Aspects of Intrauterine Fetal Mortality in Some Arab Countries

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Abstract: Prevalence of intrauterine fetal loss are estimated and its demographic and socioeconomic correlates are examined using retrospective data from four national surveys in some Arab countries. Multiple logistic regression equations are estimated. Age at first marriage, duration of marriage are significant predictor of the incidence of fetal loss. Women who ever used a family planning method (modern or traditional) in Algeria, Sudan and Yemen are more likely to suffer fetal loss than their counterparts who never used a method, even when conditions of important related factors such as parity or duration of marriage are controlled for. In contrast, in Egypt, those who ever used a family planning method are less likely to suffer pregnancy loss. Parity are important correlates of pregnancy loss in Egypt and Yemen but not in Algeria and Sudan. All the socioeconomic factors: migration status, level of mother's education, her work status are, however, statistically insignificant correlates of fetal loss.

This article addresses one neglected aspect of women's reproductive health in the Arab region: intrauterine fetal mortality or pregnancy loss. Intrauterine fetal mortality is the termination of pregnancy by events such as miscarriage, induced abortion or stillbirth. Following WHO recommendations (WHO, 1970), fetal deaths are classified into three categories; less than 20 weeks of gestation (early fetal deaths) 20-27 weeks (intermediate fetal losses) and 28 or more weeks (late fetal losses or stillbirths). Fetal losses of the first two categories are denoted in the text as miscarriages or spontaneous abortions. Induced abortion is the deliberate choice by a woman to terminate the unwanted pregnancy. Information on intrauterine fetal deaths especially spontaneous abortions and stillbirths is scanty. Much of this lack of information stems from methodological problems inherent in the study of fetal death and in the same time neglect of the scientific community --a situation that becomes a self-reinforcing. As addressed by Nakajima, The Director General of WHO (WHO, 1996: v) in his Message: "It is not for lack of knowledge that the majority of the world's women still face the prospect of death or disability as a consequence of child bearing. The burden of death and the stigma of permanent injury are borne by women and their newborn infants in large part because we, the holders of knowledge, the bearers of political authority and the architects of health and social programs, have failed to exercise our full creative capacity and to commit our energies and resources to the health and development needs of women". Although the recognition of the importance of women's reproductive health is worldwide spread and the health-policymakers are taking positive measures to identify the many ill-consequences of the negligence of women's health and raise the awareness of them, yet the interest in

intrauterine fetal mortality especially its two components miscarriage and stillbirth is almost absent by the interested parties.

We aim at estimating the prevalence of intrauterine fetal mortality in some Arab countries and analyzing some of its socioeconomic, demographic, and health correlates. Very few studies addressed this problem in the region and most of them are dated back several decades. The Arab countries under study include; Algeria, Egypt, Sudan, and Yemen. Those countries provide a diversity of demographic and socio-economic settings. As it can be seen, table A in Appendix 1, in terms of the prevalence of fertility control, for example, Yemen appears to be largely a natural fertility population. The percentage of Yemeni women who have ever used a family planning method is 20%. In contrast, three-quarter of Algerian women have ever used a method. Percentage of women who are marrying at ages less than twenty years ranges from 62% (Algeria) to 84% (Yemen). Level of urbanization ranges from 50% (Algeria) to only 10% (Yemen). Illiteracy rate among women reaches levels as high as 90% in Yemen. It appears clearly, in general, that Yemen occupies the lowest position on the demographic and socio-economic continuum whiles Algeria and Egypt have better situation, and Sudan is in the middle.

METHODS AND MATERIALS

Data from four national retrospective surveys for four Arab countries are used: Algeria 1992 (Enquete Alegerienne sur la sante de la mere et de l'enfant), Egypt 1991 (Egypt Maternal and Child Health Survey, MCH), Sudan 1993 (Sudan Maternal and Child Health Survey), and Yemen 1991/2 (Yemeni Maternal and Child Health Survey). These four national surveys were carried out as part of a large project "Pan Arab Project on the Child Development" that has been undertaken by the League of Arab Stated. Unified surveys' instruments and nearly unified formats of the different modules were applied in six Arab countries. Ever-married women, aged 15-49 are selected for this study and women who never got pregnant are excluded. The data sets have, however, some limitations. First, as the main objectives of the surveys did not include studying intrauterine mortality, the format of the administered modules in this project did not integrate events of pregnancy losses within the birth history. Hence, several important risk factors such as maternal age at conception of the lost pregnancy, its pregnancy order, etc., and several indirect determinants, such as the socioeconomic status of the respondent, had not been measured at times in which the events had taken place. Instead, they had been measured at the times of surveys taking. Second, the events of spontaneous abortion could not be distinguished from induced abortions. Mixing the two events hamper our efforts to assess correctly the

effects of the many risk factors and background characteristics and their relative weights on each type. Nevertheless, the reporting of induced abortion may be of limited magnitude. Events of induced abortion are more likely to be concealed than to be misreported as miscarriages, especially in environments that place restrictions on obtaining it. A third important data limitation relates to the method of observation is the problem of underreporting. This problem is widely recognized in retrospective studies. Fetal loss especially miscarriage can occur without a woman recognized it or it would be perceived as a delayed period. Miscarriages and stillbirths are easily forgotten especially those occur in remote past. The level of underreporting and its demographic and socio-economic correlates are not known or hardly estimated. Moreover, historical data over 30-35 years inherently provide underestimate of the overall level of prevalence of fetal loss, since the pregnancy histories are weighted toward the experience of younger groups. On other words, the pregnancy history of younger cohorts are censored, Casterline (1989a)

Hereby, in this article we will discuss the different demographic and socio-economic factors of the respondents, differentiating between those who had ever had the event of intrauterine fetal loss and those who never had it. It would be, however, a faulty step to look at the patterns of associations that emerges as proper assessments of the patterns of causation.

LEVEL OF INTRAUTERINE FETAL LOSS IN THE ARAB REGION

Data reveal, table 1, that at time of the surveys taking around 30% of women in reproductive age 15-49 have had experienced at least one episode of intrauterine fetal mortality. The levels rise 10% more (around forty percent) among women who are at the end of their reproductive careers, i.e., four out of every ten women have had experienced at least one episode of pregnancy loss. It appears that in Sudan the level of underreporting is higher than that in the other three countries. One important notice is that the levels of intrauterine fetal loss do not vary much among the four countries although these countries are remarkably different in their demographic and socioeconomic indicators. Two possible reasons acting in two opposite directions may account for this. The level of intrauterine fetal loss may be really lower in Algeria and Egypt than in Sudan and Yemen. And in the same time, the level of underreporting may be higher in the later ones than in the former. Women who had ever had an intrauterine mortality had lost on average two or more pregnancies. Algerian women have lost on average two fetuses, followed by Egyptian women, then the Sudanese. The highest mean number is among Yemeni women. Total number of fetal losses out of one hundred pregnancies ranges from almost 10 in Algeria to as high as 14 in

Egypt. These ratios do not rise much among the oldest groups. Level of underreporting of such ratios may be judged by Casterline's conclusion (1989a: 89) with regards to WFS retrospective data[1]. In his assessment of the quality of pregnancy loss data of WFS for 40 developing countries he reported that between 50 and 80 percent of the recognized spontaneous abortions and stillbirths are captured, with the assumption that misreporting of induced abortions as spontaneous are minimal.

Table 1. Level of Intrauterine Fetal Loss among Ever Married Women Aged 15-49

Measures	Algeria MCH 1992	Egypt MCH 1991	Sudan (N) MCH 1992/93	Yemen MCH 1991
Prevalence of pregnancy loss				
All women	28.2	30.2	24.2	31.0
Women (40-49)	41.0	41.8	34.4	40.3
Mean number of fetal loss [†]				
All women	1.850±0.040	2.130±0.043	2.26±0.162	2.35±0.065
Women (40-49)	2.175±0.075	2.423±0.068	2.55±0.194	2.92±0.126
Pregnancy loss ratio				
All women	9.81	13.83	10.55	12.59
Women (40-49)	10.66	14.78	10.62	12.90

[†] For women who have had experienced pregnancy loss.

Do these levels vary from those experienced in the earlier decades? If yes, in which direction they would be different?, and why?. One extraneous factor that would considerably hampers performing such comparisons is there is no unifying technique of data collection and monitoring among the different countries and in one country across times. Information is scanty and is only available for some Arab countries through WFS in the early beginning of the 1980s[2]. WFS provides, table 2, slightly higher estimate of abortion in Egypt and lower prevalence of abortion in Sudan and Yemen than MCH does. It seems that events of stillbirths are underreported in WFS, especially in Sudan and Yemen where the reported levels are the lowest of all. In the same time they may be over-reported in MCH, especially in Yemen. This would be explained partly by the fact that two different modules of maternal history had been utilized. In MCH, women were required to report only whether they had ever had an abortion, or a stillbirth and to report their numbers. It seems that there may be an

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[1] This study is the latest available one that conducted an assessment of spontaneous intrauterine fetal loss reporting on the worldwide level. Another important study, see Leridon (1976: 54-67).
[2] At late seventies and early eighties, Omran, and Standley (1976, 1981) conducted a large project based on small sample surveys in nine countries including Egypt, Syria, and Lebanon.

upward bias in stillbirths due to some women may classify children died soon after birth as stillbirths. In contrast, in WFS, questions on intrauterine fetal loss events were incorporated into the birth history inquiry. In that module, women were asked to report the gestational age in months. For those fetuses of 7 months or more which have been lost, women were asked to report whether they showed signs of life after their birth. Gestational age would be a plausible source of bias of two opposite directions. Women would report gestational age of the fetus shorter or longer than it would be. Casterline (1989a: 83) found that WFS completeness of reporting is not linked to method of data collection and questionnaire design. Convinced by this, such high prevalence of stillbirths among Sudanese and Yemeni women according to MCH and the very low prevalence among them according to WFS, may be explained partially by the political instability and civil wars during the 1980s in these two countries.

Table 2. Percent of Ever Married Women Aged 30 and over Reporting One or More Miscarriages and Stillbirths, according to WFS and MCH

Country	Abortion		Stillbirth		Any Pregnancy Loss	
	WFS	MCH	WFS	MCH	WFS	MCH
Algeria	na	28.0	na	10.7	na	33.9
Egypt	34.8	32.3	6.9	10.2	39.2	37.3
Sudan(North)	19.8	24.7	4.2	11.4	22.4	30.3
Yemen	26.3	30.7	4.5	17.7	28.4	39.5

Sources: WFS: Casterline, 1989a, Table 4, p.87, MCH: Calculated by the author from the clean taps of the retrospective surveys.   (na) not available.

Not only the risk of suffering intrauterine fetal mortality is high but also the level of repetition. There is a concern that once a woman has a pregnancy loss, the risk of undergoing more losses rises sharply, (El-Saadani, 2000, 1998; Tietze, 1979, 1981; Leridon, 1976; Casterline, 1989b). There is also a concern that her health would be aggravated by repeated pregnancy losses, especially if the loss is of induced abortion, not mentioning the surmount agony of failure in achieving her ideal family size or of remaining childless. Women of repeated pregnancy loss may be suffered from biological deficiencies or may be of strong unmet need for family planning. Data reveal that among women who had ever experienced intrauterine fetal loss, from almost 20% (Algeria) to close to 30% (Yemen) had had three intrauterine fetal mortality or more (Table 3, panel 1). The level rises about 10% more among the oldest cohort, except Sudan. Among women who had ever had an episode of pregnancy loss close to 50% proceeded to suffer a second intrauterine fetal loss (Panel 2 of the table) and among this group there is about the same percentage proceeded to suffer three losses or more. Rate of fetal loss shows that per every one thousand women who had never had fetal loss, there is around four hundred women, on

average, had at least one experience of it (Panel 3 of the table). More importantly, per every one thousand women had had only one episode of fetal loss, there is around nine hundred women, on average, had had two or more fetal mortality, the rate is more than doubled. The event does not become randomly distributed any more. Yemen data provides the highest rates of repetitions and if we exclude Sudan, Algeria provides the lowest estimates.

Table 3. Level of Repeating Intrauterine Fetal Mortality among Ever Married Women Aged 15-49

Measures	Algeria	Egypt	Sudan	Yemen
Panel 1: Percent Who Experienced Three or More Pregnancy Losses				
All women	19.1	24.7	20.5	27.9
Women (40-49)	28.2	32.1	24.9	42.0
Panel 2: Pregnancy Loss Progression Ratio				
Percent who experienced 2 or more fetal losses among those who had 1	45.8	47.8	45.3	52.1
Percent who had 3 or more fetal losses among those who had 2	42.0	49.6	45.2	53.6
Panel 3:First and Repeated Pregnancy Loss Rates [b]				
First pregnancy loss rate[1]	377	414	304	426
Repeated pregnancy loss rate [2]	844	914	827	1089

(1) Rate is per 1000 ever-married women aged 15-49 without prior pregnancy loss experience.

(2) Rate is per 1000 ever-married women age 15-49 with prior pregnancy loss episode.

SOCIOECONOMIC CORRELATES OF PREGNANCY LOSS:

The approach that view contextual/social and psychological conditions influence individuals' health has gained recognition over the past two decades (Institute of Medicine, 2001). These conditions indirectly affect health through several biological, demographic and behavioral links. The social environment influences behavior (and healthy behavior) by shaping norms, enforcing patterns of social control, and placing constraints on individual's choices. The individual/ family's social class or socioeconomic status affects health through its direct association with the material conditions of an individual's life, the physical environment in which individual is living (work conditions and housing, environmental pollution, health services, etc.) and the psychosocial risk factors.

Only three variables are adopted in our study as indicators for contextual/social dimension in which a woman is living and her social class: the woman's current place

of residence, her level of education and her work status. We assume that rural residents and women of low socioeconomic status are more likely to engage in a wide array of adverse-health related behaviors. Examples related to our problem are: absence of maternal care, inefficient practice of family planning, early age at marriage, early age at childbearing, narrow birth interval, child delivery at home, etc. Services in general and health service in particular are generally worse in rural regions than in urban ones.

Current Place of residence: Table 4 provides information for current place of residence and level of education. Constantly, in the four Arab countries, prevalence of pregnancy loss is higher among urban residence than among rural counterparts. Similar results have been found in previous studies, (Bone et *al.*, 1976, 1981; Casterline, 1989b). This pattern of association is different from expected. One explanation is the role of induced abortion. Urban women are assumed to be more likely to have the means and knowledge to obtain induced abortion for their unwanted pregnancies than rural women are. Moreover, health facilities that provide safe abortion are more likely to be available in urban than in rural places. In rural places women may, instead, resort to folk methods to get ride of their unwanted pregnancies. Maternal mortality as a consequence may be higher in rural than in urban, and hereby is likely to become a source of bias in estimating the prevalence of fetal loss in urban and rural regions. Differential in under-reporting is another source of bias in rural/urban pattern. Underreporting may be higher in rural than in urban areas due to factors such as lack of education, prevalence of more conservative norms and believes.

Table 4. Prevalence of Intrauterine Fetal Mortality according to Current Place of Residence and Level of Educational Attainment

	Algeria	Egypt	Sudan	Yemen
Urban	28.4	33.0	29.2	34.9
No education	30.6	35.5	31.3	38.8
Primary & preparatory	23.3	35.0	25.3	26.1*
Secondary or above	23.9	28.2	24.9	
Rural	27.9	28.3	21.3	30.1
No education	29.7	29.7	21.7	30.8
Primary & preparatory	14.6	20.7	18.4	16.2*
Secondary or above	6.6	19.6	21.2	

* Primary and above.

Table 5 shows prevalence of intrauterine fetal mortality according to its two components: abortion (spontaneous and induced) and stillbirth. Prevalence of abortion

in urban is higher than in rural. In contrast, prevalence of stillbirth is in opposite direction maintaining the assumption that the social and environmental factors are important risk factors that bring out intrauterine fetal loss. Furthermore, because abortion cases represent around eighty percent of the fetal loss, results are highly weighted by the abortion cases and their patterns of correlates.

Table 5. Prevalence of Intrauterine Fetal Mortality by Type and the Current Place of Residence

Current Place of Residence	Algeria	Egypt	Sudan	Yemen*
Abortion				
Urban	23.2	29.6	24.4	28.3
Rural	22.7	23.8	16.7	23.0
Stillbirth				
Urban	8.9	6.9	9.6	11.8
Rural	9.0	8.4	8.4	13.3

Another important factor that probably contributed to this unexpected association is internal migration. Place of residence of the respondent is measured at the time of the survey not at the time of having fetal loss. Rough estimate of the direction of association between migration status of the respondents and prevalence of fetal loss[3], Table 6., reveals several important notes. 1) Urban non-migrants have higher prevalence than rural non-migrants, (Egypt, Sudan, and Yemen). 2) Migrant women have, in general, higher prevalence of fetal loss than non-migrants and, in particular, migrants to urban places have the highest levels of all (Egypt, Sudan, and Yemen). 3) Migrants from rural to urban have levels close to that of migrants from urban to urban and higher than that among their counterparts who migrate to rural areas.

Table 6. Prevalence of Intrauterine Fetal Mortality by Migration Status+

Current Place of Residence	Algeria			Egypt		
	Migrant from		Non-migrant	Migrant from		Non-migrant
	Urban	Rural		Urban	Rural	
Urban	26.3	30.2	28.8	36.0	35.9	32.0
Rural	27.4	26.7	28.6	29.2	29.9	28.0
	Sudan			Yemen		
Urban	31.3	29.1	27.6	33.6	38.5	33.5
Rural	25.3	25.6	19.2	27.7	31.5	29.6

+ Migration status of the respondent is defined according to her place of previous residence.

In contrast, migrants from urban to rural places have prevalence of pregnancy loss very close to that of migrants from rural to rural (except Yemen and Sudan) and rural residents. It seems that urban/rural contexts affect differently pregnancy outcome with higher likelihood to lose the fetus in urban sites than in rural. And/or migrant women may have characteristics that prone to the environment to which they moved.

Level of mother's education: Level of women's education is found to be one of the most important differentiating factor in many problems of demographic and epidemiological research such as maternal mortality, morbidity, child health, infant mortality, use of family planning, family size, etc. Education influences women's reproductive health through behavioral links. Education allows easy access to, efficient analysis and use of information. Moreover, education allows proper utilization of the health services. All the favored patterns of reproductive health, lower mortality and morbidity are always among the educated women. Hereby, we would expect negative association between intrauterine fetal mortality and education. Educated women, on the other hand, may have strong aspirations to have small family than uneducated women, especially if they are working wives. This group may in turn has high incentive to obtain induced abortion as a pack up for family planning method failure. Educated women are on average marry at older ages. Getting pregnant at older age may carry higher risk of pregnancy loss (although evidence is not conclusive). Data reveal, table 4. above, that prevalence of intrauterine mortality is declining as the level of mother's education rises. This is true in both urban and rural areas.

Mother's work: Women's work during pregnancy may have positive association with pregnancy loss through two links. First, work may produce adverse environment, physical and psychological effects, that increase the risk of spontaneous fetal loss. And second, when continuing work is curtailed by pregnancy, some working wives may obtain induced abortion. Coombs et al., (1969:256-257) found higher fetal mortality rates among working wives than among non-working wives in their prospective part of their study (although the retrospective part do not show any association). On the other hand, work of some women may reduce the risk of fetal loss through providing information, financial means, and high autonomy that improve the health practice of those women. Data, table 7, reveals no consistent pattern of association between experience of intrauterine fetal loss and women's work either for cash or as unpaid family worker in the four countries. In Algeria and Sudan, data provide two conflicting patterns. Algerian housewives have higher prevalence of

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[3] Studying the relationship between intrauterine fetal mortality and migration is much more complicated topic and is not scope of the current study

intrauterine mortality than working wives. In contrast, the Sudanese working women have higher prevalence than the non-working.

Table 7. Prevalence of Intrauterine Fetal Loss among Ever Married Women (15-49) according to Work Status

Work Status	Algeria	Egypt	Sudan	Yemen
Ever worked for cash	24.7	30.0	28.1	31.0
Assisted her family	-	32.7	22.3	33.3
Never worked	28.5	30.3	24.0	30.8

DEMOGRAPHIC CORRELATES OF PREGNANCY LOSS

Age at first marriage and duration of marriage: One demographic variable that is widely recognized to have significant effect on women reproductive health is maternal age at childbearing. Women who get pregnant at very early ages (less than 20) or at older ages (above thirty-five) are at high-risk of having mal- pregnancy outcome; spontaneous abortion, stillbirth, perinatal mortality, underweight children, down's syndrome children. The positive association, sometimes U-shaped, between intrauterine fetal mortality and maternal age is, however, debated. Induced abortion for later parities that occur, of course, at older ages compared with earlier parities, may cause the witnessed positive association. Some other studies (El-Saadani, 2000; Santow and Bracher, 1989; James, 1974; Billewicz, 1973) suggested that there is an element of selection bias based on the hypothesis that women are not homogenous with regard to the risk of pregnancy loss- assuming two groups of women: a group with low risk and a group with high risk. Accordingly, in fertility control society, to some extent, women may restore to outcome stopping role to achieve their ideal family size. Women of high risk of fetal loss continue conceiving so as to achieve their desired number of children and hereby, a positive association between fetal loss and both gravidity and maternal age exists. The available data sets do not allow us to study the role of maternal age on pregnancy loss. Only information on age at first marriage, current age and duration of marriage is available. Table 8, provides prevalence of pregnancy loss according to age at first marriage and duration of marriage. It appears that women who got married at ages thirty or more have remarkably higher risk of losing their pregnancies compared with their counterpart who got married at younger ages. Moreover, In Algeria, Sudan and Yemen, women who got married at their late twenties (25-29) and recently married (duration of marriage less than 5 years), have remarkably stronger tendency to lose their early pregnancies than those married at younger ages. The level is more than doubled in Yemen and close to double in Algeria. Another important remark is that the

prevalence of fetal loss rises sharply the longer marriage duration. For example, for marriage duration 5-9 years the prevalence is two folds that for duration of 0-4 years and this is holds for all marriage cohorts. It seems that reporting for the events of fetal loss is biased downward in Yemen especially among the group who got married at their late twenties (25-29) and of longer duration of marriage (15+).

Table 8. Prevalence of Intrauterine Fetal Mortality among Ever-married Women (15-49) according to Age at First Marriage and Duration of Marriage

Duration of Marriage	Age at Marriage			
	<20	20-24	25-29	30+
	Algeria			
0-4	9.0	8.8	15.2	15.5
5-9	23.1	17.0	21.2	(12.5)
10-14	24.5	27.8	32.4	(52.9)
15+	37.7	37.7	39.8	(66.7)
	Egypt			
0-4	11.6	12.3	11.6	17.8
5-9	23.2	22.1	25.7	43.2
10-14	29.1	31.5	31.4	(29.6)
15+	39.8	42.5	34.6	(40.0)
	Sudan			
0-4	7.0	11.8	15.7	(16.0)
5-9	15.0	21.6	26.2	(35.7)
10-14	23.6	27.1	42.1	(26.7)
15+	30.1	36.8	38.9	(33.3)
	Yemen			
0-4	8.7	9.7	22.8	(29.9)
5-9	21.2	22.2	27.9	(26.8)
10-14	29.0	38.4	17.9	(39.6)
15+	41.1	35.4	27.5	(37.8)

Numbers in parentheses are for cases less than 30.

Parity: many studies showed positive association between fetal mortality and parity (Omran et al, 1976, 1981; Pebley et. al, 1985; El-Saadani, 1998; Casterline, 1989b). Two possible pathways are often suggested: 1) High parity apart from its linkage with maternal age, may cause wearing out of the women reproductive system. 2) High parity may force some women to obtain induced abortion to end their unwanted pregnancies. However, the effect of parity ,similar to maternal age, may be an artifact to the assumed heterogeneity among women with regards to fetal mortality (El-Saadani, 2000; Santow and Bracher, 1989; Leridon, 1976; Naylor, 1974). Results show, table 9, that the association between intrauterine fetal loss and parity takes a U-shape. The prevalence of fetal mortality is very high among nulli-parous women (have zero number of children ever born) and those of high parity (five or more). It is

clearly apparent that intrauterine fetal mortality keep some women childless. Induced abortion is probably the common type of fetal mortality among high parity women.

Table 9. Prevalence of Intrauterine Fetal Mortality among Ever-married Women (15-49) according to Duration of Marriage and Parity

Country	Parity	Duration of Marriage		
		0-4	5-9	10+
Algeria	0	17.7	(79.3)	(76.0)
	1-2	7.1	19.0	32.5
	3-4	14.3	18.4	30.1
	5+	-	28.6	35.9
Egypt	0	12.0	36.1	44.4
	1-2	11.6	24.5	30.9
	3-4	19.6	21.5	33.1
	5+	(16.7)	31.7	40.6
Sudan	0	13.7	(66.7)	(92.9)
	1-2	8.2	15.7	25.2
	3-4	(11.8)	19.4	23.9
	5+	-	11.4	31.0
Yemen	0	8.5	37.2	(65.5)
	1-2	10.6	22.4	27.4
	3-4	(16.7)	19.9	29.5
	5+	-	21.4	40.2

Numbers in parentheses are for cases less than 30.

In Table 10, prevalence of fetal loss is estimated according to their desire to have more children and taking into account their parity. Obviously, the desire to have more children declines by achieving the desired family size or by excess fertility. In such two instances women or couples may seek induced abortion if their measures to control fertility fail. Hereby, we expect rise in the prevalence of intrauterine fetal loss by increasing parity, especially among women who do not want more children. On the other hand, some women may stay at smaller parity because they are suffering from intrauterine fetal mortality. In such instance the prevalence of fetal loss among smaller parity group may be high particularly among those who want more children. Results reveal, as apparent from table 10, that the prevalence of fetal mortality is remarkably high among the group of low fertility (parity 0 or one) who want another child in the four Arab countries but Yemen. It is interesting, however, to find among those who can not get pregnant and yet have parity 0-1 a pretty high prevalence of fetal loss. A fact that means that intrauterine fetal mortality is probably the main reason behind keeping some families childless or have less fertility. Furthermore, there is a group of small parity women and yet want no more children (case of Egypt shows considerable high prevalence of fetal loss among this group compared with the other three

countries). There is no conclusive evidence regarding the proposal that fear of fetal loss may upset the desire to have more children. It certainly affects the ability to have more children. Whether the difference between the desire and the ability to have more children was quit clear among the respondents when reporting their desires, no information could help. Data reveals around 10% increase in the prevalence when women move from parity three or less to those of parity 4 or more. However, no significant difference in the prevalence of intrauterine mortality arises between those who want more children and those who have negative attitude toward large family size[4]. Rather, the prevalence in some countries, Algeria and Egypt and Yemen, among the first group is higher than among the second one.

Table 10. Prevalence of Intrauterine Fetal Mortality among Currently Married Women (15-49) of Marriage Duration 5-Years or More Controlling for Parity and the Desire for More Children

Desire for more Children		Parity			
		0-1	2	3	4+
Algeria	Want another child	45.7	21.4	25.6	33.3
	No more	(8.1)	22.8	18.9	34.2
	Can not get pregnant	(33.1)	(53.3)	(54.5)	44.2
Egypt	Want another child	39.6	31.9	28.2	38.3
	No more	23.5	27.0	25.8	36.8
	Can not get pregnant	46.9	23.8	46.9	49.3
Sudan	Want another child	30.3	19.1	22.6	28.0
	No more	(16.7)	(20.0)	27.5	32.0
	Can not get pregnant	(50.0)	(40.6)	(75.0)	30.5
Yemen	Want another child	26.7	29.6	27.6	35.5
	No more	(13.9)	19.2	22.1	38.8
	Can not get pregnant	(43.0)	(43.3)	(9.5)	36.6

Numbers in parentheses are for cases is less than 30.

Data on the relationship between fetal mortality and the practice of family planning supports that when the couples have a negative attitude toward large family size, they most probably restore to induced abortion as a back up for family planning, table 11. In addition, the prevalence is constantly higher in the instance of using family planning to limit childbearing than to space. This is true for the four Arab countries. Another important factor that may positively influence the incidence of intrauterine fetal mortality is the instance of disagreement between the couple with regard to the favored family size. In discrepant situation, the couple probably restores to induced

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[4] We tried the analysis controlling for live children instead of children ever born and we get similar pattern of associations (results not shown).

abortion. Data, table 12, agree with such postulation where in discrepant situations[5] the prevalence of intrauterine mortality is the highest. This holds for the four Arab countries.

Table 11. Prevalence of Intrauterine Fetal Mortality among Ever Married Women (15-49) by Pattern of Family Planning Practice

Pattern of Family Planning Practice	Algeria	Egypt	Sudan	Yemen
Ever used:	29.8	31.6	33.1	38.6
Never used	27.7	27.7	21.8	29.0
Purpose of Use:				
Spacing	28.9	30.0	31.0	37.7
Limiting	33.5	33.3	37.1	39.8
Method Used:				
Modern	27.9	30.7	33.2	38.9
Traditional	33.6	28.0	24.0	36.3
Both	33.1	37.1	35.5	41.4

Table 12. Prevalence of Intrauterine Fetal Mortality according to the Discrepancies between Husband and Wife with Regard to the Preferred Family Size as Perceived by the Wife, Ever Married Women (15-49),

Category	Algeria	Egypt	Sudan	Yemen
Husband wants less	30.0	30.2	29.4	26.9
Husband and wife equal	24.8	28.1	22.6	27.2
Husband wants more	27.8	33.7	27.2	28.7

UTILIZATION OF THE HEALTH SERVICES AND PREGNANCY LOSS

The relationship between the incidence of intrauterine fetal loss and health utilization is so complicated, yet is very important to explore and study. Health practice by the woman during pregnancy and delivery is highly affected in the Arab countries by several factors that interact with each other. These factors include: norms, socioeconomic status, costs, health awareness and education, previous experience of intrauterine mortality, and importantly, quality of health services provided. In environments where it is prevalent that women do not seek anti-natal care, mostly consult midwives, and deliver at homes we expect that who seek the health sector is the highly educated or of high socioeconomic status. It is naturally and faultlessly to assume that health utilization during pregnancy (anti-natal care) and during delivery

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[5] Husband's preferences are as reported by the wife. The wife's perception of her husband's attitude toward family size may be at variance with his actual views. Yet, individual's perception is a factor that strongly influences behavior.

should reduce the incidence of intrauterine fetal loss. However, several factors confound this assumption. women who are expecting problems during pregnancy due to either previous experience with fetal loss or due to older age during pregnancy may seek the health sector. Moreover, women may seek health care when they are threatened by losing their fetus and in emergency status. Women may seek health sector to get ride of the unwanted pregnancy. Finally, poor health services and poor experience of health providers may have adverse impact on pregnancy outcome. These factors may change our expected association. Two simple measures for the quality of health care during pregnancy and delivery are used: check up during pregnancy and place of delivery. These two questions were addressed to women who have had live birth(s), during only the last 5-years prior to the survey taking. No information is available on the behavior during pregnancy of the lost fetuses during this period nor during earlier periods. We classified the women into three groups, two of them include those who continuously behaved the same way during their pregnancy and child birth. The third group contains those changed their behavior from one child to another. Table 13 reveals that, in contrast to the assumption of negative association between incidence of pregnancy loss and health utilization, women who always had a check up during their pregnancies had experienced higher prevalence of intrauterine fetal loss than women who never had check up. This is true for the four countries. It is interesting to find that Algerian and Yemeni women who changed their health utilization are the ones who have the highest prevalence of fetal mortality.

Table 13. Prevalence of Intrauterine Fetal Loss among Currently Married Women (15-49) according to Check Up and Place of Delivery of Children Born during the Last Five Years Prior to the Surveys' Date

Country	Check Up during Pregnancy			Place of Delivery*		
	Yes	No	Changed	Health Clinic	Else	Changed
Algeria	26.0	21.1	29.8	7.8	8.5	10.8
Egypt	30.3	25.2	28.3	7.6	6.9	6.1
Sudan	23.1	15.5	23.3	9.3	8.0	9.2
Yemen	34.4	27.4	39.4	11.9	11.9	14.5

* Estimated prevalence is only for stillbirths.

Episodes of stillbirth are studied according to place of delivery, (table 13). In Algeria, where three quarter of women deliver their pregnancies at health unites, the prevalence of stillbirth is higher among those who delivered their births in places different from the health unites or changed their place of delivery from one pregnancy to another. In the other three Arab countries, where very low percentage of women deliver at health units (whether public or private, see table A in Appendix 1), prevalence of stillbirth is slightly higher among those who went to the health sector.

These findings although depend on crude data are in agreement with our assumption of negative association between incidence of pregnancy loss and health utilization.

LOGISTIC ANALYSIS OF PREGNANCY LOSS

A logistic curve has been fitted in order to study the correlates of the likelihood that a woman will suffer from pregnancy loss with each of the woman's attribute after controlling for the influence of the other attributes. Let P_i the probability that a woman "i" had ever had a pregnancy loss. And there are k attributes denoted by X_1 ....X_k. The binomial logistic model specified in the log odds form can be expressed as:

$$\log_e \frac{P_i}{(1-P_i)} = \sum_{j=1}^{k} \beta_j X_{ij} \qquad , i = 1,2 \ldots\ldots\ldots n$$

The dependent variable is coded 1 for women who had ever had at least one episode of pregnancy loss and zero otherwise. The explanatory variables or predictors are as follows: respondent's age at first marriage (continuous variable) , respondent's duration of marriage (continuous variable). Parity is a dummy variable coded 1 for those who had (0-1) children, 2 for those who had (4+) children and (2-3) children is reference category. Prevalence of family planning is a dummy variable coded 1 for those who ever used a method and those who never used a method is reference category. Place of residence: urban area coded as 1 and rural is reference category. Level of Education is a dummy variable coded 1 for those who have median levels (Primary and Preparatory) education and 2 for those who have higher levels (Secondary or above) of education and illiterates in the reference category. Women's work is a dummy variable coded 1 for those who ever worked for cash and 2 those who assist their families and those who never worked is reference category. Migration is a dummy variable coded 1 for those who migrated from urban to urban, 2 for those who migrated from urban to rural, 3 for those who migrated from rural to urban, 4 for those who migrated from rural to rural, and those who never migrated is the reference category.

Different models have been tried in order to obtain a model, for each country, that explains better the variations among women with regards to the risk of suffering fetal loss. Results are shown in table 14[6]. Women's age at first marriage in Algeria, Egypt

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[6] The two health utilization variables are excluded because they are measured only for women who gave birth(s) during the five years preceding the survey date.

and Sudan is a significant predictor. Results indicates that rising age at first marriage is a significant risk factor for pregnancy outcome impairment. The negative association of age at marriage among Yemeni women can be explained partly by the fact that around 85% of them got married at adolescence (ages less than 20 years) and the rest got married at age 20-29. Such negative association supports the belief that teenage marriage is negatively associated with better reproductive health. The insignificant influence of this variable in the case of Yemen is apparently the out come of the probable statistical co-linearity with duration of marriage. Since the very high majority of Yemeni women got married at ages less than 20, with no great variability among them, a positive association with marriage duration is expected.

As quite anticipated, duration of marriage is positively and significantly associated with the probability of fetal loss in the four Arab countires. Duration of marriage is a proxy for longer exposure to the incidence of fetal loss that is produced by the different genetic and behavioral risk factors.

Controlling for the other factors, number of children ever born is a significant predictor in Egypt and Yemen. The incidence of pregnancy loss is less likely to occur for women with lower parity than for those of higher parity. As the results reveal, the likelihood that a woman with 0-1 parity suffer from pregnancy loss are .74 and .69 (Egypt and Yemen, respectively) times less than the likelihood that a counterpart with 2-3 children suffer from fetal loss. On contrast, the probabilities that a woman with four or more children suffer pregnancy loss are 1.37 and 1.23 (Egypt and Yemen, respectively) times higher than the probabilities among those with 2-3 children. There is no statistically significant evidence for such relationship in Algeria and Sudan, although the coefficients assume the same signs of association.

Women who ever used a family planning method (modern or traditional) are more likely to suffer fetal loss than their counterparts who never used a method, even when conditions of important related factors such as parity or duration of marriage are controlled for. This is the case in Algeria, Sudan and Yemen, where the odds ratios are 1.36, 1.46 and 1.42 respectively. This may shed light on family planning method failure as an important incentive to obtain induced abortion in these three Arab countries. In contrast, in Egypt, those who ever used a family planning method are less likely to suffer pregnancy loss.

In contrast to the school of thought that believes in that better environmental and socioeconomic factors do influence maternal reproductive health (by alleviating the more fundamental causes of intrauterine fetal loss) results show that residence in

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urban areas in Egypt and Sudan is positively and significantly associated with higher incidence of loss. The odds that urban women suffer from fetal loss are 1.23 and 1.45 times higher than the odds among rural counterparts and are statistically significant at p-value less than .01. Whiles in Algeria and Yemen place of residence shows insignificant positive association with pregnancy loss. Furthermore, consistent with some other studies, and in contrast to the stated assumptions, mother education, her participation in the labor force and her migration status are all statistically insignificant. This holds for the four Arab countries.

CONCLUSION

In this article we estimated prevalence of intrauterine fetal loss and its demographic and socioeconomic correlates in some Arab countries. Although the estimated levels are underreported, the prevalence and the level of repetition of fetal loss are remarkably high. Four out of every ten women are suffering from at least one episode of intrauterine fetal loss and nearly three out of ten have suffered from three or more pregnancy losses. It is important to notice that although the four Arab countries represent diverse societies with regard to the socioeconomic and demographic continuum, yet the estimated rates of prevalence of fetal loss are very close. The retrospective studies in the four Arab countries demonstrate that age at first marriage in Algeria, Egypt and Sudan is a significant predictor. The negative association of age at marriage among Yemeni women is explained partly by the fact that around 85% of them got married at age less than twenty and the rest got married at age 20-29. Such negative association supports the belief that teenage marriage is negatively associated with better reproductive health. As quite anticipated, duration of marriage as a proxy for longer exposure for the incidence of fetal loss is significantly associated with it. Women who ever used a family planning method (modern or traditional) are more likely to suffer fetal loss than their counterparts who never used a method, even when conditions of important related factors such as parity or duration of marriage are controlled for. This may shed light on family planning method failure as an important incentive to obtain induced abortion. This is the case in Algeria, Sudan and Yemen. In contrast, in Egypt, those who ever used a family planning method are less likely to suffer pregnancy loss. Parity are important correlates of pregnancy loss in Egypt and Yemen but not in Algeria and Sudan. All the socioeconomic factors: migration status, level of mother's education, her work status are, however, statistically insignificant correlates of fetal loss.

Table 14 Logistic Regression Analysis for Predicting Intrauterine Fetal Mortality among Ever Married Women (15-59), different Arab Countries

Variable	Algeria MCH 1991		Egypt MCH 1991		Sudan MCH 1991/2		Yemen MCH 1991	
	B	Exp. (B)	B	Exp. (B)	B	Exp. (B)	B	Exp. (B)
Age at first marriage	0.0389**	1.0397	0.0208**	1.0210	0.0526**	1.0540	-.0081	0.9919
Duration of marriage	0.0608**	1.0627	0.0453**	1.0463	0.0528**	1.0542	0.0431**	1.0440
Parity								
0-1	-0.0068	0.9932	-0.2968**	0.7432	-0.1590	0.8530	-0.3742**	0.6878
4+	0.0979	1.1028	0.3167**	1.3726	0.0669	1.0692	0.2079*	1.2311
Prevalence of family planning								
Ever used a method	0.3070**	1.3594	-0.1155*	0.8909	0.3771**	1.4580	0.3484**	1.4169
Place of residence								
Urban	0.0608	1.0599	0.2081**	1.2314	0.3689**	1.4461	0.1356	1.1453
Level of education								
Primary and preparatory	-0.1558	0.8557	0.0168	1.0169	0.0507	1.0520	-.1766	0.8381
Secondary or above	0.0200	1.0202	0.0545	1.0560	-0.0666	0.9355		
Work								
Ever worked for cash	-0.1680	0.8454	-0.0313	0.9692	0.1028	1.1083	-0.0250	0.9753
Assist her family			0.0820	1.0854	0.0986	1.1036	0.1114	1.1178
Migration								
From urban to urban	-0.1265	0.8811	0.1765	1.1931	0.1101	1.1164	-0.0098	0.9902
From urban to rural	0.0900	1.0942	0.1205	1.1281	0.3138	1.3687	-0.0515	0.9498
From rural to urban	-0.0172	0.9829	0.1150	1.1218	0.0772	1.0802	0.2420	1.2738
From rural to rural	-.0344	0.9662	0.1704	1.1858	0.3832	1.4670	0.1421	1.1526
Constant	-2.9136**		-2.0904**		-3.2890**		-1.5749**	
-2 Log Likelihood	5505.591		10169.813		4571.903		6364.503	
Model Chi-Square	294.224**		529.080**		251.584**		366.436**	

** Significant at P-value less than .01.

* Significant at P-value less than .05.

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Appendix 1

Table A. Background Characteristics of Ever Married Women Aged 15-49 and Who Ever Got Pregnant at the Time of the Survey, different Arab Countries

Background characteristics	Algeria	Egypt	Sudan	Yemen
Age distribution.				
15-19	1.6	4.2	4.6	7.1
20-24	11.0	14.0	13.7	13.7
25-29	20.3	19.9	20.9	22.6
30-34	20.4	17.3	17.3	17.8
35-39	19.6	18.2	19.5	17.4
40-44	16.2	14.2	11.4	11.7
45-49	10.9	12.4	12.5	9.6
Place of residence				
Urban	50.3	40.4	37.6	18.5
Prevalence of family planning				
Ever used	76.8	64.9	24.1	20.1
Total fertility rate	4.39	4.13	4.57	7.7
Age at first marriage				
<20	62.4	65.8	77.2	84.5
20-29	36.1	32.7	21.5	14.8
30+	01.5	01.4	01.3	00.7
Level of education				
Illiterate	79.2	71.2	77.0	90.5
Primary & Prep.	15.0	10.8	15.1	05.4*
Secondary or above	05.8	18.0	07.8	04.1**
Work for cash since marriage				
Ever worked	07.7	16.8	16.8	04.1
Check up during pregnancy				
Yes	58.4	50.6	73.5	24.4
Place of delivery				
Public and Private Health facility	74.5	20.8	16.2	10.6
Number of women	4890	8829	4366	5477

* Primary only.   ** Preparatory or more

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