Violence against Women and Gender Equality in the Philippines: Are they Related?

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Abstract

The Philippine Commission on Women furthered campaign in promoting gender equality in the Philippines which has been a socio-cultural issue over the past years. The strict implementation of the law may have caused Filipino women to speak up and report abuses against them. The study determined the model for the trends, a sample forecast for the next 10 years, and relatedness of the reported crime of violence against women and the Gender Gap Index (GGI) in the Philippines. It retrieved data from the reports of the Philippines Statistics Authority and of the World Economic Forum from 2006 to 2017 through data mining. This study employed descriptive methods via time trend analyses using Minitab® and Symbolic Regression using Eureqa Pro®. Using time trend analysis, the reported cases of violence against women fits the Quadratic Trend Model (MAD=1968) while the quality of gender equality in the Philippines fits the Linear Trend Model (MAD=0.00306). Both reports are forecasted to be increasing for the next 10 years. The symbolic regression analysis provided a forecasted relatedness of the reported cases of violence against women (R=0.9958, R²=0.9911, MAE=0.00067) to GGI. The reported cases of violence against women have a 73% positive association of increasing GGI. Such disclosure supports the necessity of pragmatically real social action from governmental and non-governmental organizations which prevent the occurrence of the crime of violence against women in the future and increase gender equality to promote social welfare as part of the sustainable development goals.

Keywords: Gender and development; Social welfare; Sustainable development goals; Symbolic regression; Time trend analysis

Introduction

The United Nations (UN) (2015) emphasized that increasing gender equality awareness is a crucial part of the overall picture of the Sustainable Development Goals (SDG). These Global Goals encourage the world to fight and to end poverty, protect the planet, ensure that all people enjoy peace and prosperity, and to promote gender equality (United Nations Development Programme [UNDP], 2018). Gender equality, as defined by the UN Office of the Special Advisor to the Secretary-General on Gender Issues and the Advancement of Women, means men and women having equal rights, opportunities, responsibilities, and access to resources as well as the enjoyment of them while taking into account the assurance that men and women’s perceptions, interests, needs, and priorities are given equal weight (www.africa.undp.org). As evidence of living out the SDGs on gender equality, the World Economic Forum (WEF) first published the Global Gender Gap
The GGI was presented by WEF to determine the magnitude of gender-based disparities among countries worldwide (WEF, 2017). WEF provides country rankings which are designed to create global awareness on gender equality and its progress over time.

In the Philippine setting, issues on gender equality and violence against women are undeniable. The National Statistics Office found out that one out of five women suffered from physical violence with 14.4 percent of married women being physically abused or suffered domestic violence from husbands (Philippine Commission on Women [PCW], 2009a). One-third of separated or widowed women also experienced violence which resulted in separation or annulment (PCW, 2009a). This long-established unequal relationship of men and women is very much concretized by the occurrence of violence against women (VAW), as purported by the Philippine Commission on Women (PCW, 2009b) and World Health Organization (WHO) (2010). The Philippines Statistics Authority (PSA) compiled these reported cases by the PNP on violence against women.

Despite these sad realities, the Philippine Government is committed to the challenge of attaining the SDGs to promote gender equality. As reported by the Senate of the Philippines on Crime Statistics (2013), having a safe and secure community is vital and is an important factor in adopting ventures and economic growth. The Philippine government, as a response to promote the SDG on gender equality, issued a policy statement informing all government agencies to conduct data monitoring on the performance of the country with respect to the SDGs and responsibilities of statistics agencies on reported cases of violence against women in the Philippines (Philippine Statistics Authority, n.d.). As a result, Philippines is ranked as 10th out of 144 participating countries worldwide in the recent 2017 WEF report on Gender Gap Index (GGI).

This paper has three main objectives. First, it determined the model for the trends of the reported crime of violence against women and GGI in the Philippines through a time series analysis. Second, it provided a sample forecast of the reported crime of violence against women and GGI in the Philippines in the next 10 years. Thirdly, it determined the relatedness of the reported crime of violence against women and GGI in the Philippines by creating a model through symbolic regression (SR) analysis.

Theoretical Framework

The SDG on gender equality prompted all members of UN to end all forms of discrimination against women which is a necessary foundation, not only for upholding human rights but for a peaceful, prosperous and sustainable world (UNDP, 2018). As consistently cited by Hopkins & Patel (2006), Permanyer (2008), O’Connell (2011), Carlson and Randell (2013), Winchester and Browning (2015), Loots and Walker (2015), Ponte and Enríquez (2016), Lombardo, Meier and Verloo (2016), Rosche (2016), Onditi and Odera (2016), and Cochran and Rao (2018), violence against women became an underpinning manifestation of the lack of gender equality. Meanwhile, the lack of gender equality is seen as an underlying determinant of violence against women which includes hierarchical structure based on features such as gender, race or class (Ridgeway, 2014; Nayak et al., 2003; Fanslow et al., 2010), disproportionate experience of women as victims of violence (WHO, 2005; Fulu et al., 2013), and women being educationally disadvantaged (Jewkes, 2002). Further, society’s misinformed views on gender and sexuality may have contributed to these phenomena. As studied by Wall (2014), the connection between gender equality and violence against women requires a multi-dimensional perspective that goes beyond economics like the relative social status of different groups, social norms, and attitude. Wall added that the lack of research and data on gender equality and violence
against women, despite obvious logic in the connection, added to the complexity (Wall, 2014). It is necessary to look at the correlation of these variables for achieving sustainable development and to uplift human rights through enhancing social welfare of the country since it was found out from previous related studies that social welfare is affected most by the quality of gender equality (Bergqvist, 2016; Mandel & Semyonov, 2006; Korpi, 2000; Korpi, Ferrarini & Englund, 2013; Sipilä, Anttonen & Baldock, 2003).

**Methodology**

This study retrieved essential data used as variables through data mining, a process of using datasets to ascertain patterns and institute associations through data analysis (Rouse, 2008; Witten, Eibe & Holmes 2011). Witten, Eibe and Holmes (2011) added that the benefit of data mining allows uncovering hidden patterns and relationship which aids to make predictions. Davis and Patterson (2012) also assured data to be ethically neutral. Republic Act 10173 (Data Privacy Act of 2012), provides that information processed for journalistic, artistic, and literary or research purposes are valid grounds for the proper consumption and usage of available data (National Privacy Commission, n.d.).

In this study, the data are reports from reputable agencies and are readily available for public consumption. The data include the reported cases of violence against women in the Philippines, as presented in Table 1 of the annual Philippines Statistics Authority (PSA, 2017). The Philippines Statistics Authority for the past 12 consecutive years, from 2006 to 2017, produces an annual report which summarizes various statistics generated by PSA and other government and private agencies. This report includes statistics on Crime and Delinquency based on the reports given by Philippine National Police (PNP) which reported cases of violence against women, are recorded (PSA, 2017).

While Table 2 depicts the GGI of the Philippines as provided by the (WEF in 2017), WEF introduced the GGI in 2006 which served as a basis for apprehending the extent of gender-based inequalities and tracing their progress over time WEF, 2017. The Philippines is among the 144 countries which participated in the survey. Hausmann, Tyson and Zahidi (2010) reported that countries' ranking of Gender Gap Index is based on the calculated gender gap between women and men in four key areas: health and survival; educational attainment; economic participation; and political empowerment. Health and survival, as purported by Hausmann, Tyson and Zahidi (2010) and
Table 1. Reported cases of violence against women from 2006 to 2017 based on the annual Philippine Statistics Authority (PSA) report

<table>
<thead>
<tr>
<th>Year</th>
<th>Reported Cases of Violence Against Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>8,011</td>
</tr>
<tr>
<td>2007</td>
<td>7,383</td>
</tr>
<tr>
<td>2008</td>
<td>6,505</td>
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<tr>
<td>2009</td>
<td>5,889</td>
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<tr>
<td>2010</td>
<td>6,679</td>
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<tr>
<td>2011</td>
<td>7,456</td>
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<tr>
<td>2012</td>
<td>10,482</td>
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<tr>
<td>2013</td>
<td>15,789</td>
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<tr>
<td>2014</td>
<td>13,974</td>
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<tr>
<td>2015</td>
<td>17,526</td>
</tr>
<tr>
<td>2016</td>
<td>25,430</td>
</tr>
<tr>
<td>2017</td>
<td>40,220</td>
</tr>
</tbody>
</table>

Choe, Cho and Kim (2016) is an outcome on the female-to-male ratio at birth and healthy life expectancy of females relative to males as WHO (2007; 2009) reported on healthy life expectancy and in the global burden of disease obtained. Hence, the female mortality rate determined the index score. In this case, countries which reported to have high male mortality rates could achieve better scores in health and survival sub-index (Stanistreet, Bambra, & Scott-Samuel, 2005).

Meanwhile, the sub-index on educational attainment measures outcomes on access to higher level education and literacy rate of female to male as well as the female-to-male ratios in school enrolment across all levels of education including primary, secondary and tertiary levels (Hausmann, Tyson & Zahidi, 2010; Choe, Cho & Kim, 2016). The economic participation sub-index looked at salaries, participation levels and access to high-skilled employment opportunities for female and male. Hence, it calculated female-to-male ratios of labor force participation, wages, earned income, the number of workers with managerial status, and the number of professional workers (Hausmann, Tyson & Zahidi, 2010; Choe, Cho & Kim, 2016).

The sub-index on political empowerment looked at outcomes on representation in decision-making structures based on the number of women relative to men in parliament, at the ministerial level, and as heads of government (Hausmann, Tyson & Zahidi, 2010; Choe, Cho & Kim, 2016). The Philippines has been part of Gender Gap Reports of WEF from 2006 to 2017.

A four-step process is followed to construct these indices (Hausmann, Tyson & Zahidi, 2010). The indicators of interest are interpreted first from accessible data into female/male ratios. The equality benchmark is marked as 1 when data obtained are equal for women and men except for health and survival sub-index while equality benchmark for sex ratio and healthy life expectancy are 0.944 and 1.06 respectively. Calculating the weighted averages for the truncated ratios within each sub-index to create the sub-index values served as the third step. Moreover, the unweighted average of each sub-index is taken to calculate the overall GGI. The final values are bounded by 0 (inequality) and 1 (equality). These areas are very relevant in determining the quality of gender equality around the globe.

This study employed descriptive methods via time trend analyses using Minitab® and
symbolic regression using Eureqa Pro® in determining the trend and relatedness of the reported cases of violence against women and GGI in the Philippines.

**Results and Discussion**

Figure 2 gives a graphical idea of the trend of reported cases of violence against women in the Philippines from 2006 to 2017. It showed an increasing trend in the number of reported cases of violence against women in the Philippines for the past 12 years. From a report of 8,011 cases of violence against women in 2006, it increased to 40,220 cases in 2017. The result provided a Quadratic Trend Model with a Mean Absolute Percentage Error (MAPE) of 13, a Mean Absolute Deviation (MAD) of 1968, and a Mean Standard Deviation (MSD) of 6420867. The increasing trend of reported cases were recorded by the PNP. Hence, the increase of the reported cases does not necessarily mean or is conclusive that there is an increase in the occurrence of the crime against women. The possibility of unreported cases of violence against women in the Philippines could not be bargained.

Figure 3 shows an increasing trend of gender equality in the Philippines. The GGI of Philippines for the past twelve years has improved from 0.7516 in 2006 to 0.79 in 2017. The Linear Trend Model provided with a MAPE of 0.396251, a MAD of 0.00306, and an MSD of 0.000013. The model supported the result of the recent 2017 WEF report in which the Philippines is ranked as 10th out of 144 participating countries worldwide. For the past twelve years since the first Global Gender Gap Report in 2006 by the WEF, the country has scored high in the area of gender equality.

Moreover, the reported cases of violence against women are forecasted to be increasing in the next 10 years using the Quadratic Trend Model, as seen in Table 3. As predicted, the forecasted number of reported cases will be 43,121 in 2018. It will also increase up to 156,993 in 2027 if there is continued use of same trend in projecting the number of reported cases of violence against women in the Philippines. On the other hand, the forecasting of GGI of the Philippines in the next 10 years is also improving (Table 3). Using the Linear Trend Model, we predict that in 2027, the Philippines will have an index rating of 0.8289 provided that the current undertakings to improve gender equality in the Philippines are maintained. Such disclosure supports the necessity of pragmatically relevant social actions from a governmental and non-governmental organization which prevent the occurrence
of the crime of violence against women in the future and increase gender equality as part of sustainable development goals. As consistently cited, strengthening gender equality policies in every country in effect strengthens women’s desire to be empowered (Villagomes, 2004; Stratigaki, 2005; Walby, 2005; Pease, 2008; Lombardo, Meier & Verloo, 2016). Gender equality, as an ambition set as part of UN Agenda 2030 and SDG (Rosche, 2016; Ponte & Enriquez, 2016; Palmer, 2015; Razavi, 2016; Deacon, 2016; Bradshaw, Chant & Linneker, 2017) is significantly and positively affected when women are empowered.

The study proceeded with investigating the relatedness of the reported cases of violence against women and GGI of the Philippines through symbolic regression (SR) analyses using Eureqa Pro®. Symbolic regression is a method that predicts relationship and connects variables while providing a model which is not assumed beforehand. According to Barmpalexis et al. (2011), SR operates through genetic programming (GP). GP generates populations of equations using the Darwinian principle of survival of the fittest (Koza, 1994; Koza et al., 2003; Barmpalexis et al., 2011). GP searches for the fittest equation by setting a target expression and after a series of runs in every cycle which is called generation. Through GP, SR structured patterns from a dataset of variables to find the “fittest” combination to model prediction (Claveria, Monte & Torra, 2016).

In the case of forecasting the association between the reported cases of violence against women and gender gap index of the Philippines, the target expression used to predict is as follows: \( y = f(x) \), whereas Philippine Gender Gap Index \( y \) is affected by the function of the reported cases of violence against women in the Philippines \( x \).
Table 4. Variables used for symbolic regression analysis

<table>
<thead>
<tr>
<th>Year</th>
<th>Reported Cases of Violence Against Women (x)</th>
<th>Philippine Gender Gap Index (y)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>8,011</td>
<td>0.7516</td>
</tr>
<tr>
<td>2007</td>
<td>7,383</td>
<td>0.7629</td>
</tr>
<tr>
<td>2008</td>
<td>6,505</td>
<td>0.7568</td>
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<tr>
<td>2009</td>
<td>5,889</td>
<td>0.7579</td>
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<tr>
<td>2010</td>
<td>6,679</td>
<td>0.7654</td>
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<tr>
<td>2011</td>
<td>7,456</td>
<td>0.7685</td>
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<tr>
<td>2012</td>
<td>10,482</td>
<td>0.7757</td>
</tr>
<tr>
<td>2013</td>
<td>15,789</td>
<td>0.7832</td>
</tr>
<tr>
<td>2014</td>
<td>13,974</td>
<td>0.7814</td>
</tr>
<tr>
<td>2015</td>
<td>17,526</td>
<td>0.79</td>
</tr>
<tr>
<td>2016</td>
<td>25,430</td>
<td>0.786</td>
</tr>
<tr>
<td>2017</td>
<td>40,220</td>
<td>0.79</td>
</tr>
</tbody>
</table>

as presented in Table 4. The result of symbolic regression analysis for the target expression provides a fit formula (Eqtn. 1).

\[
y = 0.77 + \frac{-0.0563}{x} + 1.28e-10x^2 + 0.0329\cos(0.906 + 1.39x) + 2.28e-10x^2\cos(0.906 + 1.39x) - 2.32e-6x - 7.44e-6x\cos(0.906 + 1.39x)
\]

Eqtn. 1

The result provided a quadratic trend manifested by the presence of \(x^2\). The presence of sine and cosine functions in the equation indicated correction factors and seasonal variations which contributed to the accuracy of the formula used to predict the correlation of the reported cases of violence against women and GGI of the Philippines.

Moreover, the model has a strong positive correlation (R) of 0.9958. It has a goodness of fit (R²) of 0.9911 and has a mean absolute error (MAE) of 0.00067. Corollary to this forecasting, the reported cases of violence against women for the past 12 years had a positive association of 73 percent likelihood of increasing GGI as reflected in the variable sensitivity report. GGI will have 73 percent probability of continued increase provided that the same trend will occur on the reported cases of VAW for the forthcoming years. Thus, an increase of the reported cases of violence against women may indicate an increase in the Gender Gap Index.

As claimed by Levinson (1989), the level of women's participation in society was a factor that affected women empowerment. The surge of violence against women reported for the past 12 years suggests that there is an increased awareness of women's rights as reflected in the improved GGI of the Philippines. As purported by Lopez-Claros & Zahidi (2005), global gender gap measures the extent of awareness of women's rights on critical areas such as economic participation and opportunity, political empowerment, educational attainment, and health and well-being. As consistently cited by Lopez-Claros and Zahidi (2005), Choe, Cho and Kim (2016) and Hausmann, Tyson and Zahidi (2010), women's participation and involvement measured awareness of women's rights as reflected in these critical areas used as sub-indices of GGI.

The report of WEF on GGI recognizes strong gender equality as a manifestation of strong women empowerment efforts of a country (Lopez-Claros & Zahidi, 2005). In the 2017 Gender Gap Report of WEF, Philippines has been ranked and scored in the following sub-indices: in the health and survival sub-index, the country ranked 36\(^{th}\) with a score of 0.979. The Philippines got the 1\(^{st}\) rank together with the other 27 countries including Australia, United States, and others, with a score of 1.000 in educational attainment sub-index. In the economic participation and political empowerment sub-indices, the country ranked 25\(^{th}\) with a score of 0.764 and as 13\(^{th}\) with a score of 0.416 respectively. As an overall rating, the Philippines ranked as 10\(^{th}\) with a GGI score of 0.790. Hence, Filipino women, having an increasing trend of...
GGI, are empowered in these five critical areas (Lopez-Claros & Zahidi, 2005). As reported by the Philippine Commission on Women (PCW) regarding labor and employment (2009a, 2009b, 2009c, 2009d), there is 0.1 percent increase in the labor force participation rate for females in 2013 from 2005. While an increase of 1.57 percent of automated national and local election turnouts was also seen for women political candidates from 18.4 percent in 2010 to 19.97 percent in 2013.

Moreover, in the government bureaucracy, Civil Service data as of 2004 provided that 58.7 percent of government personnel (Professional Level) and 42 percent occupying Career Execute Service (CES) position (3rd level position) are women. Based on the current projection (2010 to 2015) of life expectancy, female life expectancy remained higher at 73.14 years than men at 67.61 years. In the educational opportunities, the female basic literacy rate of 96.1 percent is one percent higher compared to men literacy rate. Such reports coming from PCW may be associated in the passing of laws which protects women, a positive step of the Philippine government in promoting gender equality.

Filipino women being aware of their rights could be a result of the implementation of programs which promote women empowerment. Rosche (2016) claimed that the SDG on gender equality and women’s right becomes possible through advocacy undertakings of non-government organizations. The establishment of organizations such as Department of Social Welfare and Development through the Office of the Assistant Secretary for Special Women’s and Children’s Concern, Bathaluman Crisis Centre Foundation Inc., Development of People’s Foundation, Women’s Crisis Centre Institute, Harnessing Self-Reliant Initiatives and Knowledge (HASIK) & Women’s Legal Bureau, Lihok Pilipina Foundation, GABRIELA, and Philippine Commission on Women, promotes gender and development advocacy, psycho-social support, and provide an affirming environment to female survivors of domestic and intimate-relationship violence (United Nation Development Fund for Women, 2001). Such undertakings promote social welfare to Filipino women and are in harmony with the interventions proposed by WHO (2009) namely school-based, community and media interventions.

Also, the state is mandated by the Philippine 1987 Constitution under Article XIII, Section 14 to protect women for them to realize their full potential (Family and Community Healing Center, n.d.). Other Philippine laws protect women and children from violence, and affirm the role of women in nation building and ensure gender equality (FCHC, n.d.; Crispin B. Beltran Resource Center, 2015). These include the RA 9208-An Act to Institute Policies to Eliminate Trafficking in Persons Especially Women and Children; RA 7192 of 1992-The Women in Development and Nation Building Act; RA 8353-The Anti-Rape Law of 1997; RA 9262-The Anti-Violence Against Women And Their Children Act Of 2004; RA 8972-The Solo Parents' Welfare Act of 2000; and RA 9710-the Magna Carta of Women Act of 2009. PCW further asserts that continuous information campaign on the law and its strict implementation may have caused more Filipino women to speak up and report abuse since awareness on laws and services may be rising (PCW, 2009a).

Although strong legislation to protect women from violence is necessary, addressing the problem at the grassroots level (home and community) is indispensable (Carlson & Randell, 2013). Hence, addressing gender issues at the grassroots level which includes the school setting bequeathing a lasting impact on acquiring gender-sensitive attitude among students. As purported by Jewkes (2002), education is consistently noted as conferring social empowerment for both men and women. In the academe, gender equality, through gender-neutral procedure has been part of the agenda of most universities in policy making (Husu, 2000) while designing a
mechanism to eliminate gender discrimination and promote equal opportunity for women in the workplace (Winchester & Browning, 2015).

**Conclusion and Recommendations**

The study aimed to determine the model for the trend of reported cases of violence against women and the GGI in the Philippines for the past twelve years. It also provided a sample forecast of reported cases of violence against women and the GGI in the Philippines for the next 10 years. More so, through symbolic regression, it identified the model that would best fit the relationship between the reported cases of violence against women and GGI in the Philippines. It found out that the reported cases of violence against women followed a quadratic trend while the GGI in the Philippines followed a linear trend. It also predicted that both reports continue to increase in the next 10 years provided that the same trend model will be used respectively in forecasting. Furthermore, it established that there is a positive relatedness between the two reports wherein an increase of the reported cases of violence against women may indicate an increase in the GGI in the Philippines. The association of these variables can provide implications on the effect of the reported cases of VAW on GGI in the country.

Indeed, some mechanisms to empower women were established. These include the passing of laws that uphold women's rights and the establishment of public and private organizations that secure the protection of women under these laws. Hence, both public and private agencies’ effort to make women socially aware of their rights thereby becoming informed of the crime of violence against them may have contributed to the increase of awareness and number of reported cases of violence against women.

The increase of the reported cases is an effect of women being aware of their rights. The government, however, must account and address the increasing number of reported cases through strict implementation of the existing laws. Ponte and Enriquez (2016), proposed that policy space to fulfill women’s rights could be potentially enlarged. Such is critically needed if positive change is to happen for women (Ponte & Enriquez, 2016). Strengthening gender and development activities in every school would effectively make all students gender sensitive which puts forth gender equality on the right track from the very beginning. Being aware of ones right must be supplemented by a genuine response from the government to protect women.

Some limitations considered in this study that may guide future researchers, was that the study used only the report of PNP on cases of violence against women as compiled by the PSA. Hence, the study limits its inference based on the reported cases which may not reflect the actual number of the occurrence of the crime. Future researchers may utilize another data from reports of other agencies catering to similar issues on gender equality and violence against women. Conducting similar studies using different methodologies may be done to capture another significant aspect of the same issue.

To totally eradicate this trend in the Philippine setting is uncertain, but as long as the efforts to fight crimes of violence against women are sustained, hope could be set high to improve life for the future generations.

**Acknowledgment**

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