Chapter 1

OBESITY IN ADOLESCENTS: WHAT CAN WE DO ABOUT IT?

Erdem ŞAHİN[1]

Obesity is a chronic condition that can trigger physical, psychological, social, and economic problems and is caused by over consumption of energy (Reinehr, 2010). Obesity, with technological advances over the last 20-30 years, has become a global health problem in many countries and has increased rapidly in all agegroups (Aksoydan & Çakır, 2011). Rates of obesity among adolescents in Turkey have increased at a dramatic rate along with the prevalence of weight-related diseases. Adolescence is a period of rapid growth and development. Obesity causes serious health problems, which also effect long-term health (Kane & Frisco, 2013). We sought answers to the following important questions:1) What are the main factors in the development of overweight and obese adolescents?2) What problems will excess weight cause in later life?3) What can we do about it? Examining the answers to these questions is important for the individual and society.

DEFINITION

Body mass index (BMI) is the ratio of weight (kg) to the square of height (m2). BMI is an easily measurable value used to predict weight-related diseases. In adults, a BMI value between 25 and 30 kg/m2is overweight and ≥30 kg/m2 is obese. Obesity is categorized as class 1, class 2, and class 3, when BMI is30-35 kg/m2, 35-40 kg/m2,and ≥40 kg/m2, respectively (Consultation, 2000; Pi-Sunyer et al., 1998). Classification in childhood and adolescence is different. BMI values are calculated according to age and gender, because growth in children and adolescents occurs as an increase in height rather than weight gain. The National Center for Health Care Statistics (NCHS) and the Centers for Disease Control and Prevention (CDC) reported BMI standards for children and adolescents. The following definitions are used to categorize weight status for children between 2 and 20 years of age (Baker et al., 2005).

[1] Dr. Öğr, Üyesi, Erciyes Üniversitesi Tıp Fakültesi, Kadın Hatalıkları ve Doğum Kliniği, erdemsahin07@hotmail.com

(Geserick et al., 2018). These studies indicate that excessive weight gain during the pre-school years is an important predictor of permanent obesity. Long-term follow-up studies indicate that overweight children with obese parents typically continue into an adulthood of obesity. In a study involving a large international cohort, similar findings show 82% of the children (11.4 ± 4.0 years) who were obese in childhood remained obese as adults at follow-up after age 23 (Juonala et al., 2011). The risk of adult obesity increases with age and a high childhood BMI. The severity of obesity during adolescence is an important determinant for whether obesity will continuein adulthood.

REFERENCES

Aksoydan, E., & Çakır, N. (2011). Adölesanların beslenme alışkanlıkları, fiziksel aktivite düzeyleri ve vücut kitle indekslerinin değerlendirilmesi. *Gülhane Tıp Dergi, 53*, 264-270.

Anderson, S. E., & Whitaker, R. C. (2010). Household routines and obesity in US preschool-aged children. *Pediatrics, 125* (3), 420-428. doi:10.1542/peds.2009-0417

Baker, S., Barlow, S., Cochran, W., Fuchs, G., Klish, W., Krebs, N., . . . Udall, J. (2005). Overweight children and adolescents: A clinical report of the North American Society for Pediatric Gastroenterology, Hepatology and Nutrition. *Journal of Pediatric Gastroenterology and Nutrition, 40* (5), 533-543. doi:Doi 10.1097/01.Mpg.0000161147.16590.12

Braithwaite, I., Stewart, A. W., Hancox, R. J., Beasley, R., Murphy, R., Mitchell, E. A., & Grp, I. P. T. S. (2013). The Worldwide Association between Television Viewing and Obesity in Children and Adolescents: Cross Sectional Study. *Plos One, 8* (9). doi:ARTN e74263 10.1371/journal.pone.0074263

Chaput, J. P., & Tremblay, A. (2007). Does short sleep duration favor abdominal adiposity in children? *International Journal of Pediatric Obesity, 2* (3), 188-191. doi:10.1080/17477160701306144

Consultation, W. (2000). Obesity: Preventing and managing the global epidemic - Introduction. *Obesity: Preventing and Managing the Global Epidemic, 894*, 1-253.

Cunningham, S. A., Kramer, M. R., & Narayan, K. M. V. (2014). Incidence of Childhood Obesity in the United States REPLY. *New England Journal of Medicine, 370* (17), 1660-1661.

Daniels, S. R., Hassink, S. G., & Nutr, C. (2015). The Role of the Pediatrician in Primary Prevention of Obesity. *Pediatrics, 136* (1), E275-E292. doi:10.1542/peds.2015-1558

Ebbeling, C. B., Feldman, H. A., Chomitz, V. R., Antonelli, T. A., Gortmaker, S. L., Osganian, S. K., & Ludwig, D. S. (2012). A Randomized Trial of Sugar-Sweetened Beverages and Adolescent Body Weight. *New England Journal of Medicine, 367* (15), 1407-1416. doi:10.1056/NEJMoa1203388

Faith, M. S., Van Horn, L., Appel, L. J., Burke, L. E., Carson, J. A. S., Franch, H. A., . . . Wansink, B. (2012). Evaluating parents and adult caregivers as "agents of change" for treating obese children: evidence for parent behavior change strategies and research gaps: a scientific statement from the American Heart Association. *Circulation*, CIR.0b013e31824607ee.

Falbe, J., Rosner, B., Willett, W. C., Sonneville, K. R., Hu, F. B., & Field, A. E. (2013).

Adiposity and Different Types of Screen Time. *Pediatrics, 132* (6), E1497-E1505. doi:10.1542/peds.2013-0887

Farooqi, I. S., & O'Rahilly, S. (2014). 20 years of leptin: human disorders of leptin action. *Journal of Endocrinology, 223* (1), T63-T70.

Feliciano, E. M. C., Quante, M., Rifas-Shiman, S. L., Redline, S., Oken, E., & Taveras, E. M. (2018). Objective Sleep Characteristics and Cardiometabolic Health in Young Adolescents. *Pediatrics, 142* (1). doi:ARTN e20174085 10.1542/peds.2017-4085

Gambineri, A., Patton, L., Vaccina, A., Cacciari, M., Morselli-Labate, A. M., Cavazza, C., . . . Pasquali, R. (2006). Treatment with flutamide, metformin, and their combination added to a hypocaloric diet in overweight-obese women with polycystic ovary syndrome: A randomized, 12-month, placebo-controlled study. *Journal of Clinical Endocrinology & Metabolism, 91* (10), 3970-3980. doi:10.1210/jc.2005-2250

Geserick, M., Vogel, M., Gausche, R., Lipek, T., Spielau, U., Keller, E., . . . Korner, A. (2018). Acceleration of BMI in Early Childhood and Risk of Sustained Obesity. *New England Journal of Medicine, 379* (14), 1303-1312. doi:10.1056/NEJMoa1803527

Greydanus, D. E., Bricker, L. A., & Feucht, C. (2011). Pharmacotherapy for Obese Adolescents. *Pediatric Clinics of North America, 58* (1), 139-+. doi:10.1016/j.pcl.2010.10.007

Haeri, S., Guichard, I., Baker, A. M., Saddlemire, S., & Boggess, K. A. (2009). The Effect of Teenage Maternal Obesity on Perinatal Outcomes. *Obstetrics and Gynecology, 113* (2), 300-304. doi:DOI 10.1097/AOG.0b013e3181945b8a

Hauk, L. (2014). ACOG Releases Guidelines on Management of Abnormal Uterine Bleeding Associated with Ovulatory Dysfunction. *American Family Physician, 89* (12), 987-988.

Health, C. o. S. (2004). Soft drinks in schools. *Pediatrics, 113* (1), 152-154.

Juonala, M., Magnussen, C. G., Berenson, G. S., Venn, A., Burns, T. L., Sabin, M. A., . . . Raitakari, O. T. (2011). Childhood Adiposity, Adult Adiposity, and Cardiovascular Risk Factors. *New England Journal of Medicine, 365* (20), 1876-1885. doi:DOI 10.1056/NEJMoa1010112

Kane, J. B., & Frisco, M. L. (2013). Obesity, school obesity prevalence, and adolescent childbearing among U.S. young women. *Social Science & Medicine, 88*, 108-115. doi:10.1016/j.socscimed.2013.04.005

Kelly, A. S., Barlow, S. E., Rao, G., Inge, T. H., Hayman, L. L., Steinberger, J., . . . Cardiology, C. C. (2013). Severe Obesity in Children and Adolescents: Identification, Associated Health Risks, and Treatment Approaches A Scientific Statement From the American Heart Association. *Circulation, 128* (15), 1689-1712. doi:10.1161/CIR.0b013e3182a5cfb3

Lipsky, L. M., & Iannotti, R. J. (2012). Associations of Television Viewing With Eating Behaviors in the 2009 Health Behaviour in School-aged Children Study. *Archives of Pediatrics & Adolescent Medicine, 166* (5), 465-472.

McGuire, S. (2011). U.S. Department of Agriculture and U.S. Department of Health and Human Services, Dietary Guidelines for Americans, 2010. 7th Edition, Washington, DC: U.S. Government Printing Office, January 2011. *Adv Nutr, 2* (3), 293-294. doi:10.3945/an.111.000430

Michalsky, M., Reichard, K., Inge, T., Pratt, J., & Lenders, C. (2012). ASMBS pediatric committee best practice guidelines. *Surgery for Obesity and Related Diseases, 8* (1), 1-7. doi:10.1016/j.soard.2011.09.009

Naderpoor, N., Shorakae, S., de Courten, B., Misso, M. L., Moran, L. J., & Teede, H.

J. (2015). Metformin and lifestyle modification in polycystic ovary syndrome: systematic review and meta-analysis. *Human Reproduction Update, 21* (5), 560-574. doi:10.1093/humupd/dmv025

Ogden, C. L., Carroll, M. D., Lawman, H. G., Fryar, C. D., Kruszon-Moran, D., Kit, B. K., & Flegal, K. M. (2016). Trends in Obesity Prevalence Among Children and Adolescents in the United States, 1988-1994 Through 2013-2014. *Jama-Journal of the American Medical Association, 315* (21), 2292-2299. doi:10.1001/jama.2016.6361

Pi-Sunyer, F. X., Becker, D. M., Bouchard, C., Carleton, R. A., Colditz, G. A., Dietz, W. H., . . . Expert Panel Identification, E., T. (1998). Clinical guidelines on the identification, evaluation, and treatment of overweight and obesity in adults: Executive summary. *American Journal of Clinical Nutrition, 68* (4), 899-917.

Plachta-Danielzik, S., Kehden, B., Landsberg, B., Schaffrath Rosario, A., Kurth, B. M., Arnold, C., . . . Muller, M. J. (2012). Attributable risks for childhood overweight: evidence for limited effectiveness of prevention. *Pediatrics, 130* (4), e865-871. doi:10.1542/peds.2011-3296

Pugeat, M., Nader, N., Hogeveen, K., Raverot, G., Dechaud, H., & Grenot, C. (2010). Sex hormone-binding globulin gene expression in the liver: Drugs and the metabolic syndrome. *Molecular and cellular endocrinology, 316* (1), 53-59. doi:10.1016/j.mce.2009.09.020

Reinehr, T. (2010). Obesity and thyroid function. *Molecular and cellular endocrinology, 316* (2), 165-171.

Schwimmer, J. B., Deutsch, R., Kahen, T., Lavine, J. E., Stanley, C., & Behling, C. (2006). Prevalence of fatty liver in children and adolescents. *Pediatrics, 118* (4), 1388-1393. doi:10.1542/peds.2006-1212

Silventoinen, K., Jelenkovic, A., Sund, R., Hur, Y. M., Yokoyama, Y., Honda, C., . . . Kaprio, J. (2016). Genetic and environmental effects on body mass index from infancy to the onset of adulthood: an individual-based pooled analysis of 45 twin cohorts participating in the COllaborative project of Development of Anthropometrical measures in Twins (CODATwins) study. *American Journal of Clinical Nutrition, 104* (2), 371-379. doi:10.3945/ajcn.116.130252

Skinner, A. C., Perrin, E. M., Moss, L. A., & Skelton, J. A. (2015). Cardiometabolic Risks and Severity of Obesity in Children and Young Adults. *New England Journal of Medicine, 373* (14), 1307-1317. doi:10.1056/NEJMoa1502821

Skinner, A. C., Ravanbakht, S. N., Skelton, J. A., Perrin, E. M., & Armstrong, S. C. (2018). Prevalence of Obesity and Severe Obesity in US Children, 1999-2016 (vol 141, e20173459, 2018). *Pediatrics, 142* (3). doi:10.1542/peds.2018-1916

Stettler, N., Signer, T. M., & Suter, P. M. (2004). Electronic games and environmental factors associated with childhood obesity in Switzerland. *Obesity Research, 12* (6), 896-903. doi:DOI 10.1038/oby.2004.109

Swallen, K. C., Reither, E. N., Haas, S. A., & Meier, A. M. (2005). Overweight, obesity, and health-related quality of life among adolescents: The national longitudinal study of adolescent health. *Pediatrics, 115* (2), 340-347. doi:10.1542/peds.2004-0678