COMPARION FERTILITY RATE IN KURDISTAN REGION BY SURVEY MICS3

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Abstract:

In this research we make a comparison fertility rates for Women age (15-49) year between governorates of Kurdistan region in Iraq by using data of Survey MICS3-Iraq (2006), and estimate fertility rate by average of five years before Survey and found three differences rates in fertility among governorates of Kurdistan region, that was ranging from low of (4.1) in Erbil to a high of (5.4) in Suleimany and Duhok (4.9). And the fertility rate in Kurdistan region is (4.42) and it's Equal to Iraq but is higher in the south/ Centre governorates of Iraq from indicator Median Age. The Survey results giving estimation fertility rates before the Survey2006 throw the years (1972-2006), this research is analyses by using SPSS Package and Excel Software.

مقارنة نسبة الخصوبة في أقليم كوردستان باستخدام بيانات مسح MICS3

المستخلص

تم في هذا البحث عمل مقارنة لنسبة الخصوبة للنساء بعمر (١٥-٤٩) سنة بين محافظات إقليم كوردستان العراق باستخدام بيانات مسح MICS3- Iraq (2006) وتقدير نسبة الخصوبة بمعدل خمسة سنوات قبل المسح وحيث وجدت ثلاث نسب مختلفة للخصوبة بين محافظات الأقليم و بمدى اقل نسبة خصوبة في اربيل بمعدل (4.1) واعلى نسبة خصوبة في السليمانية هي (5.4) وفي دهوك (4.9) وان نسبة الخصوبة في اقليم كوردستان مساوية الى نسبة الخصوبة في العراق التي بلغت(4.42) وارتفعت في محافظات الوسط وجنوب العراق من خلال مقياس وسيط الأعمار . ويعطي نتائج تحليل المسح تقديرات لنسبة الخصوبة قبل المسح للفترة الممتدة مابين الأعوام(١٩٧٢-٢٠٠٦) وتم تحليل هذا البحث باستخدام الحقيبة الاحصائية SPSS و برنامج EXCEL .

Introduction:

Demography is the statistical study of human population. It can be a general science that can be applied to any kind of dynamic population, that is, one that changes over time or space. It encompasses the study of the size, structure and distribution of population, and spatial and/or temporal changes in them in response to birth, death, migration and

ageing [7].the fertility rates can also give a misleading impression that a population is growing faster than it in fact is, because measurement of fertility rates only involves the reproductive rate of woman, and does not adjust for the sex ratio, fertility refers to the number of live births women have. The measurement of fertility levels and differentials was an important objective of Iraq MICS-3. Previous surveys had indicated that the level of fertility was declining. Information on fertility obtained from the Kurdistan MICS-3 provides recent indicators of fertility rates, at the national level and also at sub national levels.

1.1 Standard fertility measures in single years.

Fertility rates can be calculated in period or cohort format. If we take the calendar year t, and calculate fertility rates these can be calculated as a cohort rate from average age x+0.5, over a one year interval as follows:

$$ {}_1 f^t_{x+0.5} = (1\text{st}^{1/2} B^t_x + {}^{1/2} B^t_{x+1}) / (({}_1 N^t_x + {}_1 N^{t+1}_{x+1})/2)) \qquad \ldots\ldots (1) $$

We can also calculate it as a period rate from x to x+1 as

$$ {}_1 f^t_x = (1\text{st}^{1/2} B^t_x + 2\text{nd}^{1/2} B^t_x) // (({}_1 N^t_x + {}_1 N^{t+1}_x)/2) \qquad \ldots\ldots (2) $$

The Lexis diagrams illustrate the configurations in question. Note that in the Figure (1-1) we define ${}_1 N^t_x$ refers to the number of persons between x and x+1 on the 1st of January of year t [1].

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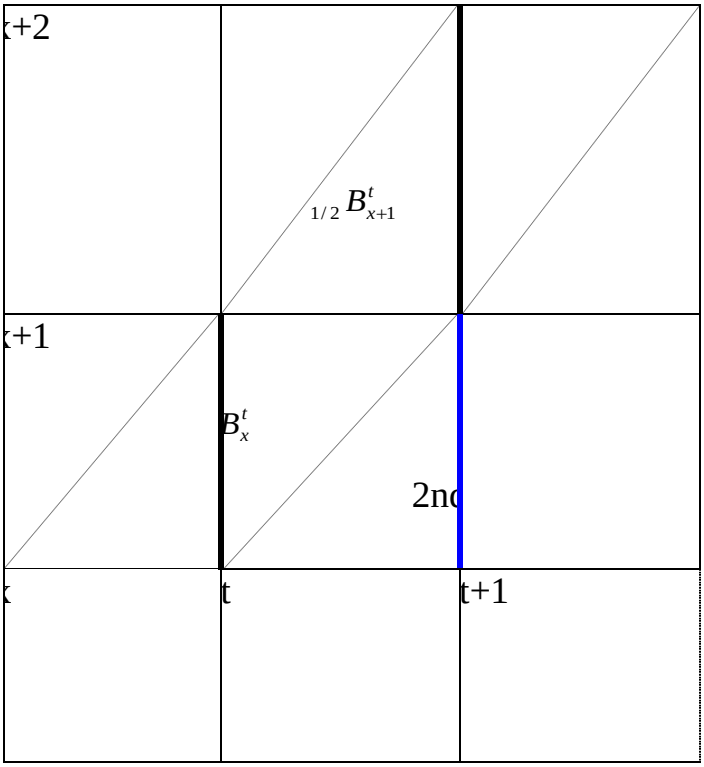

Figure (1-1) Lexis diagram for representation of calculation of period ${}_1 f^t_x$ and cohort ${}_1 f^t_{x+0.5}$

If we add these period rates up from the age of 15 to 49, that is to say over the entire reproductive period, we obtain an estimate of the Total Fertility Rate (TFR) [5], the number of children a woman would have over her entire lifespan if exposed to the period of cohort fertility rates in question [1].

$$TFR^{cohort} = \sum_{x=15}^{49} {}_1 f_{x+0.5} \qquad \text{..... (3)}$$

$$TFR^{year(t)} = \sum_{x=15}^{49} {}_1 f^t_x \qquad \text{..... (4)}$$

The next Lexis diagram illustrates the $TFR^{cohort}_{50,t}$ in the cohort of women aged 50 at time t, with a green line. This represents the actual fertility experience of women that survived until the age of 50, and gives the number of children they have had over their reproductive life span. The blue line represents the period TFR in year t, TFR^t [2]. This is

the number of children that women would have if they were exposed, during all years of their reproductive period, to the fertility rates that apply in time t. It refers to the experience of a hypothetical cohort [3], not a real cohort. We usually work with period rates, that is to say rates that apply to a one-year or a five year reference period. Next session we will look at more fertility indicators, this time in the conventional 5-year notation. Lexis diagram representing TFRs for the cohort of 50 year olds (in green) and for the period [8], year t (in blue) in below figure (1-2) .

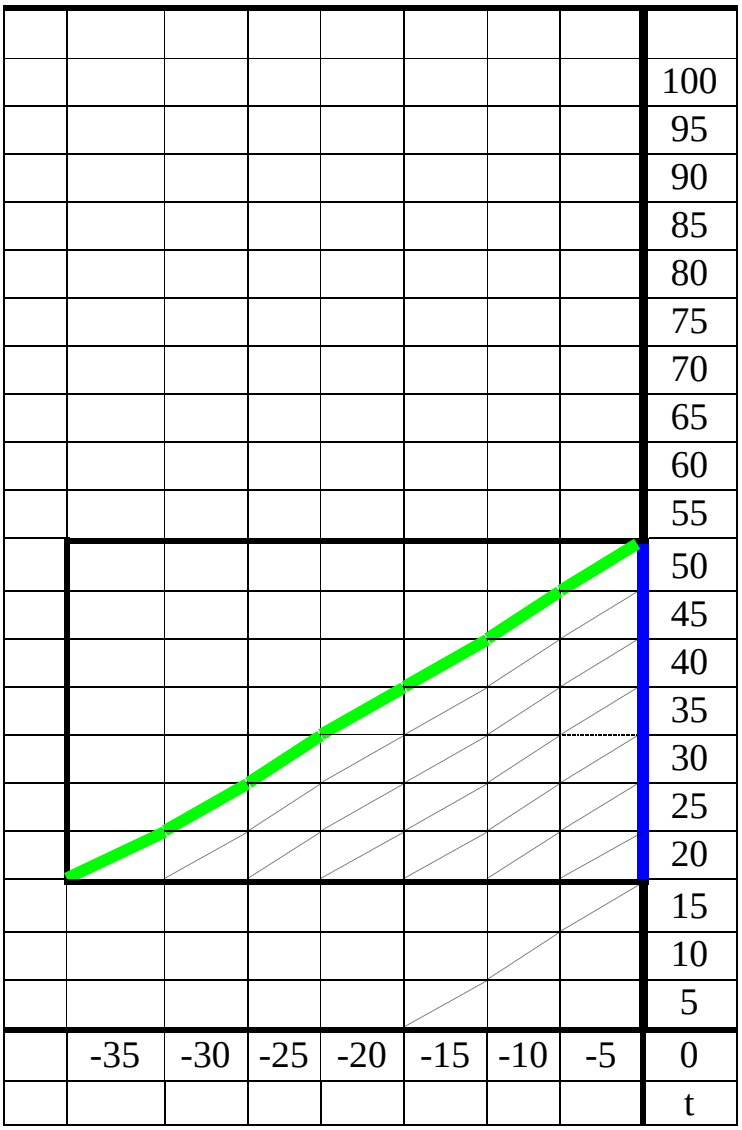

Figure (1-2) Lexis diagram TFR for cohort Age (15-50) year

1.2 The abridged life table:

Let us use the notation ${}_nD_x$ for deaths in a life table between the age of x and x+n. Then $l_{x+n} = l_x - {}_nD_x$ ….. (5)

And ${}_nq_x = {}_nD_x / l_x$ ..… (6)

The number of years that the life table population lives between the ages of x and x+n is equal to the years lived by those that survive to the end of the interval $n * l_{x+n}$ plus the years lived by those that die in the interval ${}_n\tau_x * n * {}_nD_x$, where ${}_n\tau_x$ is the proportion of the interval lived by those who die in it[2].

${}_nL_x = n * l_{x+n} + {}_n\tau_x * n * {}_nD_x$ …. (7)

For all ages over 5, we can assume that the deaths are distributed evenly over the interval, so that (7) simplifies to

${}_nL_x = n/2(l_x + l_{x+n})$ …. (7a)

For ages at the beginning of the life table, it is not a realistic assumption that deaths are spread out evenly over the interval; they are concentrated at the beginning of the interval. For age 0 we frequently use ${}_1\tau_0 = 0.3$ and ${}_4\tau_1 = .475$ which leads to:

${}_1L_0 = {}_1\tau_0 * l_0 + (1 - {}_1\tau_0) * l_1 = 0.3 * l_0 + 0.7 * l_1$ ⋯ (7b)

Where ${}_nL_x = n * l_{x+n} + {}_n\tau_x * n * {}_nD_x$

$= n * l_{x+n} + {}_n\tau_x n(l_x - l_{x+n}) = {}_n\tau_x n * l_x + n(1 - {}_n\tau_x) * l_{x+n}$

fashion. The same applies for T_x person years lived after the open age group, say person-years lived above the age of 85 [4].

The mortality rate between x and x+n , is equal to[4]:

${}_nm_x = {}_nD_x / {}_nL_x$ …. (8)

All person-years lived after the age of x is equal to

$T_x = \sum_x^{\varpi} {}_nL_x$ …. (9)

And the expectation of life after the age of x is:

$e_x = T_x / l_x$ …. (10)

Similarly we can calculate fertility rates by age of woman in five-year age groups as

${}_xf_5 = {}_5B_x / {}_5N_x$ .... (11)

Here ${}_5B_x$ stands for the births that women of age x to x+5 have had over a five year period from t to t+5, and ${}_5N_x$ represents the number of

person-years lived by women over that period, which is usually estimated as the number of women at the middle of the interval[3].
The total fertility rate (TFR) is equal to

$$TFR = 5 * \sum_{15}^{45} {}_5 f_x \quad \ldots. (12)$$

Table(1-1) Age specific Rates(TFR) And Selected derived Measures in Iraq

Year	15-19	20-24	25-29	30-34	35-39	40-44	45-49	TFR
1987	65.8	231.2	272.7	325.8	228.3	131.2	37.1	6.4605
1988	67.7	231.7	270.7	316.2	221.2	125.5	35.1	6.3403
1989	69.6	232.1	268.6	306.5	214.1	119.9	33.2	6.2202
1990	66.4	225	263.3	301.9	209.8	117.9	32.7	6.085
1991	59.8	213.2	256.2	301.3	208	118.6	33.4	5.952
1992	58.5	209.1	252.3	295.6	203.3	115.6	32.5	5.834
1993	57.1	204.9	248.5	289.9	198.5	112.7	31.6	5.716
1994	55.7	200.7	244.7	284.2	193.8	109.8	30.7	5.598
1995	54.3	196.6	240.8	278.5	189.1	106.9	29.9	5.48
1996	52.9	192.2	236.9	272.6	184.2	103.8	29	5.358
1997	51.4	187.9	232.9	266.7	179.4	100.8	28.1	5.236
1998	50	183.6	228.9	260.8	174.5	97.8	27.2	5.114
1999	48.6	179.3	225	254.9	169.6	94.7	26.3	4.992
2000	47.2	175	221	249	164.7	91.7	25.4	4.87
2001	45.8	170.8	217.2	243.3	160	88.8	24.5	4.752
2002	44.4	166.7	213.3	237.6	155.3	85.8	23.6	4.634
2003	43	162.5	209.5	231.9	150.6	82.9	22.8	4.516
2004	41.6	158.3	205.7	226.2	145.9	80	21.9	4.398
2005	40.2	154.2	201.8	220.5	141.1	77.1	21	4.28
2006	39	150.5	198.5	215.5	137	74.5	20.3	4.176
2007	37.8	146.8	195.1	210.5	132.8	71.9	19.5	4.072

Source: World Population Prospects, United Nations[9]

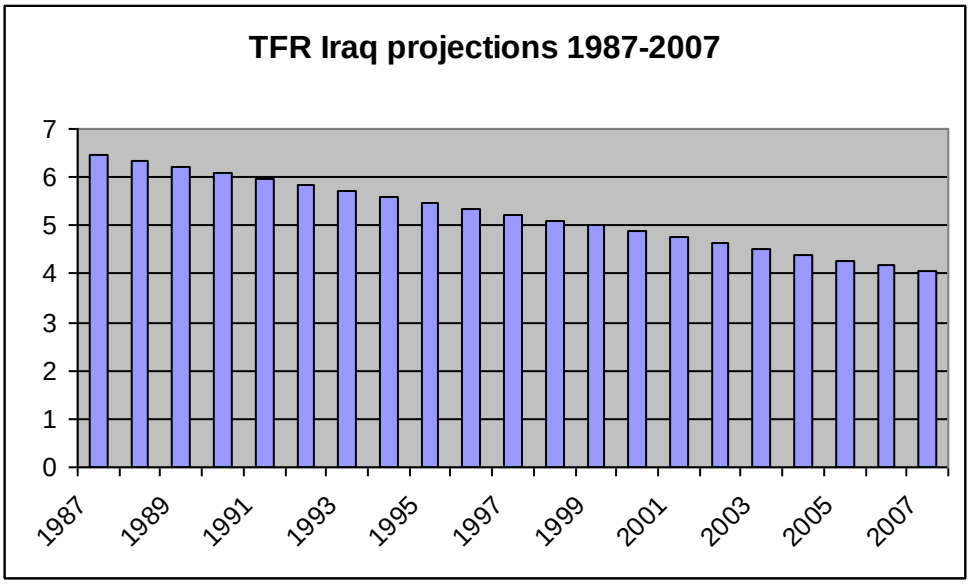

Figure (1-3) TFR Iraq from Source: World Population Prospects, United Nations [9]

1.2 Median Age

The Median Age, that is age divide the population in two halves of Equal size, is an Indicator of population ageing. At the world level , the Median Age is projected to increase from 28 to 38 years between 2005 and 2050 , Europe has today the oldest population with median age of nearly 39 years that expected to reach 47 years in 2050 [9] . from Analyses the Data of MICS3 we found median age in Kurdistan Region Equal to Iraq (21) year but in the South/ Centre is low (16) year.

2. ANALYSIS:

From Iraq MICS3 Survey that provides recent indicators of fertility rates, at the national level and also at sub national Levels.
The fertility indicators in this table of Kurdistan region are based on information provided by ever-married Women age 15-49 years regarding their reproductive histories.
From MICS3 (Multiple Indicator Cluster Survey) data 2006 we wanted to calculate fertility rates in Kurdistan region.

$${}_1f_{x+.5} = {}_1B_{x+.5} / N_{x+.5}$$

${}_1B_{x+.5}$ Refers to births of women of average x+0.5 to x+1.5 by year before the survey.
Nx+5 refers to number of person-years lived by women.

In order to make the variable "births by year before the survey" and compute in SPSS package as follows SPSS syntax:

```
PUTE dateinterview = DATE.DMY
6D,WM6M,WM6Y) .
CUTE .
PUTE datebirthwom =
E.DMY(15,WM8M,WM8Y) .
CUTE .
```

then we calculate the days between the survey and the birth of the chi
ws:

```
PUTE daysbetwnbrthsurv =CTIME.DAYS(dateinterview-datebirthchild) .
CUTE .
PUTE yrsbornbeforesurv = daysbetwnbrthsurv/365.25 .
CUTE .
PUTE complyrsbornbeforesurv = TRUNC(yrsbornbeforesurv) .
CUTE .
```

we can then make a table of births by year before the survey against age of women . This gives us the numerator of our fertility rates. The denominator is given by the women by age. If we divide the two, we get series of fertility rates by single year of age for years before the survey. We have represented them in the following graph averaging them over the 5 – year period before the survey in the table(2-1)and table(2-2) we see TFR =4.4423.

Table (2-1) births by year before the survey MICS3
a against age of women

Age of Women	No. of Women	Years										No. of birth children
			2005	2004		2002	2001	2000	1999	1998	1997	
15	206	1	1	0	0	0	0	0	0	0	0	2
16	207	2	2	0	0	0	0	0	0	0	0	4
17	174	6	0	1	0	0	0	0	0	0	0	7
18	161	7	4	3	2	1	1	0	0	0	0	18
19	170	14	9	9	4	2	1	1	0	0	0	40
20	175	20	15	6	4	7	0	0	0	0	0	52
21	165	10	13	12	6	7	6	0	0	0	0	54
22	156	28	25	17	11	10	4	5	2	0	0	102
23	150	25	27	19	13	7	15	5	5	2	1	119
24	144	32	33	21	23	14	18	11	9	5	0	166
25	145	35	25	28	24	24	23	20	7	13	7	206
26	124	25	28	24	28	29	21	23	18	8	10	214
27	125	24	28	24	23	25	21	23	16	13	11	208
28	111	25	34	24	31	23	27	33	18	14	17	246
29	103	19	32	27	31	26	30	31	30	20	22	268
30	103	15	24	31	20	22	31	28	20	29	16	236
31	106	28	22	22	26	20	37	32	27	27	19	260
32	89	20	21	21	20	19	30	26	33	20	22	232
33	111	21	29	19	24	20	26	33	34	26	30	262
34	104	6	21	11	14	23	19	29	25	27	20	195
35	89	14	32	27	23	22	31	31	25	24	32	261
36	82	15	19	21	17	23	28	26	22	20	18	209
37	92	11	13	10	19	14	23	16	26	20	23	175
38	85	8	14	18	17	16	22	24	21	23	25	188
39	66	7	8	10	14	11	16	17	14	19	18	134
40	62	4	6	9	11	18	12	21	18	17	17	133
41	74	12	10	10	11	12	16	17	23	22	24	157
42	57	2	5	5	5	3	9	14	12	11	12	78

43	49	1	4	4	4	4	11	9	9	12	8	66
44	46	1	2	7	8	3	12	7	9	10	10	69
45	46	0	5	2	8	7	13	13	8	14	11	81
46	44	0	0	1	7	3	5	8	4	11	11	50
47	31	0	1	3	0	3	2	4	4	4	9	30
48	56	0	1	1	0	1	6	5	9	9	10	42
49	47	0	1	0	1	0	1	1	3	7	4	18
Total	3755	438	514	447	449	419	517	513	451	427	407	4582

Table (2-2) fertility rates by single year of age women before survey MICS(2006)

0-4 FERTILITY RATES BEFORTHE SURVEY	Women		series of fertility rates by single year of age before the survey 2006									
			before									
		No. of women										
0.0019	15	206	0.005	0.005	0	0	0	0	0	0	0	0
0.0039	16	207	0.01	0.01	0	0	0	0	0	0	0	0
0.0080	17	174	0.034	0	0.006	0	0	0	0	0	0	0
0.0211	18	161	0.043	0.025	0.019	0.012	0.006	0.006	0	0	0	0
0.0447	19	170	0.082	0.053	0.053	0.024	0.012	0.006	0.006	0	0	0
0.0594	20	175	0.114	0.086	0.034	0.023	0.04	0	0	0	0	0
0.0582	21	165	0.061	0.079	0.073	0.036	0.042	0.036	0	0	0	0
0.1167	22	156	0.179	0.16	0.109	0.071	0.064	0.026	0.032	0.013	0	0
0.1213	23	150	0.167	0.18	0.127	0.087	0.047	0.1	0.033	0.033	0.013	0.007
0.1708	24	144	0.222	0.229	0.146	0.16	0.097	0.125	0.076	0.063	0.035	0
0.1876	25	145	0.241	0.172	0.193	0.166	0.166	0.159	0.138	0.048	0.09	0.048
0.2161	26	124	0.202	0.226	0.194	0.226	0.234	0.169	0.185	0.145	0.065	0.081
0.1984	27	125	0.192	0.224	0.192	0.184	0.2	0.168	0.184	0.128	0.104	0.088
0.2468	28	111	0.225	0.306	0.216	0.279	0.207	0.243	0.297	0.162	0.126	0.153
0.2621	29	103	0.184	0.311	0.262	0.301	0.252	0.291	0.301	0.291	0.194	0.214
0.2175	30	103	0.146	0.233	0.301	0.194	0.214	0.301	0.272	0.194	0.282	0.155
0.2226	31	106	0.264	0.208	0.208	0.245	0.189	0.349	0.302	0.255	0.255	0.179
0.2270	32	89	0.225	0.236	0.236	0.225	0.213	0.337	0.292	0.371	0.225	0.247
0.2036	33	111	0.189	0.261	0.171	0.216	0.18	0.234	0.297	0.306	0.234	0.27
0.1442	34	104	0.058	0.202	0.106	0.135	0.221	0.183	0.279	0.24	0.26	0.192
0.2652	35	89	0.157	0.36	0.303	0.258	0.247	0.348	0.348	0.281	0.27	0.36
0.2317	36	82	0.183	0.232	0.256	0.207	0.28	0.341	0.317	0.268	0.244	0.22
0.1457	37	92	0.12	0.141	0.109	0.207	0.152	0.25	0.174	0.283	0.217	0.25
0.1718	38	85	0.094	0.165	0.212	0.2	0.188	0.259	0.282	0.247	0.271	0.294
0.1515	39	66	0.106	0.121	0.152	0.212	0.167	0.242	0.258	0.212	0.288	0.273
0.1548	40	62	0.065	0.097	0.145	0.177	0.29	0.194	0.339	0.29	0.274	0.274
0.1486	41	74	0.162	0.135	0.135	0.149	0.162	0.216	0.23	0.311	0.297	0.324
0.0702	42	57	0.035	0.088	0.088	0.088	0.053	0.158	0.246	0.211	0.193	0.211
0.0694	43	49	0.02	0.082	0.082	0.082	0.082	0.224	0.184	0.184	0.245	0.163
0.0913	44	46	0.022	0.043	0.152	0.174	0.065	0.261	0.152	0.196	0.217	0.217
0.0957	45	46	0	0.109	0.043	0.174	0.152	0.283	0.283	0.174	0.304	0.239
0.0500	46	44	0	0	0.023	0.159	0.068	0.114	0.182	0.091	0.25	0.25
0.0452	47	31	0	0.032	0.097	0	0.097	0.065	0.129	0.129	0.129	0.29
0.0107	48	56	0	0.018	0.018	0	0.018	0.107	0.089	0.161	0.161	0.179
0.0085	49	47	0	0.021	0	0.021	0	0.021	0.021	0.064	0.149	0.085
4.4423		3755	3.808	4.848	4.458	4.691	4.406	5.817	5.929	5.35	5.391	5.263

Table (2-3) TFR Rate for Age group 15-49 in Kurdistan Region

Kurdistan Region MICS3 2006				
Age of women	Births 5BX	women 5NX	5fx	Cumulative Fertility Rate
15-19	68	918	0.0741	0.0741
20-24	405	790	0.5127	0.5841
25-29	666	608	1.0954	1.6795
30-34	519	513	1.0117	2.6912
35-39	403	414	0.9734	3.6646
40-44	161	288	0.5590	4.2236
45-49	45	224	0.2009	4.4272
TFR		3755	4.4272	

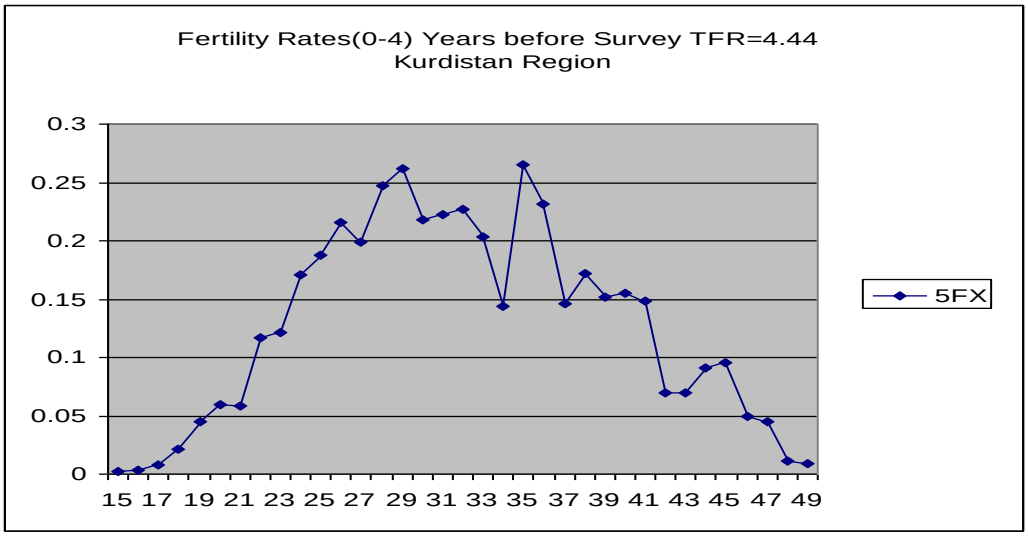

Figure (2-1) TFR before the years of Survey MICS3 (2002-2006) in Age 15-49

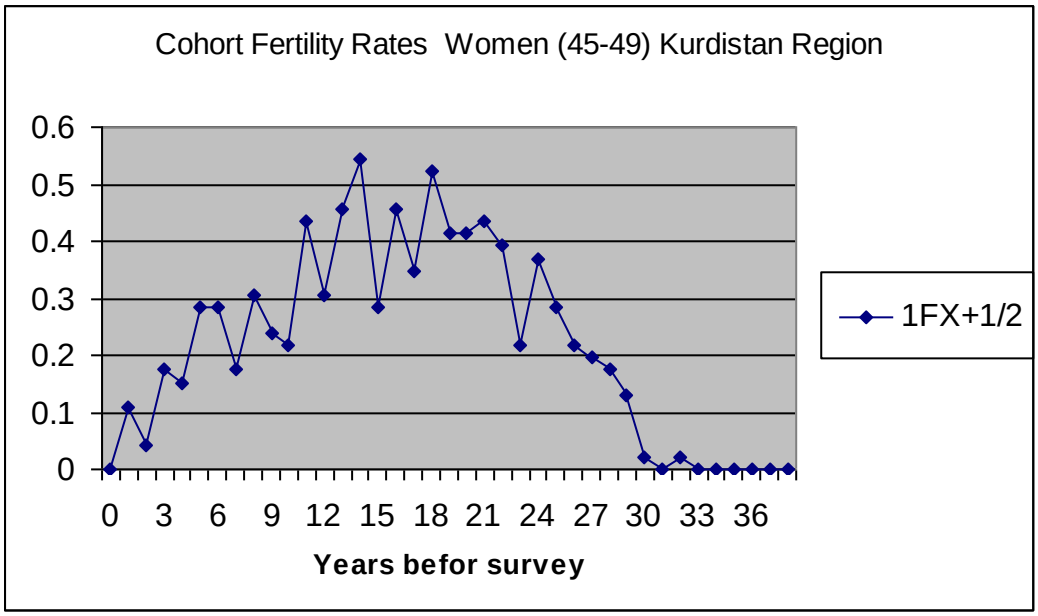

Figure (2-2) Cohort Fertility Rate before the years of Survey MICS3 in Kurdistan Region for Age 45-49

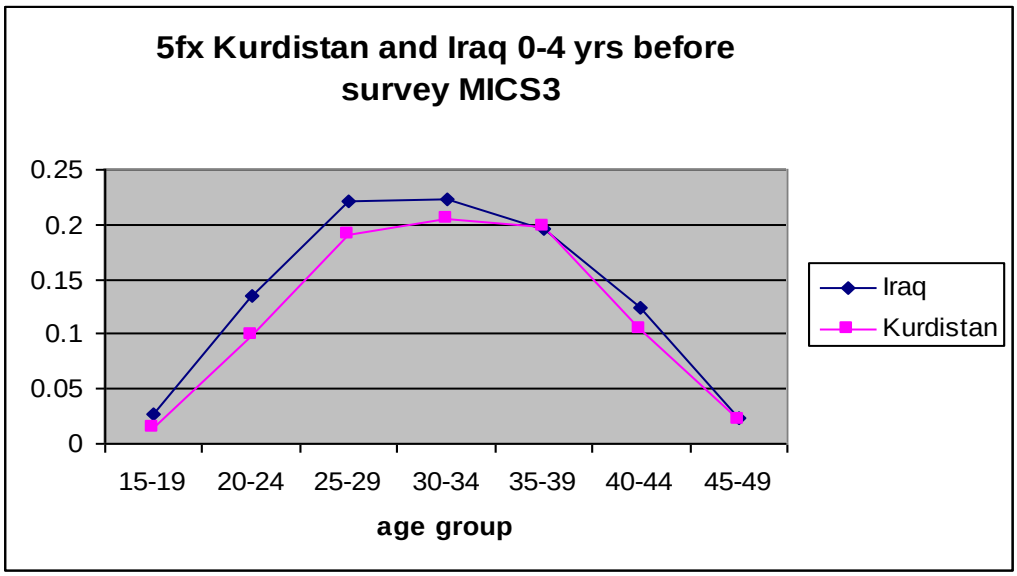

Figure (2-3) TFR between Iraq and Kurdistan Region in Survey MICS3 (2006)

Table (2-4) TFR rate for Age group 15-49 in Governorates Kurdistan Region

Age of women	Erbil	Sulamany	Duhok
	5fx	5fx	5fx
15-19	0.07571	0.1411	0.0881
20-24	0.4947	0.7630	0.5306
25-29	0.990991	1.2990	1.1391
30-34	0.853261	1.2834	1.2896
35-39	1.02649	1.1250	1.0735
40-44	0.470588	0.6800	0.7615
45-49	0.287671	0.1733	0.2396
TFR	4.199411	5.4648	5.1220

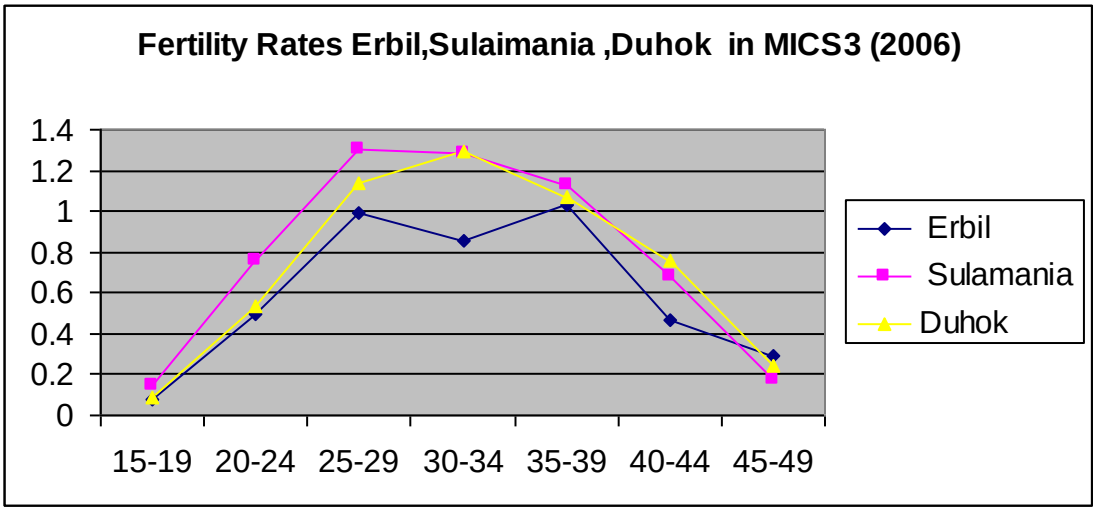

Figure (2-4) TFR before the years of Survey MICS3 (2002-2006) in Governorates
for Age 15-49

Table (2-5) TFR rate for Age group 15-49 in Duhok

Duhok MICS3 2006			
Age of women	births 5Bx	**Women 5Nx**	5fx
15-19	31	352	0.0881
20-24	182	343	0.5306
25-29	303	266	1.1391
30-34	236	183	1.2896
35-39	146	136	1.0735
40-44	83	109	0.7615
45-49	23	96	0.2396
TFR	1004	1485	5.1220

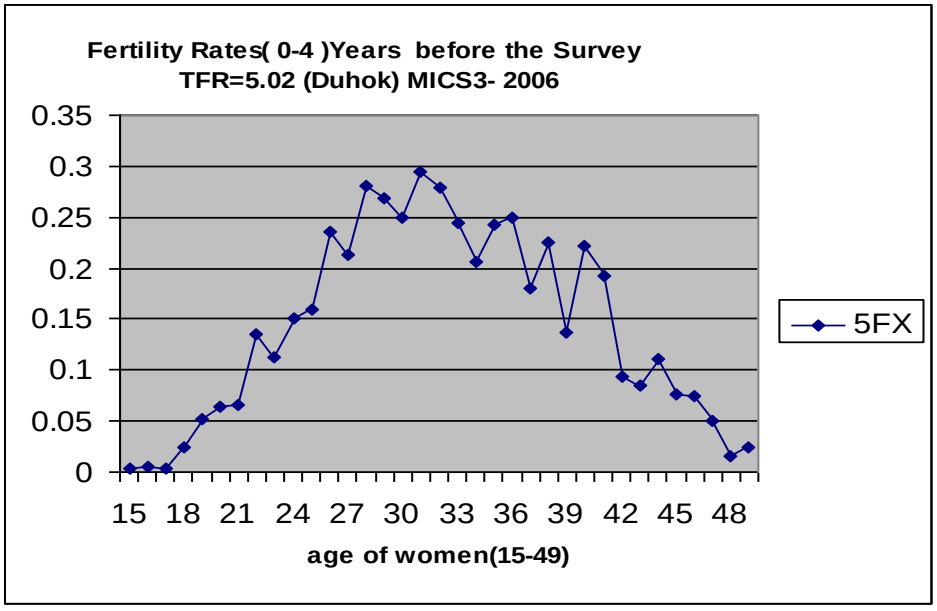

Figure (2-5) TFR before the years of Survey MICS3 (2002-2006) in Duhok for Age 15-49

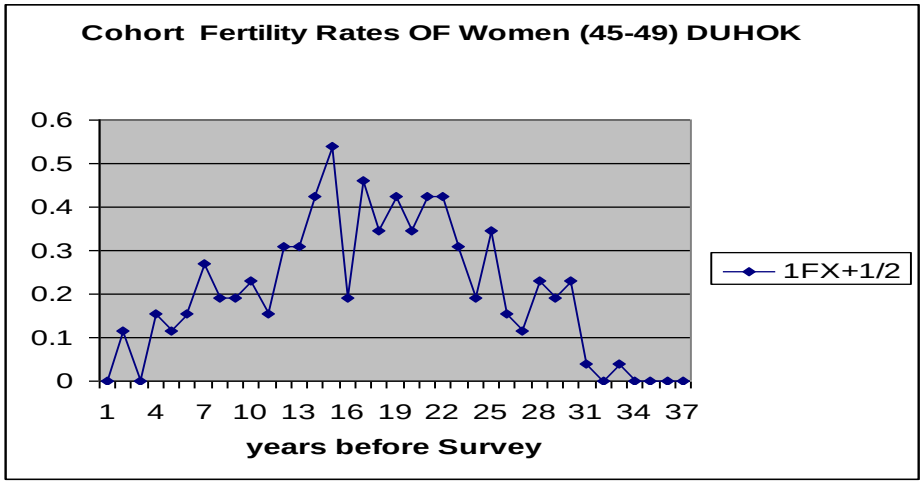

Figure (2-6) Cohort Fertility Rate before the years of Survey MICS3 in Duhok for Age 45-49

Table (2-6) TFR rate for Age group 15-49 in Erbil

Erbil MICS3 2006			
Age of women	births 5Bx	**women 5Nx**	5fx
15-19	24	317	0.07571
20-24	140	283	0.4947
25-29	220	222	0.990991
30-34	157	184	0.853261
35-39	155	151	1.02649
40-44	48	102	0.470588
45-49	21	73	0.287671
TFR	765	1332	4.199411

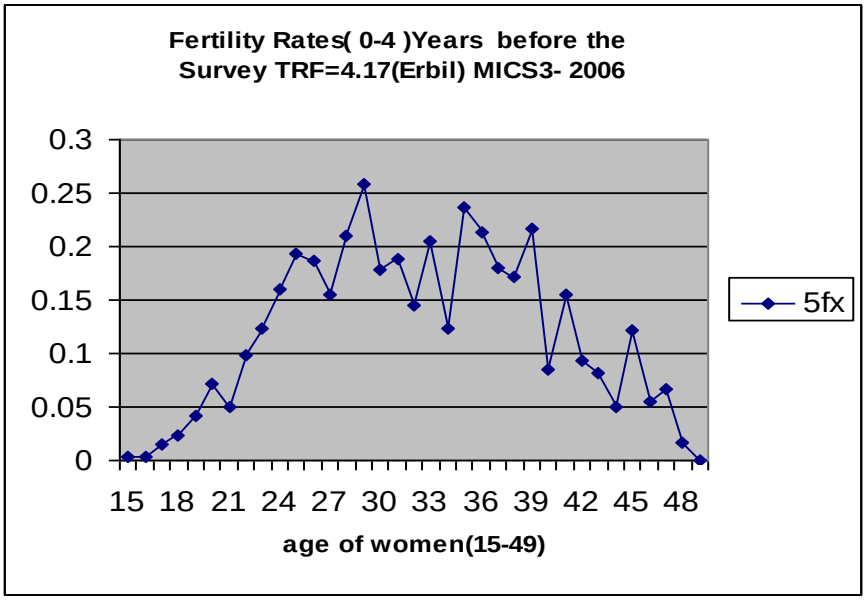

Figure (2-7) TFR before the years of Survey MICS3 (2002-2006) in Erbil
for Age 15-49

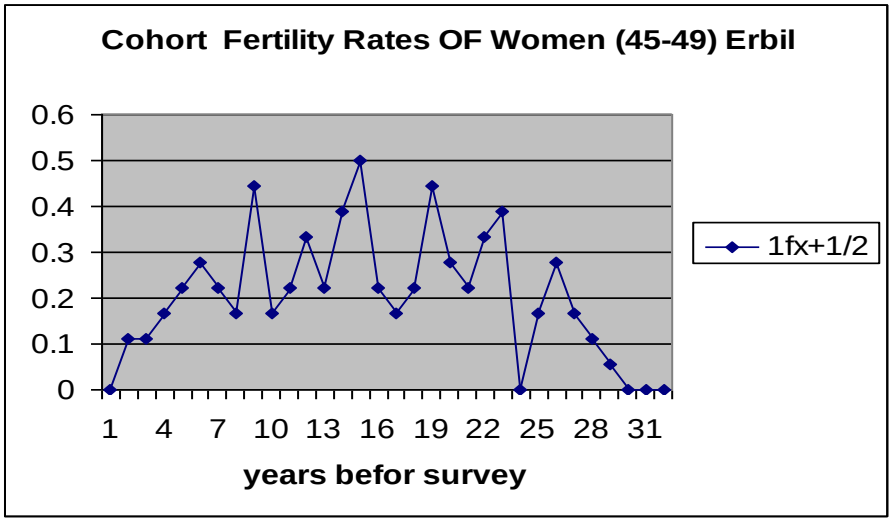

Figure (2-8) Cohort Fertility Rate before the years of Survey MICS3 in Erbil for Age 45-49

Table (2-7) TFR rate for Age group 15-49 in Sulaimany

Sulaimany MICS3 2006			
Age of women	**births 5Bx**	**Women 5Nx**	**5fx**
15-19	45	319	0.1411
20-24	206	270	0.7630
25-29	265	204	1.2990
30-34	240	187	1.2834
35-39	171	152	1.1250
40-44	68	100	0.6800
45-49	13	75	0.1733
TFR	1008	1307	5.4648

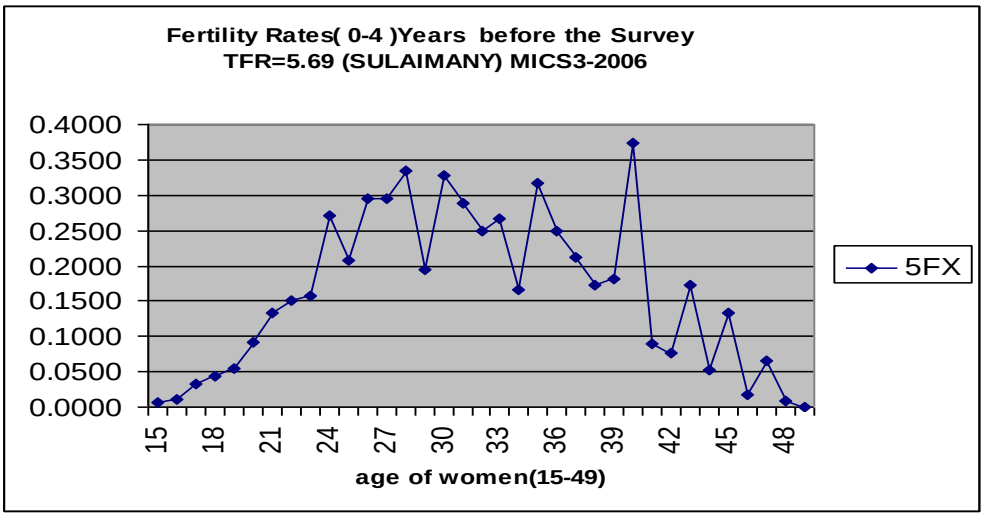

Figure (2-9) TFR before the years of Survey MICS3 (2002-2006) in Sulaimany for Age 15-49

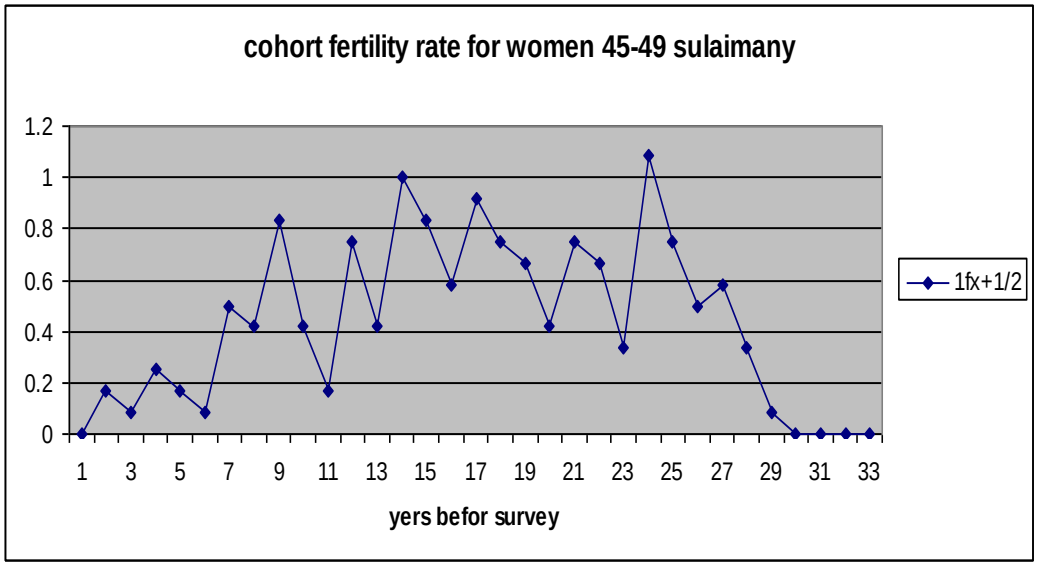

Figure (2-10) Cohort Fertility Rate before the years of Survey MICS3 in
Sulaimany for Age 45-49

Conclusions:

1-Make a graph which compares the TFR of Kurdistan (4.43) with that of other countries in the region.

2-Do the same for the life expectancy at birth and find mortality rate in Kurdistan Region.

3-Discuss the results with variables health and education Kurdistan Region.

4-Because the Median Age is low in Kurdistan Region then having higher fertility for long period.

5-Fertility rates tend to be higher in less economically developed countries and lower in more economically developed countries.

6-In general, the total fertility rate is a better indicator of (current) fertility rates because unlike the crude birth rate it is not affected by the age distribution of the population.

7-Human fertility depends on factors of nutrition, sexual behaviour, culture, instinct, endocrinology, timing, economics, way of life, emotions.

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