**Introduction**

This paper looks at the infant mortality rates (IMR) and gross domestic product purchasing power parity (GDP PPP) for 24 countries across the Middle East, North Africa, and Mediterranean Europe over the thirty-one years between 1980 and 2010.

**Methods**

The 24 countries were divided into four groups of six countries each. Group 1, Arabian Peninsula consisted of Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates. Group 2, Arab North Africa, consisted of Algerian, Egypt, Mauritania, Morocco, Sudan, and Tunisia. Group 3, non-Arab Middle East, consisted of Iran, Israel, Jordan, Lebanon, Syria, and Turkey. Group 4, Mediterranean Europe, consisted of Cyprus, France, Greece, Italy, Portugal, and Spain.

Infant mortality data was collected from the UN Inter-agency Group for Child Mortality Estimation (UNICEF, WHO, World Bank, UN DESA, UNPD) 2011 paper *Level & Trends in Child Mortality*.

GDP PPP data was collected from the International Monetary Fund’s World Economic and Financial Surveys World Economic Outlook Database.

Microsoft Excel was used to find correlations between the 31 years of IMR and GDP PPP data.

Microsoft Excel was used to perform multiple paired-sample t tests on the IMR data.

**Results**

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| **NON-ARAB MIDDLE EAST** |
| *GDP PPP* |
| MEAN | 7559.801823 |
| STDV | 5864.170785 |
| *INFANT-MORTALITY RATE* |
| MEAN | 31.61075269 |
| STDV | 20.09330378 |
| CORREL | -0.56548131 |

*Figure 1. Correlation between IMR and GDP PPP (1980 – 2010) in non-Arab Middle East.*



*Table 1. IMR and GDP PPP for the three decades (1980 – 2010) in non-Arab Middle East.*

*Figure 2. Linear regression between IMR and GDP PPP (1980 – 2010) in non-Arab Middle East.*

The overall correlation for the 24 countries studied was -0.595626.

The correlation for the Arabian Peninsula countries was -0.51530811.

The correlation for the Arab North Africa countries was -0.88129822.

The correlation for the non-Arab Middle East countries was -0.56548131.

The correlation for the Mediterranean Europe countries was -0.87596741.

All of the groups have a negative correlation between IMR and GDP PPP, suggesting that as the economy improves the health of the population also improves. The correlation coefficient for the Arabian Peninsula and the non-Arab Middle East were considerably weaker than the other two subgroups, and somewhat weaker than for the *super*group of 24 countries. With absolute values of 0.5153 and 0.5655 their correlations are moderate at best, suggesting that the improvement in health that can be expected with an improvement in economy was not quite as noticeable in the Arabian Peninsula and non-Arab Middle East countries, as compared to the Arab North Africa and Mediterranean Europe countries.

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| NON-ARAB MIDDLE EAST |
|   | 1980 | 2010 |   | 2000 | 2010 |
| IRAN | 76.7 | 21.8 |  | 35.2 | 21.8 |
| ISRAEL | 15.6 | 3.6 |  | 5.6 | 3.6 |
| JORDAN | 48.1 | 18.4 |  | 24.6 | 18.4 |
| LEBANON | 38 | 18.8 |  | 24.5 | 18.8 |
| SYRIA | 54.4 | 13.8 |  | 19.5 | 13.8 |
| TURKEY | 102.2 | 13.7 |  | 34.1 | 13.7 |
| *PAIRED-* | 0.015826029 |   | 0.023225999 |
| *SAMPLE* |   |
| *t TEST* |   |

*Figure 3. Paired-sample t test for IMR in non-Arab Middle East.*

Paired-sample t tests were run for each group using IMR data from 1980 and 2010, to test the null hypothesis – H0: μ1980 = μ2010. At the 1% level of significance, this null hypothesis was rejected for all of the groups, except the non-Arab Middle East, with its p-value of 0.015826029.

The non-Arab Middle East p-value of .015826 indicates that there is a 1.58% chance that μ1980 and μ2010 are actually the same value. If this were the case it would mean that the observed change between 1980 and 2010 was not real, and the 2010 values cannot be accepted. (I am not clear on whether this means that the 1980 values are acceptable, or if I am to assume that the true μ is some intermediate value between the two.) In any event, though the 1% level of significance is very low, considering the fact that for the other three groups the p-values were much smaller, and their null hypotheses rejected, we can conclude that the improvement observed in the non-Arab Middle East is not as robust as for the other regions.

**Discussion**

There has been an improvement in the IMR for all four groups and for all 24 countries. However, the data suggests that this improvement is not as significant for the non-Arab Middle East subgroup. In their 2011 paper, “Correlation between socioeconomic differences and infant mortality in the Arab World (1990 – 2009)”, Abuqamar, Coomans, and Louckx suggest that the following socioeconomic factors need to be considered when studying IMR: education, unemployment, level of poverty, early marriage, consanguineous marriage, literacy, maternal birthplace, marital status, and tobacco.

Though the non-Arab Middle East has shown improvement over the last three decades, the governments of each country, as well as any NGOs working in the region, should address the above mentioned socioeconomic factors in order to further improve, and be able to match the levels of improvement observed in the countries of neighboring regions.

**Sources**

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