Decreasing Risk Factors for Adolescent Depression

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ABSTRACT: The American College of Pediatricians (ACPeds) recognizes that adolescent depression is a serious public health concern. The most recent epidemiological data show that nearly 13 percent of youth will experience at least one episode of major depression by age 17. Depressive episodes are associated with negative consequences later in adolescence. These include academic difficulties, risky behavior engagement, self-injury and suicide. The purpose of this paper is to present evidence-based lifestyle changes that may prevent and/or mitigate depressive episodes among youth.

INTRODUCTION

Adolescence should be a time of optimal health, but high risk behaviors in which adolescents choose to participate are major factors that endanger their physical, emotional and academic well-being. Many studies demonstrate the interconnectedness between high risk behaviors and depression.

Major depression is a common mental health diagnosis in America, and one that can seriously impact an individual's ability to perform even the basic activities of life. Unfortunately, the prevalence of major depression has been increasing, especially among adolescents. The most recent U.S. data (published in 2016) revealed 12.8% of the adolescents between 12 and 17 years of age had experienced one major depressive episode, with the prevalence higher among adolescent females (19.4%) compared with males (6.4%). [1] This compares with a much lower prevalence of 4 – 5% in 2006. [2]

Depression can cause functional impairments in affected individuals, and may negatively impact an adolescent's school performance, as well as family and peer relationships. In addition, depression is associated with an increased risk for suicidal ideation, suicide attempts and completed suicides.

Depression is a treatable condition, but there are some concerns regarding the use of antidepressant medications in adolescents given the ongoing development of the adolescent brain. In addition, antidepressant use in adolescents has been associated with an increased risk of developing Type 2 diabetes. One retrospective cohort study of more than 119,000 patients between 5 and 20 years of age found the risk for type 2 diabetes was nearly twice as high among those who used the most commonly prescribed antidepressants - SSRI (selective serotonin reuptake inhibitors)or SNRI (serotonin-norepinephrine reuptake inhibitors). Risk also increased with duration of use. [3]

Because some studies report as many as 50% of patients with depression are not identified by their physicians, the American Academy of Pediatrics (AAP) and the US Preventive Services Task Force recommend all adolescents between 12 and 17 years of age be screened for depression. [4]

The American College of Pediatricians (ACPeds) agrees with those recommendations, but, in addition, encourages health care professionals and all healthcare providers of children, adolescents, and their families to consider primary prevention. While there is a role for medication in moderate to severe depression, there are

also known risk factors for adolescent depression that may be responsive to prevention. This paper presents multiple ideas and strategies that parents and guardians should find helpful in the well-being of the adolescent. While not attempting to be comprehensive, this report will present some of the research documenting the known protective factors.

FAMILY CONNECTION

The family is the root of a stable society, and scientific research consistently demonstrates that all children and adolescents experience better health and well-being when they are part of a healthy nuclear family. The National Longitudinal Study on Adolescent Health followed over 40,000 adolescents, beginning in 1997. One of the first reports from this study of 12,188 adolescents in grades 7 through 12 evaluated eight outcomes, including emotional distress and suicidal thoughts and behaviors. The authors concluded, "Parent-family connectedness and perceived school connectedness were protective against every health risk behavior measured except history of pregnancy." In addition, they stated, "Except for parent-family connectedness, no family context variables significantly protected against adolescent suicidality." The authors define parent-family connectedness as "Closeness to mother and/or father, perceived caring by mother and/or father, satisfaction with relationship to mother and/or father, feeling loved and wanted by family members."[5]

Even for adolescents in the most high risk categories, such as those who are minorities living in inner cities, family connection is protective. In one study of 976 predominantly minority students attending an alternative high school in Houston, Texas, those students who scored higher on a scale of perceived family connectedness were less likely to report ever having sex, having unprotected sex, and being involved with a pregnancy. [6]

It is crucial, then, that health care professionals acknowledge the importance of the family, incorporate parents into the care of adolescents whenever possible, and encourage family connectedness as a preventive measure for optimal adolescent well-being. There are numerous ways to enhance family connectedness, including participation in family meals, family chores, and volunteer work. Parents who practice supportive or responsive parenting will be setting the foundation for improved family connection.

FAMILY MEALS

Research demonstrates many benefits of families eating meals together, especially in protecting adolescents from negative high-risk behaviors and depression.

A large study of over 99,000 adolescents in grades 6 – 12 in 25 states across America found there was a consistent positive association between the frequency of family dinners and positive developmental assets. The opposite was also true, in that adolescents who experienced fewer family dinners were more likely to participate in all high risk behaviors measured, including depression and suicidal thoughts and behaviors. The authors concluded, "The findings of the present study suggest that the frequency of family dinner is an external developmental asset or protective factor that may curtail high-risk behaviors among youth." [7]

Another study of over 4000 adolescents in Minnesota also found that participation in family meals was associated with a lower frequency of high risk behaviors, depressive symptoms and suicide involvement.[8]

Even when studies have corrected for the possible confounder of parental-adolescent communication, research still demonstrates the benefits of family meals. The 2010 Canadian Health Behavior of School-aged Children study evaluated over 26,000 adolescents aged 11 – 15 years and found the frequency of family dinners was positively correlated with improved emotional well-being and prosocial behavior. [9]
Health care professionals can encourage parents to strive for family meals as often as possible, beginning when the children are infants, to set good habits that will benefit every family member in the long term.

HEALTHY NUTRITION

Nutrition obviously plays an important role in physical health, but more research is evaluating the role nutrition plays in mental health. For instance, lower levels of omega-3 fatty acids, as well as deficiencies of folate, vitamin B12, iron, zinc, and selenium have been noted to be more common in depressed individuals. [10] Folate deficiency, in particular has been noted to play a role in how well patients respond to the antidepressant selective serotonin re-uptake inhibitors.

A study specifically looking at diets in adolescents with depression found that greater consumption of unhealthy and processed foods was associated with an increased risk that adolescents would self-report symptomatic depression, even when adjusting for a number of potential confounding variables.[11]
A review of 12 epidemiological studies in children and adolescents also found evidence of a relationship between unhealthy diets and poor mental health, including depression. [12]

One of the important ways in which nutrition contributes to mental health relates to the serotonin pathway in the brain – the connection of brain neurons that contribute to a sense of contentment and happiness. Serotonin, a neurotransmitter, is essential to the optimal functioning of this system, and serotonin production requires the amino acid tryptophan. Tryptophan is an amino acid found in protein-based foods in our diet, and is more available to the brain when an individual consumes meals with high glycemic loads. Tryptophan is also utilized in other body organs. As individuals seek to decrease high glycemic load meals to decrease risks of diabetes, tryptophan becomes less available to the brain. However, omega-3 fatty acids help promote the use of tryptophan in the brain and thereby promote serotonin production.

Several studies have demonstrated the therapeutic benefits of omega-3 fatty acid supplementation in the treatment of depression. In one study, 48 patients with a diagnosis of a major depressive disorder were randomized to a treatment with fluoxetine, fluoxetine with omega-3 fatty acid, or omega 3 fatty acid alone. The researchers found in the 8 week trial that fluoxetine with omega-3 fatty acids was superior to either of the other treatments. [13]

Given this information on the importance of nutrition, health care professionals and parents should encourage a diet with less processed food, and possible supplementation with a multivitamin containing minerals plus an omega-3 fatty acid.

SEXUAL ABSTINENCE

Adolescent sexual activity alone has been acknowledged as an independent risk factor for developing low self-esteem, major depression, and attempting suicide. Using the data from Wave 1 of the National Longitudinal Study of Adolescent Health, researchers analyzed various correlations between behavior patterns and depression, suicidal thoughts and attempts. They found, "Compared to youth who abstain from risk behaviors, involvement in any drinking, smoking, and/or sexual activity was associated with significantly increased odds of depression, suicidal ideation, and suicide attempts." [14]

An early age of onset of sexual activity may be related to increased risk of depression. A study of over 186,000 adolescents in Finland attempted to evaluate risk of depression in relationship to age. For adolescents aged 14 – 15 years, self-reported depression was associated with having experienced intercourse. The association diminished in older adolescents. [15]

Some have questioned whether those adolescents who are experiencing depression might use sexual activity as a way to 'self-medicate', thus confounding the relationship between sexual activity and depression. Hallfors, et al, utilizing the data from the National Longitudinal Study on Adolescent Health, found that "Engaging in sex and drug behaviors places adolescents, and especially girls, at risk for future depression." [16]

Sexual activity can also lead to pregnancy and many adolescent pregnancies are terminated via elective abortion. It is therefore important to note the link between abortion and depression. [17, 18]

The Youth Risk Behavior Surveillance System monitors six categories of health-related behaviors, and the results for 2017 revealed a significantly decreased incidence of depression, suicidal ideation and attempts in those teens who were sexually inexperienced as compared to those teens who had sexual contacts. Nationwide 17.2% of youth had considered attempting suicide as did 19.0% of students who had sexual contact only with the opposite sex, but the rate was 12.4% among those who were abstinent. Similarly, students who were sexually inexperienced were much less likely to have made a suicide plan and to have attempted suicide**.** [19]

In addition, the use of hormonal contraception is associated with an increased risk for depression. Over one million Danish women were followed for at least 13 years and the researchers found all forms of hormonal contraception (combined oral contraceptives, progestin-only pills, norgestromin patch, etonogestrel vaginal ring and levonorgestrel intrauterine system) were associated with an increased risk of subsequent depression, with adolescents demonstrating the greatest risk. [20]

Parents and health care providers should be educating adolescents regarding their increased risk of developing depression should they choose to engage in sexual activity.

DECREASED USE OF SOCIAL MEDIA

Several studies demonstrate the relationship between increased use of screen time and depression. One longitudinal study in Denmark followed a cohort of 435 adolescents into young adulthood and found "each additional hour/day spent watching television or screen viewing in adolescence was associated with …greater odds of prevalent depression in young adulthood, and dose-response relationships were indicated." [21]

Another study from Canada evaluated 2482 youth in grades 7 – 12 and concluded, "Video game playing and computer use but not TV viewing were associated with more severe depressive symptoms…Screen time may represent a risk factor or marker of anxiety and depression in adolescents." [22]

A Meta-Analysis from the British Journal of Sports Medicine in 2016 suggests that screen time in children and adolescents is associated with depression risk in a non-linear dose-response manner.[23]

A new term has even been proposed to describe the relationship between increased use of social media and depression - "Facebook depression". Because social acceptance by peers is so important to most adolescents, viewing others on the internet as having more possessions or being "liked" more by others may contribute to depressive symptoms. [24]

Educating adolescents about the relationship between increased social media exposure and depression may help adolescents make better choices for leisure activities.

VOLUNTEERING

Volunteering to assist the needy has many potential benefits, including community engagement and improved emotional well-being. A meta-analysis of 40 papers in 2013 found that "volunteering had favourable effects on depression, life satisfaction, well-being, but not on physical health." [25]

Volunteering helps adolescents develop a sense of purpose for their lives and gives them a sense of meaning. The Institute for Volunteering Research published a review of literature in 2014 on youth volunteering and reported that youth who volunteer develop self confidence, have improved emotional well being, and are 15% less likely to worry. [26]

Encouraging families to volunteer together will not only improve well-being, but it will also serve to bond and connect parents and children – which, as noted above, is protective against adolescent depression.

RELIGIOUS ACTIVITIES

There is some evidence that participation in religious activities helps decrease the likelihood the adolescent will participate in high risk behaviors, suicidal ideation and suicidal attempts. A literature review in 1995 found, "religiousness is positively associated with prosocial values and behavior, and negatively related to suicide ideation and attempts, substance abuse, premature sexual involvement and delinquency." [27]

One study reviewed data collected in the Cross-National Adolescence Project that included 9302 adolescents from nine countries in an attempt to determine whether religious affiliation was protective in various cultures. Their study confirmed the benefits of religious affiliation and also found that even within groups of adolescence with religious affiliations, those adolescents who had the strongest religious beliefs had the greatest benefits. The authors concluded, "Overall, the idea that religiosity influences youth well-being is well-supported in the present analyses, not just in the west but around the world." [28]

It is important to note that religious affiliation is only protective from depression when the adolescent has had a positive religious experience. In a study of 744 adolescents, those who had a positive religious experience had lower levels of depressive symptoms, but those who had a negative experience had higher levels. [29]

A Harvard University review of the literature found that although depression lowered religious service attendance, longitudinal studies that addressed timing of depression versus attendance showed a protective effect of religious service attendance on depression. [30]

ADEQUATE SLEEP

The relationship between poor sleep and depression has been clearly recognized for many years and recent literature continues to contribute to our understanding of this association.

Sleep is a time when the brain is consolidating the learning experiences of the day, and may also be a time when the brain clears itself of toxins, such as beta-amyloid through the newly recognized glymphatic system. Adolescent brains are undergoing rapid growth and change, so sleep becomes even more important during this time of development. However, adolescents are at high risk for inadequate sleep because of school schedules, the physiologic delayed onset of melatonin release, as well as environmental stimuli including the use of cell phones, computers, and televisions in the bedroom.

In an attempt to determine whether sleep problems contribute to adolescent depression or are a reflection of depression, researchers performed a meta-analysis of 23 studies which showed that "sleep disturbance acts as a precursor to the development of depression." [31]

The contribution of electronic media is clearly seen in a study of 362 adolescents between 12 and 17 years of age who were questioned regarding their smartphone and other electronic media ownership and use. "Electronic media use was negatively related with sleep duration and positively with sleep difficulties, which in turn were related to depressive symptoms." [32]

Teaching adolescents and parents the importance of adequate sleep (9 hours/night for most adolescents) and healthy sleep habits, including eliminating electronic media at least one hour prior to bedtime and removing all electronic media from the bedroom (including cell phones), are important educational factors to decrease the risk of adolescent depression.

EXERCISE and OUTDOOR ACTIVITIES (NATURE)

Many people intuitively recognize the benefits of exercise as well as spending time outdoors. Research confirms that exercise can decrease the symptoms of depression in adolescents.

One meta-analysis of 30 studies evaluating sports participation in children and adolescents found improved self-esteem and social interaction as well as fewer depressive symptoms in team sports participants [33]
In a prospective study in East London, exercise was found to help prevent depressive symptoms. Over 2000 students between the ages of 11 and 12 years completed questionnaires initially and again two years later regarding physical activity time per week and depressive symptoms. Participants were surveyed using a standardized questionnaire for depression. There was a decrease in the odds of depressive symptoms by approximately 8% for each additional hour of exercise per week in both males and females. [34]

Exercise regimens have also been used in the treatment of adolescent depression. In a study in the United Kingdom, the cost effectiveness of a preferred intensity exercise program for depressed adolescents between 14 and 17 years of age was evaluated. The adolescents chose their preferred form and level of intensity of aerobic exercise for 12 sessions over a six week period of time. There were improvements in the participants' Children's Depression Inventory-2 for those in the exercise program added to usual treatment as compared to controls just receiving usual treatment. The improvements seen were also determined to be cost effective. [35]

Another study used each adolescent participant as her own control, evaluating females with depression during a period of 8 weeks of group jogging (50 minute session, 5 days per week) and another 8 weeks of usual daily activities. About half were randomly assigned to the exercise portion first while the others did the usual activities first. Participants had significantly lower depression scores after the 8 week period of exercise compared to no effect after the same period of usual daily activities. Urinary excretion of the stress hormones, cortisol and epinephrine, was reduced due to the exercise regimen. [36]

Since the benefits of exercise for physical health are well known, unless there is a medical contraindication, health care professionals can encourage exercise as a potential preventive measure for adolescent depression, as well as part of general health enhancement.

GRATITUDE JOURNALS

Keeping a gratitude journal has been shown to improve mental health. A study of young adults, most of college age, who were receiving mental health counseling for depression or anxiety were divided into three groups receiving psychotherapy. Group 1 was asked to write one letter of gratitude to another person every week for three weeks. The second group wrote about their deepest thoughts and feelings. Group 3 was not given a writing assignment. After one month those in Group 1 reported significantly better mental health than the other groups and this result persisted at three months. [37]

As part of a therapeutic regimen for the treatment of adolescent depression, health care professionals can consider encouraging their patients to keep a gratitude journal, writing down one to three things each day for which they are grateful.

CONCLUSION

There are many holistic interventions that may help prevent the onset of adolescent depression, and many of these same concepts can also be incorporated into a therapeutic regimen that will mitigate depressive tendencies.

Primary Author: Jane Anderson, MD, FCP
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The American College of Pediatricians is a national association of licensed physicians and healthcare professionals who specialize in the care of infants, children, and adolescents. The mission of the College is to enable all children to reach their optimal physical and emotional health and well-being.

REFERENCES

1. Center for Behavioral Health Statistics and Quality. (2017). 2016 National Survey on Drug Use and Health: Methodological summary and definitions. Rockville, MD: Substance Abuse and Mental Health Services Administration. https://www.nimh.nih.gov/health/statistics/major-depression.shtml

2. Thapar A, Collishaw S, et al. Depression in adolescence. *Lancet*. 2012; 379(9820):1056-1067.

3. Burcu M, Zito JM, Safer DJ. Association of antidepressant medications with incident type 2 diabetes among Medicaid-insured youths. *JAMA Pediatrics*. 2017; 171(12):1200-1207.

4. Sui A L. Screening for depression in children and adolescents: U.S. Preventive Services Task Force Recommendation Statement. *Annals of Internal Medicine*. 2016; 164(5):360-367.

5. Resnick MD, Bearman, PS, et al. Protecting Adolescents From Harm: Findings from the National Longitudinal Study on Adolescent Health. *JAMA* 1997:228 (10): 823-832.

6. Markham CM, Tortolero SR, et al. Family connectedness and sexual risk-taking among urban youth attending alternative high schools. *Perspectives on Sexual and Reproductive Health*. 2003; 35(4):174-179.

7. Fulkerson JA, Story M, et al. Family dinner meal frequency and adolescent development: relationships with developmental assets and high-risk behaviors. *Journal of Adolescent Health*. 2006; 39(3):337-345.

8. Eisenberg ME, Olson RE, et al. Correlations between family meals and psychosocial well-being among adolescents. *Archives of Pediatrics & Adolescent Medicine*. 2004;158(8):792-796.

9. Elgar FJ, Craig W, Trites SJ. Family dinners, communication, and mental health in Canadian adolescents. *Journal of Adolescent Health*. 2013; 52(4):433-438.

10. Bodnar LM and Wisner KL. Nutrition and Depression: implications for improving mental health among childbearing-aged women. Biological Psychiatry. 2005; 58(9):679-685.

11. Jacka FN, Kremer PJ, et al. Associations between diet quality and depressed mood in adolescents: results from the Australian Healthy Neighbourhoods Study. Australian and New Zealand Journal of Psychiatry. 2010; 44:435-442.

12. O'Neill A, Quirk SE, et al. Relationship between diet and mental health in children and adolescents: A systematic review. American Journal of Public Health. 2014;104(10):e31-e42.

13. Jazayrei S, Tehrani-Doost M, et all Comparison of therapeutic effects of omega-3 fatty acid eicosapentaenoic acid and fluoxetine, separately and in combination, in major depressive disorder. *Australian and New Zealand Journal of Psychiatry*. 2008; 42:192-198

14. Hallfors DD, Waller MW, Ford CA, Halpern CT, and Brodish PH, Iritani B. "Adolescent Depression and Suicide Risk: Association with Sex and Drug Behavior. *American Journal of Preventive Medicine*. 27 (2004): 224-230.

15. Savioja H, Helminen M, et al. Sexual experience and self-reported depression across the adolescent years. *Health Psychology and Behavioral Medicine*. 2015; 3(1):337 – 347. DOI: 10.1080/21642850.2015.1101696

16. Hallfors DD, Waller MW, et al. Which comes first in adolescence – sex and drugs or depression? *American Journal of Preventive Medicine*. 2005; 29(3):163 – 170.

17. Reardon DC, Ney PG, Scheuren FJ, Cougle JR, Coleman PK, Strahan T. Deaths associated with pregnancy outcome: a record linkage study of low income women. *Southern Medical Journal*. 2002;95(8):834-841.

18. Gissler, M, Kauppila R, Merilainen J, Toukomaa H, Hemminki E. Pregnancy-associated deaths in Finland 1987-1994: definition problems and benefits of record linkage. *Acta Obstetricia et Gynecologica Scandinavica*. 1997;76:651-657.

19. Kann L, McManus T, Harris WA, et al. Youth Risk Behavior Surveillance – United States, 2017. *MMWR.* 2018; 67(8): 1 - 479.

20. Skovlund CW, Morch LS, Kessing LV. Association of hormonal contraception with depression. *JAMA Psychiatry*. 2016; 73(11):1154-1162.

21. Grontved A, Singhammer J, et al. A prospective study of screen time in adolescence and depression symptoms in young adulthood. Prev Med. 2015; 81:108-113.

22. Maras D, Flament MF, et al. Screen time is associated with depression and anxiety in Canadian youth. Prev Med. 2015; 73:133–138.

23. Liu M, Wu L, Yao S. Dose-Response Association of Screen Time-Based Sedentary Behavior in Children and Adolescents and Depression. *British Journal of Sports Medicine*. 2016;50(20):1252-1258.

24. O'Keeffe GS, Clarke-Pearson K. The impact of social media on children, adolescents, and Families. *Pediatrics*. 2011; 127(4):800-804.

25. Jenkinson CE, Dickens AP, et al. Is volunteering a public health intervention? A systematic review and meta-analysis of the health and survival of volunteers. *BMC Public Health*. 2013; 13:773.

26. Ockenden N and Stuart J. Review of evidence on the outcomes of youth volunteering, social action and leadership. Institute for Volunteering Research December 2014
https://thirdsectorimpact.eu/site/assets/uploads/page/documents-for-researchers/TSI_impact-report_sports-leaders-literature-review-dec-2014.pdf

27. Donahue MJ, Benson PL. Religion and the well-being of adolescents. *Journal of Social Issues*. 1995; 51(2):145-160.

28. Stolz HE, Olsen A, Henke TM, Barber BK. Adolescent religiosity and psychosocial functioning: Investigating the roles of religious tradition, national-ethnic group, and gender. *Child Development Research*. 2013;
http://dx.doi.org/10.1155/2013/814059

29. Pearce MJ, Little TD, Perez JE. Religiousness and depressive symptoms among adolescents. *Journal of Clinical Child & Adolescent Psychology*. 2003; 32(2):267-276.

30. VanderWeele, T.J. Religion and health: a synthesis. In: Peteet, J.R. and Balboni, M.J. (eds.). Spirituality and Religion within the Culture of Medicine: From Evidence to Practice. New York, NY: Oxford University Press. p. 5

31. Lovato N, Gradisar M. A meta-analysis and model of the relationship between sleep and depression in adolescents: Recommendations for future research and clinical practice. *Sleep Medicine Reviews.* 2014;18(6):521-9.

32. Lemola S, Perkinson-Gloor N, Brand S, Dewald-Kaufmann JF, Grob A. Adolescents' electronic media use at night, sleep disturbance, and depressive symptoms in the smartphone age. *Journal of Youth and Adolescence.* 2015; 44(2):405-418.

33. Eime RM, Young JA, Harvey JT, Charity MJ, Payne WR. A systematic review of the psychological and social benefits of participation in sport for children and adolescents: informing development of a conceptual model of health through sport. *International Journal of Behavioral Nutrition and Physical Activity.* 2013; 10:98.

34. Rothon C, Edwards P, Bhui K, Viner RM, Taylor S, Stansfeld SA. Physical activity and depressive symptoms in adolescents: a prospective study. *BMC Med*. 2010; 8:32.

35. Turner D, Carter T, Sach T, Guo B, Callaghan P. Cost-effectiveness of a preferred intensity exercise programme for young people with depression compared with treatment as usual: an economic evaluation alongside a clinical trial in the UK. *BMJ Open*. 2017; 7(11):e016211.doi: 10.1136/bmjopen-2017-016211.

36. Nabkasorn C, Miyai N, Sootmongkol A, et al. Effects of physical exercise on depression, neuroendocrine stress hormones and physiological fitness in adolescent females with depressive symptoms. *European Journal of Public Health*. 2006; 16(2):179-184.

37. Wong YJ, Owen J, Gabana NT, et al. Does gratitude writing improve the mental health of psychotherapy clients? Evidence from a randomized controlled trial. *Psychother Res*. 2018;28(2):192-202.