Research Proposal

How does association between Obesity and Depression affect the Academic Performance in Adolescents?

Missouri State University

Karanpreet Kaur Gill

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**Abstract**

Obesity in children is the persistent problem in the world. In the United States, the obesity rates are increasing rapidly. The obesity in an adolescent mostly linked with the childhood obesity. Many studies have shown the positive relationship between obesity and depression. This association has adverse effects on the academic performance of the adolescents. There are some studies which have shown that the school performance gets affected when obesity results in depression but more research is needed in this area to rule out the exact cause and possible measures to control this problem. This prospective cohort study will help to bridge the gap between obesity and depression association and the impact of this relationship on the academic performance of the adolescents. The purpose of the survey is to assess the association between obesity and depression and also measure the effect of this relationship on the academic performance of the teen. The study will include 300 participants from the three different schools in Springfield, Missouri. The questionnaire and interview sessions with parents and school teachers will be conducted to collect data. The Beck’s depression inventory is used as depression measurement scale to evaluate the depression in adolescents. The academic performance will be measured by the grades of the adolescents. The participants will be followed for two years. The collected data will be analyzed with Pearson’s r correlation test. This study will be beneficial to plan the measures to control obesity rates in the adolescents and ways to improve the well-being of children.

**Specific Aims**

Obesity is an existing problem in the entire world. In recent times, the incidence of obesity has risen enormously in the United States. Obesity in adolescents mostly associated with the childhood obesity. According to Center for Disease Control and Prevention, the rates of obesity is more than three times from past years in the United States. Every one in five suffers from obesity. Obesity in adolescents has a long-term impact on their health. They are more likely to develop chronic health conditions in which depression is one. Depression is more commonly seen in the children with obesity with growing age. The adolescents with depression are more likely to be obese than the adolescents without depression. Both the problems have a major effect on the academic performance of the adolescents.

The previous studies have shown the positive association between obesity and depression. Various contributing factors play a role in family history, social factors, and individual health conditions but obesity has a significant role in the development of depression with other factors. The purpose of this study is assessing the association between obesity and depression and their effect on academic performance among adolescents of Springfield, Missouri. This prospective cohort study will determine the incidence rates of the depression among obese adolescents. Also, this study will also evaluate the school performance of these adolescents so that the problem can be addressed at the initial stage and do not disturb the entire life. Findings from this research may help in better planning and implementation of control programs to control this problem so that this will not affect later years of life and future generations. Further research is needed in this area to develop better measures to curtail this growing issue.

**Background and Significance**

In the United States, obesity is considered as a significant public health problem. In healthy people 2020, obesity is recognized as one among the ten health concerns. The prevalence of obesity is increasing day by day which needs to be addressed. (Hedley, A.A., et al., 2004). The previous researchers showed that the overall incidence of major depression is 16% in the United States. The depression is considered to become a number one health issue in coming years (Nigatu, Y.T. et al., 2015)). Many studies have shown the relationship between depression and obesity in adolescents, but it is unclear that depression leads to obesity or obesity leads to depression. The previous studies showed that there are more chances of obesity in adulthood if there is obesity in young age. In this prospective cohort study. BMI and depression rate was recorded at baseline and after one-year follow-up. The results showed that there are others contributing factors which can also lead to weight gain when there is the presence of depression like race, gender, parental obesity and socioeconomic status. Therefore, the depressed mood is associated with obesity in adolescents. (Goodman, E., Whitaker, R.C., 2002)

Poor socioeconomic status is the cause of many health problems. The socioeconomic status also plays a role in the causation of depression and obesity in adolescents. The study on the public health impact of socioeconomic status on adolescent depression and obesity showed that the socioeconomic status has a huge impact on the physical and emotional health of the adolescents. Low socioeconomic status and parent education directly linked with the depression and obesity rates in the adolescents. It is also recognized that socio-economic status will be the persistent cause of health disparities in coming years. (Goodman, E. et al., 2003)

The data from the third National Health and Nutrition Survey provides the invaluable information on the association between obesity and depression. The association between obesity and depression was found by the severity of the obesity. The severity of obesity is the potential predictor of depression. This indicates that the obesity is linked to depression and the risk increases with the severity of obesity. (Onyike, C.U. et al., 2003)

To assess the bi-directional association between obesity and depression in adolescents, a prospective study from a systemic review and meta-analysis of longitudinal studies was conducted. The results showed that there are 70% increased chances of being obese seen in depressed adolescents and as compared to this only 40% chances of depression were seen in obese adolescents. The risk is 3% higher in adolescents with depression leading to obesity than in adolescents with obesity leading to a depressive state. The bi-directional association is seen stronger in depression and obesity in females than males. (Mannan, M. et al., 2016)

In total, 60% of obesity is associated with the major depressive disorders. The highest rate of obesity was found in the non-Hispanic black adolescents. The association did not see in regards to age, gender and socioeconomic status (Merikangas, A.K. et al., 2012). However, one study claims that young women are more prone to depression than men. The adolescents who suffer from depression are at more risk of developing obesity than who are not depressed. The increase rate of depression also seen with increasing weight (Blaine, B., 2008). Obesity in adolescents increases the risk of depression whereas there is less evidence that proves that depression also leads to obesity. There are certain pathways in depression, which causes obesity. Antidepressant medication (tricyclic), disturbed sleep pattern, physical inactivity and binge eating can lead to weight gain in depression (Faith M.S. et al.,2011).

Many longitudinal studies have shown that depression in the early childhood is a risk factor for obesity in later age. However, no significant association between obesity and new onset of depressive disorders in adolescents with parents of depressive episodes whereas the link between high BMI and occurrence of depression found in adolescents with no family history of depression. To provide the clear understanding, further research is needed in this area (Hammerton, G. et al., 2014).

The association between depression and academic performance was also seen in adolescents, but the bidirectional relationship is unclear. The bidirectional relationship between depression and poor academic performance was only seen in the case of girls. The social problems also strongly associated with depression in adolescents and there is significant bidirectional association found in both the genders. The poor academic performance due to depression varies with sex (Verboom, C.E et al., 2014). The children and adolescents may face the episodes of depression again after successful treatment, so the more research is needed in this area to explore the area of treatment of depression in adolescents. Also, more emphasis should be placed on the duration of treatment (Emslie, G.J., Mayes, T.L., 1999).

One study found a negative association between perceived obesity and poor academic performance. The adolescents who see themselves as overweight perform poor in school as compared to the teens who are medically diagnosed as overweight. It is important to put more emphasis on the academic performance of the adolescents because obesity is considered as a causative factor to this persistent issue (Florin, T.A. et al., 2011).

The school dropout rate is also an important element to be considered in depression. Many psychological conditions have a significant effect on academic performance, which forces the adolescent for school dropout. Public health professionals are working to find out the main factors or reasons that are leading to school dropouts. The possible solution to curtail this issue is also a public health priority in the United States. (Freudenberg, N., Ruglis, J., 2007). Further research is needed in this area to find the significant relationship.

**Research Design and Methods**

To locate the association between obesity and depression affect the academic performance in adolescents. I would like to conduct prospective cohort study. It will be two years long study. The adolescents of 10-19 years only followed for two years. The focus should be on only in the obese adolescents to check whether they will develop depression or not with the passage of time. This study will also help to find that depression also affects the academic performance. Individual studies have shown that psychological problem increasing the school dropout rates. The other factors like family history and socioeconomic will also be monitored to see the effect of these factors on the development of depression. If there will be an association between obesity and depression after following the adolescents for two years, the focus should be on reducing the obesity rates in the future.

The prospective cohort study on 300 participants aged 10 -19 years will be conducted with the purpose to find a relationship between obesity and depression and the significant effect on the school performance of the adolescents. The study sample will be collected from 3 different schools, 100 from each school. The incentives will be given to the participants to minimize the dropout rates in the study. The gift will be given as a token of appreciation when they come to the follow ups. The dropout rates will be prevented to make the sample representative until the end. The convenience and purposive sampling will be used to select the sample. The participants will be taken from three different areas to make the study findings more generalizable.

The prospective study design is an appropriate selection for this study. There will not be any ethical issues and risks to the participants to be in the study. This study design will appropriately analyze the association and effect. The only limitation that can be seen in this study is the chances of loss of follow-up. This can introduce bias into the study results and make the results unrepresentative. But, incentives will be given to prevent loss of follow-up, so that study results will not be biased.

Method:

Participants

The study participants will be recruited from three different schools in the Springfield. In total, 100 participants will be selected from each school based on the inclusion criteria. This includes obese adolescents 10-19 years of age without depression. To find the subjects according to the inclusion criteria, BMI (Body Mass Index) will be taken to recruit the adolescents of age 10-19 years in the study. The adolescents of BMI 30 or more than 30 will be considered as obese. To recruit the participants, BMI will be taken by the professionals and should not be reported by the adolescents or by parents. The parents and school teachers will also be involved in the study to find the development of depression. The study participants will be chosen with the written consent of the parents. The detailed procedure will be explained to the parents before taking the consent or recruiting in the study. To encourage participation, a gift card of $20 will be given to the adolescents on attending each follow-up. The sample should be selected by purposive and convenience sampling followed by the inclusion criteria. The participants will be followed for two years and with every six months follow-up. There will be four follow-ups in the entire study. The study subjects will remain in the study if their BMI drops from 30 because it will be helpful to check the change. The purpose of the follow-up is to monitor the development of depression in obese adolescents and with the development of depression how their academic performance will be affecting.

Measurement:

The data will be collected from the participants by the administering the standardized depression measurement scale questionnaire to the adolescents. Firstly, the BMI will be taken because it is the main component of inclusion criteria. The Beck Depression Inventory as a depression measurement tool will be used in this study. This includes set of questions to measure the depression. This set of the questionnaire will be given to adolescents on each follow-up. Each item labeled with 0 to 3 marks. The total score will be calculated by the answer selected by the participant. The final results of this set of the questionnaire divided into the positively marked stages which are explaining the stages of depression development. The total score between 1- to10 is considered normal ups and downs, 11to16 Mild mood disturbance, 17 to 20 Borderline clinical depression,21-30 Moderate depression, 31-40 Severe depression and over 40 Extreme depression. These levels will help to measure the depression development and progression in the adolescents. The parents and school teachers will also play a significant role in the study. They will be asked specific questions about the child behavior and school performance in the interview. The personal or telephone interviews will be conducted with parents and school teachers to know behavior and performance in school. The school teachers also asked about the class performance of the participants. This information will help to analyze the academic performance of adolescents with the development and progression of depression. The parents and school teachers will also be interviewed in each follow up with an adolescent. The questionnaire will be repeated in each follow-up. This will be done to ensure the reliability of the study. The parents and school teachers response will be matched with the depression scale to check the validity. The interview sessions with parents help to confirm the information. The questionnaire from school teacher contributes to assessing the academic performance. The grades will be checked to evaluate the school performance. The grades will be measured in three categories grades got better, grades stayed same, or grades got worse, and it will follow with numbers 2, 1 or 0. The other confounding factors that will affect the study results like family history of depression, abuse and other socioeconomic factors will also be accounted.

Procedure:

Firstly, the 300 participants will be selected from three different schools, 100 from each school based on the inclusion criteria, which requires BMI of 30 or more, age 10-19 years and no depression. The participants will not be taken if their BMI is less than 30 and have depression already. The participants who met the requirement to be recruited and informed signed consent from the parents will also be taken from the parents. Then participants will be followed for two years with every six months follow-up. After selecting the sample, each participant will be given a Beck Depression Inventory questions to answer. The parents and school teachers will also interview and asked specific questions about adolescent. The confidentiality of the information will be maintained in the study. The results of the Beck depression inventory and interviews are placed in the sealed envelope or the locker until all the participants have filled out the list and all the interviews will be completed.

After every six months for two years, the Beck Depression Inventory will be given to all the participants and interviews from parents, and school teachers will be taken again to see the depression development and academic performance of the adolescents. The score of every inventory should be noted and evaluated for any increase. The open-ended questions will be asked in an interview. The session of the meeting will be 20 to 30 minutes long. The results of the initial assessment and all the follow-up will be assessed and correlated with the parents and school teacher interviews to get the valid results. The school teacher interview question will help to assess the academic performance of the adolescent. The data on academic performance will be recorded in 2, 1 and 0. The student will get 2 if the grades got better, 1 if the grades stayed same and 0 if the grades got worse. All data will be assessed by taking into account all the confounders like family history, abuse, and socioeconomic factors. All the information will be stored and analyzed in SPSS. This study focused on obesity, depression and academic performance of the adolescents will provide the information that whether the risk of depression increases with the increase in the obesity rates. The study results will help to plan the preventive measures to minimize the possibility of depression by controlling obesity rates. This will also be vital to maintaining the school performance of the adolescents.

The Bivariate analysis will be done to analyze the data in this study. The obesity and depression are the exposure variables, and academic performance will be the expected outcome. The results from the school teacher and parents interviews correlated with Becks Depression Inventory to analyze whether the school performance is getting weak because of depression development or not. This study will also rule out a dose-response relationship that the academic performance is decreasing with progression in the depression. The Pearson’s r correlation test is the reliable test to measure the strength of association. The P- value reflects if there is any association or not. The chance of bias will be minimal in this design because the interviewer and responder bias have been taken into account during the study. This study will help not only to plan improved measure for the well-being of adolescents but also controlling obesity rates in the initial stage so that it cannot leads to the depression and poor academic performance.

**Appendix B**

**Interview Questionnaire for Parents**

**Questions:**

1. How child behave in the home environment?
2. Do you have any family history of psychological problems?
3. Does child involve in the family functions?
4. How much time do you spend with your child?
5. Does the child involve in other social activities?
6. Does your child have friends and do he/ she have good relationship with them?
7. How often does your child go to meet the friends?
8. Does child get aggressive on small things?
9. Does your child take stress?
10. Does your child able to complete school homework on daily basis?

**Questionnaire for School Teachers**

**Questions:**

**Student’s Name: -------------------**

1. How is the behavior of student in the class?
2. Does the student come daily to the school?
3. Does student participate in class discussions?
4. What is the performance of student in the particular subject?
5. Does the student’s performance equivalent to the other classmates?
6. Does he/she asks doubt in the class?
7. Does he/she completes his/her homework on time?
8. How he/she performs in class tests?
9. Does he/she involves in class activities?
10. Does he/she takes part in extracurricular activities?

**References**

Blaine, B. (2008). Does depression cause obesity? A meta-analysis of longitudinal studies of depression and weight control. *Journal of health psychology*, *13*(8), 1190-1197.

Emslie, G. J., & Mayes, T. L. (1999). Depression in children and adolescents. *CNS drugs*, *11*(3), 181-189.

Faith, M. S., Butryn, M., Wadden, T. A., Fabricatore, A., Nguyen, A. M., & Heymsfield, S. B. (2011). Evidence for prospective associations among depression and obesity in population‐based studies. *Obesity Reviews*, *12*(5), e438-e453.

Florin, T. A., Shults, J., & Stettler, N. (2011). Perception of overweight is associated with poor academic performance in US adolescents. *Journal of School Health*, *81*(11), 663-670.

Freudenberg, N., & Ruglis, J. (2007). Reframing school dropout as a public health issue.

Goodman, E., & Whitaker, R. C. (2002). A prospective study of the role of depression in the development and persistence of adolescent obesity. *Pediatrics*, *110*(3), 497-504.

Goodman, E., & Whitaker, R. C. (2002). A prospective study of the role of depression in the development and persistence of adolescent obesity. *Pediatrics*, *110*(3), 497-504.

Goodman, E., Slap, G. B., & Huang, B. (2003). The public health impact of socioeconomic status on adolescent depression and obesity. *American journal of public health*, *93*(11), 1844-1850.

Hammerton, G., Thapar, A., & Thapar, A. K. (2014). Association between obesity and depressive disorder in adolescents at high risk for depression. *International Journal of Obesity*, *38*(4), 513-519.

Healthy Schools. (2017, January 25). Retrieved May 07, 2017, from https://www.cdc.gov/healthyschools/obesity/facts.htm

Hedley, A. A., Ogden, C. L., Johnson, C. L., Carroll, M. D., Curtin, L. R., & Flegal, K. M. (2004). Prevalence of overweight and obesity among US children, adolescents, and adults, 1999-2002. *Jama*, *291*(23), 2847-2850.

Mannan, M., Mamun, A., Doi, S., & Clavarino, A. (2016). Prospective associations between depression and obesity for adolescent males and females-a systematic review and meta-analysis of longitudinal studies. *PloS one*, *11*(6), e0157240.

Merikangas, A. K., Mendola, P., Pastor, P. N., Reuben, C. A., & Cleary, S. D. (2012). The association between major depressive disorder and obesity in US adolescents: results from the 2001–2004 National Health and Nutrition Examination Survey. *Journal of behavioral medicine*, *35*(2), 149-154.

Nigatu, Y. T., Bültmann, U., & Reijneveld, S. A. (2015). The prospective association between obesity and major depression in the general population: does single or recurrent episode matter? *BMC public health*, *15*(1), 350.

Onyike, C. U., Crum, R. M., Lee, H. B., Lyketsos, C. G., & Eaton, W. W. (2003). Is obesity associated with major depression? Results from the Third National Health and Nutrition Examination Survey. *American journal of epidemiology*, *158*(12), 1139-1147.

Verboom, C. E., Sijtsema, J. J., Verhulst, F. C., Penninx, B. W., & Ormel, J. (2014). Longitudinal associations between depressive problems, academic performance, and social functioning in adolescent boys and girls. *Developmental psychology*, *50*(1), 247.