Children (PAPCHILD 1992), Rural Nonusers.

Level Of Education	Number of Children Ever Born 1-3	4-5	6+	Total
Secondary+	10 (6.801)	7 (20.558)	1	18
< Secondary	5 (2.769)	5 (1.769)	17	27
< Primary	10 (1.768)	24 (1.787)	26	60
No Education	44	84	165	293
Total	69	120	209	398

* Global odds ratios are in parentheses

Figures L-1, L-2, and L-3 present the results of the first, second, and third row effects respectively. The chi-square test statistics for testing that global odds ratios in the first row is significant, thus the model of equal global odds ratios is accepted while this model is rejected in both the second and the third rows. Furthermore, all global odds ratios, except ψ_{12} are significantly different from one, indicating negative associations at the corresponding locations.

Figure L-1: First Row Effect , Rural Nonusers.

ANALYSIS OF VARIANCE TABLE

SOURCE	DF	Chi-square	Prob
INTERCEPT	2	4.27	0.1183
RESIDUAL	0	0.00	1.0000

ANALYSIS OF INDIVIDUAL PARAMETERS

Effect	Parameter	Estimate	Standard Error	Chi-square	prob
INTERCEPT	1	6.801	3.367	4.08	0.0434
	2	20.558	21.260	0.94	0.3336

Figure L-2: Second Row Effect , Rural Nonusers.

ANALYSIS OF VARIANCE TABLE

SOURCE	DF	Chi-square	Prob
INTERCEPT	2	11.48	0.0032
RESIDUAL	0	0.00	1.0000

ANALYSIS OF INDIVIDUAL PARAMETERS

Effect	Parameter	Estimate	Standard Error	Chi-square	prob
INTERCEPT	1	2.769	0.967	8.21	0.0042
	2	1.769	0.570	9.62	0.0019

Figure L-3: Third Row Effect , Rural Nonusers.

ANALYSIS OF VARIANCE TABLE

SOURCE	DF	Chi-square	Prob
INTERCEPT	2	21.75	0.0001
RESIDUAL	0	0.00	1.0000

ANALYSIS OF INDIVIDUAL PARAMETERS

Effect	Parameter	Estimate	Standard Error	Chi-square	prob
INTERCEPT	1	1.768	0.498	12.62	0.0004
	2	1.787	0.411	18.87	0.0001

M- Urban Governorates, Users.

Table 13 shows the observed cell counts and global odds ratios for the data of PAPCHILD 1992, Urban Governorates, Users. In this data set, there is no women with zero children ever born. There is only 19 women who had given birth to one child. Therefore, we added the category '0-1' to the category '2-3'

Table 13 : Observed Cell Counts and Global Odds Ratios for Women not Wanting More Children (Popchild 1992), Urban Governorates Users.

Level Of Education	Number of Children Ever Born 1-3	4-5	6+	Total
University +	102	13	2	117
	(8.240)*	(13.010)		
< University	132	39	2	173
	(7.694)	(22.607)		
< Secondary	91	72	26	189
	(5.384)	(6.292)		
< Primary	50	59	34	143
	(4.966)	(4.423)		
No. Education	48	88	69	205
Total	423	271	133	827

* Global odds ratios are in parentheses

Figures M-1, M-2, M3 and M-4 present the results of the first, second, third, and fourth row effects respectively. The chi-square test statistics for testing that global odds ratios in each row are significant, thus the model of equal global odds ratios has to be rejected. Furthermore, all global odds ratios, except ψ_{12} and ψ_{22}, are significantly different from one, indicating negative associations at the corresponding locations.

Figure M-1: First Row Effect , Urban Governorates, Users.

ANALYSIS OF VARIANCE TABLE

SOURCE	DF	Chi-square	Prob
INTERCEPT	2	12.21	0.0022
RESIDUAL	0	0.00	1.0000

ANALYSIS OF INDIVIDUAL PARAMETERS

Effect	Parameter	Estimate	Standard Error	Chi-square	prob
INTERCEPT	1	8.240	2.362	12.17	0.0005
	2	13.010	9.364	1.93	0.1647

Figure M-2: Second Row Effect , Urban Governorates, Users.

ANALYSIS OF VARIANCE TABLE

SOURCE	DF	Chi-square	Prob
INTERCEPT	2	33.32	0.0001
RESIDUAL	0	0.00	1.0000

ANALYSIS OF INDIVIDUAL PARAMETERS

Effect	Parameter	Estimate	Standard Error	Chi-square	prob
INTERCEPT	1	7.694	1.339	33.01	0.0001
	2	22.607	11.609	3.79	0.0515

Figure M-3: Third Row Effect , Urban Governorates, Users.

ANALYSIS OF VARIANCE TABLE

SOURCE	DF	Chi-square	Prob
INTERCEPT	2	47.23	0.0001
RESIDUAL	0	0.00	1.0000

ANALYSIS OF INDIVIDUAL PARAMETERS

Effect	Parameter	Estimate	Standard Error	Chi-square	prob
INTERCEPT	1	5.384	0.830	42.06	0.0001
	2	6.292	1.398	20.26	0.0001

Figure M-4: Fourth Row Effect , Urban Governorates, Users.

ANALYSIS OF VARIANCE TABLE

SOURCE	DF	Chi-square	Prob
INTERCEPT	2	39.69	0.0001
RESIDUAL	0	0.00	1.0000

ANALYSIS OF INDIVIDUAL PARAMETERS

Effect	Parameter	Estimate	Standard Error	Chi-square	prob
INTERCEPT	1	4.966	0.915	29.48	0.0001
	2	4.423	0.877	25.47	0.0001

N-Urban Governorates, Nonusers.

Table 14 shows the observed cell counts and global odds ratios for the data of PAPCHILD 1992, Urban Governorates, Nonusers. In this data set, there is no women with zero children ever born. There is only 2 women who had given birth to one child. Therefore, we added the category '0-1' to the category '2-3' to avoid zero counts. Also, there are some cells with zero counts in the two levels of education '<University' and 'University', thus, we added these two categories to the category '<Secondary' to avoid zero counts.

Table 14 : Observed Cell Counts and Global Odds Ratios for Women not Wanting More Children (PAPCHILD 1992), Urban Governorates Nonusers.

Level Of Education	Number of Children Ever Born 1-3	4-5	6+	Total
Primary+	37	21	2	60
	(5.386)	(14.284)		
< Primary	15	16	11	42
	(6.500)	(4.184)		
No. Education	8	28	22	58
Total	60	65	35	160

* Global odds ratios are in parentheses

Figures N-1, and M-2 present the results of the first, and second row effects respectively. The chi-square test statistics for testing that global odds ratios in both rows are significant, thus the model of equal global odds ratios has to be rejected. Furthermore, all global odds ratios, except ψ_{12} , are significantly different from one, indicating negative associations at the corresponding locations.

Figure N-1: First Row Effect , Urban Governorates, Nonusers.

ANALYSIS OF VARIANCE TABLE

SOURCE	DF	Chi-square	Prob
INTERCEPT	2	8.33	0.0155
RESIDUAL	0	0.00	1.0000

ANALYSIS OF INDIVIDUAL PARAMETERS

Effect	Parameter	Estimate	Standard Error	Chi-square	prob
INTERCEPT	1	5.386	1.919	7.88	0.0050
	2	14.284	10.412	1.78	0.1824

Figure N-2: Second Row Effect , Urban Governorates, Nonusers.

ANALYSIS OF VARIANCE TABLE

SOURCE	DF	Chi-square	Prob
INTERCEPT	2	8.82	0.0122
RESIDUAL	0	0.00	1.0000

ANALYSIS OF INDIVIDUAL PARAMETERS

Effect	Parameter	Estimate	Standard Error	Chi-square	prob
INTERCEPT	1	6.500	1.339	33.01	0.0001
	2	4.184	1.681	6.20	0.0128

Coclusion.

The results have shown that there is a highly significant association between the educational level and the number of children ever born for women who do not want more children. This relationship have been seen before (see Mahgoub 1990, 1991, 1992). As for the data at hand (PAPCHILD data), the global odds ratios ,on national level, are generally higher than their counterparts in the previous studies. This result may indicate that the couple build their decision about their family size on the basis of living children rather than children ever born. It may also be due to the limitations from which children ever bon data suffer. The percentages of women with no education reached 0.72 in 'Rural' areas, while it reached 0.34 in 'Urban' areas. For this group of women, the global odds ratios are generally higher in 'Urban' than 'Rural' areas. This result means that urban women with no education have lower fertility than rural women with no education. The linear trend was tested when it applied and proved to be insignificant in many situations, which means that the global odds ratios are increasing linearly with number of children ever born. It ought be known that the sample sizes in 'Rural' are quite larger than their counterparts in 'Urban' areas. This fact has led to have better results for a complete table in 'Rural' than those in 'Urban ' areas. In general, the global odds ratios in 'Rural' are larger than their counterparts in 'Urban' areas. This finding may be due to serious omission error in 'Rural' areas. The sample sizes for conraceptivs 'Users' are quite higher than their counterparts for 'Nonusers' , which led to the results for 'Users' being more reliable than those for 'Nonusers'.

Policy Implications :

First, on national level, if the target is to limit the children ever born to 'at most three' women should have at least secondary education. Moreover, if the target is to limit the number of children ever born to 'at most five' per family females should have at least primary education. It seems that having at most one child ever born is not acceptable yet as an ideal family size on the national level.

Second, it should be noted that the global odds ratios for illitrate women are generally

lower than those for educated women, regardless level of education. Moreover, the global odds ratios for illitrate women in rural areas are generally lower than those in urban areas. Therefore, more attention and serious efforts are needed to reduce the cumulative fertility for illitrate women in general, and in rural areas in particular. These efforts may be directed toward reducing infant mortality rate for this group, since the illitrate women loose more infants than the educated women. These efforts may include enforcing the existing laws such as those concerning the prohibition of children's work and the compulsory basic education for children in order to reduce the bendfits of children.

Third, with respect to contraceptives use, the global odds ratios for nonusers, where they exist, are generally lower than those for users which may suggest the importance of paying more attention to nonusers who already declared that they do not want more children. These may not be aware of the available contraceptive methods especially in rural ares. They may also have some fear or misunderstanding about the indirect effects of the contaceptive methods, or because bad economic conditions. Therefore, it is believed to overcome these obctacles through personal contact, mass media, and the availability of all contraceptive methods with no cost.

Fourth, for nonusers in Rural Upper, a global odds ratio less than one (not shown) was observed which means the existence of positive effect of education on fertility. This positive relationship had been seen in the previous studies in Rural Upper which may be due to the traditions and customs prevailing in Upper Egypt that preclude women's work and enhance their stay in their homes. It is well known thet rural Upper Egypt is the least developed region in Egypt (see Osheba, 1990). Therefore, more efforts are needed to improve the economic situations in Upper Egypt, especially in rural areas. Moreover, an attention should be paid through mass media or by personal contact to change people's views about women's work outside their homes as well as their family size.

Finally, the percentages of nonusers in urban areas are relatively lower than those percentages in rural areas which means that rural women tend not to use contraceptive methods, although they declared not wanting more children. This finding suggests that more efforts should be directed to rural womrn in order to encourage using contaception. This may be accomplished by creating jobs for women in rural areas or improving their economic conditions.

Acknowledgement

This research was supported by a grant from PAPCHILD and WHO organization. We are grateful to Dr. Atef M. Khalifa for his valuable ideas and suggestions. We thank Dr. Ahmad Abdel-Monem for making the data available.

REFERENCES:

1 - *Mahgoub Youssef M.* (1990). Education and Living Children for Women not Wanting More Children Using Global Odds Ratios. The 25th Annual Conference , I.S.S.R. , Cairo University , Vol. 25.

2 - *Mahgoub Youssef M.* (1991). The Impact of Mother's Education on the Number of Living Children. The 26th Annual Conference, I.S.S.R., Cairo University . Vol. 26 , Demography.

3 - *Mahgoub Youssef M. and Hussein Mounira A.* (1992). Regional Urban Rural Differentials of The Educational Impact on Fertility in Egypt.Cairo Demographic Center (CDC), Working Paper No. 25.

4 - *Osheba Ibrahim K.*, 1990 . *Reproductive Behaviour in Rural Upper Egypt* (1980 - 1984) : *Is There a Change?. Cairo Demographic Centre (CDC), Working Paper No.* 19.

5- *SAS Institute , Inc.* (1985) . SAS User's Guide , Statistics , Version 5 Edition. Cary , NC, USA.