

RESEARCH ARTICLE

The Impact of Armed Conflict on Under Five Mortality: Comparison of Syria and Romania with A Difference-in-Differences Method

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Abstract

The purpose of the study was to reveal the effect of armed conflicts on the mortality rates of children under five. This research was conducted using a quasi-experimental difference-in-differences (DID) model on a quantitative longitudinal dataset from Syria and Romania between 2000 and 2023, using Jamovi Version 2.6. According to the findings, being in Syria increased the mortality rate of children under five by 8.9 times compared to Romania. During the period of armed conflict, the mortality rate of children under five in Syria was approximately 10 points higher than in Romania. The results showed that both being in Syria and armed conflicts led to higher mortality rates among children under five. This study clearly revealed the devastating effect of armed conflict on children's fundamental right to life, aiming to provide a concrete basis for improving preparedness and response mechanisms for future humanitarian crises. The research findings not only made significant contributions to the academic literature but also provided directly applicable insights for humanitarian aid and international development policies. The study also brought a new perspective to the field by examining the impact of armed conflict on child mortality under five using data from Syria, one of the most significant conflicts in recent years. The research provided evidence not only of direct violence but also of indirect health and nutrition disruptions. This evidence provides empirical evidence that decision-makers and those who regulate the laws of war can use, enabling more accurate policy development.

Keywords: Armed conflict, causal inference, under five mortality, Romania, Syria

Öz

Çalışmanın amacı, silahlı çatışmaların beş yaş altı çocuk ölüm oranları üzerindeki etkisini ortaya koymaktır. 2000-2023 yılları arasında Suriye ve Romanya'ya ait nicel uzunlamasına veriler kullanılarak, Jamovi Sürüm 2.6 ile yarı deneysel olan farkların-farkı (DID) modeli ile bir araştırma yürütülmüştür. Bu araştırmanın bulgularına göre, Suriye'de bulunmak, beş yaş altı çocuk ölüm oranını Romanya'ya kıyasla 8,9 kat artırmaktadır. Silahlı çatışma döneminde, Suriye'deki beş yaş altı çocukların ölüm oranı, Romanya'daki çocuklara göre yaklaşık 10 puan daha yüksektir. Elde edilen sonuçlar, hem Suriye'de olmanın hem de silahlı çatışmaların beş yaş altı çocuklar arasında daha yüksek ölüm oranlarına yol açtığını göstermiştir. Bu çalışma, silahlı çatışmanın çocukların temel yaşam hakkı üzerindeki yıkıcı etkisini net bir şekilde ortaya koyarak, gelecekteki insani krizlere hazırlık ve müdahale mekanizmalarının iyileştirilmesi için somut bir temel sağlamayı amaçlamıştır. Araştırma sonuçları, akademik literatüre önemli katkılarda bulunmanın yanı sıra, insani yardım ve uluslararası kalkınma politikaları için doğrudan uygulanabilir bulgular sunuldu. Ayrıca çalışma, silahlı çatışmanın beş yaş altı çocuk ölümleri üzerindeki etkisini son yıllarda en önemli çatışmalara sahne olmuş Suriye verisi ile incelediğinden alana yeni bir bakış açısı getirmiştir. Araştırma doğrudan şiddeti değil, aynı zamanda dolaylı sağlık ve beslenme aksamlarına yönelik kanıt sunmuştur. Bu kanıtlar, karar vericilerin ve savaş hukukunu düzenleyenlerin kullanabileceği ampirik kanıtlar olması sebebiyle daha doğru politikalar geliştirilmesini sağlamıştır.

Anahtar Kelimeler: Silahlı çatışma, nedensel çıkarım, beş yaş altı ölüm oranı, Romanya, Suriye

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Introduction

In recent years, armed conflicts in different parts of the world have become one of the most important direct or indirect effects of under-five mortality rate. For example, in many places like Gaza, Syria, Ukraine, etc., there are deaths of children under-five mortality. (Bendavid et al., 2021; Meierrieks & Schaub, 2024; Bonati, 2025; Vesco et al., 2025). Armed conflicts are a significant factor that deeply shakes societies, preventing healthy individuals from maintaining their health status and restricting access to healthcare for individuals whose health status deteriorates (Ekzayez et al., 2021; Arage et al., 2023; David & Eriksson, 2025).

In the last fifty years, instead of wars between equal or dominant countries, it has been observed that armed conflicts have intensified, especially between poorly governed states and their rulers who are not at peace with their people (Hoffman, 2007; Rustad, 2025). These internal conflicts and asymmetric wars are more effective in densely populated areas than in the battlefield, and they lead to more civilian deaths (Wenger & Mason, 2008; Bales & Mutschler, 2025). Armed civil conflicts have spread beyond traditional conflict zones to urban areas with dense civilian populations, particularly affecting children, who are among the most vulnerable groups (Prasad & Prasad, 2009; Ayhan, 2024; Rustad, 2025). Children, who are defenseless and unaware of the situation in the midst of armed conflict, are not only physically affected by the armed conflict but also prevented from accessing the housing, nutrition, health care, education and socio-economic services that are necessary for children to sustain their lives (Dieddah, 1996; Rieder & Choonara, 2011; Goto et al., 2021; Makinde et al., 2023). This situation brings with it a new indirect death in addition to the direct deaths of armed conflict.

One of the most important indicators of a country's development is the mortality rate of children under five (Bhusal & Khanal, 2022; Öngel et al., 2022; Şenol et al., 2022). Therefore, one of the most important goals of every country is to reduce the mortality rate of children under five (Armenakyan, 2025). The United Nations has set sustainable development goals to reduce the mortality rate of

children under five and improve many other indicators. Achieving these goals by 2030 is considered one of the most important strategic initiatives for every country (Sharrow et al., 2022). Under-five child mortality, which has been particularly sought to be reduced in recent years through international cooperation and individual efforts, remains a crucial issue contributing to the sustainable development goals (United Nations Children's Fund (UNICEF), 2024). These efforts, and the investments made to achieve them, have presented challenges both locally and globally due to the recent armed conflicts (Wang et al., 2024). Data collection difficulties and security concerns in countries and regions experiencing armed conflict severely constrain epidemiological and demographic studies in this area (Daou et al., 2025). While the existing literature broadly addresses general humanitarian crises and migration movements caused by conflicts, studies directly examining the specific and sensitive issue of under-five child mortality are limited. The motivation for this study was to fill this gap in the literature and to uncover the direct and indirect effects of armed conflict, a key determinant of under-five child mortality. The lack of, or only indirect, association between, armed conflict and child mortality under the age of five represents a gap in the literature. This gap hinders a full understanding of the mechanisms and causal chains underlying conflict's impact on child mortality and highlights the need for such studies.

The effects of armed conflict on the mortality of children under five can occur in various ways. The first of these ways is the deaths that occur directly after the devastation and destruction caused by acts of violence caused by armed conflict. In the first way, the explosives, small arms, and air strikes used in armed conflict directly cause physical injuries and deaths to children. Statistical reports for such deaths do not reflect accurate mortality rates (Kadir et al., 2018; Bendavid et al., 2021; Bonati, 2025). A second pathway through which armed conflict affects under-five mortality involves a more complex mechanism that has more impact than direct effects (Wagner et al., 2018; Mugisho, 2025). The indirect effects of armed conflict, which are broader and more lasting than the

primary effects, include the collapse of health infrastructure, disruption of essential medical services, the cessation of ongoing vaccination campaigns for children, the disruption of food supply chains, and the disruption of sanitation services. These factors leave children vulnerable to infectious diseases, malnutrition, and lack of access to clean water, exacerbating their mortality. These indirect effects are reported to claim more children's lives than the direct conflict-related deaths (Brook, 2024; Ayele, 2025; Ciccacci et al., 2025; Vesco et al., 2025).

Although studies on the subject have generally revealed the impact of armed conflict on deaths of children under five, without eliminating the effects of possible confounding factors, this relationship has been addressed in the context of sustainable development (Hidayati et al., 2022; Bonati, 2025; de Groot et al., 2025). The current study eliminates the effects of potential confounding factors and examines these effects by country and period of armed conflict. This will allow us to compare the increased mortality rates resulting from disruptions to healthcare in countries experiencing armed conflict with indicators from other countries with similar socioeconomic characteristics, free of armed conflict, to the pre-conflict period. In light of this information, the current study aims to fill this important gap in the literature by providing a more comprehensive analysis of the impact of the armed conflict in Syria on under-five mortality. Childhood vaccination rates, a potential confounding factor in the DID model, are considered a significant factor associated with the increase in conflict-related mortality.

To address gaps in the literature, this study aims to examine the impact of armed conflict on under-five mortality not only as a correlation but also within a possible causal relationship, and to uncover its effects. To this end, an attempt was made to isolate the confounding factors of childhood vaccinations to clearly demonstrate the impact of armed conflict on under-five mortality. In this context, the necessary confounding factors were added to the DID model. It is known that childhood vaccines DTP3 and MCV2 are negatively correlated with under-five mortality,

thereby reducing under-five mortality. The percentage of DTP3 and MCV2 vaccines in a population is a critical indicator of the resilience of a society's health infrastructure and access to healthcare, and therefore, they were included as confounding factors in the DID model. This allows for a more reliable understanding of the true extent of the under-five mortality crisis in armed conflict zones.

Method

Study Type and Model and Assumption

This research was conducted using a quasi-experimental difference-in-differences (DID) model, a quantitative longitudinal dataset.

The DID model is a method that treats policy, intervention, and other situations as an experimental setting. In this research, the armed conflict in Syria was considered a "natural experiment," and in this natural experiment:

The researched group: Syria, where the armed conflict is taking place.

The comparison group: Romania, which has similar socio-economic characteristics but no armed conflict.

Time: Two different periods: "before the armed conflict" and "after the armed conflict."

This research methodology attempts to isolate the net impact of armed conflict on under-five mortality by controlling for time-independent differences between the researched and comparison groups, as well as general trends across these two groups.

To validate the reliability and robustness of the DID method's results, several assumptions must be tested. This ensures confidence in the results obtained from the model. The most important of these assumptions is the parallel trend hypothesis, which tests whether under-five mortality rates in Syria and Romania in the absence of armed conflict follow a similar trend over time. To test this assumption, under-five mortality in pre-war Syria and Romania is presented graphically. Another assumption of the DID method is the presence of potential confounding factors, namely, the problem of endogeneity. To address this issue, the proportion of DTP and two doses of MCV vaccines in the

population are included in the model as potential confounding factors. This allows us to demonstrate the net impact of armed conflict on under-five mortality. To demonstrate the validity and reliability of the DID model's results, Cook's Distance Mean, Durbin-Watson test, VIF, and Tolerance values are also reported.

Population and Sample

This study used publicly available data from Syria and Romania, countries with similar demographic and socio-economic characteristics, for the years 2000-2023. Since the entire two countries designated as the population were included in the study, no sample selection method was used.

Variables, Data, and Data Sources

This study used secondary data for Syria and Romania, extracted from publicly available United Nations websites for the years 2000-2023 (United Nations, 2025). The sources of these data and the information regarding the variables are provided below:

Dependent variable: Under-five mortality rate (deaths per 1,000 live births)

Independent variables:

1. Armed conflict (dummy variable, Before and after 2011, time)
2. Country (dummy variable, Syria or Romania)

Control variables:

1. Proportion of the target population who received 3 doses of diphtheria-tetanus-pertussis (DTP3) vaccine (%)
2. Proportion of the target population who received measles-containing-vaccine second-dose (MCV2) (%)

Measurements

Variable measurements were used as reported. The dependent variable, under-five mortality rate, represents the rate of under-five child mortality

per 1,000 live births. This variable is continuous. Its abbreviation in the model is "UF-MR."

Two independent variables were used in the study. One is a dummy variable, abbreviated " C^{S-R} " in the model and represented by "1" for Syria and "0" for Romania. This variable is discrete.

The second independent variable is a discrete variable used for the pre- and post-armed conflict periods, represented by " AC^{Post} " in the model, represented by "0" for before 2011 and "1" for after 2011.

Two control variables were included in the study that are thought to influence under-five child mortality. These control variables represent the percentage of children receiving mandatory vaccinations. These variables are represented in the model as "DTP3" and "MCV2." These variables are continuous.

Statistical Analysis and Model

A multiple linear regression model was constructed using the difference-in-differences (DID) method, a quasi-experimental method, using both independent variables and control variables with Jamovi Version 2.6 (The jamovi project, 2025).

This model revealed the pure impact of armed conflict on under-five child mortality. The constructed DID model is as follows (Ryan et al., 2015):

$$UF - MR_{it} = \beta_0 + \beta_1 C^{S-R} + \beta_2 AC^{Post} + \beta_3 C^{S-R} AC^{Post} + [\beta_4 DTP3 MCV2] + \varepsilon \quad (1)$$

Information regarding the terms and abbreviations used in the model is as follows:

UF-MR_{it}: Under-five child mortality rate (dependent variable)

β_0 : Constant term

β_1 : Country coefficient

C^{S-R} : 1 for Syria, 0 for Romania (independent variable)

β_2 : Armed conflict coefficient

AC^{Post} : 1 after armed conflict, 0 before armed conflict (independent variable)

β_3 : Interaction coefficient of country and armed conflict

$C^{S-R} AC^{Post}$: Interaction of country and armed conflict (independent variable)

β_4 : Control variable coefficient

DTP3, MCV2: Control variables - ε : Error term

Ethical Statement

Because the data in this study were obtained from a publicly accessible website and did not involve any intervention on humans or animals, it did not require ethics committee approval. No ethical violations were committed throughout the study.

Results

DID Assumption Checks

To demonstrate the impact of armed conflict on under-five mortality, several assumptions must be met regarding the difference-in-differences method. The most important of these assumptions is that, in the absence of armed conflict, under-five mortality in Syria and Romania would follow a similar trend over time. To test this assumption, data from Syria and Romania are presented graphically. An examination of the graph in Figure 1 reveals that under-five mortality in both Syria and Romania through 2011 follows a similar trend. Therefore, the most important assumption of the DID method is met, and the resulting findings are reliable.

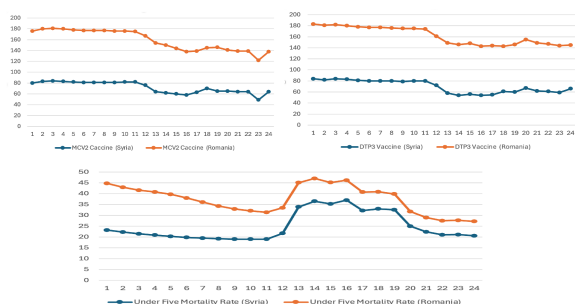


Figure 1. Under-Five Child Mortality Rate, Proportion of DTP3 and MCV2 Vaccines in Syria and Romania

Another assumption of the DID method is the consideration of potential confounding factors. In this context, the population proportion of three doses of DTP and two doses of MCV vaccines, which are thought to affect under-five mortality rates, was included in the model to eliminate the effects of potential confounding factors and reveal the net impact of armed conflict.

Table 1. Assumption Checks of DID Method

Cook's Distance			
		Range	
Mean	SD	Min	Max
0.026	0.04	3.37	0.22
Durbin-Watson Test for Autocorrelation			
Autocorrelation	DW Statistic	P	
0.105	1.857	0.451	
Collinearity Statistics			
	VIF	Tolerance	
Tedavi	3.25	0.4573	
Sonra	3.18	0.5930	
DTP3 Vaccine	3.49	0.4378	
MCV2 Caccine	4.19	0.5821	
Tedavi * Sonra	2.33	0.4876	
Tolerance			
Statistic	p		
0.987	0.884		

The validity and reliability of the DID model results depend on meeting certain assumptions. These assumptions are reported in Table 1. An examination of Table 1 reveals that the Cook's Distance mean is 0.02 ± 0.04 , significantly less than 1, and therefore, there are no outliers in the model.

The Durbin-Watson test value (DW Statistic = 1.857) was approximately 1.9 and was not statistically significant ($p > 0.05$). This value indicates that the error terms in the model are completely independent of each other and there is no autocorrelation (Durbin-Watson Test, 2008). This value is desirable for a regression model.

The VIF and Tolerance values for demonstrating multicollinearity between variables are given in Table 1. The VIF values were found to be less than 5, and the Tolerance value was found to be greater than 0.40, as desired (Miles, 2014).

DID Model Results

Table 2. Correlation Results Between Variables

	Under Five Mortality Rate	DTP3 Vaccine	MCV2 Caccine	C ^{S-R}	AC-POST
Under Five Mortality Rate	—				
DTP3 Vaccine	-0.694***	—			
MCV2 Vaccine	-0.438**	0.923***	—		
C ^{S-R}	0.731***	-0.778***	-0.619***	—	
AC ^{POST}	0.719***	-0.540***	-0.692***	0.000	—

Note. * $p < .05$, ** $p < .01$, *** $p < .001$

Table 2 shows the correlations between the dependent, independent, and control variables in the

DID model. A positive and statistically significant relationship was found between the dependent variable (under-five child mortality) and the independent variables (country (C^{S-R}) and armed conflict (AC^{POST}), while a negative and statistically significant relationship was found between DTP3 and MCV2 vaccines ($p < 0.05$). This relationship suggests that a DID model can be established using the relevant variables.

Table 3. DID Model Fit Measures

Model	R	R ²	Adjusted R ²	AIC	BIC	RMSE	Overall Model Test			
							F	df1	df2	p
1	0.92	0.85	0.84	263	276	3.24	48.4	5	42	<.001

Table 3 reports the goodness-of-fit values for the DID model. The DID model as a whole was found to be statistically significant at $F(5,42) = 48.4$ and $p < 0.001$. When this table is examined, when the Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) values, which are important for model fit, are interpreted together with the Adjusted R² (0.84), it is seen that the proposed DID model has a good goodness-of-fit value and sufficient complexity (Gallucci, 2019). The independent and control variables in the model were found to explain approximately 84% of the variance, which is statistically significant. This finding demonstrates that the DID model has good explanatory power.

Table 4. Omnibus ANOVA Test Results

	Sum of Squares	df	Mean Square	F	p
C^{S-R}	54.2	1	54.2	4.52	0.040
AC^{POST}	151.1	1	151.1	12.58	<.001
DTP3 Vaccine	181.2	1	181.2	15.08	<.001
MCV2 Vaccine	139.0	1	139.0	11.58	<.001
$C^{S-R} * AC^{POST}$	172.0	1	172.0	14.32	<.001
Residuals	504.4	42	12.0		

Table 4 shows the results of DID multiple regression analysis examining the effects of the independent variables C^{S-R} , AC^{POST} , and control variables such as DTP3 Vaccine, MCV2 Vaccine, and the interaction variable between C^{S-R} and AC^{POST} on under-five child mortality.

All variables appear to have a statistically significant effect on under-five mortality. The most significant variable in this effect is the interaction variable between C^{S-R} and AC^{POST} , which has a particularly strong effect on under-five mortality. The

statistically significant effect of this variable indicates that the armed conflict in Syria caused more under-five mortality than in Romania in the period after 2011. This suggests that armed conflict is a significant determinant of under-five mortality (Table 4).

Table 5 shows the effect of country (Syria, Romania) (C^{S-R}), armed conflict (AC^{POST}), the interaction of country and armed conflict ($C^{SR*AC^{POST}}$), and the control variables 3 doses of diphtheria-tetanus-pertussis (DTP3) and measles-containing-vaccine second-dose (MCV2) on under-five child mortality, the magnitude (estimate) of this effect, and its statistical significance ($p < 0.05$).

The constant variable represents the situation where all other independent variables in the model are zero. Accordingly, the estimated value of the constant term is 32.5, and it is found to be statistically significant ($p < 0.05$). In other words, when all independent variables are zero, the average under-five child mortality is estimated to be 32.5.

With all other variables in the DID model held constant, it was found that increasing the C^{S-R} by one unit increases the average under-five child mortality by 8.9. This estimate was found to be statistically significant ($p < 0.05$). This indicates that being in Syria increases the under-five child mortality rate by 8.9 times compared to Romania.

If the effects of the control variables are eliminated and all other variables are held constant, Syria, where the armed conflict is taking place, has an 8.1% higher under-five child mortality rate than Romania, and this is statistically significant ($p < 0.01$).

Each unit increase in DTP3, a potential confounding factor, reduces under-five mortality by an average of 0.8 points, which is statistically significant ($p < 0.01$). This finding demonstrates that the DTP3 vaccine is effective in reducing child mortality.

Table 5. DID Multiple Linear Regression Coefficients Results

Predictor	Estimate	SE	95% Confidence Interval		t	p	Stand. Estimate	95% Confidence Interval	
			Lower	Upper				Lower	Upper
Intercept ^a	32.5	12.7	6.9	58.0	2.56	0.014			
C ^{S-R} ;									
1 – 0	8.9	4.2	0.5	17.3	2.12	0.040	1.04	0.05	2.03
AC ^{POST} ;									
1 – 0	8.1	2.3	3.5	12.7	3.55	<.001	0.95	0.41	1.49
DTP3 Vaccine	-0.8	0.2	-1.1	-0.3	-3.88	<.001	-1.19	-1.80	-0.57
MCV2 Vaccine	-0.5	0.1	-0.8	-0.2	-3.40	<.001	-0.71	-1.12	-0.29
C ^{S-R} * AC ^{POST} ;									
(1 – 0) * (1 – 0)	10.4	2.8	4.85	15.9	3.78	<.001	1.22	0.66	1.87

^a Represents reference level, Dependent variable: UF-MR_{it}: Under-five child mortality

Each unit increase in MCV2, a potential confounding factor, reduces under-five mortality by an average of 0.5 points, which is statistically significant ($p < 0.01$). This finding demonstrates that the MCV2 vaccine is effective in reducing child mortality.

One of the most important findings of the DID model is the interaction effect ($C^{S-R} * AC^{POST}$), which takes into account the interaction between the period of armed conflict and the country, with a value of 10.4 points and a statistically significant ($p < 0.01$). This finding demonstrates that the effect of C^{S-R} on under-five mortality varies depending on the AC^{POST} level. Similarly, the effect of AC^{POST} varies depending on the level of C^{S-R} .

The combined interaction effects of C^{S-R} and AC^{POST} in the model were found to have a greater effect (an additional increase of 10.4%) than the sum of their individual effects. This finding suggests that both presence in Syria and armed conflict lead to higher rates of death among children under five.

Discussion and Conclusion

The current study was conducted to demonstrate the impact of the armed conflict in Syria on under-five child mortality by comparing it with Romania, a country with similar demographic and socio-economic characteristics. Both Syria and Romania have medium-sized geographic areas and moderate population densities. They hold significant economic and geopolitical positions within their regions and, although to varying degrees, have centrally planned state healthcare systems. The findings from the DID method, a quasi-experimental

method, clearly demonstrated the pure impact of armed conflict on under-five child mortality. The DID model's findings provide a result that considers both child mortality between Syria and Romania, as well as the period before and after the armed conflict began in 2011, without ignoring the interaction between these two factors. The findings of this study demonstrate that under-five child mortality caused by armed conflict is not limited to direct acts of violence but is also related to deaths resulting from the collapse of the health system and the deterioration or dysfunction of infrastructure necessary for humanitarian assistance, which are indirect effects of armed conflict. Results from numerous studies also report that armed conflict directly or indirectly impacts the mortality of children under five (Boukari et al., 2024; Bonati, 2025; Harghandiwal, 2025). These findings suggest that the current study's findings are similar to those in the literature.

When the effect of childhood vaccines such as DTP3 and MCV2, which are confounding factors included in the DID model, is held constant, the under-five mortality rate in conflict-affected Syria is approximately 9 percentage points higher than in politically stable Romania. This finding is consistent with recent studies showing the enduring damage that armed conflict inflicts on health systems and how this exacerbates regional inequalities (Bendavid et al., 2021; Ayhan, 2024; Arage et al., 2023; Ayele, 2025; Bonati, 2025). In fact, a study conducted by Kruk et al. (2018) reported that health systems in regions where armed conflict occurred not only suffered physical destruction, but also their service delivery capacity was permanently reduced due to the loss of motivation and migration of health personnel. This situation is clearly evident in the Gaza war, which has deeply

shaken the conscience of humanity. Hundreds of Gazan children are injured and die daily due to the war, and thousands more are unfortunately unable to receive the necessary healthcare or even access the most basic needs of shelter and food. This reveals the extent to which armed conflict exacerbates child mortality. If sufficient data were available today for empirical studies in Gaza, it would be possible to demonstrate the extent to which armed conflict has increased child mortality. Unfortunately, due to the lack of data on child mortality in Gaza, this dire situation cannot be scientifically demonstrated. Therefore, to prevent anyone from experiencing the same situations in the future as those experienced in armed conflict-ridden regions like Gaza, such as Syria and Ukraine, the relevant scientific evidence must be used by war lawyers, the United Nations, and other humanitarian institutions and organizations to develop policies and legislation addressing the worst-case scenarios. Only then can the impact of scientific studies like these on society be demonstrated.

Based on the findings, the approximately 9-point difference in Syria is thought to be due to the combined effects of the collapse of health infrastructure, the decline in vaccination campaigns, and the rise in malnutrition rates, which are the primary effects of the armed conflict. Romania's stable health system and strong vaccination programs can be considered one of the main reasons for this dramatic gap with Syria (UNICEF, 2021). Based on this finding, it can be concluded that to reduce under-five child mortality in conflict zones, preserving and rebuilding health infrastructure should be a top humanitarian priority, without waiting for the end of military operations. Policies should focus on maintaining these vital services even under challenging circumstances, focusing on uninterrupted vaccination programs and nutritional security, rather than simply providing emergency aid. Investing in resilient national health systems, as in Romania, offers a long-term and lasting solution to preventing dramatic deaths during post-conflict recovery. International aid agencies and local governments should adopt and implement protocols declaring the health system a "non-combat zone."

The findings indicate that under-five mortality during the armed conflict period (after 2011) was approximately 8 points higher than during the pre-armed conflict period (before 2011). This finding confirms that the onset of armed conflict causes an acute increase in under-five mortality, supporting hypotheses reported in the literature. Some studies conducted on the subject appears as another evidence demonstrating this situation. In fact, these studies addressed epidemic diseases in regions where armed conflict took place, and it was reported that factors such as displacement, deterioration of hygiene conditions and disruption of vaccination services in the early stages of the conflict accelerated the spread of deadly diseases such as measles and cholera (Marou et al., 2024; Alfaleh et al., 2025). This finding suggests that health indicators, which were better before the armed conflict, rapidly deteriorated after the onset of the armed conflict, and child mortality increased, particularly due to the proliferation of infectious diseases. This finding highlights the critical importance of understanding the dynamic impact of armed conflict and developing early response mechanisms.

One of the most significant findings of the current research is that the under-five mortality rate in Syria, following the armed conflict, was approximately 10 percentage points higher than in Romania. This result demonstrates that the effects of armed conflict on child mortality increased after the declaration of the conflict and that this increase continues at an increasing rate. Even after the armed conflict has ended, the continued devastation caused by the previous armed conflict and the dysfunction of health institutions highlight an often overlooked reality. This reality necessitates that the post-armed conflict recovery process not only rebuilds economic and political stability but also the health and well-being of the most vulnerable segments of society (Kadir et al., 2018; Wagner et al., 2018; Bendavid et al., 2021; Mhlanga & Ndhlovu, 2023; Wang et al., 2024; Vesco et al., 2025). High under-five mortality rates in post-armed conflict periods can be explained by the legacy of war: destroyed health infrastructure, persistent food insecurity, and psychosocial trauma. The difficulty of restoring vaccination coverage in post-

conflict societies and persistent problems with access to clean water play a significant role in the persistence of this high child mortality (Jawad et al., 2021; Bonati, 2025; Vesco et al., 2025). This finding provides compelling evidence that post-conflict rehabilitation and reconstruction efforts must focus on child health.

While the current study presents some empirical findings on the impact of armed conflict on child mortality under five, it has limitations, as with any study. The first limitation of this study is the existence of some unobservable situations occurring in armed conflict zones. These unobservable or incompletely incorporated factors into the model imply that the reported results may not be conclusive. This, in turn, limits the ability to fully establish causality. It should be noted that data collected during and after the armed conflict may be incomplete or inaccurate due to the breakdown of reporting mechanisms. This limitation makes it particularly difficult to determine the exact number of deaths directly related to the conflict. Secondly, the selection of Romania as the control group, despite its political stability, does not fully reflect the socioeconomic and demographic structure of Syria. Although Romania was chosen for comparison because it shares characteristics most similar to Syria, the inherent differences between the two countries (culture, healthcare system structure, etc.) limit the generalizability of the current study's findings. Finally, the variables used in this study may not fully capture the complex effects of conflict on child mortality. Difficult-to-observe factors such as psychological trauma in conflict zones, alternative solutions to local healthcare (e.g., assistance from Civil Society Organizations), and specific effects of conflict type were not included in the DID model. These limitations provide a basis for future research to examine the conflict-mortality relationship in more detail and contextually. Future studies are recommended to examine armed conflicts in more diverse countries and to examine the effects of armed conflict on under-five mortality using different models.

In conclusion this study aims to provide a concrete foundation for improving preparedness and response mechanisms for future humanitarian cri-

ses by clearly demonstrating the devastating impact of armed conflict on children's fundamental right to life. The results of this research will not only contribute significantly to the academic literature but also provide directly applicable findings for humanitarian aid and international development policies. The study's findings can provide compelling evidence demonstrating why rebuilding and strengthening child health services is so critical in post-armed conflict reconstruction efforts. Furthermore, they can contribute to the development of strategies for maintaining uninterrupted child health services even during conflict. Ensuring the safety of children, the most vulnerable, before an armed conflict erupts and implementing protocols to protect them will play a crucial role in achieving the sustainable development goals without interruption, and most importantly, ensuring the continued survival of children, our future.

This research will provide a roadmap for future studies on the topic. However, to expand this roadmap and disseminate its impact, comprehensive studies using new and different methodologies are needed. It is recommended that future studies consider the limitations of this study.

Declarations

Funding: No funding was received for conducting this study.

Conflicts of Interest: The author declares no conflict of interest.

Ethical Approval: This study used publicly available, country-level data and did not involve any interventions with human participants or animals; therefore, ethics committee approval was not required.

Informed Consent: Not applicable.

Data Availability: All variables are derived from publicly accessible United Nations datasets for Syria and Romania (2000–2023). The cleaned analytical dataset and derived outputs (e.g., model

specifications, tables, and figures) generated during the study are available from the corresponding author upon reasonable request.

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