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CHAPTER 19

~~19~~ INFANT MORTALITY AND HEALTH CARE
IN THE ARABIAN GULF REGION

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BY

~~19~~ AYMAN GAAFFAR ZOHRY

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SECTION I. INTRODUCTION :

In 1986 the Gulf Cooperation Council Ministers of Health initiated a programme to undertake a series of Child Health Surveys which in the balance of this paper will be as referred to GCHS. These Surveys are important for at least three reasons.

First, it appears that the GCHS initiative preceded a wider effort to develop information necessary to address critical issues of infant and child mortality and morbidity within the Middle East⁽¹⁾ It was in the year following the commitment to the GCH Surveys that the Arab League embarked upon the Pan Arab Programme of Child Health Surveys widely recognised as the PAPCHILD Surveys.

Secondly, the fact that the studies were conducted in the six Gulf States: Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates, meant that for the first time there was a comparable body of demographic data, collected within approximately 18 months in all six countries. Most of the countries have reasonably well developed and comprehensive statistical programmes including censuses and vital statistics. However, at the time of the initiation of the programme, There have been no census in Oman. As late as 1993, publications dealing with Oman still referred to the Seven City Survey conducted in late 1970's as the basic source of demographic data. In Saudi Arabia censuses have been conducted and a vital registration programme initiated, but little information is available.⁽²⁾

Thirdly, surveys of the GCHS type serve as important sources of information regarding health, mortality, and morbidity of Population. As will be evident from the data presented below, major differences exist among and within the GCC countries. Identification of such differences should provide useful information for policies and programmes.

Regardless of the potential values of these surveys, their significance depends upon the quality of the surveys. Ultimately the value of these surveys will be addressed by the agencies which had responsibility for the collection, tabulation, and basic analysis of the data. To critically evaluate and adjust the data requires access to the basic data.⁽¹⁾ However, comprehensive reports have now been published for each of

the six Gulf countries providing the opportunity to gain a fuller understanding of the demographic dynamics of the Gulf.⁽⁴⁾ This Paper is based upon those published reports and focuses specifically on the issues of major concern in the GCH Surveys, child mortality and morbidity.

In the first section of the Paper, we address a limited number of issues related to data quality. The second section of the paper examines levels, trends, and variations in infant mortality among the six GCC countries. The third part of the paper seeks to identify a correspondence between mortality and the data on morbidity and health care. The paper concludes with a summary and interpretation which places the results of the GCHS in the context of broader regional trends within the Middle East.

The evaluation of the GCHS data presented here must be viewed as an approximation only. With the exception of a few tables, in each report, no numbers are presented, generally only percentages and rates. However, numbers are available for the description of the sample, and the total number of males and females, separately and combined.

1.1 The Quality Of Demographic Data In The Gulf States

For many countries in which surveys such as the World Fertility Surveys and the Demographic and Health Surveys took place, sampling has posed initial problems. For most of the GCC countries good sampling frames were available, based upon recent censuses or official registration systems. Still there were problems to be overcome in some of the countries. In Oman there had been no census, and only part of the country had been mapped. Consequently it was necessary to use two different sampling procedures, A for the mapped regions and B for the unmapped regions. Partially as a result, the original target of 5,000 households was not met. Many of the communities selected in sample B turned out to be names of places only, and many of the housing units turned out to be vacant, resulting in a loss of about 20% of the intended sample. In Saudi Arabia for cost reasons, it was necessary to exclude the Nomadic population, estimated at approximately 5% of the population. There is no indication in the Oman report as to how nomadic population

was treated. In Bahrain, because the basis for sampling frame did not identify Bahrain and non-Bahraini households it was necessary to develop a procedure for implementation in the field to replace non-Bahraini with Bahraini household. This occurred in a little over 12% of the original sample. Because of the size of the population in Qatar, nationals and non-nationals are included in the sample.

Separate figures are presented for the national population, and as a consequence the number of cases is often quite small making cross classification for some variables seemingly unreliable.

Given the levels of literacy for females as reported in Table (1) for five of the countries (Bahrain, Kuwait, Oman, Qatar, and the United Arab Emirates) one must be concerned about validity of responses on dates for a woman's date of birth, her age, the dates of birth of her children, and the dates of death of her children.

As the data presented in Table (1) indicate, younger women have much lower rates of illiteracy than older women, but a high proportion of women in all states, but particularly Oman, are illiterate therefore may have a problem in knowing and/or remembering precise dates. One may anticipate that data problems are more likely to occur where there is reporting of events long before the survey. In addition heaving of events on particular years such as child deaths under age 5 being reported as occurring at age 5 may also result in an underestimation of child mortality. Consequently one must be cautious about interpreting levels and long term trends of infant and child mortality.

Because detailed evaluation reports on the age and sex distribution of the population are forthcoming, and because we have provided a fuller discussion in another paper, we shall limited our discussion to only one point. We have computed the age-ratio, sex-ratio, and combined age-sex-ratio indices proposed by the United Nations for each of the six countries based upon the population distribution as calculated from the household surveys. The age and sex distribution is presented in Table (2), and the results of the calculation of the ratios are presented in Table (3). All of the values appear to be very large with the exception of Bahrain. These results must lead one to question the accuracy of the reporting of the numbers of the individuals by

age and sex. However, the very high proportion of children under the age of 15 and the relatively balanced sex ratio of children suggests that this group may have been more accurately enumerated than other age and sex groups of the population. A special effort was made to identify children under the age of five who would be the focus of health questions. In addition, a special effort made to identify women eligible for the individual interviews on marriage, fertility, and child health and mortality may also have resulted in relatively accurate count of females in the childbearing years of life, in most of the countries. If the children were relatively completely enumerated, and if the women were relatively completely enumerated, and if the women were relatively completely enumerated, some confidence may be placed, at least, in recent estimates of infant mortality near the time of the survey, but not necessarily for earlier time periods.

1.2 Infant Mortality

There are three different ways of viewing infant and child mortality rates based upon the published data from GCHS. First, early in the questionnaire women were asked questions related to number of children ever born, sons and daughters born and dead, and sons and daughters living with the respondent or living elsewhere. These questions provide the basis for a series of indirect estimates of infant mortality using the Brass method as modified by Trussell⁽⁵⁾. Secondly, the same set of questions yield data on number of children ever born and surviving or dead by age of mother. Data from pregnancy history questionnaire may also be used to generate former set of data as well as direct estimates of infant and child mortality. These direct estimates yield sex specific neonatal, post-neonatal, infant and child mortality rates, unfortunately direct measures are published for only two countries, Bahrain and Oman. We summarise results for each of the three sets of measures, where available.

Data presented in Table 4 are for indirect estimates of infant mortality. These are particularly critical because the estimates yield data for several time periods prior to the survey.

There are several common features represented by the data in Table 4 as well as several significant differences. Consider first comparisons of the most recent and the earliest infant mortality rates country by country. Five of the countries have moderately low to quite low levels of infant mortality for the most recent time period. Only Saudi Arabia continues to record infant mortality rates around 50 per thousand. The low levels in Oman are particularly surprising in view of the fact that for the earliest time period, its rates were the highest of the six country. Given the particularly high levels of illiteracy in Oman one may suspect that there are some transfers by dates. The question regarding the validity of the Oman data is heightened when one notes the rapid decline in the levels of infant mortality, a decline of nearly 75% in 15 years. All countries have experienced great improvements in levels of infant mortality, in spite of the earlier availability of significant financial resources and more easily accessible populations (as in Bahrain, Kuwait, Qatar and the United Arab Emirates). However, none have evidenced such dramatic changes. One must take into account, the level at the earliest time period. Kuwait approximately 15 years before the Survey had the lowest levels of infant mortality, 25 to 50% lower than the other countries. Relative change at this level, therefore, is more difficult as an increasing proportion of infant deaths are likely to be more intractable neonatal deaths.

Three countries provide data separately for males and females, and in each case female infant mortality rates are lower than male mortality rates reflecting a common pattern found in most countries except for those in which son-preferences lead to systematic differential treatment of males and females. However, earlier studies of the Middle East based upon World Fertility Surveys indicated that Jordan and Egypt were unique in reporting higher female than male mortality rates. With the decline in rates of infant mortality in both of these countries such differences have narrowed or disappeared. Based upon retrospective estimates from the GCHS, there is no evidence of higher female infant mortality rates among any of the countries at any of the earlier time periods.

Among the three countries reporting separate rates for urban and rural populations (Table 5), differences are as expected. Consistently urban infant mortality rates are

lower than rural mortality rates reflecting the greater access to pre and postnatal care available in urban communities.

The same set of questions which were used to calculate indirect estimates of infant and child mortality have been used to calculate number of children ever born and dead by age of the mother. These figures refer to deaths at any age and cannot be treated as precisely comparable to infant mortality rates. They are employed here as a historical reference to life time experience of women interviewed in the Survey. In most cases data are reported for rural and urban populations as well as by education. Former measures are presented in Table (5) and the latter in Table (6).

One should expect that the proportion dead will increase by age of mother because of greater length of exposure to risk of death for children born early in life cycle as well as risks of infant mortality associated with age and parity⁽⁶⁾. The numbers follow only the expected pattern. There are certain discontinuities, large increases in values from one age to another. This is certainly true in Oman, particularly among urban females, and Saudi Arabia among urban females. These discontinuities are unexpected and unusual, because one would normally expect that older women may have forgotten about early births which ended in a death shortly after birth.

Regardless values of the absolute figures, patterns appear to be consistent. Older women have lost a significant number of their children 1 out of 9 among Qatari women, 1 out of 8 among Saudi Arabian women and nearly 1 out of 5 of Saudi rural women, and 1 out of 8 among women in the United Arab Emirates. These rates are equally high among older rural women in Bahrain, roughly one out of eight.

Loss of children is particularly low among all younger women, although the rates remain higher for rural and illiterate women. The rates for women up through age 40 are particularly low in Bahrain, (urban women only), Kuwait and Qatar.

Direct estimates of infant mortality are published for two countries representing the extremes of infant and child mortality rates, i.e., Bahrain and Oman. Each provides data on neonatal, post-neonatal, infant mortality rates and child mortality rates for

four periods of 5 years each prior to the survey. These figures are derived from the pregnancy history questionnaire and therefore may, unless there was an effort to develop correspondence across all sections of the questionnaire, provide a somewhat independent estimate of the data presented above. The data are presented in Table 7.

In Bahrain infant mortality rates have fallen to a level where in the last ten years, post-neonatal mortality rates are lower than neonatal mortality rates for both males and females. The relative risk of dying between ages 1 and 4 has also been reduced significantly again for both males and females. These data suggest the rates of infant mortality in Bahrain among 10-14 and 15-19 years before the Survey are lower than the estimates provided in Table (3). Indirect estimates may have produced figures which are too high. Similarly the figures for Oman indicate that recent estimates reported using indirect estimates of fertility are very high and the estimates for the earlier time periods are too low.

Given differences which arise from application of different methods using data from different parts of the questionnaire, there are some questions regarding validity of actually reported levels. Nevertheless the patterns are consistent. There are major differences among various countries; smaller countries whose populations have easier access to health resources have levels of infant mortality and larger countries with more dispersed populations have high levels of infant mortality. All of the countries show a dramatic and consistent decline in infant mortality rates, but within the countries there are important differences among rural versus urban and illiterate versus literate populations.

Given inter country differences in infant mortality which would seem to demonstrate differences in access to health care, we now turn to the question of whether or not data indicate major differences in access to and utilisation of health care services.

1.3 Maternity Care

Because of the modest differences in the reported levels of infant mortality according to both the indirect and direct estimates of infant mortality, one would

anticipate modest differences in level of pre- and post-natal care, but evidence of differences according to residence, rural versus urban, as a proxy for access to medical care. To a certain degree data are consistent. In Bahrain, Kuwait, Qatar and the United Arab Emirates over 90% of women who had a birth in the last five years reported received ante-natal (or pre-natal) care. The proportion is much lower in Saudi Arabia, 77% in the urban areas and 46% in rural areas. There is also a moderately large urban (97%) and rural (83%) difference in Oman. The Urban/rural differences are small in Bahrain (98.8 versus 93.4 percent) and the United Arab Emirates (97.0% versus 91.0).

As reported in Table (8), not only do a very high percentage of women, exclusive of Saudi Arabia, received ante-natal care, but an overwhelming majority of women report that birth of the last child within the previous five years was attended by a trained medical person, a doctor or a nurse. Once again, the only major source of variation is in Saudi Arabia where only 61% of rural births occurred under trained medical supervision, but the figure was 91% in urban areas. (See Table 7)

Although ante-natal care and medical supervision of delivery is very high throughout almost all of the GCC region, the figures are much lower for post-natal care. And in this case women of Saudi Arabia (64% urban, 42% rural, and 58% total) are more likely to receive post-natal care than women in Bahrain (65% urban, 42% rural, and 54% total), Oman (49%, 32% and 38% respectively), or Qatar, 35% total.⁽⁷⁾

If data for all three sources (ante-natal care, delivery, and post-natal care) of data had been consistently high, one would believe that respondents were probably providing answers which they felt the interviewers, actual or perceived representative of the government wanted to hear. Low levels of post-natal care run contrary to such an argument. Reported recent low levels of fertility suggest a high level of medical care, and lower level of ante-natal and medically supervised delivery in Saudi Arabia is also consistent with its higher level of infant mortality.

As indicators of medical care for children, two indices are examined, whether child has a health card or a record of immunisations. With the exception of United Arab

Emirates (71.9%), over 90 centres of children under the age of 5 (Bahrain), 6 (Kuwait, Qatar, and Saudi Arabia) or 7 (Oman) have health care. In spite of higher infant mortality rate in Saudi Arabia approximately 95% of children have received some immunisations, and 91% of children in Saudi Arabia are reported to have received all of recommended immunisations. The next highest is Oman, 82.7%, then Kuwait and Qatar (74.0 and 74.2% respectively), and only 42% in the United Arab Emirates (No comparable data are reported for Bahrain) For those reported to have a health card, proportions are slightly lower in the case of Oman, Saudi Arabia and the United Arab Emirates, the three countries for which a rural/urban classification is provided. In the same countries there is a slightly higher, but certainly non-significant, proportion of males with health cards. Patterns are consistent in the case of immunizations.

To a large degree data on maternity care and preventive health care for children is consistent with data on infant mortality. Infant mortality rates are quite low in all countries with the exception of Saudi Arabia. Maternity care is less likely to be available/and or used in Saudi Arabia, but preventative health care procedures for children seem to be nearly universal. Although there are continuing rural urban differences in infant mortality, differences in maternity care and preventive health care for children are very low. Therefore, if data are correct one should anticipate a further decline in infant mortality, primarily among rural population.

SECTION II. SUMMARY AND CONCLUSIONS:

The GCC Child Health Surveys provide the most comprehensive comparative body of data available on infant and child mortality to date. Although there are clearly some data problems most clearly reflected in efforts to use data to construct historical trends, there are a number of consistent patterns which should be recognised even though there may remain important questions about absolute levels of infant and child mortality.

First, one should accept the fact that infant mortality has declined to a large degree in each of the six countries. Secondly one should assume that there remain significant differences in current infant mortality rates. Infant mortality rates have reached quite low levels in Bahrain and Kuwait. Although the rate for Saudi Arabia appears to remain higher than in other countries, one must question whether the level of infant mortality in Oman is actually lower than that of Saudi Arabia and as low as reported in the data. Oman faced particularly difficult problems in selecting a sample of population, and levels of education are so much lower than the other countries reporting such data in the Survey reports, that problems of memory error for events and dates of events may have introduced more bias than in other countries.

Variations in infant mortality rates which are reported appear to be somewhat inconsistent with levels of maternity care and health care for children with one important exception. The lowest levels of ante-Natal care and the lowest proportion of births under trained medical supervision are reported in Saudi Arabia. In contrast Oman and Qatar report the lowest levels of post-natal care. There is, however, little variance in rate of childhood immunization.

At another level, within each of the countries for which information is available there remain differences in rates of infant mortality with the highest rates among the rural and less educated segments of the population. These groups, therefore clearly represent the targets for the extension of pre- and post maternity health care programs, although the maintenance of the expanded health care services in the country would be expected to result in a further reduction of infant mortality.

because of on going compositional changes. That is the populations of the region are becoming more urbanized and thus will have easier access to health care facilities. At the same time, the levels of education are increasing rapidly, expanding the number of literate and educated women who are more likely to learn about and be motivated to use the extensive health networks which have or are being developed by each of the governments. Oman and Saudi Arabia, however, face more difficult tasks because of the size and distribution of the populations.

It is also important to notice that the levels of infant mortality may, in part, reflect fertility patterns⁸. There is a well established set of what have been identified as the biodemographic aspects of infant mortality associated with fertility. Rates of infant mortality tend to be high for first party children, births to teen-age mothers, births preceded by a short birth interval, births to older mothers and higher parity children. As we have shown in another paper⁹, there are major variations in fertility among the GCC countries. A major factor ⁹Bean, Lee L. and A.G. Zohry, 1994, "Marriage and Fertility in the Gulf Region: The Impact of Pro-Family, Pro-Natal Policies".

Working Paper No. 36, Cairo Demographic Centre, Cairo, Egypt. associated with the variation and the decline in fertility in some of the countries is the increasing age at marriage. Contraceptive use has also increased in Bahrain, Kuwait, Qatar, and the United Arab Emirates and it appears, based on indirect evidence, that contraception is used largely for birth spacing purposes. The change, reducing teenage pregnancies because of latter marriage and the use of contraception for birth spacing, may have an impact on infant mortality. In addition, if traditional breastfeeding practices are retained, a further contribution to elimination of short birth intervals occurs.

To estimate these effects, we have calculated Bongaarts proximate determinants indices which are designed to indicate the reduction in fertility from a presumed natural fecundability level due to changes in nuptiality (age and proportions married by age), contraceptive utilization, and breastfeeding. Because abortion is illegal in all GCC countries, it may safely assumed to be zero and have no effect. The way in which the Bongaarts indices are computed is such that the lower the numerical value the greater the potential reduction of fertility. In this paper we use the indices not to estimate the potential reduction in fertility but to demonstrate the relative differences

in levels of marriage, contraceptive use, and breastfeeding because each will have an impact on infant mortality. The indices are presented in Table (9).

The indices were calculated from the data presented in the Gulf surveys although in those countries where there was no information on contraceptive use, estimates were taken from the data prepared by Ross.

Our interpretation of the data presented in Table (9) is that part of the recent decline in infant mortality may be the result of the reduction of high risk fertility behavior to some degree. Marriage patterns have changed, and the impact of these changes on fertility are clearly dramatic in Bahrain and Qatar, each of which reports low levels of infant mortality. There is a small effect of contraceptive use in Bahrain, Kuwait, Qatar, and the United Arab Emirates, but these are the four countries which have the highest values (lowest impact) due to breastfeeding, index Ci. If the argument that contraception is being primarily used for spacing purposes, it is clear that increased use may be simply offsetting a decline in breastfeeding. Although the value for the breastfeeding index are quite high (low impact), there appears to be a continuing effect which should be related to birth intervals.

Changes in nuptiality with the exception of Oman would reduce high-risk pregnancies in the GCC countries. If contraception is used primarily for birth spacing, another high-risk factor may be reduced. Nevertheless, given the marital fertility patterns in the Gulf, there remains a significant high risk group of mothers, those who are continuing to bear children late into the reproductive years of life and who have already had several children. It is this group, then, along with the rural and less educated woman who should be the target groups for programs designed to further reduce the levels of infant mortality.

In conclusion, it is necessary to make one comment on analysis procedures used in the reports. All reports use precisely the same estimation procedures to generate indirect estimates of infant and child mortality, as well as a range of plausible historical patterns using a second estimation technique. Only two of the reports present data on direct estimates of infant and child mortality using data from the pregnancy history questionnaire in the Oman report. that a major reason for that was

concerns with the recording of earlier events and age misreporting by mothers for themselves and for their children. Such a concern is reasonable and valid, but one should assume that the report of recent events, say 1 to 6 years before the survey would be a relatively accurate estimate of infant mortality once adjusted for preferential reporting of data.

Although the rates for Qatar may be somewhat unreliable because of the small size of the national population, recent rates calculated from pregnancy history section of the questionnaire might be at least, if not more reliable, than the indirect estimates which have not proved to be particularly robust in the face of violations of the underlying assumptions. Those assumptions, the classical stable population assumptions, may apply to Oman and Saudi Arabia, but probably do not apply to Bahrain, Kuwait, Qatar, and the United Arab Emirates.

End Notes

*Egypt National Population Council (NPC) , Cairo, Egypt.

** Department of Sociology, University of Utah, Salt Lake City, Utah 84112, U.S.A

(1) It was two years after the GCC proposal that Pan Arab Project for Child Development, PAPCHILD was initiated by the League of Arab States in collaboration with the Arab Gulf Programme for the United Nations Development Organizations UNFPA, UNICEF, WHO, and the United Nations Statistical Division. (UNSTAT).

(2) Economic and Social Commission for West Asia, Population Situation in the ESCWA Region, 1990 E/ESCWA/POP/1992/6 (United Nations, Amman, 1992.)

(3) Available reports indicate, in each case, that detailed evaluation studies of age and sex distribution of the samples have been completed and will be published separately

(4) Full citation of these publication is presented below for simplicity, further references will be by name of editors and country name. Samir Farid (ed), Bahrain Child Health Survey, (Manama, Bahrain, Ministry of Health, State of Bahrain, 1992); Rashid Al Rashoud and Samir Farid (eds), Kuwait Child Health Survey, (Kuwait, Ministry of Health, State of Kuwait, 1991);³Murtadha J. Suleiman, Ahmed Al-Ghassany and Samir Farid (eds.), Oman Child Health Survey, (Muscat, Oman, Ministry of Health, State of Oman, 1992).⁴Abdel-Jalil Salman, Khaliffa Al-Jaber, and Samir Farid (eds.), Qatar Child Survey, (Doha, Qatar, Ministry of Health, State of Qatar, 1991), Samir Farid and Yagob Al Mazrou (eds), Saudi Arabia Child Survey, (Riyad, Saudi Arabia, Ministry of Health, Kingdom of Saudi Arabia, 1991);⁵Abdul-Wahab Al Muhadeb Abdul-Ghaffar and Samir Farid (eds.), United Arab Emirates Child Health Survey (United Arab Emirates, Ministry of Health, no date.)

(5) The procedures are described in United Nations Manual X

(6) In some cases the proportion dead is higher for the youngest mothers than for the

determinants of infant mortality, the probability of dying is typically higher for first born child particularly if born to a teenage mother. If proportion of children for young mothers is less than for the next oldest group, that pattern may reflect increased access to health care mothers in recent years. But given the minimal age difference between the groups, one must be suspicious of the latter finding there may be an undercount of deaths for young women.

(7) The high rate of medical care in Saudi Arabia may be due to the fact that health cards for children are retained by the medical centres until children have met minimum immunization standards.

Table 1
Proportion of Women Illiterate, Ages 15 to 49, by Country*

Age	Bahrain	Kuwait	Oman	Qatar	United Arab Emirates
15-19	0.6	8.2	23.8	4.8	3.2
20-24	4.4	20.3	47.4	13.1	8.5
25-29	10.9	34.8	59.5	18.9	21.7
30-34	17.4	45.0	58.2	27.0	34.5
35-39	18.5	60.5	77.7	36.6	49.2
40-44	22.8	75.5	78.5	49.4	67.1
45-49	25.1	80.5	91.0	67.9	78.5

*Data not published for Saudi Arabia

Table 2
Calculated Number of Males and Females Enumerated in the Household Survey and the Sex Ratio, GCHS, by Age and Country

Age	Bahrain			Kuwait			Oman		
	Male	Female	Sex Ratio	Male	Female	Sex Ratio	Male	Female	Sex Ratio
0-4	1882	1821	103.4	3204	3168	101.1	2517	2192	105.2
5-9	1715	1693	101.3	2348	2592	98.3	2237	2125	105.3
10-14	1573	1577	99.7	2310	2213	104.4	1691	1614	104.8
15-19	1328	1295	102.5	1595	1516	105.2	915	975	93.8
20-24	1405	1334	105.4	969	1137	85.2	534	673	79.3
25-29	1057	1154	91.6	805	1152	69.9	890	801	111.1
30-34	825	911	90.6	760	970	78.3	839	662	126.8
35-39	722	667	108.3	700	788	88.9	737	592	124.5
40-44	438	513	85.5	537	424	126.4	610	372	164.2
45-49	400	449	89.0	417	243	172.0	445	267	166.6
50-54	387	372	104.0	298	349	85.5	381	209	102.6
55-59	374	385	97.2	224	182	122.9	203	372	76.2
60-64	369	244	127.0	179	167	107.2	242	267	115.6
65-69	206	180	114.9	134	91	147.5	153	209	164.2
70-74	116	103	113.1	104	91	114.7	114	93	109.5
75+	155	128	120.6	119	76	157.3	203	104	292.0
Total	12892	12824	100.5	14903	15159	98.3	12711	11587	107.7
	Qatar (Nationals Only)			Saudi Arabia			United Arab Emirates		
0-4	836	779	107.2	5542	5408	102.5	3383	3380	100.1
5-9	707	774	94.6	5161	5019	102.8	3157	3119	101.2
10-14	810	292	102.2	4310	4183	103.0	2646	2495	106.1
15-19	810	779	103.9	3401	3436	99.0	1928	1972	97.8
20-24	726	683	106.4	2023	2599	77.8	1531	1992	76.9
25-29	643	606	106.2	1554	2301	67.6	1361	2072	65.7
30-34	489	670	72.9	1144	1554	73.6	888	1288	69.0
35-39	354	464	67.2	1232	1524	80.8	888	1026	86.6
40-44	244	245	99.8	880	1046	84.1	605	523	115.6
45-49	193	206	93.5	997	1016	98.1	605	402	150.3
50-54	186	161	115.7	850	478	177.9	454	563	80.5
55-59	103	103	99.8	586	388	151.0	397	402	98.6
60-64	135	97	139.7	704	329	214.1	359	282	127.5
65-69	64	26	249.5	293	179	163.6	284	181	156.6
70-74	64	39	166.3	645*	418*	154.2	208	181	114.8
75+	64	45	142.5				227	241	93.9
Total	6428	6442	99.8	29322	29877	98.1	18902	20120	93.9

*70 and older

Table 3

The United Nations Age-Sex Accuracy Index Based on the Populations Enumerated in the GCHS Household Surveys

Country	Average Age Ratio Difference For Males	Average Age Ratio Difference For Females	Average Sex Ratio Difference	Age-Sex Accuracy Index
Bahrain	3.6	3.5	4.8	21.4
Kuwait	2.8	9.2	12.8	50.6
Oman	7.9	8.4	12.6	54.0
Qatar	7.9	7.8	12.7	53.7
Saudi Arabia	7.2	5.9	10.2	43.8
United Arab Emirates	4.5	7.2	11.4	45.9

Table 4.

Indirect Estimates of Infant Mortality, by Date, and Available Cross-classification.

Bahrain				Kuwait			
Dates	Urban	Rural	Total	Dates	Male	Female	
1988	22	28	25	1987	25	21	
1985	27	32	29	1985	26	21	
1980	41	47	44	1980	30	23	
1975	60	71	66	1975	39	32	
				1973	50	41	
Oman				Qatar			
Dates	Urban	Rural	Semi-Urban	Dates	Total		
1987	24	37	34	1985	30		
1985	29	45	42	1980	38		
1980	42	76	76	1975	62		
1975	60	117	118	1973	73		
1972	96	120	135				
Saudi Arabia				United Arab Emirates			
Dates	Male	Female	Urban	Rural	Dates	Male	Female
1987	55	50	47	68	1987	28	20
1985	69	60	57	83	1985	25	23
1980	95	87	85	107	1980	57	47
1975	108	98	101	111	1975	84	73
					1973	96	78

Table 5

Percentage of children Ever Born Who had Died at Time of the Survey by age of Mother, Urban-Rural Population

Age	Bahrain		Oman		Saudi Arabia		United Arab Emirates	
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
15-19	-	-	6.4	5.3	1.4	5.1	3.4	4.8
20-24	1.5	3.7	2.5	4.7	5.3	6.3	1.7	4.2
25-29	1.8	2.6	4.6	6.0	5.2	8.0	3.5	4.2
30-34	3.2	5.6	5.2	8.5	6.3	11.3	4.1	6.1
35-39	1.9	7.5	7.7	11.3	8.4	12.1	7.2	7.9
40-44	5.4	9.5	9.0	17.7	10.2	18.8	9.6	13.0
45-49	7.8	13.6	21.4	23.2	16.8	19.6	12.0	15.0

Table 6

Proportion of Children Dead at Time of the Survey, by Age of Mother, and Educational Indicators

Age	Bahrain			Oman	
	Illiterate	Less than Primary	Primary	Illiterate	Literate
15-19	-	-	-	5.7	5.1
20-24	5.0	.8	4.7	5.2	2.3
25-29	2.5	2.8	1.6	6.2	4.6
30-34	5.1	2.7	2.3	8.5	4.2
35-39	4.6	2.1	2.8	11.8	7.9
40-44	6.8	5.3	1.3	17.7	11.8
45-49	9.5	5.7	5.0	23.2	9.5
	Kuwait			Qatar	
	Illiterate	Inc. Primary	Preparatory	Illiterate	Literate
15-19	-	-	1.9	-	-
20-24	4.0	5.4	1.8	6.5	2.3
25-29	3.8	3.6	3.3	3.3	2.2
30-34	3.5	4.0	2.5	5.3	3.2
35-39	3.7	4.0	2.4	5.3	3.9
40-44	4.4	3.2	6.6	6.7	4.6
45-49	7.0	8.5	9.2	11.6	5.6
	United Arab Emirates			Saudi Arabia	
	Illiterate	Inc. Primary	Primary	Illiterate	Literate
15-19	5.2	3.6	3.0	4.8	4.4
20-24	3.7	2.8	1.8	7.0	4.4
25-29	4.4	4.2	2.8	7.7	3.9
30-34	5.6	3.6	4.0	8.9	4.8
35-39	8.0	6.3	6.3	9.5	4.8
40-44	11.1	7.9	1.6	13.3	8.7
45-49	13.5	9.9	-	17.9	15.4

Table 7

Direct Estimates of Infant and Child Mortality, Bahrain and Oman

Years Before the Survey	Bahrain							
	Males				Females			
	NN	PNN	IMR	4Q1	NN	PNN	IMR	4Q1
0-4	14.1	4.5	18.6	3.7	10.9	2.7	13.7	4.6
5-9	11.1	9.0	20.1	4.7	9.5	7.6	17.1	7.4
10-14	11.4	14.4	25.8	10.2	14.3	28.3	28.3	10.8
15-19	29.5	21.3	50.8	15.2	27.5	41.7	41.7	14.5
Years Before the Survey	Oman							
	Males				Females			
	NN	PNN	IMR	4Q1	NN	PNN	IMR	4Q1
0-4	12.6	14.7	27.4	10.1	10.2	14.9	25.2	12.8
5-9	28.1	24.7	52.7	16.9	15.3	25.0	40.3	22.1
10-14	42.2	59.4	101.6	39.0	33.7	58.6	92.3	60.3
15-19	61.7	92.6	154.3	87.2	51.3	75.1	126.4	109.3

Table 8

Percentage of Women Who Had Their Last Child in the Five Years Before the Survey by Type of Assistance, Residence and Country

Country	R	Doctor	Nurse	Daya	Relative or Other	No One	Total
Bahrain	U	55.2	41.6	0.5	2.5	0.2	100.0
	R	38.9	51.6	3.1	5.3	1.1	100.0
	T	47.8	46.2	1.7	3.7	0.6	100.0
Kuwait	U	57.0	41.0	0.0	2.0	0.0	100.0
Oman	U	91.0		1.0	3.0	5.0	100.0
	P	84.0		3.0	9.0	4.0	100.0
	T	87.0		2.0	7.0	4.0	100.0
Qatar	T	59.0	38.0	1.0	1.0	1.0	100.0
Saudi Arabia	U	71.0	20.0	1.0	7.0	1.0	100.0
	R	38.0	23.0	1.0	30.0	8.0	100.0
	T	61.0	21.0	1.0	14.0	3.0	100.0
United Arab Emirates	U	80.0	20.0	0.0	0.0	0.0	100.0
	R	66.0	30.0	0.0	3.0	1.0	100.0
	T	74.0	24.0	0.0	1.0	1.0	100.0

Table 9

Values of Proximate Determinants of Fertility Indices by Country

Country	Index of Marriage	Index of Contraception	Index of Post-Partum Infecundability
Bahrain	0.565	0.727	0.838
Kuwait	0.726	0.715	0.855
Oman	0.830	0.923	0.736
Qatar	0.491	0.740	0.857
Saudi Arabia	0.675	0.991	0.797
United Arab Emirates	0.713	0.721	0.864

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