

Inequality in Childcare, case study: Palestine, Tunisia, Algeria

By Ali Ebrahimi

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**Supervisors:
Professor Paul Makdissi
Professor Myra Yazbeck**

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1- Introduction:

Although parents' awareness regarding the devastating consequences of child neglect during the recent years has been increased, and its' rate is still high. According to the Children's Bureau, Child Maltreatment report in 2015 related to the United States, 75.3 percent of children who are victims of maltreatment were neglected¹. Additionally, child neglect was the only reason or at least 73% of the child death reason in 2015, in the USA (United States Department of Health and Human Services (HHS), The Administration for Children & Families (ACF), Children's Bureau (CB), 2017c). In Canada Troeme and Wolfe, (2001) report that 19% of examined children experienced physical neglect, 12% involved in abandonment, 11% reports educational neglect, and 48% of them were harmed due to lack of parents' supervision.

Child neglect primarily arose as a social issue in the developed countries of the Western World. But as time goes by, people more and more realize that it is almost everywhere in the developing and developed countries, the East and the West. In Palestine, based on the Multiple Indicator Cluster Surveys (MICS) household survey in 2014, approximately 12% of children aged 0-59 months are left under the care of other children, while 4% of the same age ranges are left alone during the last week. Combining the two groups (left alone with the supervision of other child less than 10 years old and left alone without any supervision) shows that a total of 14% of children are not adequately cared in Palestine during the past week. Children with age of 48-59 months (17%) are more in risk of inadequate care than children 36-47 months (9%).

Algeria and Tunisia are also two countries that show the relatively high rate of child neglect related to the child less than 5 years old. In 2012 and 2013, MICS data sets show 5.5% of children in Algeria were left alone during last week. In Tunisia, United

¹ In 1999 WHO defines Child maltreatment as: "Child abuse or maltreatment constitutes all forms of physical and/or emotional ill-treatment, sexual abuse, neglect or negligent treatment or commercial or other exploitation, resulting in actual or potential harm to the child's health, survival, development or dignity in the context of a relationship of responsibility, trust or power."

Nations International Children's Emergency Fund (UNICEF) household surveys reports 13.2% of children experienced inadequate supervision care (Klevens and Ports, 2017).

It is widely documented that child neglect has devastating consequences for child growth, which has different socioeconomic aspects. Metzler et al, 2017 in their report related to ten states in Colombia show that child abuse and neglect's consequences would harm a person's life forever as well as his or her next generations also. According to MacMillan (2000), the effects of child supervision neglect on child development are pervasive, impair numerous domains of development, and have serious long-term consequences. Additionally, many studies have found a relationship between the history of abuse and the existence of adolescent violence. (Bernard and Bernard, 1983; Wolfe et al., 2001). Women also show an increased likelihood of involvement in abuse and an increased risk of being abused when they were abused and neglected as a child (Wolfe et al., 2001). Mothers with early neglect experiences are likely to repeat the way they are maladaptive to their children (Main & Goldwyn, 1984). This repetitive pattern may lead to neglect of intergenerational transmission by parents.

There are more severe consequences of childcare neglecting, which we can point as adult mortality. Decades of research have found a strong relationship between child abuse and neglect and other forms of Adverse Childhood Experience (ACEs), which leads to the adult morbidity and mortality (Felitti et al., 1998; Gilbert et al., 2010).

The current paper shows inequality in childcare across three selected countries (Algeria, Tunisia, and Palestine), considering three demographical effects, child gender, child residential area, and mother's education.

2- Literature Review:

In the context of child neglecting and inadequate child supervision, one of the main questions is what is “adequate”. In some cases one can define “inadequate supervision” when a child injures because of his or her parents or a person who is taking care of them (Saluja, et al., 2004). There are few studies regarding to child neglect and its exact definition but one of the most accepted one is related to the definition that, (Jones, 1987) provides. He identified five types of child neglect issues: a child is left alone, a child is left under the care of an inappropriate alternative caregiver, a child is not adequately supervised, and a child has left with a suitable caregiver, but without proper planning or consent, and a child’s permitted, encouragement or forced to engage in harmful or potentially harmful activities. As the definition shows, child neglect is a broad major problem with multidimensional aspects, which involves different conditions and reasons. In United States, Freisthlera et al. (2014), find child supervisory neglect as the most frequent type of child neglect. In terms of studying child neglect reasons, one can mention different factors, for instance, Pelton (1994) shows there are various reasons for child neglect, which are family’s poverty, family’s breakup, and parental psychopathology. Decreasing financial stresses on mothers would decrease the rate of child neglecting since poverty is one of the most significant factors that explain child-neglecting behavior (Lee and Goerge, 1999). Clearly there is a link between poverty and child maltreatment behavior, but Slack and Holl et al. (2004) reveals what links these two factors, and it is maternal employment. Working as a mother always arises concerns about child caring, but it helps decreasing rate of child maltreatment due to its consequential financial power for mothers. Kotch et al. (1995), also indicates less maternal education and maternal depression as two of the important reasons for mothers’ child neglecting behavior. Mothers’ education level usually correlate strongly with occupation, and education may increase employability and promote financial stability, thereby increasing the availability of material resources (Brayden, et al., 1992). Thus, in many cases we can correlation mothers’ education and their working status. Additionally, Mother’s education may also influence attitudes and

preferences in choice of consumption goods, including childcare services. Brayden (1992) also find an inverse relationship between maternal education level and child neglect, since by educating one can prevent negligence directly by learning the school's parenting skills, or mothers can get the skills they need to go to school, which also enables her to develop children. Moreover, Brayden, et al. (1992) shows that mothers who showed neglectful behaviours toward their children were less likely to be educated from their high school. They also had more children who are younger than 6 years old as well as having less parenting skills.

Mothers' time may also need to be diverted to other economic activities that are related to or may not related to the child health or child development. In traditional societies, the discrimination between male and female in the labor market tends to maximize the childcare time for a mother. Conversely, in transitional societies in many developing countries, childcare time often competes with the time required for earning income (Birdsall and Greevey, 1978; Engle, 1981). However, the general child neglect rate and child abuse depend to a large extent on the overall economic situation of the family. For poor families, mothers' work may lead to neglect or care by less skilled siblings, while wealthy families may employ skilled and attentive nannies (Popkin, 1975; Kumar, 1977).

On the other hand, some researches show significant differences between boys and girls in terms of studying child neglect and child abuse. According to the World Health Organization, gender inequality may be a social risk factor for child abuse and neglect (Runyan et al., 2002). Gender inequality can lead to an increase in child abuse and child neglect in at least two ways: 1) Because of women's limited opportunities their stress and frustration in caring for their children may increase, so they may be more likely to abuse and neglect them (Fiala and LaFree, 1988). 2) Women who are more powerless may not be able to protect their children from abuse and neglect (Gartner, 1990). A study of two villages in West Bengal found that girls' nutritional status was consistently worse than that of boys in all socioeconomic classes, as defined by land ownership and maternal education (Sen and Sengupta, 1983). Gupta (1987) discusses about three main reasons for gender based child mortality resulting from child neglect in rural Punjab area in India, which are child's gender, parent's socioeconomic

status, and mothers' education level. They showed that the overall mortality rate of girls is 31% higher than that of boys, while the mortality rate of children with parents who do not have land is 36% higher than that of children whose parents own land. The mortality rate of children from uneducated young mothers is 50% higher than that of educated young mothers. However, the mortality rate related to the second girls of a family is 53% higher than other children in the entire population. Haddad et al. (1997) show that there are abundant evidences especially in some developing countries, related to households who favor boys mostly. Obermeyer, et al. (1997) shows there is significant evidence of son preferences in Tunisia that can be inferred from less investment in girls than boys and high mortality of them.

At the same time, there are usually significant differences between urban and rural areas. Rural area due to generally less economical power and education level, and in urban residential areas because of parent's busy life, there might be differences between rural and urban areas in studying child neglect. In Ethiopia, 21% of urban schoolchildren and 64% of rural school children reported child abuse and neglect (Ketsela and Kedebe, 1997).

In this paper, we are studying inequality in child neglect by focusing on difference between physical neglect, (a) among child living in rural or urban area; (b) among children with different level of mothers' education; (c) between boys and girls. To do so, we use the self-reported survey, multiple indicator cluster surveys (MICS), data related to children who have experienced being left alone more than 1 hour during previous week.

Surveys asking participants about crime or victimization would be a better way to assess child abuse and neglect rate since child abuse rates based on self-reporting or parent-reported related to child abuse and neglect incidents would be 20 times higher than reports to the authorities (Finkelhor et al., 2014). To the best of our knowledge, only three cross-country studies examined social risk factors using self-reported child abuse and neglect data collected from the survey. The two studies used multiple indicator cluster surveys (MICS) data from 25 low- and middle-income countries and found that caregivers in the past month reported higher rates of child abuse in countries where domestic violence, corporal punishment and intimate partner

violence is more culturally regulated; (Lansford et al., 2014) and higher between less educated countries (Lansford and Deater-Deckard, 2012). The third study used data from 28 countries reporting the Children's Trauma Questionnaire (CTQ) score, which asked children 12 years of age and older to assess the frequency of incidents related to child abuse and neglect (Viola et al., 2016). The results of the survey show that childhood physical neglect in countries with higher Gross Domestic Product is estimated to be lower.

The tool that we use to compare inequality between different selected groups of children is concentration index. Concentration index is a common indicator of income-related inequalities in health economic studies, which is a generalization of the Gini coefficient. In the case of income-related health inequalities, the index comes from the health concentration curve, which plots the cumulative proportion of health and the cumulative proportion of income-sorted populations. Although, there is some limitations associated with this index that results in some changes.

First, like Gini index, the attitudes to inequality is implicit, therefore, to allow for varying attitudes to inequality aversion, Wagstaff (2002) in 2002 introduce "Extended Concentration Index". By using it, one can assign different values to the aversion parameter, and as this parameter increases, inequality in the selected health variable would be more important. This process is through giving more weight to the health of very poor person and the person who is above 55th percentile of health variable.

Second, the regular concentration index cannot calculate the average level of health variable. Considering the average level helps us to find the best tradeoff between the average health value and the inequality in our selected variable. Therefore, Wagstaff (2002) introduces a weighted average of the different people's health level, Health Achievement Index, in which poor individuals would get more weight than the rich ones.

Third, all extensions of the concentration index still have a major limitation, which is related to the scaling issue. Concentration indices are sensitive to the nonnegative transformation that one choose to convert categorical data to the ordinal data, where would make them useable for concentration index. As Makdissi and Yazbeck (2017)

show, all the results related to the different type of concentration indices would change if we change our linear transformation scale of our health variable. Thus, to solve this problem, Makdissi and Yazbeck (2017) identify a robust ranking of socioeconomic health inequality index and health achievement index by changing the structure of rank dependent health inequality and health achievement indices using the “cumulative social weight” proportion of population, which is below a given health threshold.

This paper, adopts Makdissi and Yazbeck (2017) to capture the comparisons of inequality between different selected groups of children (Rural or Urban, Boys or Girls, and based on the mother’s education level). We also would examine the total health system performance by health achievement index.

3- Data:

Child neglect is most likely to be affected differently by the demographical indicators depending on the overall childcare principals in a country's culture. For this reason, it is essential to include a number of demographical indicators in the current analysis. In this paper, we use three main indicators that may affect child neglect rate across three selected countries, Algeria, Tunisia, and Palestine. The indicators that we select are child gender, the area of child's residence, and mother's education. On the other hand we rank child neglect on three categories according to Table-1:

Table 3.1- Categories of Child Neglect

Category	Description	Level of child neglect
3	During last week, Child was left alone more than 1 hour	
2	During last week, child was left alone with other children more than 1 hour	
1	During last week, child was not left alone with or without another child more than 1 hour	

All data are collected by household surveys from Multiple Indicator Cluster Survey (MICS) running by Unicef, and covers information on household surveys for Tunisia in 2011, Algeria in 2102, and Palestine in 2014. We use two variables² representing child neglect for creating 3 category of child neglect, using 2,899 observations in Tunisia, 14,701 observations in Algeria, and 7,816 for Palestine

Figures 1- 3 show the percentage of data frequency in each category across different countries considering different groups of demographical indicators, and Tables 3-5 show what percentage of each group dedicated to each category of child neglect.

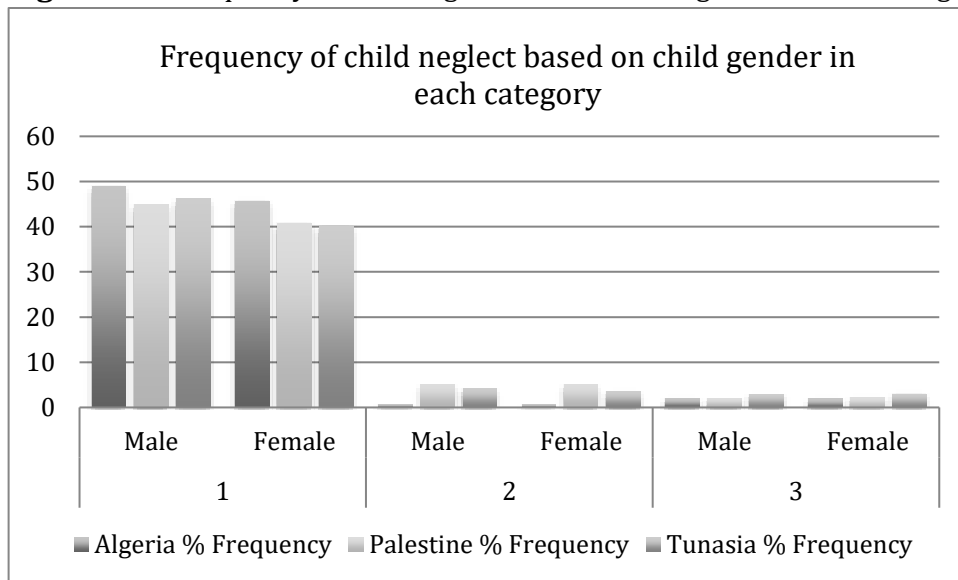
² EC3A= in past week, days left alone for more than 1 hour

EC3B= in past week, days left with other child for more than 1 hour

Table 3.2- frequency of child population based on child gender in each group

Category		1	2	3	Sum
Tunisia	Boy	86.545925	7.956015	5.49806	100
	Girl	86.031042	7.612713	6.356245	100
Palestine	Boy	86.412776	9.65602	3.931204	100
	Girl	85.077416	10.411105	4.511479	100
Algeria	Boy	94.677356	1.432514	3.89013	100
	Girl	94.670051	1.45234	3.877609	100

Figure 3.1- Frequency of child neglect based on child gender in each category



There is a difference between Palestine and other countries in residential areas, in Tunisia and Algeria there are two residential areas, Urban and Rural, but in Palestine, there is a third choice, which is related to people who are living in Camp.

On the other hand, Algeria's education system is different from two other countries, and there are more levels of education in this country.

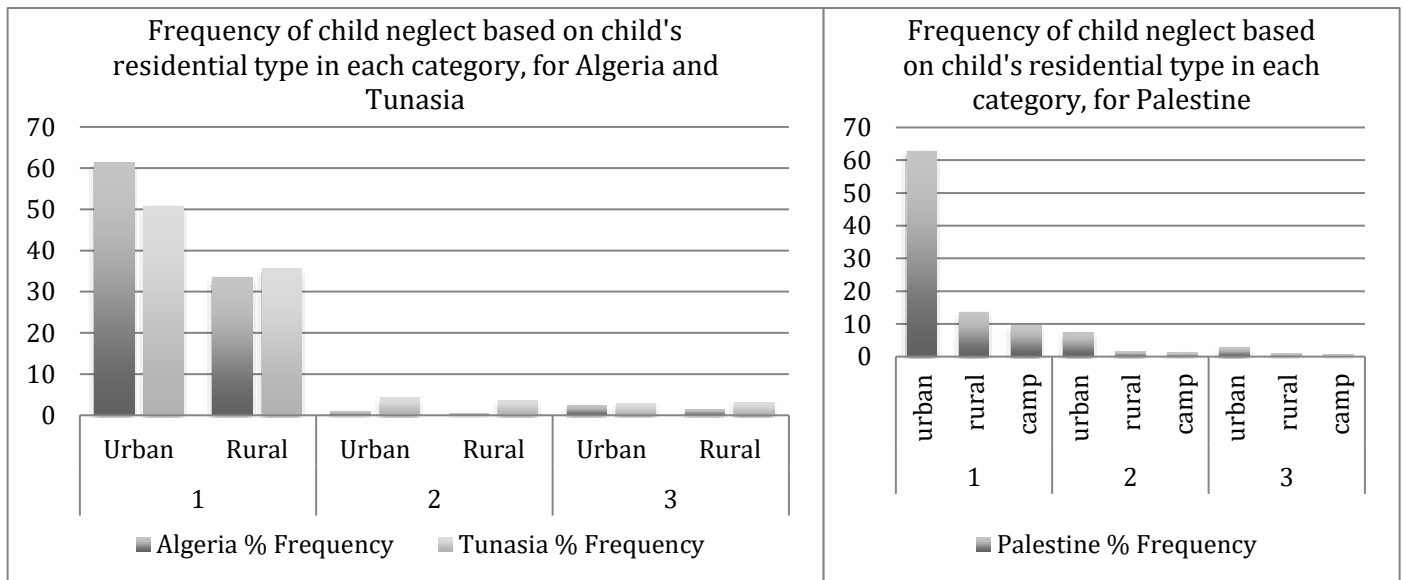
Therefore, we do have 2 different figures for Palestine's residential area and Algeria's education's system.

Table 3.3- frequency of child neglect based on the child's residential area in each group

Category		1	2	3	Sum
Tunisia	Rural	84.163265	8.489796	7.346939	100
	Urban	87.873357	7.287933	4.83871	100
Palestine	Rural	84.713376	9.952229	5.334395	100
	Urban	86.100386	10.00351	3.896104	100
	Camp	85.150812	10.208817	4.640371	100
Algeria	Rural	94.314253	1.555897	4.12985	100
	Urban	94.870985	1.379674	3.749341	100

Figure 3.2- Frequency of child neglect based on residential type in each category, for Algeria and Tunisia

Figure 3.3- Frequency of child neglect based on child's residential type in each category, for Palestine



We use these tables and figures to check our results with these descriptive statistics results. Figure-1 shows in Tunisia, the number of boys who were not exposed to child neglect (category one) is more than girls. Additionally, we can compare these numbers across countries, as figure 2 shows, the frequency of child neglect in Tunisia in the second category of child neglect is higher than Algeria in a rural area.

Table 3.4- frequency of child neglect based on the child's residential area in each group

Category		1	2	3	Sum
Tunisia	None	79.38776	10	10.61224	100
	Primary	85.020661	9.194215	5.785124	100
	Secondary	88.205645	7.056452	4.737903	100
	Higher	92.427617	4.008909	3.563474	100
Palestine	None	91.891892	8.108108	0	100
	Primary	82.008547	13.675214	4.316239	100
	Secondary	86.145038	9.923664	3.931298	100
	Higher	88.471089	7.094714	4.434197	100
Algeria	None	92.8183464	1.6898009	5.4918527	100
	Primary	93.384615	2.115385	4.5	100
	Moyen	95.687837	1.335833	2.97633	100
	Secondary	95.67113	1.308004	3.020866	100
	Higher	94.68489	1.214882	4.100228	100

Figure 3.4- Frequency of child neglect based on mothers' education in each category

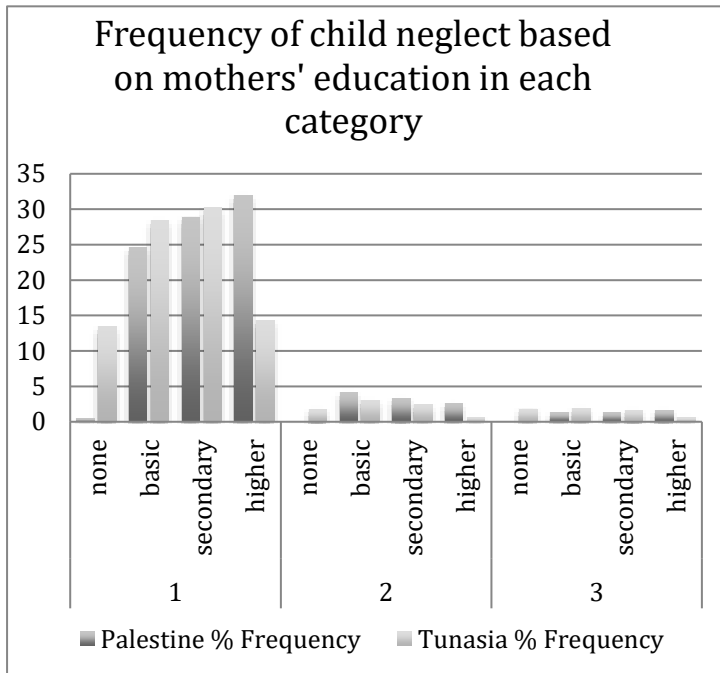
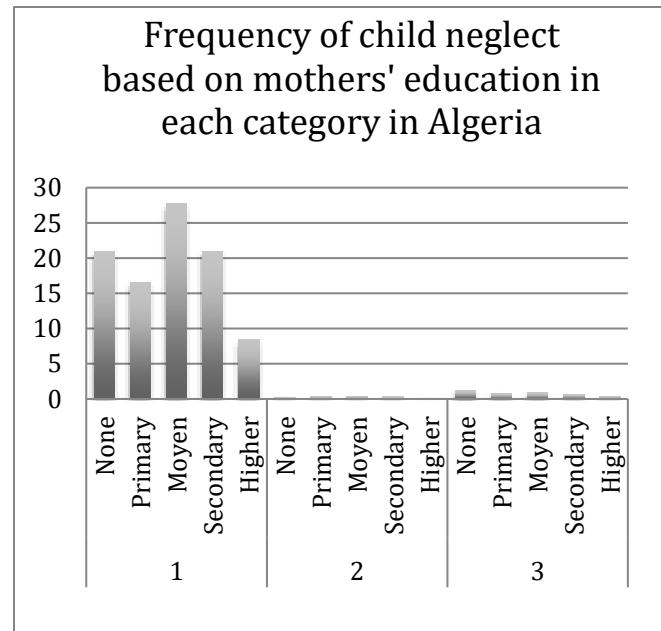


Figure 3.5- Frequency of child neglect based on mothers' education in each category in Algeria



The figures 3 and table 5 show the descriptive statistics of child neglect in our three selected countries based on the mother's educations. Figure 3 shows, at level 3 of child neglect, the number of children was alone for more than 1 hour, is higher in Tunisia and among mothers with a Basic level of education. Table 5 shows about 85% of child whose mother has primary level of education, didn't experience child neglect during last week.

4- Methodology:

The purpose of this paper is to determine inequality in child neglect. The “Extended health concentration class of indices” and “Health achievement index” used in this study allows for capture the “cost imposed by the socioeconomic disparities in the distribution of health” and “the total level of the ill-health variable”, respectively. However, as these two indices like the general concentration index, are sensitive to scaling and converting categorical self-reported variables to an ordinal variable, using them arises some problems.

Data used in this paper are the result of two self-reported surveys, which provide us with categorical variables. By using the household survey data sets, we would be able to analyze a measure, which reveals each individual’s perception from different health aspect based on their perceptions. This feature helps to avoid the arbitrary weighting of ill-health variable’s dimension. To measure inequality in child neglect and the overall health system performance by the mentioned indices, we should convert our categorical variables by any nondecreasing monotonic transformation to ordinal ones, but we would have different results from different nondecreasing monotonic transformation (Erreygers, (2006); Zheng, (2008), Makdissi and Yazbeck, (2017)). To overcome this problem, Makdissi and Yazbeck find the robust way of ranking in socioeconomic health inequality and achievement.

In this section first we introduce the selected indices to capture both inequality and achievement in child neglect variable, then explain how Makdissi and Yazbeck, (2017) solve this problem.

3.1) Indices:

To assign a numerical scale to each category of health variable ($\eta(h_k)$), where h refers health status, the number of health variable’s level (k) should be determined, which is three here. Additionally, if we assume N individuals compose our sample size, each

person should assign with one socioeconomic rank (r_i)³, where $i \in \{1, 2, \dots, N\}$. The assigned number to each category could be different, one can choose $\eta(h_k) = h$ or any other nonnegative and linear $\eta(h_k)$. In this paper, the extended health concentration index (C), generalized extended health concentration indices (GC), and health achievement index (A) are the indices that we are going to use them for measuring the inequality in childcare.

- “Generalized concentration index” and “Extended Concentration Index”:

Pereira (1998) and Wagstaff (2002), proposed to include a parameter of aversion to socioeconomic inequality, (ν), into the concentration index in order to capture different views on socioeconomic inequality aversion and capture the socioeconomic cost of disparities in health variable distribution. This results in introducing a new class of CI, *Extended Concentration Index (C)*, and can be calculated by the following formula:

$$C(\nu) = \frac{1}{\mu_\eta} \sum_{i=1}^N w_c(r_i, \nu) \eta(h_i) \quad (1)$$

Where, μ_η is the average health status, and $w_c(r_i, \nu)$ represents weights based on the socioeconomic ranking and the socioeconomic health inequality aversion parameter. When $\nu = 2$ this index would be equal to the general form of concentration index. To measure the “absolute socioeconomic health inequality” we used another transformed class of CI, named “Generalized Concentration Index”:

$$GC(\nu) = \sum_{i=1}^N w_c(r_i, \nu) \eta(h_i) \quad (2)$$

³ Based on the individual’s “wealth index” ranked them from the poorest person to the richest one.

Where, $w_c = 1 - \frac{(N+r_i+1)^\nu - (N-r_i)}{N^\nu}$

- “Health Achievement Index”:

As we mentioned in the literature, this index helps us to evaluate the performance of a health sector by measuring the total level of health and inequality in the distribution of health variable. It can be calculated by:

$$A(\nu) = \sum_{i=1}^N w_a(r_i, \nu) \eta(h_i) \quad (3)$$

Where, different weights used in this index, $w_a = \frac{(N-r_i+1)^\nu - (N-r_i)^\nu}{N^\nu}$

In case of health achievement index, $\nu = 1$ represents that there is no aversion to socioeconomic health inequality.

3.2) Makdissi and Yazbeck method:

Makidissi and Yazbeck (2017) proposed using new socioeconomic weights in the *Generalized concentration index*, *Extended Concentration Index*, and *Health Achievement Index*, to compare different inequality levels. Then they find that, we can find the comparisons by just comparing the proposed “cumulative social weights”, instead of finding the scaling-sensitive indices.

They proposed the following way of finding the “cumulative social weights” by extending the Allison and Foster (2004) method to socioeconomic inequality version. To achieve this goal, first we should find each person’s relative ranking within a society by the following formula:

$$P_1 = \frac{\text{household weight}_1}{\text{sum of all household weights}} \quad (4)$$

$$P_2 = \frac{\text{household weight}_2}{\text{sum of all household weights}} + P_1 \quad (5)$$

$$P_i = \frac{\text{household weight}_i}{\text{sum of all household weights}} + \sum_{i=1}^{i-1} P_i \quad (6)$$

:

:

$$P_N = 1 \quad (7)$$

By using the a person's socioeconomic rank (P), we can find the social weights as well. In fact, social weights, $w_a(P_i, \nu)$ and $w_c(P_i, \nu)$, indicate each person's unique weights related to a specific economic life standard and particular socioeconomic ranking. The ethical, social weights proposed by Makdissi and Yazbeck are as follows:

$$w_a(P_i, \nu) = (1 - P_{i-1})^\nu - (1 - P_i)^\nu \quad (8)$$

$$w_c(P_i, \nu) = (P_i - P_{i-1}) - [(1 - P_{i-1})^\nu - (1 - P_i)^\nu] \quad (9)$$

By $w_a(P_i, \nu)$ and $w_c(P_i, \nu)$, the cumulative social weights, Φ^1 , can be calculated by using the following formulas:

$$\Phi^1(K = 1) = \sum_{i \in k} w_i \quad (10)$$

$$\Phi^1(2) = \Phi^1(1) + \sum_{i \in k} w_i \quad (11)$$

:

$$\Phi^1(K) = \Phi^1(k-1) + \sum_{i \in k} w_i \quad (12)$$

In fact, they found that $A(v)$ and $GC(v)$ indices could be calculated by w_a and w_c , but at the end, the distribution of Φ^1 would indicate the inequality in the selected health index. We can write these indices as:

$$I = \sum_{i=1}^N w(r_i) \eta(h_i) = \eta(h_k) - \sum_{k=1}^{k-1} \Delta^1 \eta(h_k) \Phi^1(k) \quad (13)$$

Where, $\Delta^1 \eta(h_k) = \eta(h_{k+1}) - \eta(h_k)$.

Therefore, we can write three indices as:

$$A(v) = \eta(h_k) - \sum_{k=1}^{k-1} \Delta^1 \eta(h_k) \Phi_a^1(k) \quad (14)$$

$$GC(v) = \eta(h_k) - \sum_{k=1}^{k-1} \Delta^1 \eta(h_k) \Phi_c^1(k) \quad (15)$$

$$C(v) = \frac{GC(v)}{A(1)} \quad (16)$$

Where, $\Phi_a^1(k)$ shows the cumulative social weights calculated by $w_a(P_i, v)$, and similarly, $\Phi_c^1(k)$ refers to the cumulative social weights calculated by $w_c(P_i, v)$.

The value of these indices is dependent on two parts:

- The numerical differences between health variables categories ($\Delta \eta(h_k)$)

- The cumulative social weights function ($\Phi^1(k)$)

As we know, $\Delta\eta(h_k)$ is nonnegative; therefore, we can find inequality by comparing the cumulative socioeconomic weights,

Therefore, by comparing $\Phi(k)$ across different level of childcare, we can find the inequality in our selected health variable. The following conditions show how we can interpret these indices by looking at $\Phi^1(k)$:

- I. If $\Phi_a^1(k)_1 \geq \Phi_a^1(k)_2$ for all health level, distribution 2 dominates distribution 1, meaning that distribution 2 shows less health inequality than distribution 1.
- II. If $\Phi_c^1(k)_1 \geq \Phi_c^1(k)_2$ for all health level, distribution 1 dominates distribution 2, meaning that in distribution 1 we do have fewer shortfalls than distribution 2.
- III. In the case of the extended health concentration index ($C(v)$), we can find inequality by the results of I and II:
 - If $GC_1(v) \leq GC_2(v)$ for all $\eta(h)$ under consideration, and $A(1)_1 \geq A(1)_2$ for all $\eta(h)$ under consideration, hence distribution 1 dominates 2
 - If $GC_1(v) \leq GC_2(v)$ for all $\eta(h)$ under consideration, and $A(1)_2 \geq A(1)_1$ for all $\eta(h)$ under consideration, hence distribution 2 dominates 1
 - Otherwise, we cannot compare.

On the other hand, there is another way of finding the cumulative function of social weights, if the importance of differences between levels of child neglect becomes more important as we move toward higher levels of child neglect. In this case, Makdissi and Yazbeck (2017) propose a convex function of total social weights $\Phi^{-2}(k) = \sum_{j=k}^{k-1} \Phi^1(j)$, and we can compare different distributions with imposing convexity in a similar way to the concave ones.

In order to interpret and compare the “Extended health Concentration Index” we should follow these two conditions based on the (Makdissi, Yazbeck, (2017)):

1. $C_1(v) \leq C_0(v)$ for all $\eta(h)$ consideration if

$$GC_1(v) \leq GC_0(v) \text{ for all } \eta(h) \text{ under consideration}$$

and

$\mu_{\eta^1} \geq \mu_{\eta^0}$ for all $\eta(h)$ under consideration

2. $C_1^s(v) \leq C_0^s(v)$ for all $\eta(h)$ consideration if

$GC_1(v) \leq GC_0(v)$ for all $\eta(h)$ under consideration

and

$\mu_{\eta^1} \leq \mu_{\eta^0}$ for all $\eta(h)$ under consideration

5- Empirical Results:

Table 5.1- Residential Area (Algeria and Tunisia)

		A(v)		A(v)		
		Rural	Urban		Rural	Urban
Algeria	Rural			Rural		
	Urban	D		Urban	D	
		Rural	Urban		Rural	Urban
Tunisia	Rural			Rural		
	Urban	D		Urban	D	
		Rural	Urban		Rural	Urban
		GC(v)		GC(v)		
Algeria	Rural			Rural		
	Urban	D		Urban	D	
		Rural	Urban		Rural	Urban
Tunisia	Rural			Rural		
	Urban	D		Urban	D	
		Rural	Urban		Rural	Urban
		C(v)		C(v)		
Algeria	Rural			Rural		
	Urban	D		Urban	D	
		Rural	Urban		Rural	Urban
Tunisia	Rural			Rural		
	Urban	D		Urban	D	
		Rural	Urban		Rural	Urban

Table 5.2- Residential Area (Palestine)

		A(v)			A(v)			
		Rural	Urban	Camp		Rural	Urban	Camp
Rural					Rural			
Urban	1		1,3		Urban	D		D
Camp	2				Camp	D		
		GC(v)			GC(v)			
		Rural	Urban	Camp		Rural	Urban	Camp
Rural					Rural			
Urban					Urban	D		3
Camp	2	2			Camp	D	2	
		C(v)			C(v)			
		Rural	Urban	Camp		Rural	Urban	Camp
Rural					Rural			
Urban	ND				Urban	D		3
Camp	ND	ND			Camp	D		

This section presents our results for the health failure, absolute health inequality and the relative health inequality in child neglect based on our three demographical effects, residential area (rural, urban or camp⁴), mothers' education level (None, Primary, Moyen⁵, Secondary, Higher), and child gender (Female or male).

Table 1 shows the comparisons of different distribution of child neglect variables related to children's residential area in Algeria and Tunisia, and table 2 shows comparisons based on residential area in Palestine. Figure 1 and 2⁶ provides the visualize results of comparing two distribution of childcare variable in Palestinian rural, urban, and camp area with $\nu = 2$. Figure 1, illustrates the comparisons of socioeconomic health failure related to distributions of child care in rural area in compare to urban using ϕ^1 , and Figure 2 indicates the socioeconomic health inequality, which can take both positive and negative values. It would be zero when all individuals have exactly the same health status. Positive values indicates higher concentration of health shortfalls among people with higher socioeconomic situation, and negative ones are the result of higher concentration of health shortfalls among poor individuals (Makdissi, Yazbeck, 2017).

Considering health failure in self-reported childcare variable, we can conclude that urban areas across all selected countries have lower average self-reported child neglect than rural area. In case of Palestine, average child neglect in urban areas is less than camp areas also. When we increase socioeconomic health inequality aversion to $\nu = 2$, in Palestine result shows lower level of child neglect failure in camp area than rural area. However, in Algeria and Tunisia, in all different value of socioeconomic aversion, one can conclude lower level of failure in child neglect in urban areas in compare to rural residential areas.

When we impose convexity to our model, the power of ordering increases. In Algeria and Tunisia, the results didn't change, but in Palestine, considering convexity condition shows that in both camp and urban areas, there is lower level of failure in child care. Additionally, camp residential area is dominated by urban area also.

⁴ In case of Palestine

⁵ In case of Algeria

⁶ Color code: Blue=Urban, Pink=Rural, Red=Camp

Absolute socioeconomic inequality in Algeria and Tunisia proves that there is less socioeconomic inequality in providing sufficient supervision in urban areas in compare to rural residential area, for all values of socioeconomic inequality aversion, and imposing convexity to our model confirms our results. In Palestine, the absolute socioeconomic inequality in camp areas is less than both urban and rural area, and results from convex distributions shows both camp and urban areas dominates rural area.

By combining results for health failure and absolute socioeconomic inequality, in Tunisia and Algeria, urban area shows the lower relative socioeconomic inequality. in Palestine by imposing convexity, we can conclude less relative socioeconomic inequality in both urban and camp areas compared to rural areas.

Figure 5.1- Health failure

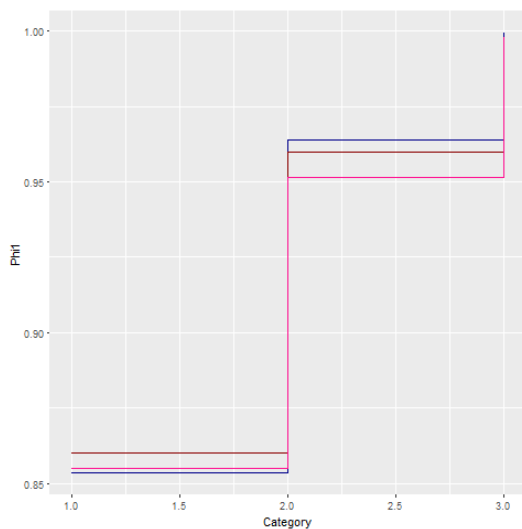


Figure 5.2- Health socioeconomic inequality

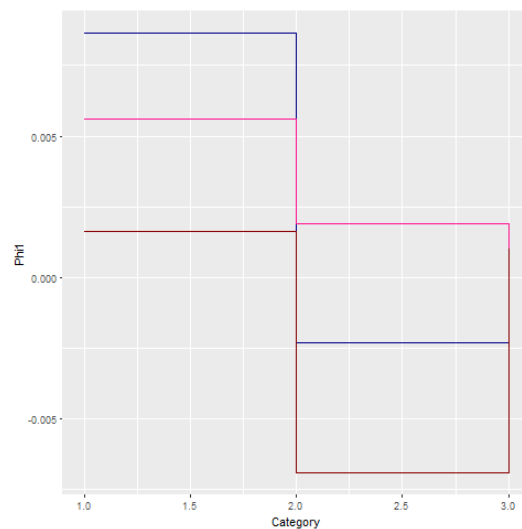


Table 3 indicate the distribution of child care variable across Palestine and Tunisia with respect to mothers' different education levels, and table 4 shows the information for Algeria, since Algeria's education system has one more level (Moyen). Tunisia's results show that as mothers' education level goes up, we would have lower level of child neglect for all values of aversion to socioeconomic health inequality. In Palestine, mother's with secondary level of education cause lower average child neglect in compare to mother's with basic education level, and as we consider convexity condition, we can also accept the dominance of secondary level to higher education when we increase the value of aversion to socioeconomic to 3.

Table 5.3- Mothers' education level (Palestine, Tunisia)

		A(v)				A(v)				
		None	Basic	Secondary	Higher		None	Basic	Secondary	Higher
Palestine	None					None				
	Basic					Basic				
	Secondary	2,3	D		2	Secondary	2,3	D		2,3
	Higher					Higher				
Tunisia	Non		Basic	Secondary	Higher	Non		Basic	Secondary	Higher
	None					None				
	Basic	D				Basic	D			
	Secondary	D	D			Secondary	D	D		
	Higher	D	D	D		Higher	D	D	D	
		GC(v)				GC(v)				
		None	Basic	Secondary	Higher		None	Basic	Secondary	Higher
Palestine	None					None				
	Basic	D			D	Basic				D
	Secondary	D	D		D	Secondary	D	D		D
	Higher	D				Higher				
Tunisia	Non		Basic	Secondary	Higher	Non		Basic	Secondary	Higher
	Non					None				
	Basic	3				Basic	3			
	Secondary	D	D		D	Secondary	D	D		D
	Higher	D				Higher	D	3		
		C(v)				C(v)				
		None	Basic	Secondary	Higher		None	Basic	Secondary	Higher
Palestine	None		ND	ND	ND	None		ND	ND	ND
	Basic				ND	Basic				ND
	Secondary		D		ND	Secondary		D		ND
	Higher					Higher				
Tunisia	None		Basic	Secondary	Higher	None		Basic	Secondary	Higher
	None					None				
	Basic	3				Basic	3			
	Secondary	D	D			Secondary	D	D		ND
	Higher	D	ND	ND		Higher	D	3		

Table 5.4- Mother's education level (Algeria)

A(v)						A(v)					
	None	Primary	Myon	Secondary	Higher		None	Primary	Myon	Secondary	Higher
None						None		2,3			D
Primary	D					Primary	1				D
Myon	D	D			D	Myon	D	D			D
Secondary	D	D	2,3		D	Secondary	D	D	3		D
Higher	D	D				Higher					
GC(v)						GC(v)					
	None	Primary	Myon	Secondary	Higher		None	Primary	Myon	Secondary	Higher
None		D	D		D	None		D	D	2	D
Primary						Primary					
Myon		D			D	Myon		D			D
Secondary	3	D	D		D	Secondary	3	D	D		D
Higher		D				Higher		D			
C(v)						C(v)					
	None	Primary	Myon	Secondary	Higher		None	Primary	Myon	Secondary	Higher
None		ND	ND			None		ND	ND		D
Primary						Primary					ND
Myon		D			D	Myon		D			D
Secondary	3	D			D	Secondary	3	D			D
Higher		D				Higher					

In Algeria, when there is no socioeconomic aversion $\nu = 1$, all upper level of education are dominant to their relative lower level, except myon and secondary, which are dominant to higher level. As the ν increases, we would have the same result, plus secondary dominancy to myon level. Results from convex numerical scales shows different results in which higher is dominated by all other levels.

Considering absolute and relative socioeconomic inequality show that in Tunisia and Algeria, considering the convex distribution, leads us to more powerful results showing that secondary level of education have less socioeconomic inequality in child neglect than other mothers' level of education. In Palestine both convex and concave numerical scale shows the same result, but basic level of education also dominates the higher one.

Table 5.5- Child gender

	A(v)		A(v)	
	Boy	Girl	Boy	Girl
Algeria	Boy	D	Boy	D
	Girl		Girl	
Tunisia	Boy	D	Boy	2,3
	Girl		Girl	
Palestine	Boy	D	Boy	D
	Girl		Girl	
	GC(v)		GC(v)	
	Boy	Girl	Boy	Girl
Algeria	Boy	3	Boy	3
	Girl		Girl	
Tunisia	Boy	N	Boy	
	Girl	N	Girl	2
Palestine	Boy	N	Boy	
	Girl	N	Girl	2
	C(v)		C(v)	
	Boy	Girl	Boy	Girl
Algeria	Boy	ND	Boy	ND
	Girl		Girl	
Tunisia	Boy	ND	Boy	ND
	Girl		Girl	
Palestine	Boy	ND	Boy	
	Girl		Girl	2

The last table shows the level of socioeconomic inequality and health failure based on the child gender, across all countries. In the context of socioeconomic health failure, boys across all countries have lower level of failure in childcare. However, the socioeconomic inequality in both Tunisia and Palestine shows less social health

inequality for Girls. Girls show less relative socioeconomic inequality in Palestine considering intermediate level of socioeconomic aversion.

6- Conclusion:

To determine socioeconomic inequality in child neglect within three selected developing countries, Tunisia, Algeria and Palestine, we used Makdissi and Yazbeck (2017) method. They proposed a robust dominance approach, which enables us to compare socioeconomic inequality by comparing total social weights within each health category. Using this method, we analyzed socioeconomic health inequality, using categorical self-reported health data, which includes all forms of the numerical scale, both concave and convex numerical scales. The results section shed more lights on the difference in socioeconomic inequality between different selected groups. The paper's finding indicates higher socioeconomic inequality among boys relative to girls in all three countries, as well as higher inequality in rural areas relative to urban areas. In the case of Palestine, camp residential areas show less inequality in compare to rural areas, which are accompanied by higher shortfalls in the health system. Results for comparing socioeconomic inequality based on the mother's education level in Tunisia and Algeria clearly show the higher level of mother's education, the less socioeconomic inequality in childcare. Palestine also shows less inequality regarding child care and fewer shortfalls in the health system among mothers with secondary level of education. In future research, it would be interesting to adopt a distribution regression approach to find more information related to socioeconomic inequality and its impact on child supervision.

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