Effects of depression on brain function

Depression

The Diagnostic and Statistical Manual of Mental Disorders, 4 th edition (DSM-IV) diagnose children and adolescents with major depression with signs that include loss of interest and sadness for two weeks straight. Psychologists usually will also look for at least five more symptoms on top of the other two symptoms. These include “ changes in sleeping or eating habits (weight and energy), psychomotor agitation or retardation, feelings of worthlessness and guilt, trouble thinking or paying attention, recurrent thoughts of death, or suicidal ideation and attempts” (Bujoreanu, Benhayon, and Szigethy, 2011, p. 548). This paper will focus on comparison of normal brain function and the brain function of an individual with depression, negative effects of daily functioning living with depression, assessments that are used for diagnoses and treatment, and appropriate treatment options and coping mechanism for individuals with depression.

Comparison between Normal Brain Function and Depressed Brain Function

Neuropsychological research has shown that emotion is controlled by the right cerebrum which means that the “ right-posterior region of the cerebrum is specialized for the perception of emotional information, regardless of valence” (Shenal, Harrison, & Demaree, 2003, p. 34). In normal brain functioning, the right cerebrum also controls arousal and attention. Other research has shown that there is a balance of positive and negative emotions between the left and right cerebrum. The left cerebrum processes positive emotions while the right cerebrum processes negative emotions (Shenal et al., 2003).

EEG asymmetries have been examined with individuals that have depression and have found there is an increased activation in the right-frontal lobe that is relative to left-hemisphere activation (Shenal et al., 2003). Other studies have shown individuals with depression have different hemisphere activation by increased right-hemisphere activation or decreased left-hemisphere activation. Individuals with depression from left-frontal dysfunction will have problems planning and arranging information. Depression from right-frontal dysfunction may have impaired nonverbal fluency.

Negative Effects of Daily Functioning Living with Depression

Major depression can have a big effect on children or adolescent's ability to function on a day to day manner. There are a lot of negative effects to depression that are important to recognize right away for help. Some of the effects of depression include " change of eating habits, change in sleeping habits (sleeping too much, not sleeping very much), irritability, social withdrawal, trouble paying attention, and feelings of sadness" (Bujoreanu et al., 2011, p. 548). If depression is not treated, this can lead to " family dysfunction, academic impairment, and psychosocial difficulties" (Bujoreanu et al., 2011, p. 548). There is also the chance that the depression can continue into adulthood if the family is not aware or informed of the symptoms the child is displaying.

Assessments that are Used for Diagnoses and Treatment

Neuropsychologists are now starting to find new ways to accurately diagnose depression in individuals as well as finding out if depression treatments are actually helping individuals with the disorder. Depression is now being

diagnosed by a blood test and neuroimaging (fMRI) is being used to examine neural circuitry in adolescents with depression.

The blood test is a new technique to psychiatry that was approved in 2011. This diagnostic tool is one way to find out if an individual has major depressive disorder without the medical professional being biased or not able to get a lot of information from the individual. The diagnostic tool looks at the levels of ethanolamine phosphate in the patient's blood to give an indication that the patient has the disorder. Studies have shown that people with depression have low levels of ethanolamine phosphate (Verma, Kaur, & David, 2012). At this point, the blood test is very expensive or is slow to get the results back to see if an individual has depression.

Neuropsychologists as well as health physicians can use this assessment as the first step in determining if the patient has major depressive disorder. Once the blood tests indicate the disorder, the neuropsychologist and health professional can refer the patient to a medical professional that specializes in depression. The blood test can be used to help the medical professionals in making a diagnosis and to find the best treatment for the patient (Verma et al., 2012).

The second assessment that is being used by neuropsychologist for depression is neuroimaging (fMRI). One study in particular used an fMRI to compare adolescents with depression and healthy adolescents on " neural responses to fearful facial expressions" before treatment (Cullen, 2012, p. 348). The study was repeated again after eight weeks with the depressed adolescents on fluxetine (antidepressant). Research showed that adolescents

with depression increase the activation in the amygdala looking at fearful faces (Cullen, 2012). After the treatment, there was no difference between adolescents with depression and healthy adolescents.

This study has opened new doors to further study other depression treatments. The fMRI was able to show the difference the fluxetine had on the brain to help adolescents with negative effectives that interfere with daily living. The next steps would need to look at what can affect before and after treatment findings. Some of these include “ age at assessment, illness status, treatment history, and type of treatment” (Cullen, 2012, p. 350). When these effects are looked at with more research, this will bring clinical advancements to the neuropsychological field.

Appropriate Treatment Options

When it comes to appropriate treatment options for children and adolescents with depression, there are two different kinds that have been the most effective. These two different kinds of treatments are psychotherapeutic treatments and psychopharmacological treatments. The psychotherapeutic treatments are therapy treatments to work with children and adolescents to help them function normally in their daily lives. Evidence-based treatments (EBT) are “ interventions or techniques that have produced therapeutic change in controlled trials” (Bujoreanu et al., 2011, p. 549). Common evidence-based treatments used with depressed children and adolescents include cognitive-behavioral therapy (CBT) and interpersonal therapy-adolescent (IPT-A).

Cognitive-behavioral therapy has been found out to be the most effective psychotherapeutic treatment with children and adolescents with depression. Aaron Beck created cognitive-behavioral therapy and focused on how “ thoughts, feelings, and behaviors are inter-related and individuals can make positive changes in how someone feels by changing what they do or think” (Bujoreanu et al., 2011, p. 549). Children and adolescents work with a therapist to learn new skills and explore different ideas that are discussed during sessions.

Interpersonal Therapy-Adolescent (IPT-A) is a treatment that does takes place for a short period of time. The therapy focuses on the clients’ depressive symptoms and the interpersonal context in which they occur (Bujoreanu et al., 2011, p. 550). To help with the depressive symptoms when they occur, the therapist helps the child or adolescent learn problem-solving and communication skills.

Psychopharmacological treatments involve the medications that are appropriate for children and adolescents with depression. These include selective serotonin reuptake inhibitors (SSRIs), norepinephrine-dopamine reupatake inhibitor (NDRI), and serotonin-norepinephrine reuptake inhibitor (SNRI). SSRIs are the most common and first kind of drugs that will be used to treat child and adolescent depression. Fluoxetine and escitalopram are FDA approved for children with depression, but there are also other medications that are not intended for depression that have been successful (Bujoreanu et al., 2011). When picking an SSRI, it is important to look at family history and how the drug affects the child or adolescent.

When SSRI’s do not work with the children and adolescents, there are other drugs that can be taken into consideration. Adolescents that have depression with bupropion would use a NDRI to help with the symptoms. Another drug category that can help with depression is SNRIs that include taking duloxetine and venlafaxine that are sedating. When one kind of treatment does not fully treat the patient, combined therapy of medication and therapy are used. Therapy is usually the first step taken in treatment before medication is considered.

Alternative Treatments

There are a lot of adolescents that are experiencing depression symptoms that are not able to receive the standard treatments. This can be from the adolescent’s family not having insurance or the families insurance does not cover certain treatment options. These alternative treatments that could help these individuals with depression include interpersonal therapy and attachment-based family therapy, the artistically creative approaches, and existential therapy (McGlasson, 2012).

The interpersonal therapy focuses on the different relationships that are in the adolescent’s life. If there is not a healthy relationship, this can lead to depression. This therapy focuses on personal issues that cause the different relationships to not be healthy and finds skills the adolescent can work on to improve those relationships. The attachment-based family therapy is where the family, the adolescent, and a trained counselor work together to build a healthy relationship. This also includes skills that that will be learned in sessions that will help in the long run (McGlasson, 2012).

The artistically creative approaches include art therapy and music to help adolescents express themselves in a creative way. Art therapy allows the youth to communicate on a deeper level than just talking about the issues with a counselor. This form of therapy might feel less threatening to the adolescent and a way they can control (McGlasson, 2012). Music is something that adolescents are familiar with and feel safe with being used in therapy. Music lowers stress and can help the therapist in understanding different moods that the client is experiencing (McGlasson, 2012, p. 19).

Existential therapy has four themes to the treatment. These themes are " the uniqueness and freedom of the individual, the recognition of suffering as part of the human experience, an emphasis on the here-and-now to discover one's meaning and identity, and a commitment to discover and develop one's talent" (McGlasson, 2012, p. 19). The themes all focus on the individual and how he or she is becoming. Therapists would focus on existential concerns that go on in the adolescent's life and find ways to explore the issues.

Coping Mechanism for Individuals with Depression

There are healthy and unhealthy coping strategies that children and adolescents do to deal with depression. The healthy and unhealthy coping strategies both involve the same three core categories (emotion-focused coping, problem-focused coping, and avoidant coping). It all depends on what the children and adolescents have picked up from others and what they have learned on their own to determine if it is healthy or unhealthy.

Unhealthy coping strategies usually fall under the emotion-focused coping and avoidant coping. Emotion-focused coping is “ any response aimed at reducing or managing the negative feelings that arise in response to the threat or loss” (Hayat, 2013, p. 153). Research has shown that common emotion-focused coping strategies that can develop depression and suicidal ideation more are self blame and emotional support (Horwitz, Hill, & King, 2011).

Avoidant coping involves a strategy that avoids the depression symptoms and suicidal ideation. Common avoidant coping strategies that are unhealthy and can develop the disorder more are behavioral disengagement and denial (Horwitz et al., 2011). Avoidant coping is usually avoided when learning new strategies that can help with depression.

When children and adolescents learn healthy ways to cope with depression, most of the strategies fall under the category problem-focused coping. This category of coping strategies is defined as “ attempting to deal constructively with the stressor or circumstances itself” (Hayat, 2013, p. 153). A medical professional can help the child or adolescent learn active coping strategies, plan different coping strategies that fit with the stressor or circumstance, and use instrumental support (Horwitz et al., 2011). For emotion-focused coping healthy alternatives would learning wishful thinking and seeking emotional support from family and friends that will not make the individual feel worse about themselves. These coping strategies can be learned by a medical professional that can work with the child or adolescent with depression. While there was only a few coping strategies mentioned,

other coping strategies might be used depending on the situation of the individual.

Preventive Measures for Individuals at Risk of Depression

It is important that society is aware of what factors will identify high-risk adolescents for depression. When factors that can lead to depression are understood, steps can be taken to help reduce the risk of the disorder developing. At this point, research has shown that biological, psychological and social risk factors can trigger depression. Newer research has also found that neuroticism (N) (personality trait) is associated with mood disorders that can risk adolescents is developing depression (Kuyken, Watkins, Holden, & Cook, 2006). High neuroticism individuals will show more mood changes and will need to respond adaptively (Kuyken et al., 2006).

Kuyken's et al., (2006) study included four different hypotheses to find out what risk factors would determine if adolescents will develop depression. They hypotheses are (1) " Adolescents at risk for depression (as indicated by high N) will report greater rumination than adolescents at low risk but lower rumination than currently depressed adolescents, (2) among currently depressed adolescents, elevated levels of rumination will be associated with higher levels of depressive symptoms, (3) the relationship between N and depressive symptoms will be partially mediated by rumination in cross-sectional analyses, with higher rumination associated with more depressive symptoms, and (4) the effect of rumination on depression will be moderated by gender, being greater for female compared to male adolescents" (Kuyken, et al., 2006, p. 42).

The results indicated that at risk adolescents for depression have more ruminated than healthy adolescents. At risk adolescents and current depressed adolescents were comparable with high neuroticism personal trait. Adolescents that found out they had depression show rumination was connected to severe depressive symptoms. This study found that rumination and depression symptoms were the same for females and males.

Conclusion

Depression is a complex disorder that is now fully starting to be understood. Neuropsychologists are able to see what parts of the brain are impaired from the disorder as well as assessments that help to diagnose and treat depression accurately. With this information medical professionals find the best treatment options for the individual and help with coping strategies that are not unhealthy to use. This information has also made it easier to determine if adolescents are at risk of developing the disorder. Determining if adolescents have depression is still new, but with more research, medical professionals will hopefully be able to reduce the amount of youth with the disorder.

References

Bujoreanu, S., Benhayon, D., & Szigethy, E. (2011). Treatment of depression in children and adolescents. *Pediatric Annals* , 40(11), 548. doi: 10. 3928/00904481-20111007-05

Cullen, K. R. (2012). Imaging adolescent depression treatment. *The American Journal of Psychiatry* , 169(4), 348.

Hayat, I. (2013). Stressful life events, depression and coping strategies. *Journal of Research in Social Sciences* , 1(2), 148.

Horwitz, A. G., Hill, R. M., & King, C. A. (2011). Specific coping behaviors in relation to adolescent depression and suicidal ideation. *Journal of Adolescence* , 34(5), 1077-1085. doi: 10. 1016/j. adolescence. 2010. 10. 004

Kuyken, W., Watkins, E., Holden, E., & Cook, W. (2006). Rumination in adolescents at risk for depression. *Journal of Affective Disorders* , 96(1), 39-47. doi: 10. 1016/j. jad. 2006. 05. 017

McGlasson, T. D. (2012). Listening clearly: Alternative treatments for adolescent depression. *The Prevention Researcher* , 19(4), 18.

Shenal, B. V., Harrison, D. W., & Demaree, H. A. (2003). The neuropsychology of depression: A literature review and preliminary model. *Neuropsychology Review* , 13(1), 33-42. doi: 10. 1023/A: 1022300622902

Verma, R. K., Kaur, S., & David, S. R. (2012). An instant diagnosis for depression by blood test. *Journal of Clinical and Diagnostic Research* : JCDR, 6(9), 1612. doi: 10. 7860/JCDR/2012/4758. 2579