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Original Research

Devaluation in the Exchange Rate and its influence on murder in a developing nation: A new public health focus arising from economics

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Abstract

Introduction: The discourses on injuries, particularly murders, and the health impact of injuries as well as devaluation of a country's currency have omitted the exchange rate as a health-crime and public health phenomena.
Objective: The current study evaluates the role of the exchange rate in movements in murders and its implications for public health in developing countries.
Methods: Using 22 years of data (1989-2010) collated from various governmental departments' publications, classical linear regression model was utilized to estimate the influence of the exchange rate as well as other macroeconomic variables on murders. Findings: Of the five (5) variables simultaneously entered into the model, three (3) emerged as factors of log murder – F statistic [5, 17] = 49.311, P < 0.0001. The factors account for 95.4 percentage points of the variability in transformed murder, with log annual exchange rate accounting for 82.1 percentage points of the total variance compared to 9.3 percentage points by log unemployment and 3.2 percentage points by log poverty.
Conclusion: The rise in price of imported goods in Jamaica is hurting the urban people; this translates into higher propensity for murders and health care costs.

INTRODUCTION

Outside of violence and health (or ill-health), the role of GDP in influencing illness rate as well as unemployment in Jamaica is indicating that health policies should be planned differently in periods of growth and during rise in unemployment than in periods of recession and increased employment. The reality is that violence is a health cost, as figures from the Ministry of Health revealed that violence crimes cost the nation approximately Jamaican $2 billion in 2006 and that the productivity losses were estimated to be Jamaican $4 billion. A new paradigm is needed in the health care system that is wellness driven with such products instead of the ill-driven current paradigm [1]

There is empirical evidence to support the influence of the macroeconomic milieu on health of people within a geo-political space [1-5]. The health status of a populace, therefore, is responsive to changes in economic conditions, which can be on a macro or a micro scale [1, 3]. The health status of people within a particular geographical zone is equally influenced by violence as well as economic conditions, and violence emerges therefore as a public health challenge [6]. The cost of violence on health care system in Jamaica [7]

must be a cause for concern; one that cannot go unnoticed and within the context of the global economic markets; the economic environment poses some challenges to health, health care and health management. Examining the macroeconomic environment in Jamaica, Bourne and co-authors omit the exchange rate [1] from among a set of macroeconomic variables that account for changes in the health status. The exchange rate in Jamaica, like many developing countries, impacts on the cost of living, pricing of goods and services, financial markets and by extension the life of people, and it can result in increased poverty that can moderate health conditions. This reality places extreme burden more so on urban people, especially the economically vulnerable, than those in rural areas owing to the nature and structure of urban zones.

The World Health Organization (WHO) reports that 4 out of every 5 chronic illnesses were in low and middle income countries [6], suggesting that there is a direct relationship between economics and illness. The poverty and illness association is well established [8-10] and this commenced before 2005 when the WHO reported that 80% of chronic conditions are in low-to-middle income nations. It can be extrapolated from the WHO's findings that chronic illness can occur in developed nations and that poverty destroys the health status of people. A study in the Netherlands establishes the chronic illness and poverty relationship [8], which is also found in the United States and other First World countries [3].

Arising from the aforementioned findings is the importance of money (or the lack thereof) to health [11]. A group of researchers went as far as to postulate that money is good for health [12]. While such an interpretation is simplistic, there are some merits to the argument as money affords options to health care, nutrition, good physical environment, and the availability of financial resources can be good or bad for one's health. Bad health emanating from limited financial resources is denominated in the form of 1) indulgence in unhealthy lifestyle practices such as smoking and consumption of alcoholic beverages, and 2) sexual promiscuity which increases the risk of poor health and deteriorating health. The aforementioned interpretation has some empirical merit as Bourne and his colleagues [1] found that log health care utilization, log unemployment and log gross domestic product (GDP) account for 62 percentage points of the variability in log illness. In their work, it was revealed that log GDP and log illness were directly correlated as well as unemployment, and illness and health were negatively associated, suggesting that the lack of money is bad for health in Jamaica. Such perspectives highlight the interconnectivity between the poverty and ill-health, and what is meant when there is an increase in poverty in a society, and the importance of health for its safe and general development [13].

There is still another side to money (more or the lack of it), which is outside of the health discourse. Using econometric techniques, Becker [14] establishes that economics is an inducement to engagement into criminal activities. He also found that probability of being caught as well as length of sentencing are among factors that influence involvement in crimes. This can be referred to as the economics of crimes, which highlights the importance of the lack of money as an inducement to criminality. If money (or the lack of it) is an indicator of changes in criminality, then the exchange rate in developing countries must be brought into the crime-and-health discourse. Despite the empirical work offered by Bourne and his colleagues [1] on the crime-health discourse, the exchange rate is largely seen as an economic phenomenon without recognition of its importance to the public health and its implications. The exchange rate holds the key to socio-economic challenges experienced in many developing nations. It offers an explanation for people switching from certain products, consuming less of others, being unable to afford medication and resources not being allocated to particular things.

The structural adjustment programmes (SAPs) which were instituted in the late 1970s in Jamaica, account for the rise of inflation, poverty, the exchange rate as well as the social turmoil which arose following the implementation of such programmes. SAPs meant trade liberalization and fluctuating exchange rate resulted in the substitution of domestic produced goods for imported items owing to the lower cost of the latter. SAPs, therefore, saw the destruction of many infant industries that would provide goods and services to the local market, the dependency on foreign imports to supply demand and the worsening of the Balance of Payment deficit. Outside of the retardation and destruction of infant industries; unemployment, inflation, and poverty meant that economic hardship had intensified among the economically vulnerable and those who were on the economic margins were experiencing the socio-economic challenges brought upon by SAP. And there is no denying the economic crises which holds results accounting for changes in the health status [2, 4, 5].

Following SAP in the 1980, a new phenomenon emerged in the society. Jamaica began experiencing an upsurge in violent crimes, particularly murders. In response to the new reality, researchers began examining the crime phenomenon and established that there was a relationship between poverty and crime, suggesting that the economic hardship had led many people into a life of crime. Becker's seminal work on

the economics of crime permeated the discourse of crime in the Caribbean, particularly Jamaica, as the society sought answers. The exchange rate which was a critical component in SAP was growing at rapid rate and people were faced with plethora of challenges, with murder being a new phenomenon.

In Jamaica, the averaged annual numbers of murder is 1, 042 people which is relatively close to the numbers of deaths by diabetes mellitus, hypertension, and endocrine, nutritional and metabolic diseases. Mortality statistics reveal that hypertension, diabetes mellitus and endocrine, nutritional and metabolic diseases are the 10 top leading cause of death in Jamaica [15,]. The mortality figures for the aforementioned health conditions are between 1000-to-2000, suggesting that murder must be included as a cause of mortality with public health significance. HIV/AIDS are public health issues in the Caribbean [16, 17]. Between 5 and 14 per 100 annual deaths are accounted for by murders and with it being so close to the numbers by hypertension and diabetes mellitus, public health must begin to focus on murders as a health issue which requires immediate attention. The current study evaluates the role of the exchange rate in movements in murders and its implications for public health in developing countries.

Econometric model

The pioneering work of Gary Becker on the economics of crime will be used to frame the current work [14]. Becker's work on the utility maximization established factors which influence an individual's choice in crime. Becker's u*tility maximization crime* framework expressed crime as a function of many variables. These are displayed in Equation [1], below:

$y = f(x_1, x_{2,}, x_3, x_4, x_5, x_6, x_7)$ .. [1]

Where y = hours spent in criminal activities,

$x_1 =$ wage for an hour spent in criminal activity,

$x_2 =$ hourly wage in legal employment,

$x_3 =$ income other than from crime or employment

$x_4 =$ probability of getting caught,

$x_5 =$ probability of being convicted if caught,

$x_6 =$ expected sentence if convicted, and

$x_7 =$ age

Becker's economic crime function establishes that crime is a function of employment (returns from employment), economic activities outcome of criminal actions and economic betterment from engagement in crime. With poverty being an incapacitation, it could be deduced from *utility maximization crime function* that critical to the participation in criminal activities as an economic medium of survivability is the failure of the formal economy.

Becker's has set the foundation for the utilization of econometrics, particularly regression techniques, in the examination of crime data. Classical Linear Regression models attempt to assess the relationship between a single dependent variable and explanatory (or independent variables). Bourne [18] employed classical linear regression model to data in Jamaica on evaluating macroeconomic factors of violent crimes. He forwards that (in Equation [2])

$y_t = f(p_t, i_t, u_t, er_t, GDP_t) + e_t$ [2]

where y_t= number of violent crimes, p_t is poverty, i_t is inflation, u_t denotes unemployment, er_t represents annual exchange rate, and e_t is the random error and t stands for time.

For this work, we establish that murder is a function of the annual exchange rate (Equation [3]):

$M_t = \alpha ER_t^{\beta}1 U_t^{\beta}2 P_t^{\beta}3$ [3]

where M_t is total number of murders, ER_t is the annual exchange rate (in percentage), U_t is unemployment (in percentage), and P_t represents poverty (in percentage).

By transforming (or natural logging) both sides of Eqn [3], it can be deduced that:

$\log M_t = \omega + \beta_1 \log (ER_t) + \beta_2 \log (U_t) + \beta_3 \log (P_t) + u_t$.[4]

where ω symbolizes log α and u_t signifies the residual error terms, t = 1, 2, 3,…22

METHODS AND DATA

The current study utilizes published data to carry-out its analyses. The data were collated from Jamaica Government Publications, namely Jamaica Survey of Living Conditions (JSLC) [19], Economic and Social Survey of Jamaica (ESSJ) [20], and Bank of Jamaica (BoJ) [21]. The data from the JSLC were on rate of illness, health care seeking behaviour and poverty for 1989 to 2010 on the population. Regarding Gross Domestic Product (GDP) and inflation, data were from a Bank of Jamaica's publication entitled Economic Statistics. Data collated from the Economic and Social Survey of Jamaica related to numbers of murder and unemployment rate (in percentage).

Statistical Data were stored, retrieved and analysed using SPSS for Windows 19.0 (SPSS Inc; Chicago, IL, USA) and Microsoft Excel. Pearson's Product Moment Correlation was used to assess the bivariate correlation between particular macroeconomic and other variables. Scatter diagrams and best fit models were used on the data. Ordinary least square (OLS) regression analyses were used to establish the model for log murder. The

OLS was utilized to determine the possible explanatory variables and test whether there is really a correlation between numbers of murders, self-reported illness and selected macroeconomic variables when placed in a single model.

In any instance where collinearity existed ($r > 0.7$); the variables were entered independently into the model to determine as to which of those should be retained during the final model construction. The final decision on whether or not to retain the variables was based on the variables' contribution to the predictive power of the model and its appropriateness as well as the Durbin-Watson test value (DW). Durbin-Watson coefficient which lies between 1.5 and 2.5 indicates independence of observations (or variables) – there is no problem with (or no serial autocorrelation).

VARIABLES

Self-reported illness (illness) rate is a percentage of people in the population who reported having an illness in the survey week in each calendar year. Illness is an indicator of poor ('bad') health as only since 2007 the JSLC began collecting data on self-rated health status [19]. Prior to that year, data on illness was collected, which was used to plan for the health of the populace. For years in Jamaica, data were collected on the antithesis of health to aid policy formulation; this was used in this research.

Murder denotes the number of people unlawfully killed (a crime causing death without a lawful excuse) within a particular geopolitical zone (excluding police killings or homicides). For this work, murders represent the total number of murders for each year.

Annual exchange rate is number of Jamaican dollars which are equivalent to 1USD, at different periods in time

RESULTS

Table 1 shows data on selected acroeconomic variables, murders and self-reported illness in Jamaica from 1989-2010. Over the past 22 years, the average numbers of Jamaicans murdered were 1,042 people. The first time the numbers of murders were in the 1000 was in 1997 and it has been like this after 2001, except in 2003 when it was 975 (Table 1). For the same period, the prevalence of poverty was 21.4 percentage points, unemployment rate, 11.3 percentage points, inflation, 18.8 percentage points and the annual exchange rate was Jamaica $45.25 for USD $1.00. On examination, the data show that early 1990s was a period of high poverty, unemployment, inflation and drastic increases in the annual exchange rate.

There is a strong statistical association between the annual number of murders and annual exchange rate (Jamaican dollars and USD). Based on Figure 1, the relationship between annual number of murders and annual exchange rate is best fitted by an exponential function – Annual Murder = $471.1e^{0.0159\text{Annual Exchange Rate}}$ ($R^2 = 0.871$ or 87.1%). Hence, annual murders at time t+1 is simply a function of the annual murder at time t and x is the annual exchange rate of Jamaican dollar to United States dollar (USD) – see Equation [1] –

$$M_{t+1}=M_t.e^x \quad [1]$$

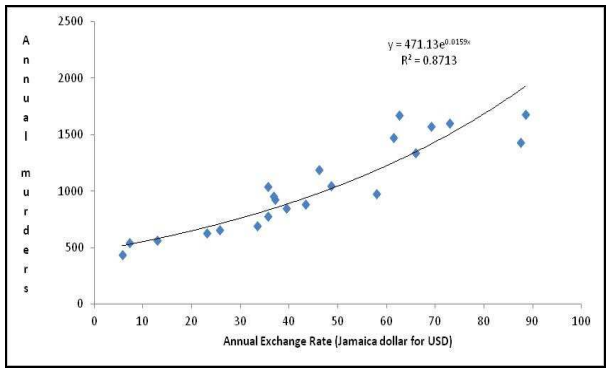

Figure 1. A graphical display of the Annual Number of Murder and Annual Exchange Rate

This means that annual murders can be predicted with a high degree of accuracy using the aforementioned function, which denotes that annual exchange rate is a predictor of annual number of murders in Jamaica.

Figure 2 displays the histogram of the frequencies of the standardized residuals and the superimposed curve signifies the ideal normal distribution of the residuals.

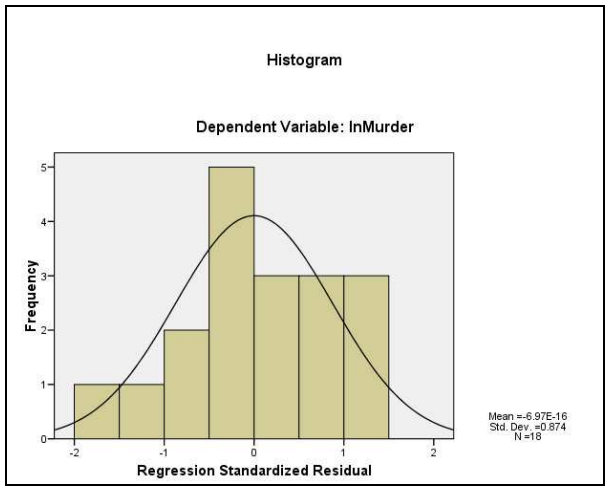

Figure 2. Histogram of the dependent variable (log murder) and regressors

Figure 3 presents a cumulative probability plot of the standardized residuals. Owing to the fact that most of the points fall on the diagonal line, this means that the residuals are normally distributed.

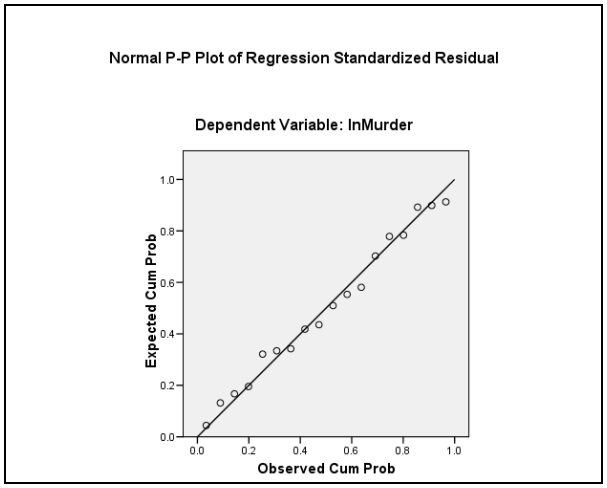

Figure 3. Cumulative probability plot of standardized residuals.

Figure 4 shows that no pattern is indicated by the data, which supports the linearity of the relationship.

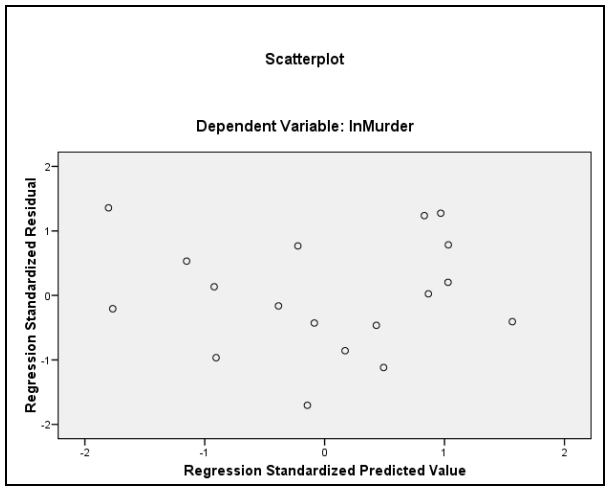

Figure 4. Scatter plot of the predicted scores against the residuals

Table 1. Selected macroeconomic variables and murder, 1980-2010

	Year	Murder	Unemployment	Poverty	Inflation	Exchange rate	Illness
1	1989	439	18	30.5	17.2	5.77	16.8
2	1990	542	15.3	28.4	29.8	7.18	18.3
3	1991	561	15.3	44.6	80.2	12.85	13.7
4	1992	629	9.4	33.9	40.2	23.01	10.6
5	1993	653	9.5	24.4	30.1	25.68	12.0
6	1994	690	10.9	22.8	26.8	33.35	12.9
7	1995	780	9.6	27.5	25.6	35.54	9.8
8	1996	925	10.8	26.1	15.8	37.02	10.7
9	1997	1037	10.6	19.9	9.2	35.58	9.7
10	1998	953	10	15.9	7.9	36.68	8.8
11	1999	849	10	16.9	6.8	39.33	10.1
12	2000	887	10.2	18.9	6.1	43.32	14.2
13	2001	1191	10.3	16.9	8.8	46.09	13.4
14	2002	1045	10.6	19.7	7.2	48.54	12.6
15	2003	975	9.7	19.1	13.8	57.93	12.5
16	2004	1471	11.7	16.9	13.7	61.34	11.4
17	2005	1674	11.2	14.8	12.6	62.5	12.5
18	2006	1340	10.3	14.3	5.7	65.88	12.2
19	2007	1574	9.8	9.9	16.8	69.06	15.5
20	2008	1601	10.6	12.3	16.8	72.92	8.7
21	2009	1680	11.4	16.5	10.2	88.49	10.6
22	2010	1428	12.9	20.3	13	87.38	
	Average	1042	11.28	21.39	18.83	45.25	12.2

Table 2 presents information on the variables that influence (or not) log annual murders in Jamaica. Of the five (5) variables simultaneously entered into the model, three (3) emerged as factors of log murder – F statistic [5, 17] = 49.311, P < 0.0001. The factors account for 95.4 percentage points of the variability in transformed murders were log annual exchange rate which accounted for 82.1 percentage points of the total variance compared to 9.3 percentage points by log unemployment and 3.2 percentage points by log poverty. Furthermore, annual exchange rate is positively correlated with murder as well as unemployment, with poverty being inversely associated with murders. Based on the information in Table 2, a mathematical formula can express the annual number of murders based on the values for 1) annual exchange rate, 2) unemployment rate, and 3) the poverty rate, Equations [3] and [4].

Table 3 presents correlations of selected macroeconomic variables. A positive negative statistical correlation existed between the annual exchange rate and poverty (r_{xy} = -0.734), which means that 53.9% of the variability in the prevalence of poverty accounts for a 1% change in the annual exchange rates. Strong statistical correlations existed between 1) poverty and the annual exchange rate and 2) poverty and inflation; with the association between poverty and unemployment being a moderate one (r_{xy} = 0.520, P=0.013).

Table 2. OLS regression of selected macroeconomic variables, self-reported illness (in %) and annual murders

Characteristic	Unstandardized Coefficient	Std. Error	Beta	t statistic	*Prob.*	95% CI	Correlations		
							Zero-order	Partial	Part
Constant	1.901	0.994		1.912	0.078	-0.246 - 4.048			
Log Inflation	-0.009	0.058	-0.015	-0.152	0.881	-0.135 - 0.117	-0.533	-0.042	-0.012
Log Illness	0.057	0.219	0.027	0.260	0.799	-0.417 - 0.531	-0.390	0.072	0.021
Log Exchange Rate	0.677	0.076	1.230	8.921	<0.0001	0.513 - 0.841	0.906	0.927	0.724
Log Unemployment	0.979	0.228	0.423	4.291	0.001	0.361 - 1.639	-0.456	0.684	0.275
Log Poverty	-0.440	0.138	-0.389	-3.185	0.008	-0.740 - -0.139	-0.861	-0.677	-0.198
R^2 = 0.954									
Adjusted R^2 = 0.934									
F statistic [5, 17] = 49.311, P < 0.0001									
Durbin Watson test = 2.2									
Standard error of the estimate = 0.11									
N = 21									

Dependent Variable: log Murder

Table 3. Pearson's Product Moment Correlation of selected macroeconomic variables

		Exchange Rate	Poverty	inflation	unemployment	illness
Exchange Rate	Pearson Correlation	1	-.734**	-.514*	-.402	-.380
	Sig. (2-tailed)		.000	.014	.063	.089
	N	22	22	22	22	21
Poverty	Pearson Correlation	-.734**	1	.834**	.520*	.247
	Sig. (2-tailed)	.000		.000	.013	.280
	N	22	22	22	22	21
inflation	Pearson Correlation	-.514*	.834**	1	.375	.198
	Sig. (2-tailed)	.014	.000		.086	.389
	N	22	22	22	22	21
unemployment	Pearson Correlation	-.402	.520*	.375	1	.632**
	Sig. (2-tailed)	.063	.013	.086		.002
	N	22	22	22	22	21
illness	Pearson Correlation	-.380	.247	.198	.632**	1
	Sig. (2-tailed)	.089	.280	.389	.002	
	N	21	21	21	21	21

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

DISCUSSION

Over the last two decades in Jamaica (1989-2010), on average three people were murdered daily, 87 per month and 1,042 annually. Historically, the first time the numbers of murders reached 1000 was in 1997 (averaging three people per day) and it has been like this after 2001 except in 2003 when it was 975 (averaging three people per day). For the same aforementioned period, the prevalence of poverty averaged 21.4%; the annual exchange rate averaged $45.24 Jamaican for a USD; inflation averaged 18.8%, and poverty, 11.3%. In fact, in 1989 the annual exchange was Jamaican $5.77 for a USD and this grew by 1,414.4% at the end of 2010 (averaging an annual increase of 64.3%). A very strong bivariate statistical relationship existed between murders and the annual exchange rate, with the distribution being best fitted by an exponential curve. Of the five (5) variables simultaneously entered into the model, three (3) emerged as factors of log murder – F statistic [5, 17] = 49.311, $P < 0.0001$. The factors account for 95.4 percentage points of the variability in transformed murders were log annual exchange rate which accounted for 82.1 percentage points of the total variance compared to 9.3 percentage points by log unemployment and 3.2 percentage points by log poverty. Furthermore, annual exchange rate is positively correlated with murder as well as unemployment, with poverty being inversely associated with murders, and that the annual exchange rate is inversely correlated with poverty.

Trade liberalization in many developing nations has left them worse off [22-24]. Prior to the structural adjustment programmes (SAPs) that were implemented by many governments in the Third World during the mid-to-late 1980s, a fixed currency was replaced by a floating exchange rate and an economic crises followed the implemented SAPs [22]. One of the rationales for trade (or market) liberalization including the devaluation of currencies is the rise of producer prices. The argument purports that a devaluation of local currency in developing countries would make their exports more competitive from the lowered prices compared to the international markets. According to Rapley [22] “In addition to the moral concerns the raised by structural adjustment, namely that SAPs have worsened the plight of the poor and deepened injustices in third-world societies.There appear to be serious economic and political drawbacks to neoclassical reform. It appears that neoclassical theories, in focusing on the virtues of rolling back the state, overlooked some of the problems this process would beget”. In the wake of SAPs and trade liberalism, the following became the experiences in many developing nations, like Jamaica; increased 1) inflation, 2) unemployment, 3) annual exchange rate, 4) human sufferings [22-24], and 5) murders.

Among the issues of SAP were floating currency and trade liberalization which weakened the state of developing nations like Mexico, Cộte d’Ivoire, Sierra Leone and Jamaica [22]. Those nations experienced an erosion of the economic base of countless households, higher inflation, unemployment and increased poverty that were unprecedented [22-24]. The discourse of SAPs in developing nations, particularly Jamaica, is void of an interpretation on murders and deterioration in the currency and the public health challenges.

Many developing nations experienced remarkable increases in exports; but what arose was the drastic rise in prices of imports, the destruction of infant industries and it did little to stimulate exports [22-24]. The Jamaica experience after the SAPs in the early 1990s was unprecedented inflation of 80.2 percentage points and prevalence of poverty which skyrocketed to 44.6 percentage points (in 1991). In 1989, the annual exchange rate in Jamaica was USD $1.00 for Jamaican $5.77, which increased by 298.8 percentage points at the end of 1992, which corresponds to a 44.3 percentage points increase in murders. The rise in violence in Jamaica in the early 1990s was a similar experience in Mexico and many countries, particularly in Africa, and what emerge were balance of payment and financial crises [22]. There are enough empirical evidence which reveals that there is an association between financial crises and health problems [2, 4, 5], and now there is economics of murder.

The current work reveals that the exchange rate is a strong positive predictor of murders in Jamaica. What envelopes in this finding is the role of devaluation of a currency in murder rates, suggesting that there is an economics of murder in Jamaica. Becker’s seminal work [14] which states that engagement in criminal activities is an economic phenomenon provides some explanation for the economics of murder in Jamaica. It can be forwarded, therefore, that among the legacies of SAPs were murders, poverty and health challenges as the present findings show a direct association between 1) the annual exchange rate and murders, 2) poverty and inflation, 3) poverty and inflation, 4) illness and poverty and 5) murder is influenced by the exchange rate, unemployment and poverty.

The murder pandemic which began during the 1980s can be attributed, therefore, to the general state of the Jamaican economy, particularly the continuous deterioration in the nation’s currency and unemployment. Rapley provides an interpretation of the challenges of devaluation in a country’s currency this way “They [consumers or people] will stop eating rice and start eating cassava, or stop buying bread made

from higher-quality imported wheat. Grumbling as they eat, they will eat nonetheless, and in the meantime local producers will get the benefit of an increased demand for their goods. However, the poorest urban consumers, who simply cannot absorb the price increase and so will reduce their consumption, need to be believed" [22], suggesting that economic hardship which follows devaluation of a nation's currency plays a part in the health challenges. There is another side to this coin, engagement into criminal activities because of economic hardship account for not only the rise in murders; but, the psychological issues felt on families as well as the health care cost that is absorbed by the society. It was long established by Gary Becker [14] that involvement in criminality is an economic issue. The present work finds that the economic factors (annual exchange rate, unemployment and poverty) account for 93.4% of the variability in murder; and now murder must be added to the general discourse.

When Becker shows that people's engagement in crimes is economic as well as price of being caught and sentenced. This meant that survivability will be met by any available option necessary. The findings in this paper found that there is a direct correlation between 1) poverty and unemployment, 2) inflation and poverty, 3) murder and the exchange rate, which means that economic deprivation and economic marginalization are driving the murder pandemic in Jamaica. Involvement in criminality, of which murder is an offspring, is not an innate reality but a happening which surfaces owing to a matter of survivability against the cost of penalty. In developing countries, SAPs have destroyed many once infant industries that would provide goods and services to the local market, and this accounts for the dependency on foreign imports to supply demand which was once filled by local producers, economic livelihood and livability [22]. SAP results in economic crises in many developing countries and one researcher opined that financial and/or economic crises can spill off into other areas within a society. Downes [25] contends that the collapse of the subprime market in the United States in 2007 along with the crash in the financial market subsequently resulted in the global financial crises, and that this financial virus became contagious in many developed as well as developing nations. He postulated that global financial meltdown spilled over into a worldwide crises, which saw the reduced income, demand for goods, and employment, indicating the opened world economies and the interconnectivity between economy of the United States and other nations, and imported domestic economic hardship.

A study by Stuckler and colleagues [26] concurs with the postulation of Downes when they opined that Northern Ireland experienced a global economic spinoff that saw the reduction in production of goods and services, increased unemployment, and that some home buyers weree left with negative equity. Unlike Downes who did not extend the discourse to health of the population, Stuckler et al. [37] found that the recession was inversely affecting the health status of people in Northern Ireland, particularly among those who had lost their jobs, and that unemployment was associated with increased consumption of alcoholic beverages. Such a finding is highlighting the extent of the crisis, the destruction in the human capital and erosion of future health status. Witter and Anderson [23] show that the social cost of the SAPs (or economic hardship) left many Jamaicans in poverty, unemployment, and the human cost was enormous. The rapid devaluation of the Jamaican dollars was eroding the economic base of the natives, especially the economically vulnerable and those who were on the economic margins were suffering as they substitute nutritious foods for anything to eat. A study by Bourne [10] finds that there is an inverse correlation between poverty and health care utilization, indicating that economic crisis was accounting for a substitution of nutritious foods and health care utilization for poor foods and the avoidance of seeking medical care because of the economic climate.

The continued deterioration of a country's currency is an indicator of economic crisis; but economic crisis extends beyond an economic issue (including poverty, unemployment, and devaluation) to a public health matter [27-29]. This work shows that devaluating a local currency translates into increased murders, which are both a security issue as well as a public health matter. The present paper is concerned with the public health challenges of devaluation in a country's currency as the strong direct association between the exchange rate and murder, suggests that public health programmes and thinking must include the exchange rate.

Within the context that devaluation increases the likelihood of a murder being committed in Jamaica, the exchange rate must be the new focus of public health practitioners, epidemiologists, health demographers and policy specialists as it provides a good proxy of the changes in murder. Gary Becker establishes that there is an economics to crime which extends to murder, and devaluation of local currencies in developing nations must be watched as it provides an indicator of movements in murder, which is a public health challenge within the context of typologies of deaths. Even though murder is a finality of life, the costs associated with violence – including injuries and gunshot wounds – are enormous burden on resources in developing nations as it relates to health care treatment [30, 31] and the psychological trauma of caring for the

bereaved afterwards increases burden on tax payers as many people seek public health care. And, then there is the general fear of crimes and victimization [32, 33], which is also a public health issue. During the imported economic recession of 2007/08 [25], the annual exchange rate in Jamaica increased by 5.8% which corresponds to a 1.7% rise in murders which was omitted from the global economic crisis in the Caribbean and Latin America, particularly Jamaica [25, 34, 35].

The impact of the economic crisis in the Caribbean is expressed more than this statement made by Downes [25], "Caribbean economies are general regarded as being vulnerable to external economic shocks and given the size of this shock, one would expect significant large and lasting effects" to include the depreciation in the exchange rate and the murders which resulted from the rise in the annual exchange rates. In 2008/09, the annual exchange rate in Jamaica increased by 5.8% which corresponds to a 1.7% rise in murders and this must be included in the analysis of the global economic crisis and its consequences on developing nations. In 2009, the number of murders in Jamaica was the highest in history (1,680 people), averaging approximately 5 murders daily, which is marginally lower than the number of mortality by diabetes mellitus, greater than the number of deaths by hypertension [15] and substantially more than the number of deaths by HIV/AIDS indicating the seriousness of public health concerns, the murder pandemic and its relationship with economics. In fact, the number of mortality by hypertension, using statistics from the Statistical Institute of Jamaica (STATIN), from 2004 to 2008 [15] has been less than the number of murders for the same period, and murders are at least five times the number of deaths by HIV. Yet murders are not classified among the 10 leading causes of mortality yet hypertension, diabetes and HIV are enlisted therein.

The reality in Jamaica is that murder is a pandemic and it is substantially explained by economics, particularly the exchange rate. Murder is aggregately explained by 1) the exchange rate, 2) poverty and 3) unemployment (R^2 = 93.4%), indicating that the health challenges of murder rest squarely with economics. The exchange rates is, therefore, more than an economic issue as the present work unearthed findings to justify the importance of this phenomenon in public health and health literature.

CONCLUSION

There is absolutely no doubt that murder is a public health challenge, particularly in developing nations, and that exchange rate must be included in the study of public health, health demography and the general health discourse. In Jamaica, the reality is almost 3 persons are murdered daily and that the annual number of murders is greater that deaths by HIV/AIDS and close to the number of mortality by hypertension as well as diabetes mellitus. The nation is experiencing a murder pandemic which is brought upon by the economic climate. The devaluation of a country's currency should provide the advantage of increased exports in Third World nations. Instead it has resulted in increased murders, pre-mature deaths and lower life expectancy as many young people are slaughtered because of economics. The Jamaica experience has been devaluation which accounts for a rise in murder and the vulnerability of developing nations' economics to external shocks make it increasingly important to include devaluation in public health and health matters. In Jamaica, between 1988 and 2011, the nation experienced at least one financial crisis, two economic recessions, massive devaluation of the Jamaican dollar and a corresponding geometric rise in murder, and a high public health cost [7] in respect to health care utilization, medication and psychological trauma – including fear of crime and victimization, which is not included in public health care accounting.

In summary, currency devaluation offers a glance into the disbenefits of increases in the exchange rate and the public health problem of murders. Devaluation is associated with the lowering of the life expectancy of many people in developing nations and the number of morality makes it a public health challenge. The rise in price of imported goods in Jamaica is hurting the urban people and this translates into higher propensity of murders as well as health care cost. The reality is, deterioration in the local currency results in greater propensity of loss potential years of life, which is a public health matter that cannot be left without being addressed in any society. Public health, therefore, must focus on the deterioration in value of the local currency as measures are needed to reduce its influence on human life, life expectancy, the quality of life, human sufferings and health care expenditure. Devaluation is an economic phenomenon; but the present work shows that it is equally a public health matter and should not be left to be studied only by economics as it is an aspect, therefore, of health economics.

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