Resilience CE

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ABSTRACT

Every child is a unique individual. This individuality is evident in children exposed to psychosocial trauma or adverse childhood experiences. There exists wide variation in the way children respond to toxic stressors in their lives. Some children appear to be relatively unaffected, while others develop a variety of psychological, behavioral, and physical consequences. What is the explanation for this phenomenon? Resiliency has been suggested to explain this variation in pathology expressions in trauma-exposed children. It is vital for pediatric nurse practitioners to understand the concept of resilience. This continuing education offering will define concepts of resilience and stress, explore the neurobiology of resilience, and examine interventions that promote resilience in children. J Pediatr Health Care. (2017) *31*, 384-390.

KEY WORDS

Trauma, resilience, stress

OBJECTIVES

1. Define the concepts of resilience and stress.
2. Discuss the neurobiology of resilience.
3. Understand factors related to resilience.
4. Describe resilience promotion at the macro- and micro-level.
5. Identify strategies to promote resilience that the pediatric nurse practitioner can incorporate into practice.

Every child is a unique individual. This individuality is evident in children exposed to psychosocial trauma or adverse childhood experiences. There exists wide variation in the way children, even identical twins raised in the same environment, respond to toxic stressors in their lives. Some trauma-exposed children develop a variety of psychological or physical concerns, but others with similar exposures remain relatively unscathed (Jaffee, 2007). It is estimated that up to 15% of trauma-exposed children experiencing child maltreatment and other adverse childhood experiences (see Box 1) appear to have little or no symptom development, whereas others exposed to similar or even apparently less trauma exposure develop severe symptoms (Werner & Smith, 2001). What is the explanation for this phenomenon? Resiliency has been suggested to explain this variation in pathology expression in trauma-exposed children. It is vital for pediatric nurse practitioners (PNPs) to understand the concept of resilience. This continuing educational offering will define the concepts of resilience and stress, explore the neurobiology of resilience, and examine interventions that promote resilience in children.

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DEFINING RESILIENCE

Resilience is a dynamic concept (Rutter, 2013). Most definitions of resilience include the overcoming of stress or adversity or a relative resistance to environmental risk (Bowes & Jaffee, 2013). The broader, systems framework definition of resilience is the capacity of a dynamic system to withstand or recover from significant challenges that threaten its stability, viability, or development (Sapienza & Masten, 2011). Rutter (2006) used the term resilience to refer to the finding that some individuals have a relatively good psychological outcome despite suffering risk experiences that would be expected to result in serious sequelae. Resilience, at its essence, is an interactive concept to describe the combination of serious risk experiences and a relatively positive psychological outcome despite those experiences (Rutter, 2006). Resiliency can also be defined as protective or positive processes that reduce maladaptive outcomes under conditions of risk (Greenberg, 2006). Three broad categories of protective factors have been identified: individual (temperament and intelligence/cognitive ability), the quality of the child's relationships, and broader environmental factors (safe neighborhoods, quality schools, and regulatory activities; Greenberg, 2006).

It is also important to understand the concept of risk. First of all, it is unlikely that there exists a single cause of

BOX 1. Adverse childhood experiences/sources of toxic stress

- Child maltreatment
  - Sexual abuse
  - Physical abuse
  - Emotional abuse
  - Neglect
- Exposure to domestic violence
- Household drug/alcohol abuse
- Parental mental illness
- Loss of a parent
- Poverty
- Household involvement with law enforcement
- Familial involvement with child protective services

Source: Felitti et al. (1998).

many negative outcomes to trauma exposure, such as mental illness, substance abuse, or high risk sexual behaviors, among others. Even when a genetic or biochemical mechanism has been identified, expression of the disorder is influenced by environmental or biological events. There are multiple routes to and from risk and problem outcomes; different combinations of risk factors necessary and the effect of a risk factor will depend on its timing and relationship to other risk factors (Bowes & Jaffee, 2013). Risk factors may be mediated by individual factors, such as sex, ethnicity, and culture. The concept of risk may vary across groups or cultures. For example, the definition of child maltreatment in one culture, or at one time in history, may not be the same as another (Bowes & Jaffee, 2013). Physical punishment and strict parenting may be regarded as evidence of a parent's involvement and care in some communities but considered child maltreatment in others (Chen & Luster, 2002).

Stress

To fully understand the concept of resilience it is important to understand the concept of stress. Stress is a rather complex concept. Stress has been defined as a perceived threat to an individual's homeostasis. The threat to homeostasis can be physical, psychological/emotional, or both. Our bodies react physiologically and psychologically to all types of stressors (Banny, Cicchetti, Rogosch, Oshri, & Crick, 2013). Exposure to severe or chronic stress (toxic stress) has been associated with both physical and psychological negative health consequences. However, exposure to mild or moderate stress is much less likely to result in negative health consequences and may actually be beneficial to development (Rutter, 2013). Stress is somewhat subjective both in the measurement of severity and experience; the way in which individuals perceive and interpret stressors may vary greatly (Bowes & Jaffee, 2013). This variance may be a function of their previous exposures to stress (Cicchetti & Rogosch, 2009). Exposure to low or controlled levels of stress may potentially benefit an individual both physiologically and psychologically. Key elements that help determine whether a stressor is associated with severe symptoms or recovery include appraisal of the experience, potential consequences of the experience, and the choice of coping strategies used by the individual to either change the stressful experience or modify his/her emotional response (Lazarus, 1996). Physiologically, evidence proves that differences in coping strategies are associated with differences in neuroendocrine responses to acute and chronic stress (Olff, 1999).

There are basically three levels of stress response. Brief exposures to stress with opportunities to return to baseline can be positive and result in growth (Cicchetti & Rogosch, 2009). These exposures can better prepare the individual for stress exposure later in life. This exposure results in only a mild elevation of stress hormones, and individuals learn to self-regulate. A supportive caregiver facilitates stress exposure that results in positive growth for the individual. There is also tolerable stress; serious but temporary stress exposure. Stress hormone levels are elevated, but with buffering from genetics and supportive relationships the individual recovers. Then there is toxic stress—ongoing stress over a long period of time (Hornor, 2015). This results in chronic activation of the stress response, which results in consistently high levels of stress hormones. When this occurs in the absence of protective relationships and protective genetics, lifelong physical and psychological consequences can occur for the individual.

> A supportive caregiver facilitates stress exposure that results in positive growth for the individual.

Stressful experiences during critical periods of brain development in infancy and young childhood can change the functioning of specific brain circuits that underlie adult emotional and cognitive behavior and functioning (Taylor, 2010). These effects of stress are mediated by the autonomic nervous system and hypothalamus–pituitary–adrenal (HPA) axis (Daskalakis, Bagot, Parker, Vinkders, & de Kloet, 2013). Much research has focused on understanding how mediators of these systems such as biogenic amines (adrenaline), neuropeptides, and hormones can change brain function and behavior for life (Maras & Baram, 2012). These stress mediators and their receptors on the hypothalamus–pituitary–adrenal axis are prime targets for epigenetic changes; enduring changes in the transcriptome underlying DNA methylation and chromatic modification (Daskalakis et al., 2013). The exact mechanism by which epigenetic changes occur and result in functional and behavioral changes remains unknown.

Daskalakis et al. (2013) discuss three models to explain the stress/resilience phenomena. The cumulative stress model (McEwen, 1998) states that the accumulation of

stressors throughout a lifetime enhances the development of psychopathology in at-risk individuals. Psychopathology develops when a critical stress threshold is exceeded. The match/mismatch model takes into account the concept of epigenetic changes (Gluckman, Hanson, Buklijas, Low, & Beedle, 2009). Early-life exposure to stressors can induce epigenetic changes to match an organism to its environment and decrease the risk of disease. A mismatch between the phenotypic outcome of the epigenetic changes and the ability to cope with current environmental stressors is thought to increase the risk of disease. The major difference between these two models is that the cumulative stress model asserts that cumulative stress or adversity never has any advantageous effect; rather it progressively increases disease risk. The cumulative stress model does not allow for adaptation/epigenetic changes that can be protective for the individual. The match/mismatch model includes the concept of adaptation to early life stressors (even significant cumulative stressors) for certain individuals; thus, it includes the concept of resilience. The three-hit concept of vulnerability and resilience (Daskalakis et al., 2013) attempts to reconcile the differences in these two models. The three-hit model considers the following: the interaction of genetic factors (Hit 1) with early life experiences (Hit 2) causes altered endocrine regulations and epigenetic changes during brain development, which programs gene expression patterns relevant for an evolving phenotype. These programmed phenotypes have different susceptibility to later-life challenges (Hit 3); disease resilience or vulnerability may precipitate (Daskalakis et al., 2013). When exposed to one type of later-life environment the programmed phenotype results in vulnerability, but when exposed to another type of later-life environment the same phenotype will result in resilience. The three-hit model includes the concept of environmental interventions affecting vulnerability or resilience outcomes.

> …Epigenetics allows an individual a means of adaptation, resilience, and survival, but sometimes these epigenetic changes can have slow but devastating consequences.

NEUROBIOLOGY OF RESILIENCE

In recent years there has been an explosion of research exploring the genetics and biology of resilience. A basic understanding of epigenetics can assist in truly understanding the concept of resilience. Epigenetics is the study of heritable, but modifiable, changes in gene expression that do not involve changes to the underlying DNA sequence (Gershon & High, 2015). Epigenetics explains how the human body has learned to adapt itself to its environment. These changes have occurred over many generations as part of natural selection, but changes can also and do occur in the life of an individual to maximize survival. Epigenetic mechanisms, such as DNA methylation and histone modifications, can change gene expressions, preparing the individual for future responses to environmental challenges. Thus, epigenetics allows an individual a means of adaptation, resilience, and survival, but sometimes these epigenetic changes can have slow but devastating consequences. This can be true regarding epigenetic changes triggered by trauma exposure; however, it is important to remember that these changes are reversible.

The ability to study measured genes (G) and measured environments (E) and their interactions (G × E) has allowed for new research on resilience (Sapienza & Masten, 2011). Genes have been identified that appear to convey risk or vulnerability, making it possible to study genetic and environmental mitigating factors. Children with risk or vulnerability genes may also have other genes or experiences that could mitigate the risk. Studies have explored the G × E effects on the experience of child maltreatment to later developing depression or overinternalizing symptoms (Caspi, Sudgen & Moffitt, 2003; Kim-Cohen & Gold, 2009; Stein, Campbell-Sills, & Gelernter, 2009). Studies have indicated that polymorphisms of the serotonin transporter gene (*SLC6A*, serotonin transported–linked polymorphic region 5-HTTLPR) may moderate the G × E effects. The short alleles of 5-HTTLPR have been found to be associated with depression and other internalizing behaviors, as well as with externalizing behaviors such as drug use and high-risk sexual activity, and the long allele of 5-HTTLPR may be associated with resilience in individuals exposed to child maltreatment and other psychosocial traumas (Saprinza & Masten, 2011). Brody, Beach, and Phillibert (2009), in a ground-breaking test of a G × E hypothesis in a randomized prevention study, showed a protective effect of the Strong African-American Families intervention. Young people with known environmental risk (exposures to psychosocial traumas) and identified as being at genetic risk for depression and risky behaviors (having one or two copies of the short allele for the 5-HTTLPR polymorphism), were given the intervention program, and genetic and environmental risk was mitigated by the intervention (Brody et al., 2009). Young people in the intervention group with similar environmental risk and genetic risk to those who did not receive the intervention were less likely to develop internalizing and externalizing behaviors.

Exploring the biology of resilience and risk and understanding the neural plasticity for resilience allows for

studies to promote resilience by targeting a group with genetic risk markers and attempting to cause a protective G × E effect (Sapienza & Masten, 2011). Karg, Burmeister, Shedden, and Sen (2011), in a large-scale meta-analysis looking at various stresses, found only a marginally significant G × E effect for all negative life events except for child maltreatment, where a strong and highly significant G × E effect was found. A second gene was identified as being involved in a G × E. The G × E effect involves the polymorphism of the *MAOA* gene, which is associated with high MAO-A protein activity in individuals who experienced child maltreatment who later develop antisocial behaviors. At first, the G × E finding might appear to be relevant only in identifying children who are usually vulnerable to the development of psychopathology because of adverse experiences. However, there is evidence to suggest that the genetic polymorphisms that are associated with vulnerability to negative life events, like child maltreatment, may also be associated with greater responsivity to positive events/environments brought about by therapeutic interventions because of neural plasticity (Rutter, 2013).

RESILIENCE FACTORS AND FEATURES

Individual and environmental factors contribute to resilience (see Box 2). Resilience can also develop from factors that are not positive in the absence of environmental risk; without the environmental risk these factors may be neutral or even potentially risky in their effects (Rutter, 2013). Consider the concept of nonmaternal care. There is no reason to believe that nonmaternal care would be advantageous to a child if the mother is able to provide a safe and nurturing environment. However, consider the child being cared for by a mother whose parenting ability is limited by substance abuse, mental illness, or domestic violence; nonmaternal care may be a protective factor building resilience for that child (Cote, Geoffroy, Borge, Rutter, & Tremblay, 2008).

BOX 2. Resilience factors

- Higher cognitive ability
- Psychological hardiness
- Self-esteem and social skills
- Sense of hope
- Respect and esteem for others
- Sense of control over life
- Interpretation of their traumatic experience as not their fault
- Ability to accept support and assistance
- Support people
- Good peer relationships
- Hobbies and creative pursuits

Source: Rutter (2012).

Resilience can develop from repeated brief exposures to negative life experiences as long as circumstances allow the individual to successfully cope with the experience (Rutter, 2012). The medical phenomena explaining this concept is that of immunity to infectious diseases as a result of natural exposure to the infectious agents or inoculation of a modified form of the infectious agent. Therefore, resistance to infectious diseases does not result from complete avoidance of germs; living in a sterile, germ-free environment is more likely to increase vulnerability to pathogens rather than resistance. As this concept as related to the human psyche, evidence that suggests that if an individual has fears or phobias, avoidance of the feared object/scenario will only result in persistence and exacerbation of the fear. Over time, limited exposure to the object/scenario can help gradually decrease the anxiety associated with the object/scenario (Rutter, 2013).

There are personality and cognitive factors that tend to be present in resilient individuals. Certain mental features such as planning (Clausen, 1993), self-reflection, determination, self-confidence (Hauser, Allen, & Golden, 2006), and self-control (Moffitt, et al., 2011) tend to be present in resilient individuals. Resilient individuals possess a propensity to plan regarding all of life's key decisions. The act of planning can be more important than the skill of planning. Self-reflection allows an individual to determine what has or has not worked for them in the past. Resilient individuals possess a sense of determination to meet life's challenges and develop self-confidence in being able to meet these challenges with success. A sense of self-control in childhood is associated with overall better physical, psychological, and social outcomes (Moffitt et al., 2011).

Positive social relationships promote resilience (Rutter, 2013). Bowes, Maughan, Caspi, Moffitt, and Arseneault (2010) found maternal warmth, sibling warmth, and a positive family atmosphere to be significantly protective against bullying. The benefit of family warmth was also noted in nonbullied children.

PROMOTING RESILIENCE

Promoting resilience is a complex problem that involves interventions at both the macro- and microlevel (Greenberg, 2006). Macrolevel interventions provide the framework for microlevel interventions aimed at the community, family, and individual (Oral et al., 2016). Macrolevel interventions are focused at the level of economic and social policy to create community environments, attitudes, and behaviors that are safe, supportive, and healthy. Macrolevel approaches to strengthening resilience of the entire population focus on the primary prevention of adverse childhood experiences while maximizing community strengths. These are interventions targeted at the population level, which will have the

greatest individual and societal impact (Oral et al., 2016). Legislation and policy aimed at reducing resource disparity such as raising the minimum wage, improving the affordability of higher education, and improving access to mental health services are examples of resilience promotion at the societal level. To optimally promote resilience, interventions must occur at every level: the larger society, the community, the family, and the individual. The child advocacy center movement is an example of intervention at multiple levels that has resulted in resilience promotion (Hornor, 2008). Legislation and funding at the federal level has resulted in state and community development of child advocacy centers aimed at improving the multidisciplinary assessment of children for concerns of child maltreatment, particularly sexual abuse, decreasing the trauma of the investigative process and linking abused children and their families with resources to promote healing and resilience.

Microlevel interventions attempt to improve the culture, attitudes, and relations in communities, schools, peer groups, and families by focusing on building communication skills and values that promote positive developmental processes, such as parenting classes, antibullying policies and programs, and drug education programs (Greenberg, 2006). These interventions are often aimed at children's relationships—strengthening relationships with parents, siblings, and other relatives and peers. Healthy relationships build resilience (Oral et al., 2016). There are several evidence-based programs that have shown promise in improving parent–child attachment and reducing exposure to adverse childhood experiences including child maltreatment: Circle of Security (Cassidy, Woodhouse, Sherman, Stupica, & Lejuez, 2011), Incredible Years (Webster-Stratton & McCoy, 2015), and Nurse Family Partnership (Jack et al., 2015). Interventions that strengthen communities in which children live promote resilience. Examples include community programs that focus on violence reduction in at-risk neighborhoods and increased access to food pantries, homeless shelters, and domestic violence shelters.

Interventions must also focus at the individual level; attributes inside the individual may be able to be molded to promote resilience. Individual interventions aim to enhance individual characteristics that enhance resilience such as temperament and intelligence/cognitive ability (Greenberg, 2006). Identifying the individual strengths and interests of children also promotes resilience. Participation in academic, athletic, art, or other activities that children are passionate about and excel in can give them a sense of accomplishment and confidence. These pursuits also assist in the development of peer relationships that promote resilience. See Box 3 for skills that promote resilience.

IMPLICATIONS FOR PRACTICE

It is crucial for PNPs to understand that exposure to adverse childhood experiences with resulting toxic stress has the potential to result in lifelong consequences for children and generational consequences for families and society. It is equally important to understand resilience and to realize that resilience is not a stagnant concept but rather something that is dynamic and responsive to intervention. PNPs must advocate for national and state legislation and policies that support the development and sustainability of programs that promote resilience in children. Pediatric health care, primary care in particular, can play a vital role in resilience promotion at the family and individual level. PNPs must identify both the stressors and the strengths that patients and their families are experiencing. Routine screening of children and families for psychosocial risk factors and linking families with appropriate interventions and resources when risks are identified is crucial. PNPs must know their patients' psychosocial histories as well as they know their health histories. A thorough psychosocial history should be obtained when care is initiated and at all subsequent well-child appointments (see Box 4). Families and patients should be linked with appropriate interventions and resources when risk factors are identified in the psychosocial screening, and progress should be monitored regarding the identified psychosocial need. The SEEK Model (Dubowitz, 2014) offers an evidenced-based model for pediatric primary care that identifies not only risk factors present in families but also strengths and builds on the identified familial strengths to intervene for risk factors.

> …Exposure to adverse childhood experiences with resulting toxic stress has the potential to result in lifelong consequences for children and generational consequences for families and society.

Concerns for child maltreatment or neglect must be reported to child protective services when identified. Children exposed to trauma may not need ongoing mental health therapy; however, they would benefit from an assessment by a clinician skilled in identifying trauma symptoms. Symptomatic children need to be linked with a clinician skilled in trauma-informed care. Trauma-informed care involves the recognition of the effects of traumatic events, common coping strategies, and effective treatments (Substance Abuse and Mental Health Services Administration, 2015). Identifying and intervening

BOX 3. Skills promoting resilience

- Knowledge that they can handle a situation
  - Focus on individual strengths
    - Academic
    - Athletic
    - Arts
    - Personality
- Confidence in their own abilities
  - Honest praise
  - Point out skills
- Connection
  - Parents
  - Siblings
  - Family
  - Other adults
  - Faith/spiritual community
  - School
  - Peers
- Morals and values
  - Understanding how their behavior affects others
- Contribution
  - Work as a team
  - Serve others
- Coping
  - Ability to focus on decisions
- Planning

Source: Block (2016).

BOX 4. Psychosocial assessment

- Family tree
  - Parents' names and ages
  - Names and ages of siblings
  - Living arrangement of child
- Parental employment/financial stressors
- Parental drug/alcohol concerns
- Parental mental health concerns
  - Mental retardation/low functioning
  - Anxiety
  - Depression
  - Other diagnosis
  - Mental health/psychiatric medications
- Interpersonal violence/domestic violence
- Maternal/paternal/familial
  - Sexual abuse as a child
  - Physical abuse as a child
  - Child protective services involvement as a child
- Previous or current familial involvement with child protective services
- Previous or current parental involvement with law enforcement
- Support systems
- Strengths

Source: Hornor (2013).

for trauma exposure in children's lives promotes resilience.

The prevention of trauma exposure should be the ultimate goal of pediatric health care. PNPs can facilitate the elimination of trauma exposure and the promotion of resilience by consistent encouragement of positive parenting practices from infancy through adolescence. Positive parenting is defined as the continual relationship of parent(s) and child or children that includes caring, teaching, leading, communicating, and providing for the needs of a child consistently and unconditionally (Seay, Freysteinson, & McFarlane, 2014). The Centers for Disease Control and Prevention (2014) offers positive parenting tips handouts on its Web site for various age groups that incorporate anticipatory guidance for safety, education, development, and the establishment of a caring relationship between parent and child. Anticipatory guidance regarding discipline, sexual abuse, and positive parenting practices should be provided beginning in infancy and minimally at every well-child appointment. Strengthening families and children promotes resilience. Pediatric health care, in which PNPs play a vital role, is uniquely positioned to affect trauma exposure and resilience promotion at the societal, familial, and individual levels.

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