Intimate Partner Violence and Maternal factors that Influence Early Child Growth

Author: Dr. Pamela Kimeto

Affiliation: Department of Nursing, Kabarak University, Nakuru, Kenya
Correspondence: p_kimeto@kabarak.ac.ke

Abstract

Introduction: An association between Intimate Partner Violence **(**IPV) against women and negative social and health consequences for children has been observed in multiple studies from around the world. Impaired growth is an important health determinant in children and has been associated with higher morbidity and mortality in children less than 5 years of age. Different forms of violence have been shown to impair the growth of children in diverse countries, especially low-income countries. This study describes the relationship between maternal experience of IPV, maternal characteristics (age, parity, ethnicity, marital status and symptoms of depression) and subsequent child growth.

Methods: Existing data that utilized longitudinal study design to collect data from 207 mother-child dyads that were from a low socio-economic status was used for secondary data analysis. The child's weight and length data were converted to WHO growth standard z scores (Weight for Length (WLZ) and Length for Age (LAZ)) at birth and at 24 months. The z scores were assessed in relation to women's IPV exposure status and maternal characteristics. Linear regression was used to assess the association between prenatal and postnatal maternal variables, child variables (gender and birth order) and child's WLZ and LAZ.

Findings: There was no statistical significance in WLZ and LAZ in children who were exposed to maternal prenatal IPV and those not exposed. The following relationships were seen in male children: birth order (p=0.023) and WLZ; Symptoms of maternal depression during pregnancy (p=0.021) and WLZ at 24 months; symptoms of maternal depression after birth (p= 0.049) and WLZ at 24 months and exposure to postnatal violence (p=0.030), specifically emotional violence (p=0.050) and LAZ score. Female children whose mothers were not married had a low LAZ (p=0.009).

Conclusion: The growth of male children less than two years is vulnerable to exposure of maternal emotional violence and depression in the pre and postnatal period while height gain of female children is affected by maternal single status.

Recommendations: There is need to screen mothers for IPV, specifically emotional violence carefully monitor the growth patterns in their children after birth especially male children

Key words: *Intimate Partner Violence; Weight-for-Length; Length-for-Age.*

Introduction

Intimate partner violence (IPV) includes physical, sexual, emotional abuse and controlling behaviors by an intimate partner. Intimate partner violence occurs in all settings and among all socio economic, religious and cultural groups (Breiding, Smith, Basile, Walters, Chen, & Merrick, 2011). Although women can be violent in relationships with men, often in self-defense, the overwhelming global burden of IPV is borne by women (Breiding et al., 2011). The most recent data from the 2010-2012 report on National Intimate Partner and Sexual Violence Survey (NISVS) indicate that 37.3% of women experience IPV in their lifetime by a current or former intimate partner(Smith et al., 2017). Intimate partner violence has lifelong consequences. Studies have shown that beyond injury and even death, victims of IPV are more likely to report a range of negative health outcomes such as physical injuries, sexual and reproductive health problems like unintended pregnancies; and adverse pregnancy outcomes such as induced abortion and preterm babies (Antai, 2011; Decker et al., 2014).

An association between IPV against women and negative social and health consequences for children has been observed in multiple studies from around the world. Impaired growth is an important health determinant in children and has been associated with higher morbidity and mortality in children less than 5 years of age (Black et al., 2008).

Different forms of violence have been shown to impair the growth of children in diverse countries, especially low-income countries. An Indian cross-sectional study and a community cohort study in Bangladesh reported a relationship between IPV and child stunting, wasting and severe under nutrition (Ackerson, L. K. & Subramanian, 2009; Asling-Monemi, Naved, &Persson, 2009). Additionally, a case study conducted in Brazil found that severe physical partner abuse in the previous 12 months increased the risk of severe malnutrition in children aged between one and 24 months (Hasselmann&Reichenheim, 2006).

Findings from a US national study, albeit from eight years ago, indicate that more than 1 in 15 children witness IPV each year (Hamby, Finkelhor, Turner, & and Ormrod, 2011).The United Nation's Secretary-General's Study on Violence Against Children conservatively estimates that 275 million children worldwide are exposed to violence in the home (The United Nations Children's Fund (UNICEF), 2006). Because this estimate is based on limited data, in actuality many more children maybe exposed. Despite the substantial number of children exposed to violence and the possible impact of such exposure on children's growth, there are few longitudinal studies that have measured the effect of violence on the growth of the child. Thus the aim of this study was to determine the relationship between maternal experience of IPV and maternal factors (age, parity, ethnicity, marital status and symptoms of depression and subsequent weight and length in children less than two years of age.

Methods

Existing data from two previous studies was used for this analysis [R01NR 05313: Nursing smoking cessation intervention during pregnancy (Baby BEEP)] and [RO1HD0045542: Nursing support better infant outcomes in violent

homes (BBK)]. Baby BEEP study was randomized control trial that recruited Women attending rural Women, Infant, and Children Nutrition Supplement Program (WIC) in 21 counties in a Midwestern state who reported smoking at least one cigarette per day between January 2002 and October 2005. The women in the Baby BEEP were recruited after delivery of their child to BBK between 2006-2010, where they were provided with nursing support to improve the outcome of their children (Bullock et al., 2009). Trained research nurses collected data during the study period (2002-2010). They obtained weight and length measurements of the index child at birth and at approximately 6, 15 and 24 month's post-delivery.

Prenatal violencewas measured with the Abuse Assessment Screen (AAS). AAS measures past and present instances of physical and sexual violence, as well as the perpetrator and location of the physical abuse (McFarlane, Parker, Soeken, & Bullock, 1992). Postnatal violence was measured using the Severity of Violence Against Women Scales (SVAWS). The SVAWS measures behaviors that threaten physical violence and actual physical and sexual violence(Marshall, 1992).Maternal depressionin this study refers to symptoms indicative of depression, but a clinical diagnosis of depression was not made. Prenatal and postnatal maternal depressionwas measured using the five- item Mental Health Inventory (MHI-5) tool (Ware, John E. & Gandek, 1994).To measure the infant's weight, the research nurses used The Visiting Nurse Scale (SR241 – Algen Scale Corporation) that weighs infants up to 20.4kg. This portable scale system used a Load Cell technology to assure accurate and repeatable weight data. The scales did not have any moving parts, so there was no need to recalibrate at each measurement. The accuracy is stated to be at 0.1% +/- 1 digit over 200 grams.

For weighing, infants had all clothing removed except the diaper and was placed in a lying or sitting position. Weight was recorded in kilograms.To measure the infant's recumbent length, the research nurses used the Portable Infant Measuring Device (590210 – HPI). This mat has a measurement range of 4 to 39 inches (10-99 cm) in ¼ inch graduations. The mat's rigid plastic headboards and footboards helped ensure accurate measurement of infants. To measure recumbent length, infants' heads were held midline and flat against the headboard. Infants' knees were then pressed down until the legs were fully extended and the feet were firmly against the footboard. Recumbent length was recorded in fraction of inches.

For data analysis, there were two periods of interest for this secondary data analyses: birth and 24 months. Twenty-four month post-delivery data collection occurred at any time between 19-24 months post-delivery due to the large geographical area where the women were located. For comparison purposes, weight and length were interpolated to 24 months. Measurements taken within 15 days of the designated 24 months' time point were kept for analysis. Those beyond 15 days were interpolated to align to the 24 months. For interpolation, the measurements available within as early as 22 months were used to get the value in the designated month. Data collected before 22 months were considered missing. The rationale for imputing was to have

one time point for each child for comparison purpose. Rationale for keeping ±15 days of the designated month is because the average weight gained by both sexes aged between 9-24 months is approximately 120grams in 15 days. On length, infants will gain about 10 cm between 12-24 months (0.833 cm a month and 0.416 in 15 days) (Danner, Joeckel, Michalak, Phillips, & Goday, 2009; Hockenberry& Wilson, 2015). Thus ±15 day's measurement would not significantly differ from the weight/length taken at exactly 24 months.

The program ANTHRO 2011 (WHO, 2011) was used to convert weight and length measurements into weight-for-length (WLZ) and length-for-age (LAZ) Z-scores. Weight-for length Z-score was used to evaluate nutritional status (wasting/overweight) while LAZ score was used to evaluate linear growth (stunting). Student's t-test was used to compare differences in maternal abuse status (abused/not abused) and child's gender for continuous variables and chi-square for categorical variables.

Univariate and multivariate linear regression were used to assess the association between prenatal maternal violence status, postnatal violence status, type and severity of postnatal violence, maternal factors and WLZ and LAZ scores.

The Statistical Package for Social Sciences (Version 23; SPSS Inc., Chicago, IL) was used to analyze the data. Frequency and percentages were reported for categorical variables, while means and standard deviation were reported for continuous variables. Coefficients and standard error were reported for both univariate and multivariate linear regression. A p-value of less than 0.05 was considered significant for all analyses.

The data was de-identified to protect the participants and keep them anonymous. The Institutional Review Board (IRB) of University of Virginia approved the study protocol.

Findings

There were 695 pregnant participants enrolled from WIC in the Baby BEEP study. Six hundred and thirty one resulted in live births; about 50% (325) of these participants were enrolled in the BBK study.

The participants from the BBK study were used in the current study. Of the 325, 21 participants were excluded because they had a premature infant or death of infant. There were 255 dyads between 19-24 months, 12 were excluded because their birth length was less than 45 cm, and eight were excluded because the child was older than 24.5 months, 10 had either weight or length missing and 18 were lost during interpolation because weight and length data collected between 22 and 24. 5 months were interpolated to 24 months and any data collected before 22 months and after 24.5 months was considered missing. The final sample size at 24 months after interpolation was 207.

Prenatal maternal characteristics

Majority of the participants 98% (188/207) were white. The overall mean age in years for all the women was 23.84 (±4.90 SD). Fifty seven percent (118/207) of women had symptoms of depression during pregnancy. Seventy percent of women were married (145/207).

The index child was the first pregnancy

for 47% (97/207) and second pregnancy for 44% (91/207).

Mothers who did not experience prenatal violence were 65% (134/207 (Table 1).

Table 1: Maternal baseline demographic data stratified by maternal prenatal violence status

	Total sample N= 207	**Violence n=73**	**No violence n= 134**	**P value**
Baseline variables	***n (%)***	***n (%)***	***n (%)***	
Maternal Depression				0.061
Not depressed	89 (43)	25 (34.2)	64 (47.8)	
Depressed	118 (57)	48 (65.8)	70 (52.2)	
Pregnancies				0.872
1st pregnancy	97 (46.9)	33 (45.2)	64 (47.8)	
2nd pregnancy	91 (44.0)	33 (45.2)	58 (43.3)	
3rd or more pregnancies	19 (9.2)	7 (9.6)	12 (9.0)	
Mothers Ethnicity				0.096
White	188 (90.8)	63 (86.3)	125 (93.3)	
Other	19 (9.2)	10 (13.7)	9 (6.7)	
Maternal relationship status				0.319
Married	145 (70)	48 (65.8)	97 (72.4)	
Other	62 (30)	25 (34.2)	37 (27.6)	
	Mean (SD)	***Mean (SD)***	***Mean (SD)***	
Mothers age (years)	23.84 (4.90)	3. 66 (4.78)	23.97 (5.02)	0.652*
Follow up/post-natal Data				
	Total sample N= 207	**Violence n=73**	**No Violence n= 134**	**P value***
Follow up variables	***n (%)***	***n (%)***	***n (%)***	
Intimate partner violence				
None	78 (37.7)	23 (31.5)	55 (41)	0.301
Yes	96 (46.4)	39 (53.4)	57 (42.5)	
Missing	33 (15.9)	11 (15.1)	22 (16.4)	
Type of violence				
None	78 (37.7)	23 (31.5)	55 (41)	0.466
Emotional	49 (23.7)	19 (26)	30 (22.4)	
Emotional and physical	47 (22.7)	20 (27.4)	27 (20.1)	
Missing	33 (15.9)	11 (15.1)	22 (16.4)	
*** Chi square test.**				

Postnatal maternal characteristics

Forty six percent (96/207) mothers experienced violence after birth, of these 16% (32/207) experienced moderate to severe violence. Twenty four percent (49/207) of mothers experienced emotional violence while 23% (47/207) experiencedboth emotional and physical violence. Fifty-eight percent (119/207) had symptoms of depression after giving birth. Of the 134 mothers who did not experience prenatal violence, 43% (57/134) were exposed to postnatal violence and 58% (77/134) had symptoms of depression after birth (Table 1).

Characteristics of the child

More than half of the sample was male (108/207). The mean birth weight was3.28 (±. 46) kg; and the mean birth length was 50.07 (±4.66) Cm. Children exposed to prenatal violence had a mean weight of 3.24 (±. 43) Kg and length of 50.07 (±4.61) Cm. Children not exposed to prenatal violence had a mean weight of 3.30(±. 48) Kg and length of 50.10 (± 4.71) Cm. The mean WLZ at birth was -.68 (±1.65) and LAZ was -.48(±1.39). Children exposed to perinatal violence had a mean of -.79 (±1.67) WLZ and LAZ of .49 (±1.41). Forty six percent (96/207) of children were exposed to postnatal violence. Out of the 96 children exposed to postnatal violence, 57 were not exposed to prenatal violence. The difference in birth length, Weight and Z scores in children exposed to prenatal violence and those not exposed were not statistically significant (Table 2). The mean difference in length, weight Z score and postnatal exposure to violence between children exposed to prenatal violence and those not exposed were not statistically significant as well (Table 2).

Table 2: Baby's baseline and follow up demographic data stratified by maternal prenatal violence status.

	Total sample	Violence	No Violence	P value*
Baseline	**N =207**	**n= 73**	**n= 134**	
Gender	**n (%)**	**n (%)**	**n (%)**	
Male	108 (52.2)	37 (50.7)	71 (53)	0.572
Female	99 (47.8)	36 (49.3)	63 (47)	
	Mean (SD)	***Mean (SD)***	***Mean (SD)***	
Baby's weight (kg)	3.28 (.46)	3.24 (.43)	3.30 (.48)	0.371
Baby's length (cm)	50.07 (4.66)	50.02 (4.61)	50.10 (4.71)	0.9
WLZ score	-.68 (1.65)	-.79 (1.67)	-.63 (1.66)	0.498
LAZ score	0.48 (1.39)	.49 (1.41)	.48 (1.38)	0.974
Difference at birth and 24 months	***Mean (SD)***	***Mean (SD)***	***Mean (SD)***	
Baby's weight difference (kg)	9.90 (1.69)	10.21 (1.81)	9.73 (1.61)	0.053
Baby's Length difference (cm)	38.07 (5.16)	38.48 (5.14)	37.85 (5.17)	0.402
WLZ score difference	1.54 (1.87)	1.81 (1.76)	1.39 (1.92)	0.127
LAZ score difference	-.15 (1.46)	-.03 (1.54)	-.21 (1.42)	0.4
Postnatal IPV exposure	**n (%)**	**n (%)**	**n (%)**	
None	78 (37.7)	23 (31.5)	55 (41)	0.301
Yes	96 (46.4)	39 (53.4)	57 (42.5)	
Missing	33 (15.9)	11 (15.1)	22 (16.4)	

*** Student's t test**

Association between baseline and follow up predictors and WLZ and LAZ

Linear regression was used to model the relationship between the maternal and child predictors and child's WLZ and LAZ. There were significant relationships between predictors and WLZ and LAZ. There was an association between 2nd pregnancy (estimate= -0.464; SE=0.207; p=0.027) and WLZ in males. Male second borns' had a lower WLZ compared to male children who were firstborns (Tables 3).

Table 3: Univariate association between baseline predictors and follow up predictors with WLZ at 24 stratified by gender

	Female			Male		
	Estimates	**SE**	**P value**	**Estimates**	**SE**	**P value**
WLZ score at baseline	-0.065	0.072	0.37	0.176	0.065	0.008
Baseline predictors						
Pregnancies (1st preg is ref)						
2nd pregnancy	-0.24	0.226	0.29	-0.464	0.207	0.027*
3rd or more pregnancies	-0.548	0.469	0.246	0.085	0.321	0.792

Note: Each of the predictors (baseline and follow up) are adjusted for WLZ score at baseline and gender
**Significant at p= 0.05*

Symptoms of maternal depression during pregnancy (estimate= -0.503; SE=0.214; p=0.021), and after the birth of the child (estimate= -0.021; SE=0.01; p= 0.049) were also significantly associated with WLZ at 24 months for male children. Male children whose mothers had symptoms of depression during pregnancy and after birth of the child had a low WLZ score compared to male children whose mothers did not have symptoms of depression in the prenatal period and after birth. (Table 4).

Table 4: Multivariate association of baseline predictors and WLZ score at 24 months stratified by gender

	Female			Male		
	Estimates	**SE**	**P value**	**Estimates**	**SE**	**P value**
Baseline predictors						
WLZ at baseline	-0.082	0.074	0.272	0.229	0.065	0.001
Depression at baseline (Yes vs. No	0.344	0.247	0.167	-0.503	0.214	0.021*
Pregnancies (1st preg is ref)						
2nd pregnancy	-0.302	0.276	0.278	-0.719	0.252	0.005*
3rd or more pregnancies	-0.554	0.568	0.332	-0.423	0.451	0.351
Follow up predictors						
Depression (Yes vs. No)	0.02	0.012	0.1	0.021	0.01	0.049*

Note: The coefficient for baseline and IPV were obtained from the model with all variables included.

Results from follow up predictors were obtained by replacing IPV with each of the follow up variables.

*** Significant at p=0.05**

There was a relationship between Violence exposures of the mother after birth (estimate= 0.505; SE=0.231; p=0.030) specifically emotional violence (estimate= 0.528; SE=0.266; p=0.050) and LAZ score at 24 months for males. Male children whose mothers experienced IPV after birth, specifically emotional violence had a higher LAZ score compared to their counterparts whose mothers did not

experience IPV after birth (Table 5).

Table 5: Univariate association between baseline predictors and follow up predictors with LAZ at 24 months stratified by gender

	Female			Male		
	Estimates	**SE**	**P value**	**Estimates**	**SE**	**P value**
LAZ score at baseline	0.171	0.07	0.016	0.303	0.076	<.001
Baseline predictors						
Mother's Abuse (Yes vs. No)	0.282	0.197	0.156	0.111	0.225	0.624
Follow up predictors						
Intimate partner violence (No is the ref)						
Yes	-0.058	0.211	0.785	0.505	0.231	0.030*
Missing	0.272	0.284	0.340	0.216	0.315	0.494
Type of violence (None is ref)						
Emotional	-0.147	0.269	0.586	0.528	0.266	0.050*
Emotional and physical	-0.103	0.243	0.674	0.480	0.297	0.108
Missing	0.239	0.283	0.402	0.223	0.318	0.483

Note: Each of the predictors (baseline and follow up) are adjusted for weight-for-length Z-score at baseline and gender

*** Significant at p=0.05**

There was also a relationship between maternal relationship status (estimate= -0.562; SE=0.210; p=0.009) and female children'sLAZ at 24 months. Female children whose mothers were not married had a lower LAZ compared to their counterparts whose mothers were married (Table 6).

Table 6: Multivariate association of baseline predictors and LAZ score at 24 stratified by gender

	Female			Male		
	Estimates	**SE**	**P value**	**Estimates**	**SE**	**P value**
Baseline predictors						
LAZ score at baseline	0.146	0.069	0.036	0.307	0.08	<.001
Mother's Abuse (Yes vs. No)	0.313	0.2	0.121	0.121	0.234	0.606
Relationship status (married/ Other)	-0.562	0.210	0.009*	-0.046	0.249	0.854
Follow up Predictors						
Intimate partner violence (No is the ref)						
Yes	-0.09	0.213	0.674	0.501	0.246	0.044*
Missing	0.252	0.277	0.365	0.191	0.342	0.579
Type of violence (None is ref)						
Emotional	-0.228	0.268	0.398	0.574	0.28	0.043*
Emotional and physical	-0.127	0.248	0.611	0.393	0.321	0.224
Missing	0.216	0.276	0.437	0.198	0.346	0.568

Note: The coefficient for baseline and IPV were obtained from the model with all variables included.

Results from follow up predictors were obtained by replacing IPV with each of the follow up variables.

*** Significant at p=0.05**

Discussion

Studies have demonstrated a relationship between child exposure to maternal IPV and stunting (Asling-Monemi et al., 2009; Hasselmann&Reichenheim, 2006; Rico, Fenn, Abramsky, & Watts, 2011; Salazar, Hogberg, Valladares, &Persson, 2012). Results from this study however showed that male children who were exposed to maternal emotional violence after the birth were taller compared to those who were not exposed. Several mechanisms through which IPV against a mother can affect child growth have been demonstrated; for example violence may increase or share some of the contributing factors with child abuse such as neglect and stress that can decrease the child's metabolic rate and physical growth (Mead, Beauchaine, & Shannon, 2010). Perpetrators of violence may stop the mother from taking the child to the clinic/hospital when sick or limit the amount of money spent on food and other household needs (Black et al., 2008). With this knowledge, it is disconcerting that the children exposed to maternal violence were not stunted. Female children whose mothers were not in a marriage relationship were shorter compared to their counterparts. This finding was in agreement with results from Nicaragua that indicated single motherhood as a risk factor for stunting in children (Salazar et al., 2012).

Lack of significant difference in maternal characteristics between thosethat experienced violence in the prenatal period and those who did not contradict findings from India, Brazil (Hasselmann&Reichenheim, 2006), Bangladesh (Asling-Monemi et al., 2009), Nicaragua (Salazar et al., 2012) and Egypt, Honduras, Rwanda, Malawi and Kenya (Rico et al., 2011) that found a relationship between maternal characteristics such as age during current pregnancy, mothers' ability to make decisions in the family, education level, family's economic status, place of residence, and the number of pregnancies the mother has had and experience of violence. These studies also found the children of these mothers were stunted, wasted and suffered from nutritional anemia. These findings are not in line with the finding from the currents study that found no statistical significant in WLZ and LAZ in children exposed to and those not exposed to violence in the prenatal period and in the follow up period. Women and children in this study were from rural setting with low income but they are not comparable to mothers from countries with low income cited because of differences in health care access, availability of food and clean water, levels of literacy, Gross Domestic Product (GDP), number of children per woman and women's political and social autonomy.

Low weight gain in second born male children compared to first borns at 24 months follow up contrast with that of Sobkviak et al. (2012) whose study found that children with a higher birth order experience lower weight gain and have increased odds of wasting, but another study (Ware, J. E. &Gandek, 1994)found that firstborn children at birth had a low weight compared to other birth orders but have a higher weight and height overshoot in catch-up growth. This finding may explain the difference in low weight gain in second borns when compared to firstborns at 24 months in this study.Child exposure to maternal symptoms of depression in pregnancy resulted in low weight gain in male children. This finding concurs with

a number of studies (Santos, Matijasevich, Domingues, Barros, & Barros, 2010; Wojcicki et al., 2011) that have shown children exposed to maternal prenatal depression have lower weight gain compared to those not exposed.However, studies also suggest that maternal depression in the postpartum period is not a risk factor for impaired child growth (Drewett, Blair, &Emond, 2004; Santos et al., 2010). These findings contrast with the findings of this study where male children exposed to symptoms of maternal depression after birth had a low weight gain. All mothers in this study were smokers; a relationship exists between smoking and depression (Place, 2014; Rodriguez et al., 2010). Studies have shown that smoking during pregnancy is estimated to account for about a quarter of low birth weight babies (Meyer, 1978; Vogazianos, Fiala, &Vogazianos, 2005; Zheng et al., 2016). Children born to all mothers in this study had a normal birth weight despite their smoking status. Maternal WIC participation during pregnancy may have been a protective factor against child low birth weight; WIC has been linked with longer gestation periods and higher birth weights (http://www.fns.usda.gov/wic/about-wic-wics-mission). The reason for low weight gain after birth specifically for male children after a normal birth weight for children exposed to maternal symptoms of depression in pregnancy and after birth needs to be examined

Limitations

The following limitations were observed in this study: Lack of statistical significance in both maternal and child characteristics may be attributed to the small sample, which did not provide enoughpower for statistical significance. Findings from this study cannot be generalized to the general population because of the homogeneous nature of this sample of poor, rural, largely white mothers who were smokers.

Conclusion

The growth of male children less than two years is vulnerable to exposure of maternal emotional violence and depression in the pre and postnatal period while height gain of female children is affected by maternal single status.

Recommendations

There is need to screen mothers for IPV, specifically emotional violence carefully monitor the growth patterns in their children after birth especially male children. More studies need to be conducted to determine why male children were more affected than female children in weight and length gain in this population.

References

Ackerson, L. K., & Subramanian, S. V. (2009). *Intimate partner violence and death among infants and children in India*. Pediatrics, 24(5), e878-89.

Ackerson, L. K., & Subramanian, S. V. (2008). *Domestic violence and chronic malnutrition among women and children in India*.American Journal of Epidemiology, 167(10), 1188-1196.

Antai, D. (2011). *Traumatic physical health consequences of intimate partner violence against women: what is the role of community level factors?* BioMedCentral Women's Health, 11(1), 56.

Asling-Monemi, K., Naved, R. T., &Persson, L. A. (2009). *Violence against women and the risk of fetal and early childhood growth impairment: A cohort study in rural Bangladesh.*Archives of Disease in Childhood, 94(10), 775-779.

Black, R. E., Allen, L. H., Bhutta, Z. A., Caulfield, L. E., de Onis, M., Ezzati, M., . . . Maternal and Child Undernutrition Study Group. (2008). *Maternal and child undernutrition: Global and regional exposures and health consequences*.Lancet, 371(9608), 243-260. doi:http://dx.doi.org/10.1016/S0140-6736(07)61690-0

Bullock, L., Everett, K. D., Mullen, P. D., Geden, E., Longo, D. R., & Madsen, R. (2009). *Baby BEEP: A randomized controlled trial of nurses' individualized social support for poor rural pregnant smokers.*Maternal& Child Health Journal, 13(3), 395-406.

Danner, E., Joeckel, R., Michalak, S., Phillips, S., &Goday, P. S. (2009). *Weight velocity in infants and children.* Nutrition in Clinical Practice, 24(1), 76-79. doi:http://dx.doi.org/10.1177/0884533608329663

Decker, M. R., Peitzmeier, S., Olumide, A., Acharya, R., Ojengbede, O., & Covarrubias, L., . . .Brahmbhatt, H. (2014). *Prevalence and health impact of intimate partner violence and non partner sexual violence among female adolescents aged 15–19 years in vulnerable urban environments: A multi country study.* Journal of Adolescent Health, 55(6), S58-S67.

Drewett, R., Blair, P., &Emond, A. (2004). *Failure to thrive in the term and preterm infants of mothers depressed in the post natal period a population based birth cohort study*.Journal of Child Psychology & Psychiatry & Allied Disciplines, 45, 359-366.

Hamby, S., Finkelhor, D., Turner, H., & and Ormrod, R. (2011). *Children's exposure to intimate partner violence and other family violence. 2011:1-12*.Washington DC: Government Printing Office.

Hasselmann, M. H., &Reichenheim, M. E. (2006). *Parental violence and the occurrence of severe and acute malnutrition in childhood.*Pediatric Perinatal Epidemiology, 20(4), 299-311.

Hockenberry, M. J., & Wilson, D. (2015). *Wong's nursing care of infants and children* (10th ed.) Mosby.

Marshall, L. L. (1992). *Development of the severity of violence against women scales.*Journal of Family Violence, 7, 103-121.

McFarlane, J., Parker, B., Soeken, K., & Bullock, L. (1992). *Assessing for abuse during pregnancy. Severity and frequency of injuries and associated entry into prenatal care.*Journal of American Medical Association, *267*(23), 3176-3178.

Mead, H. K., Beauchaine, T. P., & Shannon, K., E. (2010). *Neurobiological adaptations to violence across development.*Developmental Psychopathology, 22, 1-22.

Meyer, M. B. (1978). H*ow does maternal smoking affect birth weight and maternal weight gain? Evidence from the*

*Ontarioperinatal mortality study.*American Journal of Obstetrics & Gynecology, 131(8), 888-893.

Place, J. m. (2014). *Detecting intimate partner violence and post partumdepression*.Journal of Global Health, 1-13

Rico, E., Fenn, B., Abramsky, T., & Watts, C. (2011). *Associations between maternal experiences of intimate partner violence and child nutrition and mortality: Findings from demographic and health surveys in Egypt, Honduras, Kenya, Malawi and Rwanda*. *Journal of Epidemiology & Community Health*, *65*(4), 360-367.

Rodriguez, M. A., Valentine, J., Ahmed, S. R., Eisenman, D. P., Sumner, L. A., Heilemann, M. V., & Liu, H. (2010). *Intimate partner violence and maternal depression during the perinatal period: A longitudinal investigation of Latinas*.ViolenceAgainst Women, 16(5), 543-559.

Salazar, M., Hogberg, U., Valladares, E., &Persson, L. A. (2012). *Intimate partner violence and early child growth: A community-based cohort study in Nicaragua*.BioMedCentral Pediatrics, 12, 82.

Santos, I. S., Matijasevich, A., Domingues, M. R., Barros, A. J. D., & Barros, F. C. F. (2010). *Long-lasting maternal depression and child growth at 4 years of age: A cohort study. Journal of Pediatrics*, *157*(3), 401-406.

Smith, S. G., Chen, J., Basile, K. C., Gilbert, L. K., Merrick, M. T., Patel, N., . . . Jain, A. (2017). *The national intimate partner and sexual violence survey (NISVS): 2010-2012 state report.* Atlanta, GA: National Center for Injury Prevention and Control, Centers for Disease Control and Prevention.

Vogazianos, P., Fiala, J., &Vogazianos, M. (2005). T*he influence of active maternal smoking during pregnancy on birth weights in Cyprus.*Central European Journal of Public Health, 13(2), 78-84.

Ware, J. E., &Gandek, B. (1994). *The SF-36 health survey: Development and use in mental health research and the IQOLA project.* International Journal of Mental Health, 23(2), 49-73. doi:10.1080/00207411.1994.11449283

Ware, J. E., &Gandek, B. (1994). *The SF-36 health survey: Development and use in mental health research and the IQOLAproject.*International Journal of Mental Health, 23(2), 49-73. doi:10.1080/00207411.1994.11449283

Wojcicki, J. M., Holbrook, K., Lustig, R. H., Epel, E., Caughey, A. B., Munoz, R. F., . . . Heyman, M. B. (2011). *Chronic maternal depression is associated with reduced weight gain in Latino infants from birth to 2 years of age*.PublicLibrary of Science ONE [Electronic Resource], 6(2), e16737.

Zheng, W., Suzuki, K., Tanaka, T., Kohama, M., Yamagata, Z., &The Okinawa Child Health Study Group. (2016). *Association between maternal smoking during pregnancy and low birth weight: Effects by maternal age.* 11(1): e0146241. *Public Library of Science ONE, 11(1)* doi:https://doi.org/10.1371/journal.pone.0146241