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Can Health be Related to Interpersonal Violence in Middle Eastern Countries?

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Abstract
Background: Preventing violence is important especially in the Middle East, where many countries are struggling with violence. Knowing the affecting factors could help public policy makers to decrease violence level. Thus, this study is aimed to analyze health and other socio-economic factors that could affect interpersonal violence in middle eastern countries.
Methods: From international organization databases, we collected the panel data of Middle Eastern countries from 1990 to 2016 on prevalence of interpersonal violence as dependent variable and per capita income, life expectancy, democracy index (DI), urbanization and unemployment as explanatory factors. Several panel data diagnostic tests were performed for selecting a suitable model of estimation. The variables were entered in the model in logarithmic form. Because of heteroscedasticity, cross-sectional dependence and serial correlation of residuals, feasible generalized least squares (FGLS) was used for estimation of mentioned model using Stata 14.2.
Results: The means of interpersonal violence prevalence and life expectancy were 2462.2 (SD = 232.4) per 100 000 population and 73.5 (SD = 4.5) in the Middle East, respectively. Urbanization (β = -0.0925, $P < 0.01$), life expectancy (β = -0.0362, $P < 0.01$), per capita income (β = -0.0046, $P < 0.01$), unemployment (β = 0.0007, $P < 0.01$) and democracy (β = -5.83e-06, $P < 0.01$) had significant relation with interpersonal violence.
Conclusion: Life expectancy as a proxy for health is one of the main predictors of interpersonal violence, as literature supports. That is, if a society is healthier, the burden of interpersonal violence will be lower. Thus, health policy makers should consider health status as a preventive factor of violence, which is stated in health as a bridge for peace by the world health organization.
Keywords: Health, Life expectancy, Middle East, Socioeconomic factors, Violence
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Introduction

Reports on burden of violence are highly alarming in our era in both incidence and prevalence. The WHO report on violence reports the 20th century as one of the most violent periods in human history. The report states that 191 million people died due to violence and conflicts across the globe.[1] On the other hand, the Global Burden of Diseases (GBD) reported conflict and terrorism as two fastest growing causes of mortality, which increased 118% from 2007 to 2017.[2] Also, considering the huge increase in burden of violence, it could be the main cause of disability adjusted life years (DALYs) in near future.[3]

While the world health assembly in 1998 considered violence as a major public health issue, it can have bad effects on population and economy. Thus, health systems are concerned with violence not merely because of its adverse effect on health and mortality, but it can also affect health inequalities, functions of health workers and facilities, and as a result create barriers for health utilization.[4] On the other hand, violence could have a much more destructive effect on others beside the direct victim; for each person who dies due to violence, many others suffer from a wide range of health and mental health problems.[1] This could result in indirect effects on the economic situation of countries. For example, in South Africa, 2.3 million and 84,287 DALYs were lost which is estimated at about US$ 13.5 billion, equal to 4.3% of the country's gross domestic product (GDP).[5]

Violence is defined as individual or group aggressive behavior which is socially unacceptable, turbulent, and often destructive. Thus, violence could be categorized into three categories including self-directed, interpersonal, and collective violence. In self-directed violence, such as suicide, the victim is the perpetrator. Interpersonal violence is between individuals such as child maltreatment, elder abuse, youth violence, violence related to property crimes, and violence in workplace. Collective violence is related to violence which happens between nations and groups,

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such as war and terrorism. According to GBD estimates in 2017, the prevalence of interpersonal violence in North Africa and Middle East region was 1752 per 100 000 populations which resulted in 14 400 deaths. Moreover, the DALY, years of life lost, and years lived with disability due to interpersonal violence were about 162, 136, and 26, respectively.[6]

According to the World Health Organization (WHO), the risk factors of interpersonal violence are individual, family, community, and societal factors.[1] Being victim of child maltreatment,[7] psychological or personality disorders,[8-11] and alcohol or substance abuse[12-14] are the most prevalent individual factors that cause violent behavior. Also, there is evidence suggesting that playing video games could cause aggression and violent behavior.[15,16] Low socioeconomic status,[17-20] divorce,[21] and poor parental practice[22,23] are the main family factors that could predict violence. Unemployment and poverty[24,25] and other related situational factors related to community could cause violence. Health is another variable that has direct and indirect relation with peace. Some researches have demonstrated that health could affect violence as an independent variable,[26-28] while another study considered health as an outcome of peace.[29] It can be hypothesized that macro-economic variables and socioeconomic conditions of countries such as democracy, per-capita income, urbanization, unemployment rate, and life expectancy could affect violence at macro level.

All the mentioned types of violence are prevalent across the globe. However, some of the Middle Eastern countries are struggling with all types of violence. In fact, in recent decades, war and violence have become an inseparable aspect of life in the Middle East. Thus, the Middle East could be a good sample for studying the determinants of violence. Thus, the aim of the present study is to determine the factors that affect violence incidence in Middle Eastern countries.

Materials and Methods
The Model
According to the literature, we developed the following model based on the aim of our study:
IPVP=f (GDPP, DI, UE, LE, U)

where IPVP, GDPP, DI, UE, LE and U indicate Interpersonal Violence Prevalence, Gross Domestic Product Per capita, Democracy Index, Unemployment, Life Expectancy, and Urbanization, respectively.

According to the literature and for simple interpretation of coefficients, the variables were entered in the model in logarithmic form. So, the econometric model of the Middle Eastern countries from 1990 to 2016 panel is as follows:

$$L\ IPVP_{it} = \beta_0 + \beta_1 L\ GDPP_{it} + \beta_2 L\ DI_{it} + \beta_3 L\ UE_{it} + \beta4 L\ LE_{it} + \beta_5\ L\ U_{it} + e_{it}$$

Where L shows logarithm, $\beta_0 + \beta_5$ indicate the model

coefficients, and e_{it} represents the error term.

Data and Variables
As mentioned above, we used the panel data of Middle Eastern countries from 1990 to 2016. The dependent variable (IPVP) is the prevalence of interpersonal violence per 100 000 population. According to the GBD, interpersonal violence consists of four types; physical violence by firearm, physical violence by sharp object, sexual violence and physical violence by other means. We gathered IPVP data from the GBD database. The Institute for Health Metrics and Evaluation annually reports GBD estimates of hundreds of diseases, injuries, and risk factors. These estimations can be found at the GBD results tool.[6] The first explanatory variable is income. We used GDP per capita (GDPP) in US dollars for this purpose. The GDPP data was gathered from the Word Bank International Comparison Program database.[30]

Democracy index (DI), as indicator of democracy situation, was another independent variable. It was taken from the Polity project that produces democracy scores for world countries according to three criteria including; "the existence of procedures by which citizens can express preferences about policies and leaders; institutionalized constraints on executive power; and guarantees for the civil liberties of citizens". This indicator which is reported by the Center for Systemic Peace ranges from -10 (hereditary monarchy) to +10 (consolidated democracy). However, in some specific conditions, it takes a more negative score including: -66 in cases of foreign interruption, -77 in cases of interregnum or anarchy, and -88 in cases of transition. Data for this variable was extracted from the Center for Systemic Peace database.[31]

The third factor is employment situation. Rate of unemployment (UE) refers to the share of the labor force that is without work but available for and seeking employment per total labor force. It was extracted from the International Labor Organization database.[32]

Health status is another determinant of interpersonal violence. Life expectancy (LE) at birth was used as proxy for health status. The LE data was collected from the WHO Global Health Observatory data repository.[33]

Urbanization rate (U), urban population as percentage of total population, is also used as factor affecting interpersonal violence. We gathered the urbanization data from the Word Bank database.[34]

Analysis
After descriptive analysis of data, we used the methodology of panel data analysis for estimating the econometric model. Stationarity of data was checked using Im-Pesaran-Shin unit root test. We also conducted several tests for choosing the suitable estimation methods including panel diagnostic tests, heteroskedasticity, serial correlation and cross-sectional dependency. Finally, the model was

estimated using feasible generalized least squares (FGLS). Estimations were performed using Stata 14.2.

Results

Time series statistics shows a decreasing trend of interpersonal violence prevalence in the Middle East region (Figure 1). However, there is a noticeable prevalence of interpersonal violence in the region (about 2274 per 100 000 in 2016). Mean and standard deviation of the variables are presented in Table 1.

The results of unit root test showed that all variables are stationary at level. Other diagnostic tests showed cross-sectional dependency and serial correlation of residuals, so the model was estimated using FGLS. The scatter plot of explanatory variables and interpersonal violence prevalence is presented in Figure 2.

Regression results showed that GDP per capita, urbanization, DI and LE had a positive, while unemployment had a negative relationship with interpersonal violence prevalence (Table 2).

Discussion

While interpersonal violence is prevalent in the Middle East region, the trend is decreasing. In addition, per capita income, democracy level, unemployment rate, LE, and urbanization have a significant relationship with interpersonal violence. Improvement in these factors in recent years may have resulted in the decrease in interpersonal violence.

As findings showed, per capita income is one of the main determinants of interpersonal violence. It can
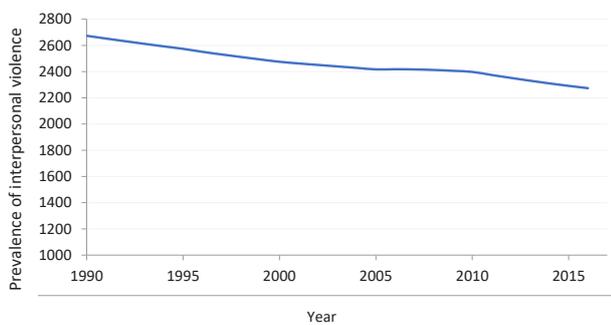
Figure 1. Trend of Interpersonal Violence Prevalence (Per 100,000) in the Middle East Region (1990–2016).

Table 1. Descriptive Statistics of Variables

Variables	Mean	SD	Min	Max
Interpersonal violence prevalence (per 100 000 population)	2462.3	232.4	1856.6	3255.3
Per capita income (US$1000)	12.933	15.418	0.172	88.564
Democracy index	-7.9	18.2	-88	10
Unemployment rate	7.3	4.4	0.14	20.3
Life expectancy at birth	73.5	4.5	58.7	82.1
Urbanization rate	73	18.3	20.9	99.3

be concluded that poverty increases the likelihood of intergroup and interpersonal conflicts. Elbadawi and Sambanis found that Africa's high frequency of civil war results from its high levels of poverty.[35] Several other studies have investigated the relationship between different types of violence and income. For example, Subodh et al showed that intimate partner violence is highly associated with income and other factors such as unemployment.[36] Babu and Kar also reported income as a determinant of domestic violence against women.[37] Similar findings are reported by Raissian[24] and Sanz-Barbero et al[25] in different contexts. Thus, as all evidence supports, it could be concluded that income and income inequality, as one of the main predictors of socio-economic status, could be a major determinant of violence in general. It should be considered that income in most Middle Eastern countries depends on oil price which has increased in the recent two decades. This increase may solve some economic issues, resulting in decreased interpersonal violence. On the other hand, it should be mentioned that income distribution and equality in income could be another major factor in predicting violence which could be shown somehow via unemployment rate.

Another variable that has a significant relationship with interpersonal violence is unemployment rate in Middle Eastern countries. While income in Middle Eastern countries is highly dependent on oil, unemployment could be another aspect of economic situation. In fact, most of per capita income is achieved through selling crude oil, not production and employment. The findings suggest that countries which have more unemployed population face greater interpersonal violence. This finding is confirmed by studies on individuals. Several studies have reported that unemployed individuals are more prone to committing violence against others.[24,25,36,37] In situations with high unemployment rate and absence of social welfare system, people, especially the youth, lack legitimate income and occupations; so, some have turned to crime and violence. In fact, low income and unemployment are two sides of one coin that could predict interpersonal violence.

The results about DI show that more democratic countries face lower levels of interpersonal violence. It should be mentioned that according to our descriptive analysis, democracy level is generally low in Middle Eastern countries. In this regard, where the government lets the individuals express their attitudes toward political issues, people are less prone to committing violence against each other. Also, strong democracies provide more effective and peaceful means for settling disputes and easing socio-economic inequalities. As Schwarzmantel discussed, democracy aims at the elimination of violence. When people are able to express their views and interests through a democratic process, they will adopt a nonviolent behavior. In undemocratic societies, violence is highly
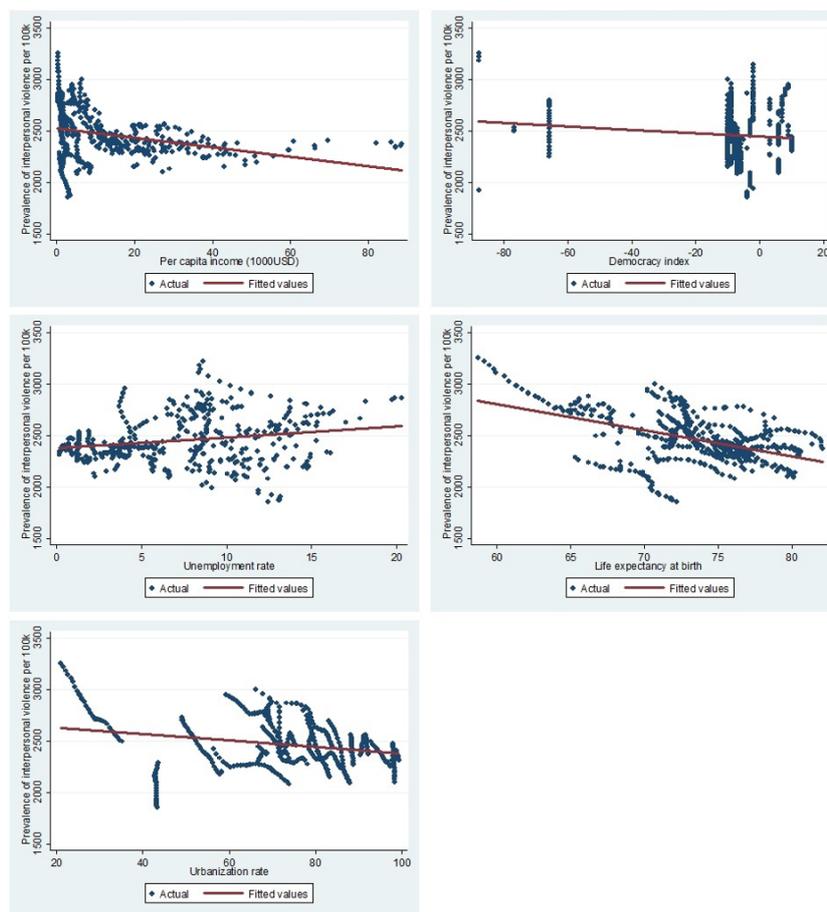
Figure 2. Scatter Plot of Explanatory Variables and Interpersonal Violence Prevalence.

used by the government to maintain itself in existence[38] and this could change individual behavior to more violent behavior.

Urbanization degree has a negative relation with violence. According to our findings, urban populations face less violence. The same finding was observed by Peek-Asa et al. They found that rural women report higher prevalence and severity of intimate partner violence compared to urban women.[39] Some reasons for the higher rates of violence among rural population may include social isolation, limited access to health facilities and physicians, and lower levels of education. On the other hand, Babu and Kar found urbanization to have a positive relation with violence.[37] Since there are few previous studies on urbanization and violence, this relation is not clear enough according to the literature.

Finally, the most interesting result of our research is that health has a significant relation with interpersonal violence. LE was selected as a proxy for health and the result was that the healthier society, the less interpersonal violence. According to Dutton et al, public health improvement can reduce domestic violence against women and adolescents.[40] In addition, Krug et al stated that health, as a form of human capital, could shift incentives for risky behaviors and change options outside of violent relationships.[4] Poor health and chronic diseases are associated with abuse.[4,41] Thus, health has been proven as a predictor of violence in different societies.

Table 2. Estimates of Panel Data Analysis of Factors Affecting Interpersonal Violence Prevalence in the Middle East Region

	Unadjusted Coefficients	Adjusted Coefficients	95% Confidence Interval		P Value
Constant	3532.951	8.5210	8.4872	8.5548	<0.01
Per capita income	-.1393	-.0046	-.0051	-.0041	<0.01
Democracy index	-.0072	-5.83e-06	-9.85e-06	-1.82e-06	<0.01
Unemployment rate	1.8474	.0007	.0003	.0011	<0.01
Life expectancy	-.9504	-.0363	-.0460	-.0264	<0.01
Urbanization rate	-8.5988	-.0925	-.0949	-.0901	<0.01
Goodness of fit		*Wald chi2 = 24156.7*			*< 0.01*

This study faced a number of limitations. First of all, the present study is a type of ecological study which used aggregated data. The second is variable and data limitations. In other words, several factors could affect violence such as education level. Since we did not have access to data pertaining to these related factors, we could not test their effect. Another limitation was endogeneity of peace and health. In fact, estimating a reliable instrumental variable approach is needed for addressing the endogeneity problem. We need a variable as instrument which in real life, can be too difficult to find and access. The fourth is heterogeneity considerations about Middle Eastern countries. The countries are different in terms of their socioeconomic situation. Thus, study limitations should be considered for generalizability of findings.

In conclusion, interpersonal violence in Middle Eastern countries has a decreasing trend but it is relatively higher than other regions. The present study revealed that urbanization, LE, per capita income, unemployment, and democracy had significant relations with interpersonal violence. Similar findings have been reported in other regions and countries. Thus, public policy makers should consider these factors for decreasing interpersonal violence. Also, focus on social determinants of health and health in all policies approach are suggested for decreasing violence.

Authors' Contribution
MB presented the idea and devised the project, gathered data, and analyzed data. FL prepared and cleaned data and helped in devising the project. KK searched relevant literature and helped in data analysis. SoD searched for relevant data and helped in drafting the manuscript. SaD developed the research idea, drafted the manuscript and managed the research. All authors read, commented, and approved the manuscript.

Conflict of Interest Disclosures
None.

Ethical Statement
The study protocol complies with the Helsinki Declaration (1964). As well, the research was an ecological study that used macro data from international open access databases and did not include individual data.

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