Title: The challenges of the Maternal Mortality in a vulnerable population – The case of the Afghan population using household sample data¹.

RESUMO: A mortalidade materna – cujas causas na vasta maioria dos casos são evitáveis, é ainda, um enorme desafio social. Este desafio agiganta-se com a dificuldade para estimar seus níveis, seja pela falta de dados, seja pela pouca confiabilidade que costumam ter os dados quando disponíveis. Este paper apresenta estimativas de mortalidade materna para um contexto de alta vulnerabilidade social e encontra evidencias de que, mesmo com dados pouco confiáveis, é possível mapear a mortalidade materna, denunciando a associação entre a falta de acesso aos serviços de saúde materno-infantil e reprodutiva e os altos níveis de mortalidade materna. Os dados são fruto de pesquisas domiciliares, coletadas em treze províncias do Afeganistão, ao longo da presente década (especificamente, os anos de 2011 a 2017) e cobrem, segundo as estimativas, pouco mais de 50% do território afegão. A análise da fecundidade, resultante dessa pesquisa, chegou à conclusão de que essas províncias também entraram em um processo de transição da fecundidade em direção a níveis descendentes. Se assumirmos que esta pesquisa expressa o que o país está passando em termos de fecundidade e suas correlatas condições de saúde materna, também podemos assumir que a mortalidade materna está expressando tendências descendentes, embora o contexto de saúde do país ainda seja muito precário.

¹ This paper is a byproduct of a major project that analyses the demography dynamic of Afghanistan using data collected in the Socio Demographic and Economic Survey (SDES) project. It was funded for the Japanese and British Governments and implemented and developed by the Afghan Central Statistics Office and the United Nations Population Fund for Population Activities in Afghanistan. The authors form part of the research team in charge of the analyses.
INTRODUCTION

Maternal mortality is currently one of the challenges of the Sustainable Development Goals (SDG) framework as it was of the Millennium Development Goals; despite being a key indicator of social development and above all, of the access to reproductive health care, data for measure it are very often unreliable (Graham et al., 2016). Furthermore, access to complex modelling and more updated information little ameliorate measures precisions if basic data continues unreliable (Dorrington & Bradshaw, 2016).

Afghanistan, one of the poorest worldwide countries (GDP below US$ 2,000) has two national surveys on maternal deaths plus a specific module on household deaths included in a provincial household surveys project (SDES).

High maternal mortality prevalence affects children’s health, care and raising, the family composition, the sex balance of the population and even labour-force participation because a maternal death occurs at the prime women's age. High maternal mortality prevalence is associated to high infant and child mortality and by disrupting the nuclear family, most of the time, also interferes negatively in the child's future survivorship, as widely demonstrated long ago in the study of Rosenfield and Maine (1985) and more recently, for example, by Ronsmans et al. (2015); Molla et al., (2015); Moucheraud (2015).

The focus on maternal mortality as an important development indicator dates back at least to the 1980s, when demands for highlighting this issue motivated the 1987 Safe Motherhood Conference in Nairobi, among the first most relevant actions. The most important achievement was the launching of the Safe Motherhood Initiative (SMI), which became a major milestone in the race to reduce the burden of maternal mortality throughout the world. Advocacy for awareness of this tragic problem that started in the 1980’s can be also seen in: Rosenfield & Maine (1985); Boerma (1987); Mahler (1987); Graham & Campbell (1992).

Maternal deaths are highly concentrated in the poorest regions in the world; WHO (2014) estimates that the sub-Saharan Africa region alone accounts for 62% of global maternal deaths followed by Southern Asia at 24%. By 2010, six countries accounted for over half of maternal deaths (India, Nigeria, Pakistan, Afghanistan, Ethiopia, and the Democratic Republic of Congo), corresponding to Afghanistan the highest maternal mortality ratio.
After 25 years, a considerable number of maternal deaths, 303,000 according to the most recent estimates (WHO, 2015) continue to be a stubborn health and development challenge. A significant degree of uncertainty on the exact level still persists, as the above estimate lies within 291,000 to 349,000 uncertainty interval range. The persistency of this large number of deaths - a vast majority of them avoidable – is due to lack of or inadequate access to maternal health care and antenatal care. The difficulties of breaking down the vicious cycle of poor action/poor data/poor action that Graham and Campbell (1992) described in 1992 still persist.

Most recently, the SDG framework established the Goal 3: “Ensure healthy lives and promote well-being for all at all ages”, being the indicator 3.1, to reduce the global maternal mortality ratio (MMR) to less than 70 maternal deaths per 100,000 live births by 2030. At the same time, as mentioned by Zureick-Brown (2013), the existence of a great challenge in tracking progress toward achieving this target was acknowledged. Reliable data were lacking in the very countries thought to have the greatest burden; with no doubt Afghanistan is among these. Despite the scarcity of reliable information, Afghanistan has been classified as "making progress towards improving maternal health", since MMR has more than halved over the period 2000-2015, registering an average annual decrease of around 4.3 per cent (WHO, 2015). Most recent estimates, though, does not confirm the decline, generating an enigma that demands further and deeper analysis of the maternal mortality in Afghanistan. The right diagnosis and prognosis of the maternal mortality question will support, no doubt, monitoring the SDG aiming to ensure healthy lives and promote well-being for all at all ages.

OBJECTIVES

Based on SDES data, this study aims to broaden the understanding of the maternal mortality in a population highly vulnerable using data from the Socio Demographic and Economic Survey (first and second rounds). Provinces object of the study are Bagdish, Baghlan, Balkh, Barmiyar, Daykundi, Ghor, Herat, Kabul, Kapisa, Nimrooz, Parwan, Samangan, Takhar; most of them surrounded by a socioeconomic background typical from rather high vulnerable environment.

The objective of this study is to provide an evidence-based perspective of this critical health issue. The results should strengthen the knowledge base to guide health and social policies for reducing maternal mortality, contributing to improve the
health and social status of women, enhancing access to reproductive health care and advancing social development in the country.

FRAMEWORK OF MATERNAL MORTALITY IN AFGHANISTAN

In order to contextualize findings from the SDES and to justify the importance of specific analyses of the maternal mortality, a brief profile of this phenomenon in Afghanistan is given.

Afghanistan is ranked among the countries with high maternal mortality; WHO (2015) estimates a maternal mortality ratio (MMratio) around 400 maternal deaths for every 100 000 live births which is about twofold the average corresponding to developing countries (WHO, 2015). Coleman and Lemmon (2011) argue that the high risk of having a maternal death in Afghanistan is determined by the synergy of macro and micro dimensions. According the them, several structural factors, for which there are no “quick fixes,” affect maternal mortality. First, there is limited access to quality health services and, in particular, obstetric care. Access to care is especially limited in rural areas. The average rural woman lives in villages that are largely inaccessible by roads, and floods and avalanches frequently obstruct the few transportation paths that are available.

“some women have to walk for hours, even days, to reach a clinic. . . [and] it is quite difficult to transport emergency cases to a clinic.”
(Unicef; 2009)².

Fragile access to reproductive health care is illustrated in Table 1; proportion of Afghan women giving birth in medical facilities, for instance, outside Kabul, is just above one third. Despite improvements in women’s rights since the fall of Taliban, significant social and cultural barriers still contribute to poor maternal health in Afghanistan. Also, despite legal efforts to avoid girl’s early marriages, Coleman and Lemmon (2011) mention a number of studies estimating that between 60 percent and 80 percent of all marriages are forced. Findings from the SDES database reveal significant presence of early marriage: three or four out of ten young women below age 18 are already married in provinces like Ghor or Badghis, respectively. Women still have minimal economic and educational opportunities as shown in Table 1. National average of female literacy rate (excluding Kabul) is below 15% and average

schooling hardly surpass 2 years. Diverse welfare indicators like access to drinking water and sanitary toilet and underemployment illustrates the synergy of macro and micro dimensions to determine the risk of a maternal mortality much higher outside Kabul, the capital city.

In addition, though provisions for gender equity in Afghanistan’s constitution are on the way, the gap between rhetoric and practice is large, according the mentioned authors. At the micro level, community and religious leaders often resist women’s employment and education. Decision-making authority within households is typically held by the eldest male, and control over decisions regarding maternal and child health is shared by older men and mothers-in-law, who can be resistant to modern contraceptive techniques and skilled birthing procedures due to a lack of education. The challenges of improving maternal health are also exacerbated by a strong cultural preference for women to be seen and treated only by other women, despite a severe shortage of trained female health workers in Afghanistan.

Table 1- Afghanistan, 2013: Selected socioeconomic indicators. Total of the country, average for the provinces excluding Kabul, and Kabul alone

<table>
<thead>
<tr>
<th>Socioeconomic Indicator (per cent)</th>
<th>Afghanistan</th>
<th>National Average excluding Kabul*</th>
<th>Kabul</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female rural population</td>
<td>75.9</td>
<td>91.0</td>
<td>16.1</td>
</tr>
<tr>
<td>Female Literacy Rate - age 14+</td>
<td>20.3</td>
<td>14.5</td>
<td>40.9</td>
</tr>
<tr>
<td>Average Years of Schooling - age 18+</td>
<td>2.8</td>
<td>2.1</td>
<td>5.7</td>
</tr>
<tr>
<td>Underemployment rate</td>
<td>21.2</td>
<td>23.3</td>
<td>9.6</td>
</tr>
<tr>
<td>Access to Sanitary Toilet</td>
<td>39.2</td>
<td>27.8</td>
<td>93.7</td>
</tr>
<tr>
<td>Access to Safe Drinking Water</td>
<td>64.8</td>
<td>52.6</td>
<td>94.2</td>
</tr>
<tr>
<td><strong>Access to maternal health care</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Access to Skilled Antenatal Care</td>
<td>62.6</td>
<td>57.4</td>
<td>88.4</td>
</tr>
<tr>
<td>Deliveries in Medical Facility</td>
<td>44.1</td>
<td>38.9</td>
<td>82.7</td>
</tr>
<tr>
<td>Births Attended by Skilled Attendants</td>
<td>46.4</td>
<td>41.4</td>
<td>85.0</td>
</tr>
</tbody>
</table>

* Unweighted average for 34 provinces, excluding Kabul


Indicators in Table 1, presented by the World Bank (2016), points out that maternal health care access, that is reasonable high in Kabul where more than 80% of women have access to maternal care services, it is not available outside the capital province. Services like access to skilled antenatal care, births attended by

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3 Dr. Zohra Shamszai (deputy manager, Health Unit HAWA Program, CARE International: Afghanistan), interview with Ashley Harden, June 23, 2011. (Cited in (Coleman & Lemmon, 2011; page 6)
skilled attendants or delivered in medical facilities are afforded by less than half of the women in the rest of the country (See Table 1). It should be of no surprise the relationship between the lack of access to health care services and the high maternal mortality levels.

METHODS

Although this study, due to data available requires no other methodology than direct estimation, it is important to establish that a series of evaluations are needed before proceed to the actual estimation of the maternal mortality measures.

In the case of the SDES, the approach adopted was to collect direct information on pregnancy related deaths occurred in the household. Although the direct approach demands less data processing, it demands specific efforts to assess the completeness of the reports and to derive corrective measures to adjust for under reporting. Assessment involves evaluation of quality and coverage of information about deaths and particularly in maternal deaths; it also requires evaluation of the denominator, i.e., live births and women of reproductive age.

This item includes a brief explanation of procedures to evaluate coverage of deaths and live births; it explains, also, how we decided to establish three possible scenarios of the maternal mortality levels. The series of indexes or indicators used to measure the maternal mortality level are those listed in Box 1.

<table>
<thead>
<tr>
<th>Box 1. Maternal mortality measures</th>
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</table>
a) PMFD: Proportion of maternal deaths among total female deaths at reproductive age or proportion of maternal deaths:

b) MMratio: Maternal mortality it refers to the number of maternal deaths per 100,000 live births

c) MMrate: The maternal mortality rate is an indicator of the risk of maternal death among women of reproductive age. The MMrate is usually multiplied by a factor of 1,000:

d) LTR: The lifetime risk of maternal death reflects the chances of a woman dying from maternal causes over the course of her 35-year reproductive life span.
The data for estimating maternal mortality

The basic information needed to calculate the above listed indicators is: **a)** Population distribution by age and sex; **b)** Number of maternal deaths, and **c)** live births. All these information should refer to a specific time period and a well-defined population. The criteria for identifying a maternal death, is the pregnancy-related-deaths (PRD), whose definition appears in the next item.

Given the common data problems for measuring maternal mortality, the evaluation of the data quality is especially important as most experts, among them Hill and others (2001) strongly emphasize. In case of deficiencies, the collected data need adjustments to arrive at reliable maternal mortality indicators. Important to consider that, even at national levels and/or high mortality settings, a maternal death is a rare event. The 2010 and 2015 national surveys captured 256 and 1,009 cases, respectively, by asking women on their sister’s survivorship. The SDES collected 675 events properly defined as a maternal death referred to a 24-month period (unweighted cases) of women 10 to 49 years old. That is, 338 annual deaths in the seven provinces together.

Regarding data precision, deaths with unknown relationship to a pregnancy need to be consider because they have, on average the important share of 25 per cent of all female deaths; moreover, the unknown cases surpasses, in general the number of properly identified pregnancy related deaths (PRD). The relevance is such that in the extreme situation, all deaths with unknown causes could be a PRD meaning that maternal mortality can be underestimated by 50 percent or more.

SDES has collected information on household deaths including the identification of all household members who have died within the 24 month previous to the surveys' date as well as the sex and age, in completed years of each deceased person.

The total number of reported deaths was evaluated using well established indirect techniques like the Brass' method called the growth balance (Brass, 1975) by Turra (2017) that concluded that answers on female adult deaths (ages 10 or more) refer, on average, only to 89.6 percent of the total female adults deaths. The coverage found refer to female adult mortality in general and it is adopted in this report to adjust the number of maternal deaths, on the assumption that the level of maternal deaths underreporting is similar to that affecting other female adult deaths.
The adjustment factor 1.12 is assumed to adequately represent the degree of adjustment to the omission of the PRD in the seven provinces. The scarce number of events per province may not produce a more reliable diagnoses of the underreporting.

**Pregnancy-related deaths as a proxy for maternal deaths**

In order to distinguish maternal from other deaths, specific question were included. The information specifies the timing of a female maternal death (during pregnancy, at childbirth and in the postpartum period). Hence, this study uses *pregnancy-related deaths*: a woman's death while pregnant or within 42 days of termination of pregnancy, irrespective of cause. It includes deaths from accidental or incidental causes. For this reason, when this text refers to a maternal death it should be understood that the event is actually a pregnancy related death (PRD). This paper does not follow the formal definition of a maternal death given by the WHO based on actual causes of maternal deaths. Pregnancy related death is a proxy of a maternal death, because the SDES has no information on the causes of death, neither there is any national register of maternal deaths.

PRD were collected when a death in the household was identified as being of an ever married woman. The following question was asked:

"Did _____ die during pregnancy, giving birth, or within 6 weeks of delivery?"*

Secondly, the information on maternal deaths is classified as follows:

a) Pregnancy-related deaths
b) Not Pregnancy-related deaths
c) Not known whether pregnancy-related deaths.

Categories (a) and (b) correspond to deaths defined that way by the respondents. The (c) category may have captured maternal deaths – and only maternal deaths – with unknown timing of death (during pregnancy, giving birth or

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*Data were collected as follow: Timing of the death of ever married woman 10 to 49 years old:
This question applies only to the ever married women 10 to 49 years of age. If the deceased was a male, or a never married or a female 50 years old and above, leave the boxes blank. You must ascertain the precise moment when she died, i.e.:

- a. whether she died during pregnancy, in which case enter Code “1”,
- b. whether she died during delivery (while giving birth), in which case enter Code “2”,
- c. whether she died within six weeks after she gave birth, in which case enter Code “3”, or
- d. whether she did NOT die during pregnancy, while giving birth, nor within six weeks after giving birth, in which case enter Code “4”.

As this question must necessarily be asked from a third party, the person in question being dead, the respondent may not know the condition of the deceased at the time of her death. You may ask from other knowledgeable member of the household. If in the remote case that no one in the household knew the condition of the deceased, enter Code “5” (Do not Know).
after six weeks of delivery), because the question is included in the column of the questionnaire which is dedicated to maternal deaths. On the other hand, it could have included any female death with unknown pregnant/not-pregnant status. To solve the ambiguity it was decided to distribute the "Not known whether pregnancy-related deaths" between the other two categories: (a) “pregnancy-related deaths” and (b) “not pregnancy-related deaths” by age group. We applied a pro rata distribution. Hence, the estimated number of maternal deaths is obtained by adding (a) + (c*), where c* is the proportion of “not known” which was assumed to be a pregnancy related death. We believe that this procedure provides a reasonable estimate of the actual number of pregnancy related deaths; therefore, this is what we consider the plausible scenario (SC1). The adjustment did not change, in general terms, the age pattern of declared maternal deaths

In addition to the plausible scenario, we can consider two additional scenarios:

- A minimum scenario (SC2): it includes only well declared maternal deaths within the three event-timing categories; thus, only the adjustment factor for omission for all adult deaths is applied. Pregnancy related deaths are only those classified in (a).
- A maximum scenario (SC3): where all "Not known whether pregnancy-related deaths" are assumed to be pregnancy related deaths in addition to the actual declared PRD.

The adjusted numbers of maternal deaths, according to the three designed scenarios, are shown in Table 2; it includes estimates for the all the provinces (first and second round).

An additional procedure is needed to adjust the number of live births that is obtained from the SDES. Information is based on the number of births in the 12 months previous to the date of the survey, which is the basis for evaluating the data and then estimating and adjusted numbers of live births (the denominator in the MMratio).

The birth stands to represent women at risk of a maternal death and is estimated from the age specific fertility rates obtained by applying Brass’ P/F technique using the above mentioned information. The application of Brass’ method produced adjustments factors to correct fertility rates and to estimate adjusted life births by age of mother. The adjusted numbers of live births by province are included also in Table 2.
Table 2. Kabul, Bamiyan, Daykundi, Ghor, Kapisa, Parwan, Badghis, Baghlan, Balkh, Herat, Nimroz, Samangan and Takhar (2015-2017): Adjustment factors for reported Pregnancy Related Deaths (PRD) and live births, annual number of events (live births and PRD)

<table>
<thead>
<tr>
<th>Provinces</th>
<th>Adjustment factors</th>
<th>Number of annual events</th>
<th>Variation in PRD</th>
<th>Number of annual events</th>
<th>Variation in PRD</th>
<th>Number of annual events</th>
<th>Variation in PRD</th>
<th>Number of annual events</th>
<th>Variation in PRD</th>
<th>Number of annual events</th>
<th>Variation in PRD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Live Births</td>
<td>PRD (a)</td>
<td>Live births</td>
<td>PRD (b)</td>
<td>Scenarios (c)</td>
<td>Plausible</td>
<td>Minimum</td>
<td>Maximum</td>
<td>Minimum</td>
<td>Maximum</td>
<td>Minimum</td>
</tr>
<tr>
<td>Kabul</td>
<td>1.88</td>
<td>1.53</td>
<td>173,110</td>
<td>508</td>
<td>292</td>
<td>1032</td>
<td>42.6</td>
<td>103.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bamiyan</td>
<td>2.20</td>
<td>1.49</td>
<td>18,258</td>
<td>171</td>
<td>91</td>
<td>202</td>
<td>46.8</td>
<td>18.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Daykundi</td>
<td>1.94</td>
<td>1.23</td>
<td>30,326</td>
<td>382</td>
<td>303</td>
<td>406</td>
<td>20.7</td>
<td>6.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ghor</td>
<td>1.91</td>
<td>1.72</td>
<td>41,771</td>
<td>786</td>
<td>601</td>
<td>841</td>
<td>23.6</td>
<td>7.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kapisa</td>
<td>1.54</td>
<td>1.61</td>
<td>14,994</td>
<td>35</td>
<td>25</td>
<td>76</td>
<td>28.60</td>
<td>117.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parwan</td>
<td>1.56</td>
<td>1.51</td>
<td>30,947</td>
<td>144</td>
<td>102</td>
<td>223</td>
<td>29.3</td>
<td>54.9</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: SDES 2015-2017, UNFPA-Afghanistan and CSO of Afghanistan (Micro data)
(a) Adjustment factor estimated using the Brass P/F Method (Wonget al., 201; Carvalho et al 2018)
(b) Adjustment factor estimated using the Brass Growth Balance method (Turra 2015; 2018)
(c) Already adjusted according factors in (b) and as described in the text.

RESULTS

This section presents a set of maternal mortality measures by provinces, namely, the Maternal mortality ratios. Proportion of maternal deaths among the total female deaths are analysed with the additional objective of evaluating data reliability. Pregnancy related deaths by timing of death are, also, considered due to their strong association with the causes of maternal deaths, that on turn indicates the presence of preventable causes of deaths and thus, the status of the reproductive health.

Proportion of maternal deaths among total female deaths at reproductive age

On the principle of no woman should die from a pregnancy related cause, in the ideal world, proportion of maternal deaths among the total female deaths at reproductive age (PMFD) should be near to zero because, as it is known, vast majority of PRD are due to preventable causes, thus the better the life conditions and the access to health care services, the less the maternal deaths. Current PMFD for developed and/or high income countries can be even lower than 1 percent of all female deaths aged 15-49. On the opposite side, most vulnerable countries have corresponding
PMFD as high as 20 or 30 percent. WHO (2014) reports a PMFD of about 18 percent for Afghanistan in 2013. Population with intermediary general mortality levels have PMFD, in general, around or below 10%. This proportion has been found in Latin American countries whose MMratio is near 100 per 100,000 live births. (Hill et al., 2009). PMFD as high as 20 or 30 percent are found in contexts where MMratio is, say, over 600 or even 1,000 per 100,000 live births (Stanton, Abderrahim, Hill, 2000). The PMFD for the whole reproductive age period gives a reliable approximation of the maternal mortality levels.

PMFD for the thirteen provinces here analysed are shown in Figure 1, according to the three scenarios defined before. The ranking they have in the table 4 is, however, coincidental with the health care access indicators for Ghor, Bamiyan, Nimroz and Balkh that have the lowest PMDF. Highest values, complementary, correspond to Kabul, Badghis and Takhar; provinces with the more precarious access to health care services. On the other side, PMDF values in the plausible scenario (SC1), according to the references given in the previous paragraph suggest that maternal mortality levels may as high as the three digits ratio. In general, PMDF are over 10 per cent whatever the scenario and it reaches half of all female deaths in the called maximum scenario (SC3).

The variation of PMDF between the three scenarios depends on how responses are given and whether or not the female death is rightly recognized as a PRD. Comparison of the age patterns resulting in each scenario allow us to evaluate any possible bias those three scenarios may have in each province. (See Figure 1).

Note that shape of the SC1 and SC2 are similar, which is not the case for SC3 that differs mainly at older ages, where mortality risks in general increase. This finding indicates that the SC1, the plausible scenario, does not modify the maternal mortality age pattern implicit in the reported maternal deaths rightly identifying the timing of the death. Answers on “Not known whether pregnancy-related deaths” might have been misclassified and a number of female deaths were, probably PRD.

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5 In conjunction with additional information, the PMFD allows to obtain modeled MMratios that may validate those ratios calculated directly from survey data. (The detail procedures can be seen in: Gelman A, and Hill J. Data analysis using regression and multilevel/hierarchical models. Cambridge University Press, Cambridge, 2006. – Cited by WHO, 2010.)
Figure 1
Kabul, Bamiyan, Daykundi, Ghor, Kapisa, Parwan, Bagdish, Baghlan, Balkh, Herat, Nimroz, Samangan and Takhar (2015-2017): Age distribution of the maternal deaths according to Plausible, Minimum and Maximum Scenarios (per cent).

First SDES round (Six provinces)
Second SDES round (Seven provinces)

Source: SDES-2015-2017, UNFPA-Afghanistan and CSO of Afghanistan (Micro data)
Distribution of pregnancy related deaths according to timing of death

Before defining the level of the maternal mortality in the seven provinces is important to assess the distribution by moment of dying from a PRD, which is done considering the deaths "during pregnancy", "delivering" (or giving birth) and "during post-partum" (or within six weeks of delivery). This distribution, like the proportion of PRD on the total female deaths, constitutes a reliable approximation to the maternal mortality level, because the timing of the maternal death is associated to the availability of health care services and accordingly to the possibility of being from a cause of death considered avoidable, particularly when the timing of death is while giving birth. Data on Figure 2 shows the distribution of PRDs registered for the 24 months prior to the Surveys by timing of death and provinces are ranked by proportion of deaths occurring, in particular, while delivering.

Out of almost 1500 weighted cases identified as properly PRDs occurred the 24 months before date of survey, nearly two thirds occurred during delivery in five provinces.

The provinces analysed in the first SDES round suggest a similar profile altogether (SDES, 2016). Apart from Kabul, plus its neighbours Parwan and Kapisa, proportions concentrated at the time of delivering are, also, around the two thirds of the total maternal deaths. It is known that most of the causes of maternal deaths are related to severe bleeding, infections, obstructed labour and blood clots/embolism, conditions that are present at the very time of delivering and easily account for more than half of the maternal deaths around the world. Evidence given by Bartlett et al. (2005) in their study in Afghan territory reinforce this finding: in the four cases (Kabul, Alisheng, Ragh and Maywand), two causes of death typically occurring at the time of delivery –haemorrhage and obstructed labour– account for half or more of the total maternal deaths researched (60% in the case of Maywand). Furthermore, more recent data registers 67 percent of all maternal death in Afghanistan due to these two causes (AMS/2010). From the second round, Nimroz and Balk precisely the provinces with relative best access to maternal health care, show the smallest proportions.
Afghanistan (SDES) - Kabul, Bamiyan, Daykundi, Ghor, Kapisa, Parwan, Bagdish, Baghlan, Balkh, Herat, Nimroz, Samangan and Takhar (2015-2017): Timing of death of the pregnancy related death as reported for the 24 months previous to the date of the survey (*)

First SDES round (Six provinces)  
Second SDES round (Seven provinces)

(*) Referred only to pregnancy related deaths with valid answer on the timing of death.

The distribution reported in the SDES, either first or second round, points to how fragile the health system can be regarded to the specific issue of obstetric care. It is not a surprise that the provinces registering higher vulnerabilities present the highest proportions of maternal deaths occurring at the time of delivery. As expected, also, Nimroz and Balk with, again, relatively good access to maternal health care, have the less concentration of PRD at delivery time.

The pattern is very similar by age; in general, in the seven provinces, whatever the woman age, more than half and very often two third of the maternal deaths occur during delivery. While first round presented a shy trend indicating slightly higher proportion among young women and equally slightly lower among older ages, in the second one the trend suggest no correlation with age. It is one more signal that the cause of maternal death is certainly due to external factor and thus, avoidable and it should be of great concern to the decisions makers that need to meet the terms of the SDGs. In fact, related to maternal health, the SDG frame envisions the ending of all preventable maternal deaths. “*Although maternal deaths might still occur in even the best circumstances, every effort should be made to eliminate preventable maternal deaths*” (Alkema et al., 2016).

In short, just the distribution of the PRD according to the timing of death, available in the SDES is already a valued indicator of the maternal mortality surroundings.

**The Maternal Mortality Risks**

The MMratio, the commonest measure of the maternal mortality level is presented in this section. The estimates are presented considering the plausible scenario (SC1), after the adjustments done to the basic data (live births and deaths) and on the assumption that a share of the “*Not known whether pregnancy-related deaths*” –equivalent to the proportion that the PRD represent in the total female deaths– are indeed, PRD.

The age pattern as well as relative risks are also, presented. In an effort to avoid random fluctuations by age, the MMratio for broad age groups 15-24 and 40 or more, is presented. Complementing this set of measures the maternal mortality rate (MMrate) and the Life Time Risk are included. The overall maternal mortality ratio and its values by age are presented in Table 3.
The SDG of reducing maternal mortality below 70 deaths per 100,000 live births by 2030 is a good parameter of current maternal mortality levels. If so, in less than 15-year period, most of the provinces in Afghanistan should considerably reduce their maternal mortality levels. MMratios in Table 3 varies from 115 to 1,882 maternal deaths per 100,000 live births. Estimates for the total population, specifically those from WHO (2015) giving a confidence interval of 253-620 suggest that most of the total MMratios showed in Table 3 can be considered consistent with the national average in the sense that most of them fall inside that interval. The exceptions are Balkh and Nimroz with MMratio below 200, whose low levels are compatible with the health care context they have. Kabul, Kapisa and Takhar followed these better contexts, showing values to MMration between 293 and 235. As expected, the highest MMratio is in Ghor, which has a highly vulnerable context.

Because, as said, no woman should die giving life, it is important to note that despite the ranking, all the provinces have very high maternal mortality risks. WHO (2014) considers national MMratios below 20 maternal deaths per 100,000 live births in the Low (or minimum) category, which is often found in developed settings with some countries having MMratios even lower than 5. That reference indicates that MMratio for the seven provinces are quite high. Even Nimroz, where, as said, access to Maternal health care seems facilitated, the MMratio is over 100, or more than 4 times the ratio needed to consider it in the low category. International comparison shows a MMratio of 190.0 in Southern Asia, where Afghanistan is included (WHO, 2014) and implies that the country is among those with the highest MMratio in the region.

The estimates of the MMratio for the provinces are quite high. Decision-makers have no option but to urgently formulate policies and implement strategies to improve the situation, even for the best positioned provinces.

Finally, related to the total MMratios available for the provinces from the first SDES round, we noticed very much higher levels in the three most vulnerable provinces (Ghor, Daykundi and Bamiyan). The other provinces presented ratios similar to the ones in the second round. MMratios for all the provinces included in both SDES round suggest that apart from the three provinces above mentioned, MMratio is in general around 400 maternal death for every 100,000 live births.

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6 The Southern Asia, according WHO (2014), comprises Afghanistan, Bangladesh, Bhutan, India, Iran, Maldives, Nepal, Pakistan and Sri Lanka.
Afghanistan:
Maternal mortality ratio (total and by age) according to Plausible Scenario

<table>
<thead>
<tr>
<th>Age Groups</th>
<th>Second SDES round (Seven provinces)</th>
<th>First SDES round (Six provinces)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Badghis</td>
<td>Baghlan</td>
</tr>
<tr>
<td>MMratio(a)</td>
<td>460.3</td>
<td>394.4</td>
</tr>
<tr>
<td>15-19</td>
<td>365.6</td>
<td>460.9</td>
</tr>
<tr>
<td>20-24</td>
<td>407.0</td>
<td>295.9</td>
</tr>
<tr>
<td>25-29</td>
<td>424.7</td>
<td>319.4</td>
</tr>
<tr>
<td>30-34</td>
<td>492.4</td>
<td>305.3</td>
</tr>
<tr>
<td>35-39</td>
<td>625.3</td>
<td>575.5</td>
</tr>
<tr>
<td>40-44</td>
<td>728.7</td>
<td>932.5</td>
</tr>
<tr>
<td>45-49</td>
<td>478.9</td>
<td>1640.0</td>
</tr>
<tr>
<td><strong>Comparative risks for MMratio</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15-24</td>
<td>395.5</td>
<td>330.8</td>
</tr>
<tr>
<td>40 or more</td>
<td>647.0</td>
<td>1135.3</td>
</tr>
<tr>
<td>Ratio of risk of older to young women</td>
<td>1.6</td>
<td>3.4</td>
</tr>
<tr>
<td><strong>The MMrate and the LTR</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MMrate(c)</td>
<td>9.9</td>
<td>7.7</td>
</tr>
<tr>
<td>LTR(d)</td>
<td>0.032</td>
<td>0.025</td>
</tr>
</tbody>
</table>

(a) Per 100,000 live births
(b) No maternal death were reported
(c) Per 10,000 women aged 15-49.
(d) Estimated as LTR = 1 - (1 - MMratio/100,000) / TFR

Source: SDES- (2015-2016) UNFPA-Afghanistan and CSO of Afghanistan (Micro data)
DISCUSSION/ CONCLUSIONS

To collect information on maternal mortality is a big challenge that will remain as avoidable causes of maternal death remain. This is particularly true in settings with no access to maternal health services and a more acute problem in very vulnerable populations as it is very often, the case of a number of Afghan provinces where the rural environment makes even harder that access.

Findings from this study, although undergo significant uncertainty, set a baseline that it is available now for thirteen provinces that includes some of the most populated which means that about half of the Afghan population is covered.

National efforts by the demographic and health surveys to collect data on maternal mortality, given all sort of fieldwork difficulties, locate their level around those estimated by WHO and SDES estimates tend to do so.

The age of the maternal mortality pattern is consistent with was it expected, replicating a J shape by age revealing that very young mums (ages 15-19) may have up to 100% higher probability of dying from a PRD than women aged 20-24. At the same time that it denotes reliability on the data it also denounce the sourness involved in pregnancy after ages, say 35 or 40; above those ages, MMRatio reaches very often, the four digits mark.

Correlates of maternal mortality and high fertility are well documented since at list 40 years by now.7 For this reason, let’s consider, here, what is happening with the fertility in Afghanistan. Kabul, the capital city and neighbour provinces Kapisa and Parwan seemed to have entered the fertility transition towards low levels; coincidentally, these same provinces have beaten down the 500 deaths per 100,000 live births mark by the beginning of the 2010s. As these provinces probably have relatively more access to health services, together with the decreasing fertility, that level seems plausible. It also seems plausible that other provinces with much less access to social development and high fertility like Ghor or Bamiyan presented levels rounding the four digits mark. The second SDES round provinces’ results –


approximately five years later – at the same time that MMRatios diverge less among them, are lower, on average, than those in the first round. Again, the fertility analysis arrived to the conclusion that these provinces have, also entered in the fertility transition to downward levels.

Thus, taking some liberties, if we assume that first and second round of SDES provinces express what the country is undergoing in terms of fertility and its correlated maternal health conditions, we also can assume that maternal mortality is expressing downward trends. Despite ambiguities, overview of the data suggests that current maternal mortality measured by the MMRatio in general terms is below the four digits level and probably near and below the level of 500 maternal deaths per 100000 live births.

If changes in the maternal mortality levels have occurred, changes the composition by cause of the maternal death should also be expected on the assumption that the each SDES rounds tells what is happening in the country. There is an equally high concentration of PRD at the time of delivery in both SDES rounds, though; it indicates that an important number of maternal deaths probably due to avoidable causes are still occurring. Also there is no association of this concentration with age of the women, indicating that all women are equally exposed to die due to lack of service in both SDES rounds.

Furthermore, the process of a downward trend of maternal mortality could be only confirmed if access to maternal health has improved in the country but the evidences are not consistent enough. 2010 and 2015 health and demographic surveys confirm on the one side, that contraception practice has not increased among currently married women and it is still an unmet demand of nearly every other married women in 2015. Furthermore, unmet need reaches two third of women in Bagdhis and even more in Ghor, the most socio-vulnerable province. On the other side, the more proximate maternal health determinants (access to pre-natal care, births attended by qualify health workers and deliveries in health facilities) do not show clear improvements over the 2010-2015 period.

While waiting for enough evidences on improvements in maternal health care, confirmation of a solid downward maternal mortality trend is also waiting.

Maternal mortality levels found in this report are the result of a complex synergy of many social, demographic, medical, economic and cultural factors. It is a context of absolute scarce resources and highly unbalanced gender relationships,
where family and children have the highest social value. In this context, any social policy framework struggling with such high maternal mortality levels cannot diverge from investing in the three dimensions proposed long ago by the international agencies of development: primary health care, communication for behaviour change and equity for women.

Actions in terms of policy implications in view of the results here presented needs to consider at least two dimensions.

First and straight, the need to focus on the determinants of such still high maternal mortality levels. Set aside the fragile general economic infrastructure associated to the social organization, that pervasively affect any immediate action towards ameliorating maternal health.

Secondly, the necessity to emphasis the women status in the Afghan society. On the assumption that family planning for implementation of reproductive preferences highly correlates with maternal mortality decline, let’s keep in mind that implementation of those preferences (age at first child, birth spacing, parity) are not entirely of women's domain in Afghanistan. Reproductive preferences most of the time is implemented by the husband, if not by the household head, more often than not, a man. This important specificity needs to be incorporated in the design of policies targeting maternal mortality since as mentioned, maternity, marriage and children are highly valuable. Culturally sensitive policies and programmes will be necessary to adequately address traditional values on marriage and motherhood/parenthood and, consequently less maternal deaths.

Finally, by doing efforts to eliminate at the maximum the number of maternal deaths due to avoidable causes the country will focus in the sustainable development goal 3, ensuring health and well-being for all at all ages. It will only be reached if women and reproductive health is on the development agenda.

Given the difficulty inherent to collect data on maternal mortality, it is always of the most importance to analyse the microdata in order to reassure their reliability; although efforts have been done in this study, additional scrutiny to the point of going back to fieldwork if possible is highly recommended. A more robust diagnose of the reliability of the maternal mortality information will contribute to a better assessment of the maternal mortality level.
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