Introduction

Neonatal Mortality, being a component of childhood mortality and hence Millennium Development Goal 4 (MDG 4), has been a focus of global health improvement strategies and plans of action since 1990. The result is that global neonatal mortality has decreased from an estimated 4 million neonatal deaths per year reported in 2005 to an estimated 3.1 million neonatal deaths per year reported in 2008. Unfortunately this decline in neonatal mortality has been uneven. The countries which needed most improvement had the least gain; the main reason being financial, political, administrative and technical resource restriction.

The global neonatal survival has improved significantly between 1970 and 2010, though; the results remain grossly uneven between countries and regions. Some countries, particularly State of Qatar, Brazil and Sri Lanka, have done exceptionally well in reducing their neonatal mortality rates.

Objective

1-To prospectively ascertain Qatar’s Neonatal Mortality Rate (NMR) during 2011,
2-To analyze trends in NMR between 1975 and 2011,
3-To compare with recent data from high income countries.

Methods

Data on live births and neonatal mortality was collected from all public and private maternity facilities in Qatar during 2011 and compared with historical neonatal mortality data (1975-2011) ascertained from the database of mortality and neonatal units of Women’s Hospital and annual reports of HMC. Inter country comparisons were made using World Health statistics 2011 and European Perinatal Health report 2008

PEARL Study uses the following WHO definitions, based on ICD-10, to ascertain, analyze and report its perinatal neonatal data. 

Neonatal Mortality: Death of a live born term baby (37 completed weeks of gestation) during the first 28 days (day 0 to day 27) of life.

Early Neonatal Mortality: Death of a live born baby during first 7 days of life (day 0 to day 6 of life irrespective of gestation at birth.

Late Neonatal Mortality: Death of a live born baby between day 7 and day 27 of life. Pearl study uses this criterion only for babies born at term 37 completed weeks of gestation. For preterm babies (≤36th week of gestation), 

Prematurity Adjusted Neonatal Mortality (PEARL Study) has developed an intrinsic methodology of adjusting neonatal period for prematurity.

For all preterm babies, an extended neonatal period is calculated, in order to compensate for their prematurity. Corrected Neonatal Mortality is calculating corrected neonatal mortality after exclusion of cases with futile outcome.

Data was entered into Epi Data version 3.0 and analyzed using SPSS version 18.0. Chi square test of significance was used to identify any significant differences between categorical variables which were computed as frequency and percentages. A two sided p value of <0.05 was taken as significant. The Relative Risk (RR) of Mortality with 95% CI was calculated using 1975 data as reference. Significance of trends in Neonatal Mortality between 1975 and 2011 was measured by using trend Chi square statistics.

Results

Table 1: Trends in Population, Live births and Relative Risk of NMR, ENMR and LNMNR in Qatar 1975-2011

<table>
<thead>
<tr>
<th>Year</th>
<th>Population</th>
<th>Total Live Birth</th>
<th>NM R</th>
<th>RR (95% CI) p-value</th>
<th>ENMR</th>
<th>RR (95% CI) p-value</th>
<th>LNMN</th>
<th>RR (95% CI) p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1975</td>
<td>171,000</td>
<td>2053</td>
<td>104</td>
<td>36.45</td>
<td>89</td>
<td>31.2</td>
<td>15</td>
<td>5.25</td>
</tr>
<tr>
<td>1980</td>
<td>220,000</td>
<td>6009</td>
<td>88</td>
<td>13.32</td>
<td>64</td>
<td>10.29</td>
<td>20</td>
<td>3.03</td>
</tr>
<tr>
<td>1985</td>
<td>320,000</td>
<td>9787</td>
<td>81</td>
<td>8.29</td>
<td>62</td>
<td>6.35</td>
<td>19</td>
<td>1.95</td>
</tr>
<tr>
<td>1990</td>
<td>430,000</td>
<td>10759</td>
<td>76</td>
<td>5.58</td>
<td>64</td>
<td>5.58</td>
<td>32</td>
<td>2.97</td>
</tr>
<tr>
<td>1995</td>
<td>642,000</td>
<td>9995</td>
<td>74</td>
<td>7.40</td>
<td>33</td>
<td>3.30</td>
<td>41</td>
<td>4.10</td>
</tr>
<tr>
<td>2000</td>
<td>744,000</td>
<td>11074</td>
<td>134</td>
<td>12.10</td>
<td>55</td>
<td>4.6</td>
<td>83</td>
<td>7.5</td>
</tr>
<tr>
<td>2005</td>
<td>863,000</td>
<td>13242</td>
<td>67</td>
<td>5.06</td>
<td>30</td>
<td>2.6</td>
<td>37</td>
<td>2.8</td>
</tr>
<tr>
<td>2011</td>
<td>1,707,756</td>
<td>20583</td>
<td>101</td>
<td>4.3</td>
<td>55</td>
<td>2.7</td>
<td>46</td>
<td>2.4</td>
</tr>
</tbody>
</table>

Fig: 1 Trends in Qatar’s NMR, ENMR LNMR and PMR over a period of 36 years (1975-2011)

Fig: 2 Comparative analysis of Qatar’s Neonatal and corrected Neonatal Mortality Rates 2011with Global, Eastern Mediterranean Region (EMR), GCC countries and some developed world countries (Source: World Health Statistics 2011).

Fig: 3. Comparative Analysis of Qatar’s Early and Late Neonatal Mortality Rates with some of the European countries (Source: Europeristat Report 2008)

Conclusion

*Qatar has achieved its target neonatal survival by 2011 as required by MDG 4. The improvement has been more marked in ENMR than LNMNR.

 Qatari’s current NMR, ENMR, LNMNR and cNMR are comparable with selected high income counties.

Further in depth analysis of correlates and determinants of Neonatal survival in Qatar may form the basis of a strategic global neonatal mortality improvement plan. 

References


The State of Qatar’s National Perinatal Mortality Rate during 2011 is comparable with Selected High Income Countries: A PEARL Study Analysis
Nuha Nimeri, Sajjad Rahman, Sarrah El Tinay, Walid El Ansari, Emirah A Latif, Hilal Al Rifai, Halima Al Tamimi, Khalid Salameh, Affaf Shaddad, Mohammad Tahir, Abdulbari Bener

Introduction

The concept of Perinatal period was introduced in 1949 in England to establish continuum of life and disease between fetal and neonatal period. Perinatal mortality, a combination of stillbirths (late fetal mortality) and early neonatal mortality (day 0-6 of life), is a very strong indicator to assess health care during the Perinatal period. Globally an estimated 2.08-3.79 million babies are stillborn every year, one in three of these deaths occurs during delivery and could largely be prevented. While neonatal mortality has declined significantly worldwide over the last four decades, stillbirths have shown very little if any decline. Hence the burden of still births and Perinatal Mortality continues to be a global health care challenge. The State of Qatar stands unique among the world nations in having achieved all Millennium Development Goals (MDG’s) by 2007, half way before the 2015 universal deadline. Since stillbirths are neither counted in WHO’s Millennium Development Goals, nor tracked by the United Nations; nor included in the Global Burden of Disease Metrics, the current prospective epidemiologic study was undertaken to estimate Qatar’s National Perinatal Mortality Rate during 2011.

Objective

1- To prospectively ascertain Qatar’s Perinatal Mortality Rate (PMR) during 2011,
2- To analyze trends in PMR between 1990 and 2011
3- To compare with recent data from selected high income countries.

Methods

The data on live births, stillbirths and early neonatal mortality was collected from all public and private maternity units in Qatar during 2011 (We have 3 public hospitals namely Women hospital, Al Khor Hospital and Hamad General Hospital. The Private sector composed of three hospitals ; Al Ahli Hospital, Doha clinic and Al Emadi Hospital). Data was compared with Qatar’s historic perinatal mortality data (1990-2010) ascertained from maternity and neonatal unit databases of Women’s Hospital and annual reports of HMC. We used ICD-10 definitions both for reporting and comparison with selected high income countries (data from World Health Statistics 2011 and European Perinatal Health Report 2008).

Early Neonatal Mortality is defined, using the WHO criteria, as Neonatal death during first 7 days of life (between day 0 and day 6 irrespective of gestation at birth).

For reporting purposes, Still birth is defined, using ICD-10 definition, as foetal death with a birth weight of ≥ 500 grams, or, if missing, ≥ 22 completed weeks of gestation, or if missing, crown heel length ≥ 25 cm.

For international comparison purpose, Still birth is defined, using WHO international comparison definition, as foetal death with a birth weight of ≥ 1000 grams, or, if missing, ≥ 28 completed weeks of gestation, or if missing, crown heel length ≥ 35 cm.

The Perinatal Mortality Rate per 1000 is calculated, using WHO criteria , by taking early neonatal mortality plus still births during the study period as denominator and total births (live plus still births) during the same period as a denominator per 1000 total births.

Data was entered into Epi Data version 3.0 and analyzed using SPSS version 18.0. Mean with standard deviations were calculated for continuous scale variables and frequency with percentage for categorical variables. Chi square test of significance was used to identify the difference between categorical variables. A p value of <0.05 was taken as significant. The Relative Risk (RR) of mortality was calculated using and 1990 data as reference.

Results

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Population</th>
<th>Live Births</th>
<th>SB*</th>
<th>SBR</th>
<th>Early Neonatal Deaths</th>
<th>ENMR</th>
<th>Perinatal Mortality</th>
<th>PMR</th>
<th>RR (95% CI)</th>
<th>P&lt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>439,000</td>
<td>10759</td>
<td>79</td>
<td>7.2</td>
<td>64</td>
<td>5.9</td>
<td>143</td>
<td>13.2</td>
<td>0.98(0.77-1.24)</td>
<td>0.859</td>
</tr>
<tr>
<td>1995</td>
<td>642,000</td>
<td>9995</td>
<td>97</td>
<td>9.6</td>
<td>33</td>
<td>3.3</td>
<td>130</td>
<td>12.88</td>
<td>0.98(0.77-1.24)</td>
<td>0.859</td>
</tr>
<tr>
<td>2001</td>
<td>769,152</td>
<td>11875</td>
<td>88</td>
<td>7.36</td>
<td>52</td>
<td>4.35</td>
<td>140</td>
<td>11.9</td>
<td>0.89(0.70-1.12)</td>
<td>0.315</td>
</tr>
<tr>
<td>2006</td>
<td>885,359</td>
<td>13741</td>
<td>110</td>
<td>7.94</td>
<td>26</td>
<td>1.89</td>
<td>136</td>
<td>9.82</td>
<td>0.75(0.59-0.94)</td>
<td>0.016</td>
</tr>
<tr>
<td>2011</td>
<td>1,707,756</td>
<td>20583</td>
<td>142</td>
<td>6.85</td>
<td>56</td>
<td>2.7</td>
<td>198</td>
<td>9.55</td>
<td>0.72(0.58-0.89)</td>
<td>0.002</td>
</tr>
</tbody>
</table>

*p 0.019 ** p <0.001 (p values based on trend chi square statistics)


Conclusions

*Qatar’s 2011 PMR, ENMR and SBR are comparable to selected high income countries.
*Though there is significant improvement in Perinatal Mortality in Qatar since 1990, further improvement is possible by designing well targeted research based health systems improvement strategies.
Qatar is a sovereign state in the Middle East. Geographically a peninsula spread over 11,437 km², it is bordered by Saudi Arabia in the South and Persian Gulf on all other sides. Since 2010, Qatar has the highest per capita GDP in the world based on its proven reserves of oil and natural gas. Currently Qatar is the world’s largest Liquefied Natural Gas (LNG) producer. Qatar’s economic boom, which started in mid-1990’s, has resulted in exponential increase in its population due to economic migration. The life in Qatar is changing rapidly due to heavy investment in infrastructure and systems development. United Nations has classified Qatar as one of 42 countries possessing a very high human development index. Qatar allocates 15% of its national budget to health care. In addition, Qatar is investing a lot of funds in health related research which is a part of its strategic goal to develop a knowledge based society. It is plausible that these heavy health care investments could have contributed to Qatar’s significantly improved Maternal, Neonatal and Perinatal Survival rates.

Perinatal Neonatal Outcomes Research Study in the Arabian Gulf (PEARL Study) is Qatar’s prospective National Perinatal Epidemiologic Study which is funded by Qatar National Research Fund (grant # QNRF-NPRP-09-390-3-097).

PEARL Study is a joint collaborative project between Hamad Medical Corporation, Doha, Qatar and the University of Gloucestershire, Gloucester, United Kingdom. The project aims to build a Neonatal Perinatal Registry for Qatar called P-Peri-Reg. which will be used to quantify Maternal, Neonatal and Perinatal Mortality and morbidities and their correlates.

PEARL study is approved by the Research Ethics Committee (IRB) of Hamad Medical Corporation (protocol #9211/09), which is responsible for providing ethical approval to all health care research projects in the State of Qatar.

**Introduction**

Maternal mortality is an important focus of international development efforts, and a target for Millennium Development Goal (MDG) 5. It is also a significant measure of women’s health and indicative of the performance of health care system. Over half a million women die each year due to complications during pregnancy and birth. Most maternal deaths are due to causes that can be prevented or treated. Globally, around 80% of maternal deaths are due to obstetric complications; mainly hemorrhage, sepsis, unsafe abortions, preeclampsia and eclampsia, and prolonged or obstructed labor.

As part of the MDG 5, the UN established the target of reducing the maternal mortality ratio by three-quarters between 1990 and 2015 for all national and regional populations. Hence, the two main targets used for assessing progress in improving maternal health (MDG 5) are: (1) reducing the maternal mortality ratio (MMR) by three-quarters between 1990 and 2015; and, (2) achieving universal access to reproductive health by 2015.

**Objective**

To analyze Qatar’s performance in achieving MDG 5 by 2011.

**Methods**

The study was carried out in all public and private hospitals in Qatar which includes Women’s hospital and Al khor hospital from Hamad Medical Corporation, Al Ahli Hospital, Doha Clinic and Al Emadi Hospital. We obtained data on all live births and maternal deaths during 2011. Data on maternal health indicators was ascertained by the department of medical statistics and epidemiology HMC and the Supreme Council of health and published in their annual reports.

The PEARL Study data collection team is comprised of thirteen Full time physicians (including one research fellow, two research associates and ten research assistants). The current study was conducted during the first year of the project.

**Results**

During 2011 the total deliveries in the State of Qatar were 20314; Normal Vaginal deliveries were 15076 (74.22%) and Caesarean sections were 5238 (25.78%). 99.45 % of deliveries were attended by a trained birth attendant in a maternity facility while 0.55 % (n = 114) took place out of hospital. 100% of mothers had made at least one antenatal visit. 100% of births were examined by a pediatrician and entered in national birth register.

Qatar had only two maternal deaths during 2011 giving a Maternal Mortality Rate (MMR) of 9.85/100,000. Qatar’s MMR had been zero for several years between 1995 and 2000; for the rest of the years it had been between 7 and 11 (Fig 2). Qatar’s MMR during 2011 (9.85/100,000) was comparable to countries like Australia (8/100,000) and better than UK (12/100,000) and USA (24/100,000).

Qatar has made a significant progress in improving its MMR at a time when the global MMR is 260/100,000.

**Conclusion**

*Qatar has achieved its target MDG 5 well before 2015. Qatar’s 2011 MMR is comparable to most high income countries. 

*Qatar’s reproductive health system provides a unique model to study the correlates and associations of maternal survival which can form the basis of global health systems improvement strategies.

**References**

4.世界人口统计世界数据 2005