Extended Abstract:

Conflict intensity and service utilization patterns for maternal care: Evidence from a pseudo-longitudinal analysis in the Palestinian Territories

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Motivation

East mediterranean countries involved in conflict face several complications within their health systems [1]. The extent to which conflicts affect people's routine health seeking behaviors, and health systems' abilities to respond to their needs is under-studied in the region however. Understanding shortfalls in health systems performance and changes in demand for healthcare during conflict are key to implementing evidence-based policies that strive to meet surging conflict-induced health needs without compromising on routine demands or core operations [2].

This study focuses on the association between conflict intensity and healthcare utilization patterns for delivery in the Palestinian Territories. The Palestinian-Israeli conflict makes a suitable context because given its long-term nature, with political volatility varying over time and geography. Second, the network of healthcare providers in the territories is rather complex. Providers include the public sector, private sector, UNRWA facilities, non-profit organizations, and facilities in Israel [1]. Women thus have different facilities to choose from. With that, understanding and predicting deviations in service utilization is a policy-relevant question for building and maintaining health system resilience. It can also explore a potential hypothesis behind the stalled decline in neonatal mortality in some parts of the territories [3].

We hypothesize that conflict intensity can affect delivery location choice through various mechanisms. Women may anticipate higher occupancy in certain hospitals and thus revert to facilities with presumably lower occupancy. Women may also prefer closer hospitals, or ones not separated from their place of residence by checkpoints, or resort to facilities with the lowest costs. Finally, on the supply side, occupancy in certain facilities at time of conflict, or the anticipation of conflict-induced health needs may lead facilities to refer routine cases them to other facilities, possibly within proximity.

Methods

Data sources. The first source of data includes DHS and MICS surveys (2004, 2006, 2010 and 2014), which are nationally representative sample of women of childbearing age 15 to 54 years. The surveys include questions that about birth history, the nature of each pregnancy and birth, and places of delivery. The second source of data comes from B'Tselem – the Israeli Information Center for Human Rights in the Occupied Territories, which tracks the number of conflict-based casualties in the territories. The third source of data is the Palestinian Central Bureau of Statistics (PCBS), which provides mid-year population

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projections at the province level in the territories between 2002 and 2014. The software used for the analysis is STATA, version 14.

Study population. Our sample consists of mothers who had at least one birth within the 2 years preceding each survey. We choose a 2-year frame to maximize sample size while also minimizing recall bias and changing household and individual circumstances between time of birth and interview date. To identify the sample of interest, we calculate the hypothetical age for each birth in months, by subtracting his or her date of birth from the date of the interview. Overall, the sample included 13,882 births between 2002 and 2014.

Outcome measures. Our outcome is delivery location. We classify delivery location by ownership (governmental facilities, private facilities, NGOs, maternity centers and Israeli facilities). For each type, we create a binary variable for whether the woman has delivered in this location. Information was missing for 4.6% of births, and was particularly skewed for the 2006 survey, where data was missing for 10% of the sample. We imputed missing values using locality type, region, and socioeconomic status as predictors for each survey.

Exposure. Our exposure is intensity of conflict per 100,000 population at the time and location for each birth. We calculate conflict intensity by dividing the number of casualties by the total estimated sub-regional population for each month. The sub-regions are North West Bank, Central West Bank, South West Bank, North and Central Gaza, and South Gaza.

Covariates. Infant-level variables include singleton versus not, child sex, and the birth interval and birth order of the infant. Maternal level factors include maternal age at time of birth, marital status (classified as currently married versus not) and educational level of the woman (classified as secondary or higher). Household characteristics include socioeconomic status. Finally, we include locality type (rural, refugee camp, and urban) and geographical sub-regions.

Statistical analysis. To measure the OR of delivering in a given facility type, we apply multivariate logistic regression models. To account for the variation in stratification, we generate a variable for survey-specific strata. We also generate a clustering variable for the 2004 and 2006, given the unavailability of the variable, via kmeans approach. The clustering is based on dwelling ownership, water source, toilet type, presence of a private car, type of floor and availability of fridge, and locality type for survey 2004 and all the aforementioned variables in addition to governorate in the survey for 2006. All analyses are weighed.

Results and conclusion

Table 1 shows sub-regional and time variation of conflict between 2002 and 2014, as well as the number of births exposed within each survey and sub-region. For the births captured in the study, intensity of conflict ranged from 1.69 casualties per 100,000 population (se = 1.69) in 2004, to 1.34 (se = 2.62) in 2004, 0.20 (se = 0.319) in 2010 and 0.40 (se = 1.62) in 2014. Figure 1 presents 4 panels summarizing the distribution of births within each survey by facility ownership. The figure shows that birth distribution, while increasing in governmental facilities over time, is variable in other facility types. Deliveries in maternity centers and Israeli facilities remain consistently the lowest in all survey years.

Exploring the adjusted relationship between conflict intensity and the odds of delivering at different facility types, we find a significant association between conflict intensity and deliveries in governmental facilities, whereby a one unit increase in casualties per 100,000 population is associated with a 0.02 increase in the odds of delivering there (p= 0.048). Conflict intensity is also associated with a decline in the odds of utilizing NGOs (OR = 0.91, p-value = 0.034). We also find a marginal non-significant decrease in utilization of private facilities (OR = 0.97, p-value = 0.071). Our results indicate that intensity of conflict is predictive of shifts in utilization of care for delivery across providers in the Palestinian Territories. These deviations reflect possibly altered health-seeking behaviors' during conflict, or different supply-side responses during volatile times.

Table 1. The weighted average exposure to conflict by sub-region in each survey

	Conflict intensity average (Se) , casualties / 100,000 population			
Region	**2004**	**2006**	**2010**	**2014**
N	539	812	985	565
North West Bank	1.714 (0.731)	0.750 (0.450)	0.076 (0.121)	0.047 (0.076)
	278	702	616	577
Central West Bank	0.319 (0.371)	0.136 (0.156)	0.065 (0.126)	0.084 (0.102)
	363	171	188	658
South West Bank	0.571 (0.541)	0.107 (0.135)	0.058 (0.077)	0.053 (0.098)
	528	959	982	716
North Gaza	2.309 (1.389)	2.681 ((4.52)	0.288 (0.304)	0.826 (2.734)
	379	860	927	633
Central and South Gaza	3.152 (2.44)	1.723 (2.239)	0.314 (0.400)	0.635 (1.20)

This work comes with various strengths. To the best of our knowledge, this is the first effort to quantify the association between conflict intensity and healthcare utilization patterns for delivery in a conflict-zone country in the Middle East. Our work also combines information from several years, making the result rigorous over time. It is also policy-relevant and can help consider points of the health system where an increase in service requests can take place during conflict. Limitations of our research include accounting for the different survey designs. Given the limitation of information on geographical location of births in the 2004 survey to sub-regions, we could not explore conflict intensity at the governorate level, which would have provided a greater resolution of the relationship. Finally, rate of casualties per 100,000 population is not an optimal measure for conflict intensity. Future steps can include understanding the driving mechanisms of these variations in healthcare utilization for delivery, as well as exploring whether these variations translate into different health outcomes, particularly neonatal mortality.

Figure 1. The distribution of births per 1,000 population by facility type , for each survey. Numbers do not add to 1,000 population as births in other locations, such as home or on the way to the facility, were not included in the analysis.

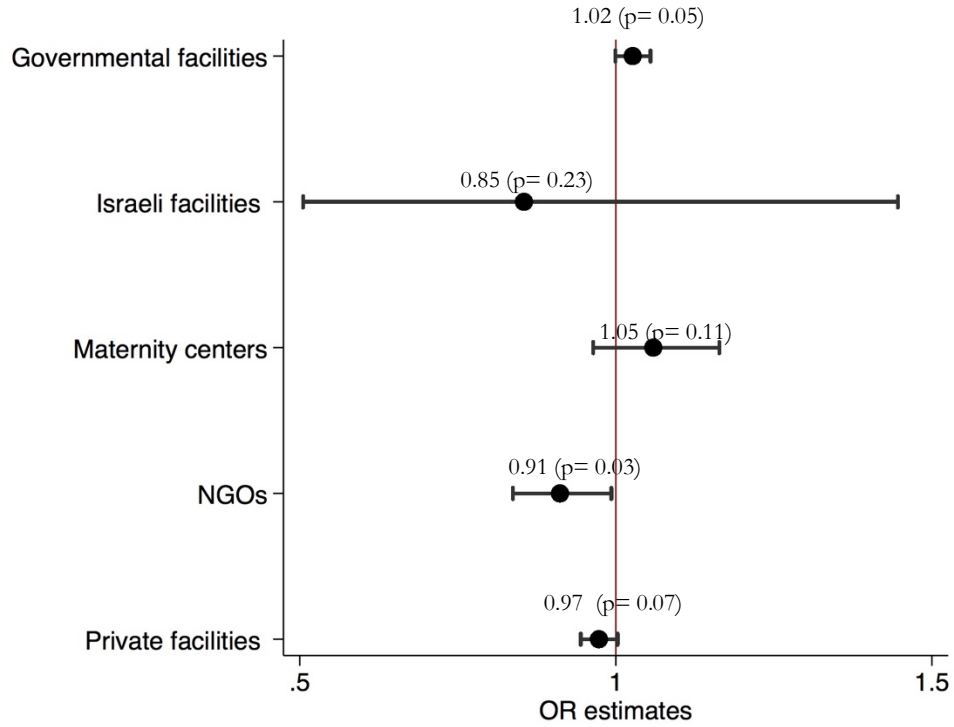

Figure 2. Forest plot showing the relationship between conflicts intensity and delivering in each facility type.

References

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