

The EMBODY Study: A Biobehavioral Study of Dating Experiences in Young Women

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Abstract

As a research assistant for the **EMBODY** study I worked with young women who had experienced intimate partner violence. Additionally, the types of long-term effects due to these experiences of violence were investigated. More than half of adolescents report engaging in an intimate relationship. As many as a third of those relationships include some form of abusive or controlling behavior. More specifically, teen dating violence (TDV) affects 65% of women. Little is known about the biobehavioral impact of TDV. Among adult women cellular-level changes have been shown in those who experienced intimate partner violence and affected women exhibit long-term chronic health problems. The goal of the **EMBODY** study is to examine relationships among epigenetic alterations, acquired chromosomal changes, biologic stress measures, and biobehavioral characteristics in identical twin pairs who are discordant for an experience of TDV. Using a classical discordant twin study design we sought to examine biobehavioral and chromosomal-level differences. We investigated whether TDV could act as an agent of allostatic loading. The sample included female monozygotic twins aged 18-21, who were discordant for an experience of TDV. McEwen's allostatic loading model was used to examine the effects of individual and environmental cofactors among women exposed to TDV. Surveys were used to assess individual and environmental characteristics, TDV experiences, sleep status, exercise habits, social support, perceived daily stress, depressive and trauma symptoms. Also, waist-height ratios and peripheral blood samples were collected. Serum analyses were used to quantify mean telomere length, acquired chromosomal instability, and acquired genome-wide DNA methylation changes. Data analysis is ongoing and will begin to elucidate the relationships between and among the survey and cellular-level datasets. Cellular-level findings are pending. The incidence and prevalence of depression and other problematic behavioral problems appears higher than those in the general population.

Keywords: Teen Dating Violence, Women's Health, Cellular Aging, Telomeres

1. Introduction:

Approximately 85% of all adolescents report engaging in intimate relationships. Of that 85% about 1 in 3 people report that they are either currently experiencing or that they have experienced teen dating violence in the past. 65% of these individuals that have reported being in a violent relationship at some point in time identify themselves as female. Due to this high prevalence of violence within intimate relationships, teen dating violence has become a major public health issue. Teen dating violence (TDV) is a continual pattern of behavior that is used by one person in an intimate relationship to exert power and control over another. Teen dating violence includes various forms of abuse such as physical, emotional, verbal, or sexual abuse. TDV generally occurs among individuals between the ages of 13-19 years old.

The goal of the EMBODY study is to examine the relationships among epigenetic alterations, acquired chromosomal changes, biological stress measures, and biobehavioral characteristics. The term “EMBODY” refers to the Effect of Multiple factors in a Biobehavioral study Of Dating among Young women. Epigenetics is the study of external and environmental factors that turn genes on and off and affect the way in which cells read genes. Epigenetics and epigenetic changes were used to identify the connection between relationship stress and young women’s health outcomes. More specifically, the study focused on cellular and physiological trait variations that are not caused by changes in the DNA sequence. The chromosomal changes that were most specifically examined was the shortening of the telomeres. Telomeres are the caps at the end of each strand of DNA that protect the chromosomes. Biological stress measures included the levels of stress that are endured on a day-to-day basis as well as the coping mechanisms used to manage experienced stress. The biobehavioral characteristics involved the interaction of behavioral and biological processes. Currently, little is known about the biobehavioral impact of these teen dating violence experiences and therefore the EMBODY study potentially provides information about the interaction of these processes.

2. Methods and Materials:

2.1 Systematic Review:

Initially, a systemic literature review was conducted to gain knowledge that helped to identify a valuable research question and other background information to strengthen the research study. Also, the completion of a systematic review allows researchers to control for biases by reading articles that have opposite conclusions. Two main databases were used during the review, which were PubMed and CINAHL Complete. PubMed is composed primarily of biomedical literature from MEDLINE, life science journals, and online books. CINAHL Complete is composed of the top nursing journals as well as other allied health journals. The search strategies used included many key words such as: Teen Dating Violence (TDV), Intimate Partner Violence (IPV), Domestic Violence, Cellular Aging, Telomeres, and Telomere Shortening.

2.2 Study Sample And Subjects:

Fifteen adult female pairs of identical twins were recruited as subjects in the study as well as five singles that were control matched with existing data. The twin pairs plus the singles created a total sample size of thirty-five participating research subjects. The twin pairs were all monozygotic meaning that each pair was derived from a single ovum. The ovum is the female reproductive cell or gamete. The participants were between the ages of 18-21 years old. The twin pairs were discordant for an experience of teen dating violence. Being discordant for TDV meant that one twin was positive for experiences of TDV and one twin was negative for experiences of TDV. To participate in the study TDV must have been experienced between the ages of 11-18 years old. The twin pairs were from all over the United States and were recruited by the Mid-Atlantic Twin Registry (MATR). MATR is responsible for enrolling pairs of twins in various research studies and they also provided guidelines to follow for study recruitment and enrollment.

Since identical twins develop from a single fertilized egg, they have the exact same genome therefore identical twins provide many insights. A genome is an organism’s complete makeup of DNA, including all of its genes. Their identical genomes help to better understand how the concept of ‘nature’ and ‘nurture’ work together. ‘Nature’ refers to a person’s innate qualities whereas ‘nurture’ relates to their individual qualities and how they cause individual differences to form. The field of behavioral genetics has conducted many twin studies that have identified some behavioral traits that are strongly influenced by the environment and also have a genetic component.

2.3 Methods:

As previously mentioned, the study involved a discordant twin study design. Teen dating violence was examined as an agent of allostatic loading. An allostatic load accounts for individual and environmental cofactors among the women who are affected by a chronic stressor. The physiological consequences of chronic exposure to stress can be represented by the allostatic loading model. Also, the model can be used to suggest the long-term health problems that may result. The participants were initially assessed using the MATR consent and screening process. This process ensured that the participants were at least 18 years of age to participate and that they were only eligible if the twins

were discordant for experiences of teen dating violence. Following the MATR process was a repeated screening to ensure that all study subjects were eligible to participate. Additionally, the completion of a health questionnaire was used to classify the type of abuse experienced such as physical, emotional, verbal, or sexual abuse. Also, the questionnaire identified the duration of the abuse and the amount of time since the end of the relationship or if the participant was presently still involved in the relationship. The questionnaire eliminated participants that had any preexisting health conditions that would act as confounding variables. The assessment process also included an online study survey that consisted of 236 questions. The survey was used to thoroughly examine participants through both past experiences and their daily life routines. The questions evaluated the subject's individual and environmental characteristics and their teen dating violence experiences. Additionally, the subject's sleep status, exercise habits, social support, perceived daily stress, and their depressive and trauma symptoms were all examined via the online survey.

The methods used in the laboratory included the collection of weight-height ratios, which were used to calculate the participant's body mass index (BMI). BMI was then used as a control due to the affect it can have on participant's results. Also, samples of peripheral blood mononuclear cells (PBMCs) were obtained. These blood samples were used to quantify various factors such as the participant's mean telomere length, acquired chromosomal instability, and any genome-wide DNA methylation changes.

3. Results:

3.1 Data Analysis

Data analysis is ongoing and will begin to elucidate the relationships between and among the survey and cellular-level datasets. Cellular-level findings are pending.

3.2 Preliminary Findings:

Currently, there are thirty-five total participants enrolled in the EMBODY study which includes the fifteen identical twin pairs and the five singles. Presently, the final analysis of the data is being conducted. The preliminary data analysis suggests that the participating twins and singles that were affected by TDV do in fact appear to have shorter telomeres compared to the participants that were not affected by TDV.

3.3 Systematic Review Findings:

The systematic review demonstrated a few important correlations to identify. A correlation demonstrated that in formerly abused women, intimate partner violence has been linked with epigenetic changes. Also, these epigenetic changes have been related to significant long-term and chronic health problems. Additionally, there was a correlation identified between mean telomere length and the duration of the violence experienced. The review also demonstrated two crucial factors that are important to control for when measuring telomere length such as a participant's BMI and their age. Reduced telomeres could also be caused due to various confounding factors such as: the smoking of cigarettes, obesity, ethnicity, social class, or the lack of exercise.

4. Implications For Nursing:

Nurses should offer advice about the benefits of physical activity to their patients. Physical activity is beneficial because it acts as a method of inhibiting rapid cellular aging. Additionally, forms of physical activity are a way to decrease stress levels and also serve as a coping mechanism. It has been recommended for inclusion of routine screening for intimate partner violence in all healthcare environments. Screening could be conducted via a verbal questionnaire or through a blood test measuring peripheral blood mononuclear cells, which could be used to measure telomere lengths. The routine measuring of telomere lengths could aid in early detection of various health conditions.

5. Conclusion:

This study examined the biobehavioral impact of TDV by evaluating the physiological consequences of chronic exposure as well as possible long-term health problems that may result due to the experienced abuse. The preliminary findings suggest that the health related impact of TDV corresponds with the impact of various other forms of abuse. This association demonstrates the significant need for utilization of procedures and programming in clinical and several other diverse settings that are able to provide services such as screening and identification of experienced abuse. Additionally, the implementation of educational programming and creation of preventative strategies are crucial for repairing the biobehavioral effects of chronic exposure to abuse.

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