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The phenomenon of infant mortality in the Arab world: the disparity between countries and the influencing variables

ظاهرة وفيات الأطفال في العالم العربي: التفاوت بين البلدان والعوامل المؤثرة

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Abstract :

Infant mortality rates in the Arab World have decreased significantly but with big variations between countries. This paper aims to shed light on children situation generally and infants particularly in this region and to identify the major social and economic variables affecting these rates .According to the most recent data (2018), there is a large gap between the Arab countries, while these rates are decreasing in the countries that afford welfare and healthcare like Gulf Cooperation Council (GCC) , they are highly increasing in countries that suffer from conflicts and wars and poverty (Syria, Yemen, Somalia). It also clarifies that the increase of maternal mortality, fertility rates and poverty rate play a key role in the increase of infant mortality.

Keywords: infant mortality; Arab World; maternal mortality; fertility rate; poverty indicators; linear regression.

ملخص:

انخفضت معدلات وفيات الرضع في الوطن العربي بشكل محسوس ولكن مع تباينات كبيرة بين البلدان. حيث تهدف هذه الورقة إلى إبراز وضع الأطفال بصفة عامة والرضع بصفة خاصة في هذه المنطقة وتحديد أهم المتغيرات الاجتماعية والاقتصادية تأثيرا على هذه المعدلات..

وقد تبين من خلال الاعتماد على أحدث البيانات (سنة 2018) وجود فجوة كبيرة بين بلدان الوطن العربي، ففي الوقت الذي تنخفض فيه هذه المعدلات في البلدان التي يتمتع فيها الأطفال بالرفاهية والرعاية الصحية الكافية كدول مجلس التعاون الخليجي، ترتفع بشكل مقلق في البلدان التي نعاني النزاعات والحروب والفقر (سوريا واليمن والصومال). كما تبين أن ارتفاع كلا من وفيات الأمهات ومعدلات الخصوبة ونسبة الفقر يلعب دورا أساسيا في ارتفاع معدلات وفيات الرضع.

كلمات مفتاحية: وفيات الرضع، الوطن العربي، وفيات الأمهات، معدل الخصوبة، مؤشرات الفقر، الانحدار الخطي.

Introduction:

The world's child health indicators have continued to improve continuously, with infant mortality rates falling from 36.7% in 1990 to 29% in 2018. This means promoting survival for the millions of children born annually around the world. But 'about 15,000 children die every day from preventable diseases, and 50 countries are still far from achieving the sustainable development goals linked to infant mortality (NU, 2019, p. 2)some of them Arab countries.

Reducing infant mortality is a sub-goal of sustainable development that aspires to achieve a lower rate of 12% by 2030. Survival for up to five years is also an essential element in calculating the human capital index which allows for two main objectives: eradicating extreme poverty and promoting the common well-being of all countries.

In the Arab region until recently, infant mortality rates were among the highest in the world with nearly 200‰ in the mid-century. But thanks to policies adopted specifically for health, they have been reduced to acceptable levels within those policies' framework. However, there remain significant differences between its countries in terms of the level and direction of these rates because of the differences in their systems, health programs, physical and human potential and economic, particularly security, conditions. While some Arab countries enjoy wealth and well-being, others suffer from poverty, conflicts and wars that affected children's health and lives. As with the global trends, infectious diseases, neonatal diseases, food diseases and maternal diseases have become less important in the Middle East and North Africa, the risks associated with children diseases remain high in countries such as Djibouti, Iraq, and Yemen(IHME, 2013).

Many international reports also indicate that conditions in conflict countries are more dangerous to children's lives and health. In 2017, there were 90% of children in Yemen and 70% in Syria and 60% in Somalia living in the worst conditions (save the child, 2019).(UNHCR, 2013).

In this search we will try to answer the following question:*What is the situation of children in the Arab world?andwhat are the most variables Impact on infant mortality?*

And then we would suggest the following hypotheses:

- There is a relationship between the social and economic variables and infant mortality in the Arab World.
- The social and economic conditions (poverty) and security conditions (wars- conflicts) have a role in making difference in infant mortality among the Arab World countries.

Previous studies:

Given the importance of the infant mortality study, many Arab studies have dealt with this subject, but by allocating it to each individual country, such as Algeria, Morocco, Palestine, Arabic, Saudi Arabia, etc., or a particular region such as North Africa, where we find a study (Tabutin et Gourbin,1997), which dealt with the development of infant mortality in this region between 1960 and 1992 and studied both (2005 Tabutin.et, Schumaker -) covered the period 1960 and 2000 and relied on the results of demographic surveys. In both studies, researchers found that mortality rates had decreased considerably, but remained significant with a clear gender difference, as they rose in females compared with males. This is due to biological, social and economic factors, most notably educational level and housing conditions. BOUHDIBA addressed infant mortality in urban Arab areas and concluded that some North African and Gulf countries had a better infant status than the rest.

In general, our current research is consistent with previous studies as it dealt with infant mortality in the Arab world, but differs in that it dealt with a large number of countries in this region and examined their determinants of health and population indicators and poverty using linear regression and the latest data.

Research methodology:

With a quantitative demographic approach and using the descriptive curriculum, this research addresses infant mortality in the Arab world in comparison between countries in terms of their levels and most important determinants. By using data on 16 Arab States, the absence of other States is due to a lack of recent data due to their weak sources or the country's disadvantaged situation due to poverty, war or conflict. We have obtained such data from United Nations international reports in particular or from each State's national surveys. We have also adopted a linear regression method to neutralize the most

important determinants of infant mortality according to their importance and have used international and national reports to analyse the results.

1. Infant mortality:

1.1. definition and causes:

Infant mortality is the death occurs to children before they turn their first year, and it represents the level of social and economic development in any given country. It is divided into:

1.1.1. Neonatal mortality:

It is the mortality which happens to the newborn baby within the 28 days after birth (and it is divided in turn into premature neonatal deaths, which occur in the first week and another late which occur between the eighth and twenty-eighth day of the day of birth). Its direct causes are complications of premature birth and low birth weight, infections, and complications that arise during the birth process (previously known as birth asphyxia). These causes account for more than 85 per cent of newborn mortality (UNHCR, 2013, pp. 4-5).

1.1.2. Post-neonatal mortality:

Deaths occurring after the 28thday to less than one year of birth, often caused by pneumonia, diarrhea, congenital defects, malaria and malnutrition, according to the World Health Organization.

In Arab countries, more than 50% of infant deaths occur for birth-related reasons such as early labor complications and complications during labor (united Unies & Leag Arab of States , 2015).

It is insistent to point out to the catastrophic situation of Arab refugee children in the Arab region, neonatal death audit process was also established in Zaatari refugee camp in Jordan to investigate an increased number of neonatal deaths detected in the HIS in 2013. Initial audits found that most deaths were due to prematurity, infection or congenital anomalies, and that contributing factors included poor knowledge of conditions that require urgent care and weak emergency transport systems (UNHCR, 2013, p. 5). These factors are exacerbated in conflict and asylum areas more than in any other region.

Table 1
Infant mortality in some Arab countries

Rates	Tunisia (2018)	Morocco (2018)	Jordan (2017)	Algeria (2018)*
Neonatal mortality	9	13.6	11	**17.1**
Post-neonatal mortality	5	4.45	6	**5.1**
Infant mortality	14	18	17	**21.0**

Source: The last cluster surveys in the mentioned countries. The National Bureau of Statistics of Algeria (ONS).

The above table data indicate that neonatal mortality is always the highest in the selected Arab countries, which confirms that there are problems in obstetric care, just before and after labor, despite the generally decline recorded in infant mortality.

1.2. The situation of children in the Arab world:

Arab countries ratified the conventions on child rights, including the Arab Children's Rights Charter, in which they approved the "affirmation and guarantee of the child's right to social security, and to raise in health and well-being based on health, preventive and curative care for him and his mother from her day of pregnancy and to strengthen the environment in which he grows up, and his right to adequate housing in which he remains, and his nutrition has to be sufficient, balanced and appropriate for his growth stages. 'Sadly, the number of countries experiencing conflict is at its highest point since the adoption of the Convention on the Rights of the Child in 1989. Nearly nine years of war in the Syrian Arab Republic have left nearly 5 million children in need and more than 2.5 million children living as refugees outside of the country. More than four years of conflict in Yemen have created the world's worst humanitarian crisis' (UNICEF.2019:2).The most distinctive feature of conflict zones is the deteriorating health situation, which adversely affects infant lives by failing to obtain proper health care because of the shelling and destruction of health facilities.

Table 2

Number of attacks on health services in conflict zones in 2017

Country	Syria	Libya	Iraq	Palestine	Yemen
Number of attacks	252	15	35	93	24

Source*:* (Thompson & Kabila , 2018, p. 25)

In the most recent ESCWA (2019) study, the results showed that 66.6% of the Arab population surveyed are either poor or vulnerable to poverty, while

undernourishment and housing conditions are the biggest causes of child poverty, with 24.7% of children living in extreme poverty and disparities among Arab children are widening by regions, educational levels and wealth index.

According to Save Children Organization (2019), at least 550,000 infants died between 2013 and 2017 in the 10 war-affected countries, including four Arab ones: Yemen, Iraq, Somalia, and Sudan because of hunger, poor hygiene, or inadequate health care.

Yemen is one of the Arab countries where childhood with all ages are in a disastrous health situation where, according to UNICEF, only 3 out of 10 births occur in health facilities and 1 out of 37 births dies in his first month, and half of health facilities do not work because of the shortage of staff, lack of supplies, inability to cover operating costs or the limited access to them.

In Somalia, high infant mortality is due to a combination of factors, 'including inadequate access to quality maternal and child health and nutrition services, low skilled birth attendance and inadequate emergency obstetrics and newborn care'(WHO, 2014, p. 27).

In Syria and Iraq where security conditions are defined as dangerous curves and the laws of war are violated, the Syrian Human Rights Network (2019) has reported the deaths of more than 29,000 children between 2011 and 2019, mostly because of chemical attacks, explosions, indiscriminate bombing, and so on Siege and starvation, which are violations of human rights.

1.3. The evolution of infant mortality rates in the Arab world:

The infant mortality rate has decreased in most countries of the Arab world since the middle of the twentieth century as a result of their benefit from health development, especially in terms of vaccination and antibiotics, in addition to an improvement in the standard of living, such as providing safe drinking water and sanitation, improving health services and spreading ways protection and prevention. All this was done thanks to the health and social policies that these countries adopted in order to achieve the goal of minimizing deaths in general and infant mortality in particular.

Table 3
Evolution of infant mortality rates (%) in the Arab world 1952-2018

Year	*2018	2002	1992	1972	1952
Rate	26	39	54	121	**192**
Evolution (%)	- 26	- 28	- 55	- 37	-

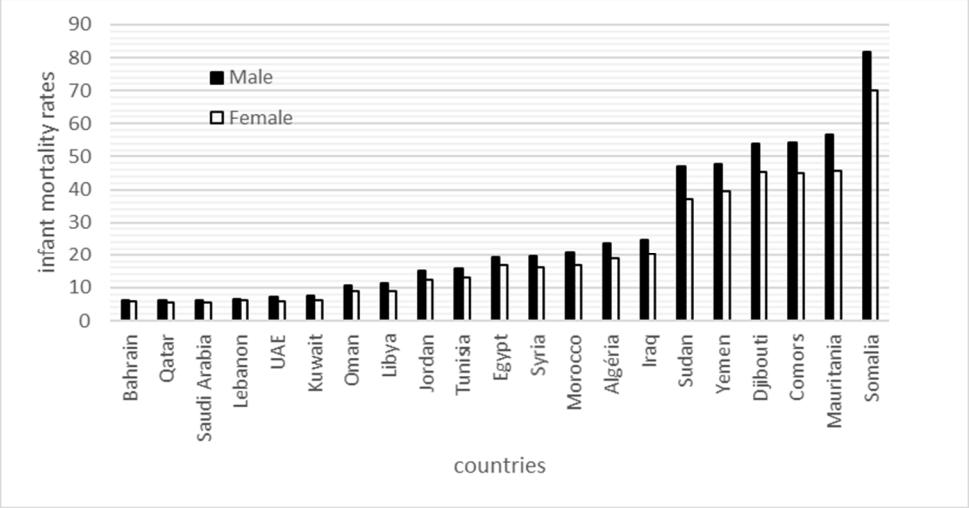
Source*:* (Tabutin & Schumaker, 2005, p. 661)* https://data.albankaldawli.org

As noted in Table 3, the Arab region has had high infant mortality rates, estimated at 192 deaths per 1,000 births, down to 26 in 2018 less than the world average of 29 in the same year. The period 1972-1992 is the most distinctive, as the rate fell by more than half, a period in which most Arab countries have known health programs in the 1980s with a view to reduce those rates.

But this retreat hides a big difference between these countries, while countries like the United Arab Emirates, Bahrain, Kuwait, Saudi Arabia, Qatar and Lebanon managed to achieve the lowest rates (between 5.8% and 6.7%), other countries still record high rates such as Djibouti, Mauritania, Comoros, Somalia, Sudan, and Yemen (between 42% - 76%), as we have already pointed out they are poor countries and among the world's most security and political volatile regions.

Gender disparities in favor of females are also common, as they are found to be very visible in some countries as shown in Figure 1.

Figure 1
Infant mortality rates



Source: https://data.albankaldawli.org/indicator/SP.DYN.IMRT

This difference between countries allows for the distinction of countries that have already achieved very low levels of infant mortality as we pointed out. We noted that the Gulf countries are the most distinctive because of the health systems improvement in this region, where 'almost all infants are vaccinated, and most Gulf countries apply health policies related to the national systems for testing and tracking the newborns and children's health in addition to government programs designed to provide supplementary food for pregnant women who have suffered from malnutrition'. (Doha International Family Institute.2018:19).

2. Method and Tools:

In this research, we will deal with children situation in the Arab region with an emphasis on infant mortality rate by analyzing and comparing between the Arab countries using a set of social and economic variables that are classified as indirect determinants of infant mortality and we will rely on the simple and multiple linear regression method.

Regarding data, its lack is a major obstacle in including a large number of variables and indicators that allow to full and accurate comparison as the one related to poverty, its forms, its geographical and social distribution and income distribution. Mostly often, the most significant statistic reports indicate to data related at best to 16 countries out of 22 Arab countries, with the availability of data in countries and their absence in others. Most of data issues and gaps are related to regions of poverty, conflicts and wars such in Yemen, Somalia, Sudan, and Palestine. Armed conflicts weaken the health information systems, and the fighting groups may see health information of a political sensitivity or as a real threat (Brown, 2006). Therefore, we find a significant difference in the number of population and the one of dead. Even by going back to regional and local reports, the data cannot cover all years or all variables.

Most of statistics we relied on because of the standard nature were derived from world institutions' reports like World Bank and United Nations Organizations (UNICEF, WHO...) and others regional like ESCWA and Arab Monetary Fund and also the reference years 2017-2018 and this was conducted after revisions and comparisons between the different sources.

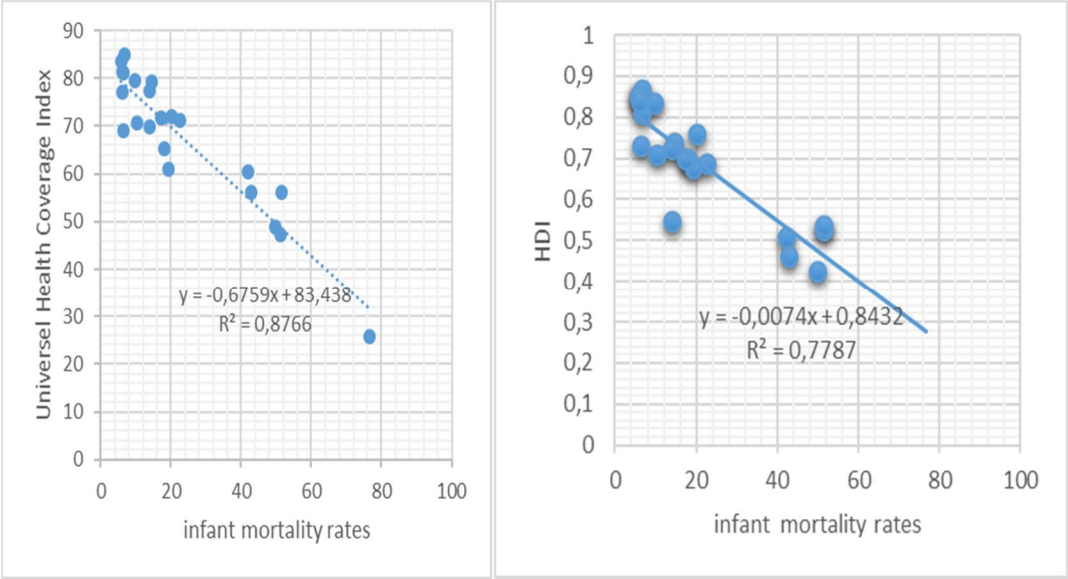
3. Results and Discussion:

Over time, changes in maternal and child survival over time reflected the outcome of investments made across a range of critical social determinants such as female education, women's empowerment, poverty alleviation, investments in health systems and good governance.' (WHO.2012, p.33).These determinants have relied on a set of variables and indicators that were fully obtained for a considerable number of Arab countries and varied between social, economic and demographic variables.

In the light of the existing important international indicators that reflect the level of development and take into account a variety of variables, we found that there is a strong and significant reverse relationship between the human development index HDI and the Universal Health Coverage Index with infant mortality that decreases when those indexes increase as it is shown in Figure 2.

Figure 2

The relationship between infant mortality rates, HDI, and universal health coverage index



Source: personal account from UNDP (2019)

This strong inverse relationship between infant mortality and these indicators is explained by the fact that they take into account a wide range of social, health, economic, demographic variables which their high values reflect the improvement of living conditions. Therefore, as we have pointed out earlier, we have relied on a range of these variables depending on their availability to a large number of Arab countries.

3.1. Health and population indicators:

Addressing these indicators means the health services provided, and it is certain that most Arab countries were able to expand the size of population benefiting from health care. 'The countries of the Gulf Cooperation Council in particular, citizens usually receive health care of good quality that is provided free of charge to the public. In most other Arab countries, the large and increasing payments from private funds indicate a lack of access to good quality services' (ESCWA, 2019, p. 8).

In order to provide health services of good quality, government spending increased, however, this does not mean that all residents receive this care in a fair and adequate manner, but it is related to providing physical medical facilities like hospital, clinics, and their equipment, and to support curative, preventive, and human programs represented by all qualified practitioners to provide the required health services.

Countries with the lowest infant mortality rates have a very adequate number of medical personnel, the number of beds and birth rates under a medical supervision very suitable the number of population like in United Arab Emirates, Qatar, Kuwait, Saudi Arabia, Lebanon and Jordan, compared to those with the highest rates, such as Somalia, Yemen and Mauritania.

Referring to the most important of these variables, we have tested the relationship between them an infant mortality rates taking into account only those with a correlation factor of more than 0.7. We have excluded three countries from the analysis because of the lack of up-to-date data on these variables; Palestine, Comoros and Somalia, recalling that the data source is the World Bank's data site and the latest Human Development Report (2019).

The variables used are: maternal mortality rate, percentage of population with sanitation, percentage of population with drinking water, proportion of births under medical supervision, measles immunization rate, birth rate for adolescent girls, fertility rate of 19 countries in addition to poverty indicators including multidimensional poverty index, the proportion of the population in extreme poverty and the proportion of the poor with an income of $ 3.2 per day, which pertains to 12 countries due to the lack of this data for the Arab Gulf countries.

Table 4
Correlation between infant mortality and some health and population variables

The variable	Correlation coefficient r	The variable	Correlation coefficient r
Maternal mortality rate	0.946	%Of measles immunization	-0.728
%Of the population has access to sanitation	-0.936	%Of adolescent births	0.790
%Of the population with access to safe drinking water	-0.894	Fertility rate	0.861
%Of deliveries are under medical supervision	-0.922		

Source: Personal account from World Bank data: https://data.albankaldawli.org

As is noted, there is a too strong direct correlation between infant mortality and maternal mortality, which means poor obstetric care, as translated by the strong inverse relationship between this rate and the percentage of births under medical supervision. By referring to data, we found that the countries that suffer from high infant mortality rates are the same countries with high maternal mortality rates, ranging between 229 and 732 mother deaths per 100.000 births, namely Mauritania, Somalia, Sudan, Djibouti and Yemen where the proportion of births under medical supervision is low. For instance, this percentage does not exceed 50% in both Yemen and Somalia.

The percentage of the population with access to safe drinking water and sanitation has also played a major role in the infant mortality level as it decreases as this percentage increases. This is evidence of the necessity of providing hygiene means that are lacking in Yemen, Sudan, Somalia and Mauritania, and whose absence encourages the emergence and exacerbation of epidemics and infectious diseases.

We have also found that there is a positive relationship between infant mortality and their mothers' age where it increases with teenage mothers (15-19 years old). Giving birth at these ages exceeds 50% of total births in Yemen, Iraq, Sudan and Mauritania where it reaches 71%. They countries are known by the early marriage phenomenon, which in turn contributes to the high fertility rate that shows its strong relation with infant mortality.

By combining these variables, the linear multipolar regression model allowed only the two most influential variables in infant mortality and the most significant in the model, maternal mortality and fertility rate, where the results showed that for the model we found R = 0.992 and is a very strong correlation while we found that the regression equation represents 98% of the data (by the value of the corrected determination coefficient), meaning that the variables of maternal mortality and the fertility rate explain 98% of the change in the infant mortality rate in Arab countries. Also, the analysis of variance allowed to prove the significance of regression (0.000 = sig). Thus, the regression equation is as follows:

Infant mortality rate = -6.363 + 0.057 * maternal mortality rate + 6.267 * fertility rate. This means that the higher maternal mortality rate and the fertility rate, the higher the infant mortality rate.

'The rise in maternal deaths in some regions of the world reflects existing inequalities in access to health services, and highlights the gap between the rich and the poor. Almost all maternal deaths take place in developing countries (99%), noting that half of these deaths occur in sub-Saharan Africa and a third in South Asia. More than half of maternal deaths happen in places of fragility and poor human conditions' (WHO, 2019) ' like in some Arab countries, as these conditions contribute to high risks of pregnancy and childbirth as a result of poor obstetric care, which, according to the World Health Organization, is due to' poverty, distance, lack of information, services and cultural practices '(WHO.2019).

But inequality in access to health services is no less important because of the spread of corruption. The Arab Barometer Report 2019, which covered 12 Arab countries, indicated that only 38% of the respondents in the Arab world are satisfied with health services in their home countries, while 47% see the necessity of paying a bribe to obtain these services. Access to antenatal and post-natal services associated with maternal mortality and consequently infant mortality is most affected by the spread of corruption.

As for the fertility rate, which represents the average number of children per woman, it is not less important in its relationship with child mortality because the repetition and closeness of births play a major role in the deterioration of the mother's health and thus the newborn's health. Women who

get pregnant closely from one pregnant to another and are not keen on spacing between the periods of pregnancy, they are more likely to give birth to premature babies, and to give birth to more babies (WHO.2012). Consequently, and in many cases, this may lead to infant death.

3.2. Poverty indicators:

Some Arab countries suffering political conflicts, wars and economic crises top the poorest Arab countries list, including those classified as the poorest in the world as Yemen. According to the World Bank's 2018 report , some Arab countries are among the poorest in the world and are ranked in Arab terms: Yemen, Palestine, Egypt, Djibouti and Iraq, poverty means deteriorating health and social conditions for families because of the difficulty of providing life requirements and especially access to essential health care.

We have relied on the most important poverty indicators represented in the multidimensional poverty index, the proportion of the population in extreme poverty and the poverty rate at $ 3.2 per day, which pertains to 12 countries for lack of such data for the Arab Gulf countries.

Table 5

The correlation coefficients between infant mortality and poverty indicators

The variable	% The poor with $3.2 per day	% population in extreme poverty	The multi dimensial poverty index
Corrélation Coefficient r	0.869	0.921	0.966

Source: Personal account from UNDP (2019).

By combining the previous health indicators and the two poverty indicators manifested in the percentage of the population in extreme poverty and the proportion of the poor earning less than $ 3.2 per day, the results of the regression gave a high significance correlation (0.99), which took only two variables, namely maternal mortality and the proportion of poor people with less than $ 3.2 per day income. Thus, we get the following equation:

Infant mortality rate = 12.48 + 0.058 * maternal mortality + 0.274 *% of the poor with an income of less than $ 3.2 per day.

This means that the higher the maternal mortality rate and the lower the rate of the poor with less than income of $3.2 a day, the higher the infant mortality. Poverty, especially because of low income, leads to malnutrition and

difficult access to the necessary health care and services for the mother and the child, which increases the chances of death among them.

Most of the 12 Arab countries in which we get the percentage of the poor are war-ravaged countries such as Yemen and Syria, or drought such as Somalia and Sudan, or with a high population profile and a fragile economy such as Egypt, Morocco and Mauritania.

Conclusion:

Infant mortality rates vary widely among countries of the Arab world. This gap between the rich Arab countries, where children enjoy security, health and care, can be seen thanks to their comprehensive health systems that enabled them to take global leadership in health, such as Qatar, Bahrain and the United Arab Emirates. Poor countries, which suffer from conflicts destroying many health facilities and hindered access to vital services, like in Yemen and Syria where children suffer from hunger, disease, and poor health care, what led in turn to death at an early age.

We have shown in this research that maternal mortality has the biggest role in infant mortality, as well as the importance of the proportion of the poor what is mainly due to poor obstetric care because of poverty and conflict

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