The Nature of Stress due to Terrorism on Pregnant Women and their Offspring

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Full Text: Headnote ABSTRACT: Current literature demonstrates that stress during pregnancy can have long-term effects on offspring. The purpose of this paper is to examine the possible stress reactions of pregnant women exposed to terrorism. The main focus is on PTSD as the predominant reaction to terrorism and how it affects pregnancy. Conclusions: Although specific research linking terrorism and stress in pregnancy has not been studied/ published, the literature reviewed shows evidence that stress caused by terrorism is acute. Women exposed directly or indirectly to terrorist attacks could be subjecting their offspring to a high level of long-term risk. KEY WORDS: terrorism, PTSD, stresses due to terrorism, stress, pregnancy, fetal development. INTRODUCTION Terrorist attacks are creating both physical harm and psychological stress to large numbers of people all over the world. Since the 90's the number of attacks and casualties have spiked dramatically (US Department of State, 2004). Statistics show that in the years 2000 and 2001 the number of international terrorist attacks was approximately 1970, killing more than 7287 people and wounding more than 7034 (Dugan, 2002). The stress generated by terrorist acts is therefore severe, often resulting in Posttraumatic Stress Disorder (Hamblen, 2003). Pregnant women are exposed to this stress just like the rest of the population. In this paper the effects of terrorism-induced stress on pregnant women and their offspring will be examined. Also reviewed will be the research on stress and its effect on pregnant women and their offspring, focusing on the specific characteristics of stress caused by terrorism. Coping strategies and resilience will explored as well. LITERATURE REVIEW In the last 20 years, research has demonstrated the potential risk of lifelong problems for children exposed in the womb to excessive maternal stress, anxiety and depression (Verny &Weintraub, 2002). Stress can be denned as "a threat, real or imagined, to the psychological or biological integrity of an individual. It refers to both the internal and external demands that we face to accommodate change" (Verny &Weintraub, 2002, p. 39). Maternal Stress Effects During exposure to a stressor, the whole system of stress regulation (the hypothalamus-pituitary-adrenal cortex system - HPA axis) and the sympathetic nervous system (adrenal medulla system) are activated. Various hormones are released in large quantities to the blood. Mulder, Robles de Medina, Huizink, Van den Bergh, Buitelaar and Visser (2002) describe three mechanisms that may operate simultaneously to explain the way signals of maternal stress may reach the fetus. The possible mechanisms involve: reduction in blood flow to the uterus and the fetus at increased levels of maternal stress, transplacental transport of maternal hormones and stress-induced release of placental CRH to the intrauterine environment. Animal experiments have also demonstrated that prenatal maternal stress affects pregnancy and results in early programming of brain functions with permanent changes in neuroendocrine regulation and behavior in offspring (Mudler et al. 2002). Research with primates has shown structural changes in the brain resulting from maternal stress. In their research, Coe, Lubach, and Schnider (2002) investigated whether maternal stress during pregnancy would influence the size and shape of the corpus callosum in infant monkeys. For 30% of the gestation period an experimental group of females were disturbed using acoustic sounds for 10 minutes a day. Magnetic resonance imaging was used to scan the infants' brains. Measures of the corpus collosum of the infants were later compared to those of the control group. The results indicated that prenatal conditions altered the corpus callosum. Prenatal disturbances in male offspring produced a decrease in overall size of the corpus callosum while prenatal disturbance in females resulted in an increased corpus callosum. In another research study with primates it was found that prenatal stress alters brain biogenic amine levels (Schneider, Clark, Kraemer, Roughton, Lubach, Rimm, Kaufman Schmidt &Ebert, 1998). In the same research,

several behavioral differences between the prenatally stressed monkeys and the control group were found. Prenatally stressed monkeys spent more time clinging to their surrogates, eating and drinking, while controls showed more locomotion and social play with their cage mates. These findings suggest that psychological stress during pregnancy has long-lasting effects on noradrenergic and dopaminergic activity and behavior in the offspring of stressed primate mothers. Evidence in rats shows that stress around birth can lead to irreversible changes in endocrine functioning in adult life (Bakker &Van Ress, 1997). The link between stress during pregnancy and pregnancy outcomes has been studied not only in animals but also with human subjects. During ultrasound observation fetuses of highly anxious women have been found more active than those of low anxious women (Van den Bergh, 1990). In her longitudinal study Alessandra Piontelli (1992) observed the behavior of several children from very early stages in the womb, through birth, infancy and childhood. One of her observations was that stressful mothers were more likely to have an unquiet fetus. Two studies (Huizink, Robles de Medina, Mulder, Visser &Buitelaar, 2002; Van den Bergh, 1990) have demonstrated that newborn infants (2-3 days after birth) cry more and are difficult to soothe if their mothers were more anxious, had more depressive symptoms or were classified as a Type A mother (flurried, impatient and competitive) during pregnancy. Van den Berg (1990) followed-up 70 mother-infant pairs from the first trimester of pregnancy to the age of 9 years. Observations of fetal behaviors at 36 weeks gestational age (using ultrasound) showed that fetuses of highly anxious women had more physical activity than those of women reporting low anxiousness. During the first seven months after birth, these babies exhibited the following behavioral characteristics more frequently than their counterparts: crying, irritability, irregularity of biological functions, and difficult temperaments. At the age of 9, these children showed more attention deficits, had more problems with inhibition of difficult behavior and were more aggressive. Huizink et al. (2002) examined in a prospective study whether maternal stress during pregnancy is related to infant temperament. The results of the study indicated that increased maternal prenatal stress is associated with temperamental variation of young infants and may be a risk factor for psychopathology later in life. Stress and negative emotions have been identified as causal factors in negative birth outcomes such as low birth-weight and pre-term delivery as well (Lobel, 1994). Stress During Pregnancy There are a variety of potential stressors during pregnancy: First, pregnancy itself is a stressful life event. It includes stressors that are particular to the pregnancy situation: physical discomforts (fatigue, frequent urination, swelling, backache), emotional vulnerability caused by hormonal changes and fear (fear of delivery, of parenting and for the baby's health). Another type of stressor may be caused by psychosocial factors. Hawkins (2001) investigated the connection between maternal work-related stress and the development of the fetus. They hypothesized that psychosocial influences exert an independent effect on the developing fetal neural system. The results demonstrated that greater psychosocial work-stress was negatively associated with fetal movements and fetal heart rate after controlling for parity, age and education. The type of marital relationship can cause maternal stress with the father of the baby. Talley (2002) found in her research that pregnant women who were victims of male violence demonstrated neuroendocrinological patterns that varied from the control group. Chronic psychosocial stress may raise the risk of preterm delivery by raising the levels of placental CRH (corticotrophin- releasing hormone). Women who had been targets of racism or personal violence may be at particularly high risk of preterm delivery (Rich-Edwards, Krieger, Majzoub, Zierler, Liberman &Gillman, 2001). Several studies indicate that about 15% of pregnant woman are victims of domestic abuse. Abused pregnant women are more depressed and anxious and are more likely to smoke, drink and self- medicate with drugs to numb their pain and anxiety. All these conditions can cause dramatic effects on the baby (Verny &Weintraub, 2002). Acute stress can also be caused by external events such as war, disasters and terrorism. Extraordinary examples of such events are the five-day invasion and defeat of the Netherlands by the German army in May 1940. These were well-documented national stress events. Women in the age range of 32-51 exposed, and not exposed to, these stressors in the first to third trimester of pregnancy were followed up throughout their life times by the National Psychiatric Case Register. Results revealed a higher cumulative incidence of

schizophrenia in the exposed offspring, especially in those exposed in the first trimester of pregnancy. The authors conclude that maternal stress during pregnancy may contribute to the development of vulnerability to schizophrenia (Van Os &Selten, 1998). Prewar stress adversely affected the development of Israeli boys whose mothers were pregnant during the stressful period prior to the six-day war, compared to children born 2 years later (Kofman, 2002). In the big earthquake in 1994 in California, women who were exposed to the stress of the earthquake late in their pregnancies delivered earlier than a control group of women who weren't exposed to the earthquake (Mealey, 2001). Kofman (2002) found that during an earthquake in Italy, fetuses showed vigorous motor hyperactivity lasting 2-8 hours. Stress and Terrorism One of the major causes of stress that people are facing in many places in the world today is the acute stress caused by terrorism. Countries like Israel, Ireland, Russia, Spain, Bosnia and several countries in Africa are suffering from this chronic state of terrorism and stress. In the USA too, September 11, 2001 was a day that changed the nation forever. This was the single largest terrorist attack ever experienced by this or any other country. Stress from terrorism has specific characteristics: "Terrorism challenges the natural need of humans to see the world as predictable, orderly and controllable" (Hamblen, 2003, p.1). Many studies (Kligman, Raviv &Stein 2000; Jehel, Peterniti, Brunet, Duchet &Guelfi, 2003) have demonstrated that deliberate violence creates long lasting mental health effects. The survivors often feel that injustice has been done to them. This can lead to anger, frustration, helplessness, fear and desire for revenge that in turn increase the levels of stress. A frequent reaction to terrorism is Posttraumatic Stress Disorder (PTSD), however there are other reactions to terrorist attacks. People, who are close to the attack physically or are related to the attack in an indirect way, also suffer from various degrees of stress. Relatives and friends of those killed or wounded in the terrorist attack undergo a stressful event themselves, even though their contact with the terrorist act was an indirect one (Silver Cohen, Holman, Malntosh, Poulin &Gil-Rivas, 2002). There are also certain factors that influence which people are most likely to experience serious and lasting psychological distress as a result of a disaster, such as a terrorist attack. The review of the literature yields the following conclusions. An adult's risk for psychological distress will increase as the number of the following conditions increases (Norris, Byrne &Diaz, 2003): * female gender * 40-60 years old * Little previous experience or training relevant to coping with disaster * Ethnic minority * Low socioeconomic status * Children present in the event * Psychiatric history * Severe exposure to the disaster, especially injury, life threat and extreme loss * Living in highly disturbed or traumatized community * Secondary stress and resource loss * For women, the presence of a spouse, especially, if he is significantly distressed. A nationwide longitudinal study of responses to September 11 found that high levels of posttraumatic stress symptoms were associated with female sex, marital separation, pre- 9/11 diagnosed depression, anxiety disorder or physical illness, severity of exposure to the attacks and early disengagement from coping efforts. Distress was also associated with the severity of loss due to the attacks and lack of early coping strategies (Silver Cohen et al., 2002). One of many outcomes of this specific terrorist attack was the increased use of tobacco, alcohol and marijuana among Manhattan residents. A random telephone survey was conducted to estimate the prevalence of increased cigarette smoking, alcohol consumption and marijuana use among residents of Manhattan, 5-8 weeks after the attacks. The results of this study showed a substantial increase in substance abuse in the acute post disaster period after 9/11 (Vlahov, Galea, Resnick, Ahern &Kilpatrick, 2002). The authors have advised that increase in use of different substances may be associated with the presence of different psychiatric conditions. Jehel et al. (2003) found persisting PTSD symptoms in victims as long as 32 months after the actual terrorist attack. Even people who are thousands of miles away from the actual terrorist attack can develop PTSD symptoms. Speckhard (2003) surveyed 50 expatriate Americans in Brussels in the 10 weeks following 9/11. All the participants in the survey showed symptoms of distress, 10% of them showed acute stress disorder in the first week. Van Zelt, De Berus and Smit (2003) found symptoms of PTSD after 9/11 in older persons surveyed in the Netherlands. The critical question to analyze is how terror attacks and the stress effects created by them affect pregnant women and their babies. Surprisingly, very little research has been done on this subject. As previously

mentioned, there is research that connects PTSD and pregnancy complications. The objective of most of these studies was to assess the connection between specific pregnancy complications and PTSD based on neurobiological and behavioral characteristics. After controlling for demographic and psychosocial factors, women with PTSD possessed a higher risk for complications such as ectopic pregnancy, spontaneous abortion, preterm contractions and more (Seng, Oakley, Sampselle, Killion, Graham-Berman &Liberzon, 2001). Possible Coping Strategies Skills for coping with stress and stress-resilience are important factors when discussing stress during pregnancy. Research has shown that optimism/pessimism and social support play an important role in the ability of the pregnant women to cope with stress and in the outcome for their babies. Devincent (2002) found that women high in pessimism were more likely to deliver preterm infants than woman high in optimism. Another study (Yali &Lobel, 2002) examined the value of stress-resistance resources such as optimism and social support. Optimism in pregnant women was associated with less distress in early and later stages of pregnancy. Optimism was also negatively related to the use of avoidant strategies. Avoidant strategies were found to be related to higher levels of distress in both early and later pregnancy. Higher levels of social support were associated with more frequent use of avoidance and with higher levels of emotional distress. Positive appraisal was the only way of coping associated with less distress. The conclusions from this research are that optimism and avoidance play a major role in understanding who will experience psychological distress during pregnancy. Summary To summarize the information so far, there is clear evidence both in animals and humans that stress during pregnancy affects the healthy development of the fetus and has long-term implications. There is also support for the fact that acts of terrorism create very high levels of stress in those directly and indirectly exposed to them. The stress is manifested as PTSD, anxiety disorder and other psychological reactions. The issue that is lacking research is the connection between terrorism and its effects on fetal development as well as long-term implications. Since there is a gap in the literature for this kind of study, future research questions that need addressing are: 1. How does terror-induced stress affect the pregnant woman? 2. How does terror-induced stress affect the development of the fetus? 3. Are pregnant women affected by terror-induced stress differently from other women? 4. What are the variables that mediate the effects of terror-related stress and pregnancy? According to the existing data, resilience, optimism and lack of avoidant behavior can act as such variables and mitigate the effects of stress. It has been my personal experience that in Israel, religious women that believe that their mission in life is to live on settlements in Judea and Samaria are less susceptible to acts of terrorism or thoughts about the implications of living where they live. This has not been shown empirically but there is plenty of anecdotal evidence that would make this population an extremely interesting one for future research. 5. What are the long-term implications of terror-induced stress during pregnancy on child development? What are the biological as well as psychological consequences and effects on child development? 6. In countries plagued by terrorism acts, what are the long-term psychological effects of terrorism on the emerging personalities and culture of the next generations? 7. What should be the preventive measures that could help pregnant women cope better with terrorism-induced stress? CONCLUSION Terrorism creates acute levels of stress in people directly and indirectly involved in the terrorist event. One of the most extreme outcomes is PTSD. Research has shown that stress during pregnancy can have negative long lasting effects on the baby. The link between terrorism, stress, and pregnancy outcomes has not been researched yet. The existing data allows to hypothesize that terrorist attacks may have long lasting negative effects on the offspring of pregnant women. This paper points to the need for future research on the subject. References REFERENCES Bakker, J. M. &Van Rees, E. P. (1997). Prenatal stress and immuncompetence in later life. Development Brain Dysfunction, 10(6), 445-446. Berkovitz, G. S., Wolff, M. S., Janevic T. M., Holzman, I. R. &Yehuda, R. (2003). The World Trade Center disaster and intrauterine growth restriction. Journal of American Medical Association, 290(5), 595-596. Coe, C. L., Lubach, G. R., &Schneider, M. L. (2002). Prenatal disturbance alters the size of the corpus callosum in young monkeys. Developmental Psychobiology, 41(9), 1078-1085. Devincent, C. J. (2002). Prenatal maternal stress, optimism, pessimism,

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