Tracking the Maternal Mortality in Economic Cooperation Countries; Achievement and Gaps toward Millennium Development Goals

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Objective: Evaluating the status of the ECO member countries in relation to goal 5 of 3rd millennium which includes 75% reduction of maternal mortality rate till 2015 in comparison to 1990.
Material and Methods: In 2009, we have critically reviewed the countries' MDG reports and extracted the data on each MDGs' indicator by year and cause of mortality, (if possible) resident area (urban/rural) to explore the trend. In the next phase, the main stakeholders, from both governmental and international organizations in the country have been visited and interviewed (individually and in group) by the research team as part of the data validation process.
Results: The MMR is very heterogeneous among the ECO countries. Afghanistan with the MMR of 1800 (per 100,000 live births) in 2005 is the worst country in the region/world while Turkey has reached the level of 19.4 maternal deaths per 100,000 live births in 2008. Multiple regression analysis shows that only the index of delivery by skilled health personnel is effective in reduction of maternal mortality.
Conclusion: With considering half a decade to the end of predetermined time for achieving the millennium development goals, i.e. 2015, it's optimistically expected that only a few of the ECO countries will reach the target for maternal health.

Keywords: Millennium Development Goals, Maternal Mortality Rate, ECO.

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Introduction

The maternal mortality ratio is the number of women who die from any cause related to or aggravated by pregnancy or its management (excluding accidental or incidental causes) during pregnancy and childbirth or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, per

100,000 live births. Maternal Mortality is one of the most global strategic indicators for not only health but also general development of a country.

Millennium Development Goals (MDGs) have emerged as the key strategic tools for raising awareness, advocacy, alliance building, and renewing the political commitment towards the promotion of Sustainable Human Development at the country level based on a global consensus. In the Millennium Declaration member states committed themselves to reducing human poverty by 2015.

Economic Cooperation Organization, known as "ECO", is a regional organization established in 1985 with cooperation of Islamic Republic of Iran, Islamic Republic of Pakistan and Republic of Turkey.

In 1992, the number of member countries has increased to 10 including Islamic republic of Afghanistan, Republic of Azerbaijan, Republic of Kazakhstan, republic of Gherghizestan, republic of Tajikistan, republic of Turkmenistan and republic of Uzbekistan.

Total population of 10 member countries in 2010 is equal to 400 million people.

Secretarial office of ECO in Tehran has not limited its activities to Economical issues its goal is extended to the objectives of 3rd millennium in cooperation of member countries.

The purpose of this study was to answer the following questions: What's the most evidenced–based status of the ECO countries in regard to maternal mortality and if they are in track for achieving the goal in 2015 or not?

Materials and Methods

This review study has been done in 2009. As the first step, a comprehensive literature review has been done to find the most recent documents related to MDGs 4, 5 and 6 indicators for each country as the member of the ECO. The focal MDG secretariats in the Ministry of Health and the international Organizations have been contacted in advance to provide the available documents, report (mostly gray literature) for the research team.

We reviewed the latest MDGs' report critically to extract the most valid and reliable data by year of data collection and place of residence (if available).

In the next phase, the main stakeholders, from both governmental and international organizations, in the country have been visited and interviewed (individually and in group) by the research team. A specific data extraction toolkit was applied to extract the findings into tables, and list all the important pros and cons regarding the country health care services and public health programs.

After the literature review and the country visits, we have found that, the most valid information is gathered through following reports:

a. Countries' cooperation based on the approved international methodologies such as "Demographic Health Surveys" (DHS), and "Multiple Indicators Cluster Surveys" (MICS) assessments under the supervision of the international organizations.
b. Reports published by UNICEF, UNFPA, UNDP, WHO and other international organizations.
c. Reports prepared by member countries based on the registered information and local consensus.

To find out that if the country is on the track, we have calculated the target in 2015 based on 75% reduction of maternal mortality rate in comparison with 1990.

Results

The baseline level of MMR indicator (in 1990) as well as the target (Reduce by three quarters, between 1990 and 2015) for each of the ten ECO countries is presented in Table 1. As it is obvious from the table, MMR is very heterogeneous among the ECO countries.

Afghanistan with the MMR of 1800 (per 100,000 live births) in 2005 is the worst country in the region/ world while Turkey has reached the level of 19.4 maternal deaths per 100,000 live births in 2008 (Table 1).

The most important ecological factors such as General Domestic Product (USD), percentage of literate people over 15 years, contraceptive prevalence rate among the couples aged 15–49 and the proportion of births attended by skilled health personnel in each country is reported in Table 2.

The Percentage of literate people over 15 years has a negative correlation with MMR ($R = –0.850$, $P<0.01$). Also, MMR is increased significantly when the Contraceptive prevalence rate ($R = –0.731$, $P<0.05$) and the Proportion of births attended by skilled health personnel decreased($R = –0.908$, $P<0.01$). The negative relationship between the GDP and MMR was not statistically significant($R = –0.475$).

Multi variable regression analysis shows that only the index of percentage of delivery by skilled birth attends is effective in reduction of maternal mortality, which is due to its strong correlation with other variables. The regression equation is as below:

$$Y = 1693.06 – 17.58\ X$$

Table 3. Maternal Mortality ratio in 1990, current status and the target in 2015 by country.

Country	MMR (per 100,000 Live birth) in 1990	last reported MMR (per 100,000 Live birth)	Year of last report	MMR (per 100,000 Live birth) target by 2015
Afghanistan	1800	1800	2005	450
Azerbaijan	118	82	2005	30
Iran	60	25	2005	15
Kazakhstan	120	70	2006	30
Kirghizstan	120	62	2007	30
Pakistan	550	320	2005	138
Tajikistan	280	97	2005	70
Turkey	80	19.4	2008	20
Turkmenistan	60	28	2006	15
Uzbekistan	66	28	2006	15.5

Table 3. Ecological factors which are related to MMR by country.

Country	Population	General Domestic Product (USD)	Percentage of literate people over 15 years (%)	Contraceptive prevalence rate among the couples aged 15–49 (%)	Proportion of births attended by skilled health personnel (%)
Afghanistan	27.4 (2008)	400 (2008)	31 (2005)	18.6 (2006)	14.3 (2003)
Azerbaijan	8.3 (2008)	2550 (2007)	99.9 (2006)	51.1 (2007)	88 (2007)
Iran	74 (2010)	3540 (2007)	84 (2006)	73.8 (2000)	97.3 (2005)
Kazakhstan	15.8 (2009)	2536 (2008)	99.5 (1999)	50.7 (2006)	100 (2006)
Kirghizstan	5.2 (2007)	956.4 (2005)	98.6 (2005)	60 (2008)	97.6 (2006)
Pakistan	149.5 (2002)	580 (2003)	50.0 (2006)	29.6 (2007)	48.0 (2005)
Tajikistan	7.2 (2008)	701.9 (2007)	99.5 (2004)	37.9 (2005)	83.4 (2005)
Turkey	71.5 (2007)	4400 (2007)	88.7 (2007)	73.1 (2008)	91.3 (2003)
Turkmenistan	5.0 (2008)	1236 (2003)	98.8 (2004)	57 (2004)	99.5 (2008)
Uzbekistan	27.3 (2008)	2600 (2006)	96.9 (2005)	64.9 (2006)	99.9 (2006)

Table 3. Correlation between Maternal Mortality Ratio and the main ecological factors.

	MMR	General Domestic Product (USD)	Percentage of literate people over 15 years (%)	Cntraceptive prevalence rate among the couples aged 15–49 (%)	Proportion of births attended by skilled health personnel (%)
MMR	1	-0.475	–0.85**	–0.731*	–0.908**
General Domestic Product (USD)		1	0.409	0.807**	0.553
Percentage of literate people over 15 years			1	0.686*	0.948**
Contraceptive prevalence rate among the couples aged 15–49				1	0.845**
Proportion of births attended by skilled health personnel					1

* Significant in 0.05 level ** Significant in 0.01 level

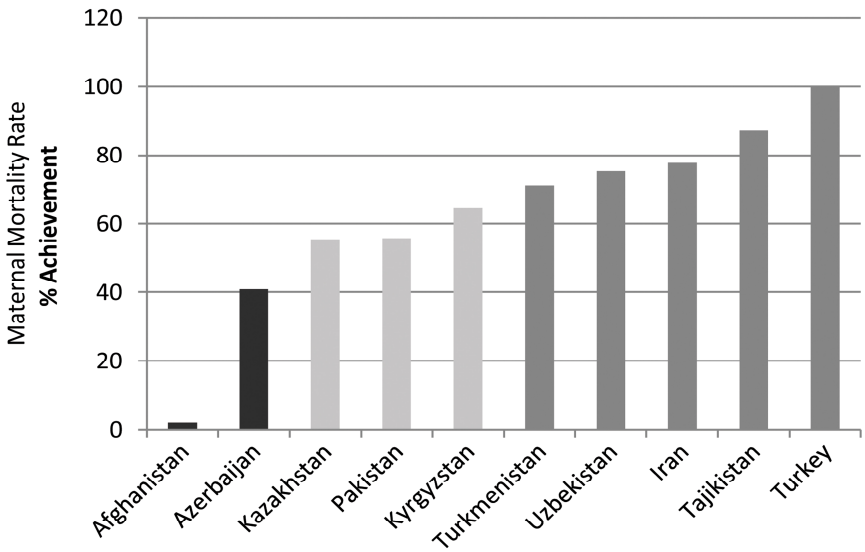

Figure 1. The percentage of Maternal Health millennium goal achievement based on the country data between 2006 and 2009.

Excluding the data of Afghanistan because of its great deviation from the domain of other countries' data results in following equation:

$$Y = 563.58 - 5.39\ X$$

The effect of percentage of delivery by skilled operator in reduction of MMR is significant in both situations ($P<0.001$).

The percentage of achievement to the MDG5 (Maternal Health) according the last available data for each country (table1) is illustrated in figure 1. The achievement of the maternal health goal varies between %5 (Afghanistan) and 100% (Turkey). Between 1990 and 2009, Azerbaijan has achieved only 40% of the target. The percentage of achievement on maternal health was between 40% to 65% in Kazakhstan, Pakistan and Kirghizstan and it was more than 65% in Uzbekistan, Iran and Tajikistan (Figure 1).

Conclusion

Based on the results, Turkey has already reached the maternal health goal and it is expected to be the case for Tajikistan, Iran and Uzbekistan by 2015 as well. Other countries like Kirghizstan, Pakistan, Kazakhstan and Azerbaijan have reached less than 50% of the target while Afghanistan is too far away from the determined target on maternal health by 2015.

With considering half a decade to the end of predetermined time for achieving the millennium development goals, i.e. 2015, it's optimistically expected that only half of the ECO countries will reach the target for maternal health.

Hogan et al in a systematic analysis of maternal dead in 181 countries, has reported that More than 50% of all maternal deaths were in only six countries in 2008 (India, Nigeria, Pakistan, Afghanistan, Ethiopia, and the Democratic Republic of the Congo). It was mentioned that only 23 countries (13%) are on track to achieve a 75% decrease in MMR by 2015 (1).

The current report from United Nations on monitoring the MDGs has mentioned that the millennium development goals will not be achieved by many developing countries especially those in Africa, Middle and West Asia region (2-3). The best achievement was observed in the south east of Asia. The main reason, which previously mentioned by several authors (2-5), is the rapid economical development which has happened in south east of Asia.

Maternal dead is not just an indicator for health, instead it's a strategic indicator for sustain and comprehensive development (6). It is totally agreed and has been addressed by many scientific reports. Maternal and child dead is highly correlated with literacy rate, personal and family income and other economical and cultural factors (5-8).

It has been reported that there is a big gap between the developed countries (with the average of MMR as 20 per 100,000 live births) and developing countries (with the average of MMR as 200 per 100,000 live

births) (9). This huge variation also exists among the developing countries. As we found, MMR is more than 1800 per 100,000 live births in Afghanistan while it's less than about 50 per 100,000 live births in its neighborhood counties. It is expected that the disparity will become worse as the low-income developing countries still have weak health systems, continuing high fertility and poor availability of data. Maternal deaths are clustered around labour, delivery, and the immediate postpartum period, with obstetric haemorrhage being the main medical cause of death (10).

The important point is that in most of study countries, the reported MMR from the national surveys and the estimation models differ considerably from the MMR which has been reported as part of the routine national surveillance system of maternal dead. Generally, MMRs reported based on the routine surveyllance data are $^1/_2$ to $^1/_3$ of those which has been reported from the surveys or statistical models. This means that countries still continue to miss many maternal deaths in the health system which could be detected on time and being prevented by timely interventions.

We explore the main related ecological factors for MMR and we found that the percentage of literate people over 15 years, contraceptive prevalence rate among the couples aged 15-49 and the proportion of births attended by skilled health personnel is highly correlated with MMR of the study countries.

As general comment, ECO secretariat should work much more to mobilize resources to help the member countries in implementing effective interventions to bring into real the following recommendations to improve the health status of the country regarding MDGs. The authors recommend the ECO secretariat encourage the member countries to carry out the following activities to improve the death registration system for the children and pregnant women:

- Developing a protocol based on the available designs such as DHS and MICS for determining MMR in each country and to implement it in three rounds in 2011, 2013 and 2015 in order to provide reliable indicators for the remaining years to 2015.
- Support the country members to improve their routine data reporting systems up to in the remaining years to 2015, in a manner which running national surveys to estimate MMR become restricted to few indicators and the health routine system data reporting could provide reliable data on monitorring such indicators.
- In the medical literature, there are strong evidences regarding the effectiveness of primary health care (PHC) to reduce not only the maternal mortality but also child mortality and better control/prevent of several diseases such as tuberculosis, HIV infections and Malaria. It's highly recommended that the ECO secretariat help and support the member countries to re-establish and improved the PHC, to integrate the prenatal and neonate health programs as well as the surveillance of the tuberculosis, HIV/AIDS and Malaria in the health system. The ECO countries, from the Soviet Unions, have a brilliant experience on the PHC development and by refining the system; even they could provide best–practice examples for the other countries in the world.
- In most of the ECO countries, the prenatal, delivery and especially the neonatal cares are not qualified enough to prevent all the preventable deaths occurred in both mothers and the infants. The ECO secretariat could improve the quality of such cares by organizing and running specific short training courses for the health providers whom actually serves the pregnant women.
- Unfortunately, in some visited countries abortion is generally behave as a Reproductive Health (including Family Planning) strategy; While according to the definition of UNFPA, abortion shall not be applied as an alternative method of family planing health in any cases, and it has serious complications, mortality and morbidity, for both mother and the child. Providing a better access to safe family planning health devices and strategies as well as training programs for the health providers could improve the situation and ECO secretariat could acts a lot on these activities.
- In most of the countries, during the defining phase of the target population of the Reproductive Health (including Family Planning) services, adolescents and juveniles were the most ignored groups. Designing and running applied research to find out the best way to address these issues by a well accepted PHC compatible to all believes, traditions and social cultures is highly recommended.
- Support the member countries to develop and expand the coverage of the child and mother friendly hospitals in the ECO countries.
- The ECO secretariat shall help countries to develop curriculum and running educational programs to train auxiliary midwifes for those countries who have no access to enough well-educated midwifes
- As some countries in the region, such as turkey, have a well successful experience on Reproductive

Health (including Family Planning) program, which has a direct prominent effect on improving the health status of mother and children, it is highly recommended to ECO secretariat provide the opportunity for the others countries to get familiar, adopt and apply such programs according to their context and settings.

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