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PAATEE:

Preventing Anorexia in Adolescents Through Empowerment and Education

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Section I. Introduction

Health Problem

Eating disorders (EDs) refer to a group of mental health illnesses under the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) in which individuals may experience a range of symptoms including excessive or compulsive dieting, bingeing and purging, fasting, and a drive for thinness (Arcelus, Mitchell, Wales, & Nielsen, 2011; Mehler & Brown, 2015). Depending on the specific symptoms experienced, EDs can be categorized as anorexia nervosa (AN), bulimia nervosa (BN), binge eating disorder (BED), or eating disorders not otherwise specified (EDNOS; American Psychiatric Association, 2013; Office on Women's Health, 2010). Overall, EDs affect a large number of the population in the United States.

Twenty million women and 10 million men in the U.S. will suffer from an ED sometime in their lifetime (Wade, Keski-Rahkonen, & Hudson, 2011). For any population, the potential health impacts of EDs are cause for concern. Concerns about EDs have led to an objective in Healthy People 2020 (HP 2020) under Mental Health and Mental Disorders for adolescents: an aim to decrease the proportion of adolescents who attempt to control weight by disordered eating from 14.3% in 2009 to 12.9% by the year 2020 (Office of Disease Prevention and Health Promotion, 2013). According to the most current report in 2013, 16.7% of adolescents engage in disordered eating behaviors to control weight (Office of Disease Prevention and Health Promotion, 2013). Therefore, contrary to HP 2020 objectives, data show an increase rather than a decrease in disordered eating. Clearly, current efforts for reducing rates of EDs are not producing the intended outcomes. For this reason, prevention or early recognition of AN (arguably the most serious of EDs) using an evidence-based program is one strategy health workers can use to address the larger issue of EDs.

AN is an ED that causes a person to engage in behaviors to lose more weight than is considered healthy based on that person's age and height (Medline Plus, 2013). As such, some key characteristic of AN include body image disturbance (a perception of being "fat" when in fact the person is underweight), an obsession with weight or shape, and a fear of gaining weight (American Psychiatric Association, 1994; Arcelus et al., 2011). Along with becoming underweight, a continued restriction of calories puts an individual into a state of malnutrition, leading to further serious and potentially deadly medical complications (Mehler & Brown, 2015).

AN is associated with severe morbidity, along with the highest rate of mortality among all mental health disorders (Arcelus et al., 2011; Mehler & Brown, 2015; Eating Disorders Coalition 2015). One factor that contributes to this severity is the potential of AN to negatively impact virtually all body systems (e.g., cardiovascular, gastrointestinal, endocrine, initiating myriad further issues (e.g., loss of brain function, hypotension, hypothermia, sudden death due to abnormal heartbeat, and respiratory failure; Mehler & Brown, 2015). Such complications are the most common causes of death in AN cases, accounting for over half of all related deaths (National Collaborating Centre for Mental Health, 2004). Overall, the standardized mortality ratios (SMR)¹ for AN range from 1.70 (Crow et al., 2009) to 10.5 (Birmingham, Su, Hlynsky, Goldner, & Gao, 2005). This large range in SMR may be due to the differences in length of participant follow-up (Arcelus et al., 2011), duration of illness (Franko et al., 2013) or inconsistencies in the diagnosis and reporting of AN and AN-related death. Nevertheless, these rates indicate that there are more deaths due to AN than is to be expected.

¹ Standardized mortality ratio (SMR) is the ratio of deaths observed from a health problem compared to deaths expected from a health problem. When SMR is higher than 1, more deaths occurred than was expected.

Research shows that health-related quality of life is lower in individuals with EDs such as AN (Zeiler et al., 2015). These illnesses often do not occur in isolation, showing comorbidities with other mental health illnesses or concerns such as anxiety, low self-esteem, depression (Zeiler, et al., 2015), and suicidal behaviors (Birmingham et al., 2005). In a meta-analysis of AN deaths overall, 20% of individuals who died with AN had committed suicide (Arcelus et al., 2011) and tertiary care AN patients show an even higher suicide rate (Birmingham et al., 2005). For instance, Birmingham et al. (2005) found that, of 25 individuals in tertiary care who died of EDs, 17 of them were AN cases and of those 17 deaths, seven (or 41%) were by suicide (Birmingham et al., 2005). These data further illustrate the lower quality of life (self-perceived at very least) in people with AN and the seriousness of AN comorbidities including depression or other mental illnesses (Becker, Plasencia, Kilpela, Briggs, & Stewart, 2014). AN is clearly a serious health problem related to high morbidity and mortality rates, thus demonstrating the need for early recognition of the disease as well as effective prevention programs.

To address AN in its early stages, risk factors and warning signs must be recognized as early as possible. Identifying warning signs such as dramatic weight loss, weight gain anxiety, preoccupation with weight (or food intake, nutrition, dieting, etc.), or consistent excuses to avoid meals (National Eating Disorders Association [NEDA], 2015) can lead to early treatment, which dramatically improves chances of recovery (DeSocio, 2013). Therefore, primary prevention efforts are ideal.

Population

Among all eating disorders, it is estimated that 30 in 10,000 adolescents² experience AN, while 90 in 10,000 and 160 in 10,000 experience BN and BED respectively (Swanson, Crow, Le

² For the purposes of this program, adolescents are defined as those between the ages of 14 and 18.

Grange, Swendsen, & Merikangas, 2011). Although AN is less prevalent than other EDs, it is arguably the most severe. Because of AN's severity, health professionals are concerned about its effect on young people, including the unmet need for treatment (Swanson et al., 2011). Hudson, Hiripi, Pope, & Kessler (2007) found that identifying and treating AN improves the likelihood for recovery for adolescents, but only 33.8% of individuals with AN actually receive treatment. Even among those who receive treatment, 50% recover, 30% continue to struggle with the symptoms, and 20% follow a chronic course (Herzog & Eddy, 2007). According to these numbers, it seems that treatment alone is not enough to address AN in the adolescent population. Therefore, further prevention is needed.

In the United States, EDs including AN are most reported among female adolescents (Crow et al., 2009; Rees, 2012). But, due to the sensitive, secretive nature of this health issue, and the fact that many individuals do not seek treatment, these numbers may be lower than in reality (NEDA, 2015; Rees, 2012). Therefore, not only is there a need for increased attention towards EDs for adolescents, but more specifically, the adolescent female population, because in general, females are at higher risk (Keski-Rahkonen et al., 2005). Mortality rates of AN are the highest among EDs (Arcelus, et al., 2011; Mehler & Brown, 2015), therefore AN should be a major concern especially as it affects the female adolescent population.

The current health program plan, Preventing Anorexia in Adolescents Through Empowerment and Education (PAATEE, pronounced "pat-ee"), will focus specifically on preventing AN in the female adolescent population within Washington State (WA). Research surrounding EDs for WA is limited, but some data exist that convey the severity of the issue in this state. The prevalence of AN for adolescents in WA is 1 in 100, with the majority being female (University of Washington, 2016). This prevalence estimate may be highly

underestimated, however, because AN often goes unreported due to its secretive nature (as previously discussed), and it is unclear if WA has a systematic approach for collecting related data. Despite the lack of information on rates of AN in WA, there is enough evidence to suggest that it is a national concern, therefore a concern in WA, too.

Because little is known about EDs in WA, one aim of PAATEE is increasing ED-related education. In WA, EDs are mandated to be covered in all school health curriculums (State of Washington, 2008). However, a study of 300 schools in WA reflected that less than 80% actually taught about EDs in classrooms (Washington State Department of Health, 2012). WA has areas to improve the education and support for EDs for female adolescents, but much work still needs to be done, and PAATEE aims to support these efforts. There is consistent literature to support that AN is a serious concern among female adolescents nationwide, and thus in WA. For this reason, and because of the increasing prevalence of AN in this population, the PAATEE program targets the prevention of AN in high school girls using a multidimensional, evidence-based approach.

Predisposing, enabling, and reinforcing factors are determinants of AN. The following section discusses the different determinants of AN as a way to illustrate the complexity of the health problem, as well as to illustrate those determinants that are most changeable through intervention.

Section II. Literature Review: Contributing Factors

Although the causes of eating disorders (EDs) are unclear and the etiology complex, this section will present factors that contribute to, enable, reinforce, and predispose people to EDs such as anorexia nervosa (AN). The most important contributing factors to the development of EDs such as AN can be categorized within the socioecological model levels (McLeroy, Bibeau,

Steckler, & Glanz, 1988) including intrapersonal (genetics and personality), interpersonal (peer and family pressures and environments), institutional (the Western beauty ideal), and public policy.

Intrapersonal Factors

Although the levels of the socioecological model are reciprocal and interrelated in nature (McLeroy et al., 1988), there are specific traits within a person that influence health behaviors and are determinants of a health problem. For example, genetic and individual traits have been identified as possible risk factors for AN (Anderluh, Tchanturia, Rabe-Hesketh, & Treasure, 2003; Devlin et al., 2002; Kaye et al., 2008; Keski-Rahkonen et al., 2005; 2008; Mazzeo et al., 2008). Although the pathophysiology of AN is not entirely clear, research provides some clues to understanding relevant determinants.

Genetics are an important component to consider for a health problem because they influence all the other levels of the socioecological model (McLeroy et al., 1988). Research through family (Devlin et al., 2002; Kaye et al., 2008) and twin studies (Keski-Rahkonen et al., 2005; Mazzeo et al., 2008) have measured the heritability of AN. Namely, researchers found moderate heritability of the disease itself (Mazzeo et al., 2008) and moderate to high heritability of specific correlates of AN in female twins, such as a drive for thinness and body dissatisfaction (Keski-Rahkonen et al., 2005). These constructs may be genetic markers that can identify elevated risk for EDs in females (Keski-Rahkonen et al., 2005). However, perhaps more important than identifying these markers is considering the complex interaction between a person's genes and the environment in which that person lives (see Interpersonal Factors below; Anderluh et al., 2003).

As mentioned, intrapersonal traits can influence, and be influenced by, our genetics and lived experiences (Anderluh et al., 2003). In the Western world, society places cultural autonomy in high regard, and women with low self-confidence are at risk of high levels of anxiety, alienation from peers, and emotional confusion, which are all determinants associated EDs (Sassaroli, 2015). In addition, Anderluh et al. (2003) found that obsessive compulsive traits (e.g., perfectionism, rigidity, excessive doubt and cautiousness, and drive for order and symmetry), are prototypical of AN cases. Therefore, obsessive compulsive personality characteristics may be important identifiable risk factors for AN.

At least three studies (i.e., Devlin et al., 2002; Anderluh et al., 2003; Kaye et al., 2008) have noted that traits, such as the ones described above, predate EDs. In other words, it is clear that these traits are antecedents of, rather than a result of, the ED. The development of mental illnesses such as AN may begin long before symptoms of AN manifest (Insel & Wang, 2010). Thus, early recognition of, and mediation on these indicators of family history and intrapersonal traits may help to prevent or reduce the impact of disease. For this reason, Insel and Wang (2010) have recommended that a stronger emphasis be placed on risk awareness and pre-emptive interventions of mental disorders, rather than relying on treatment. Although these intrapersonal factors provide insight into some risk factors of AN, interpersonal factors also act as determinants of EDs, including AN.

Interpersonal Factors

Personal connections and interactions with peers are major components that influence behavior (Allen, Gibson, McLean, Davis, & Byrne, 2014). A person's attitudes and beliefs can be shaped and/or redefined by the individuals with whom they interact. For example, if someone is in the presence of others who exhibit or encourage self-confidence, this individual might

improve self-confidence and, for instance, feel less desire to change his/her/zir body. On the other hand, family connection and interactions (e.g., having a family that emphasizes weight, restricts eating, or suggests a certain body shape is “right”) can act as a predisposing factor to ED symptoms (Allen et al., 2014). Berge et al. (2015) research findings echoed these results, by finding that social factors (e.g., family, interaction with peers) that support poor self-image play a significant role in the determinants of EDs such as AN (Berge et al., 2014). Cazzato et al. (2015) claim that continuous exposure to predisposing factors (such as thin-idealized bodies) may influence perceptions of the ideal body among female AN patients. The insights from Cazzato et al. (2015) also bring attention back to the female population, which report the most cases of EDs (Crow et al., 2009).

In relation to the adolescent population, a recent study (Berge et al., 2014) showed that adolescents ages 11-19 in households that practiced healthy family functioning were less likely to participate in unhealthy weight control behaviors. Family functioning was defined by three characteristics: connection between parents and their children, parental knowledge of their children’s whereabouts, and parental respect for their children’s psychological autonomy. When these three characteristics were not met, unhealthy weight control behaviors were more likely to develop in the adolescents, suggesting a lack of healthy family functioning can enable the ED behaviors and inhibit changes towards healthier behavior (Berg et al., 2014). In sum, social factors including interpersonal factors play a key role in the development of EDs such as AN, including AN among adolescent females.

Institutional/Organization Factors

The Western beauty ideal is a perception-based construct perpetuated by the media industry of the Western world (Latif, Khan, & Farooq, 2011). It is based on the culturally biased

concepts of beauty that are present in Western developed countries (Latif et al., 2011) Such concepts of beauty (e.g., thinness, body shape, weight, etc.) are not commonly rooted in reality, but rather exaggerated by advertising's depictions of women with an emphasis on thinness (Halliwell, 2005). Advertisements in the Western media continuously support the image of extreme thinness and display this as a standard of beauty (Halliwell, 2005). The social perception of this beauty ideal can be attributed to the media (Latif et al., 2011). Further, one study showed social pressures to be thin had an impact on females, contributing to the development of EDs (Latif et al., 2011). The harm of the Western beauty ideal is in the potentially instilling effects of a false reality in the minds of adolescents. This can lead to a mentality in young females that they must live up to impossible expectations, contributing to self-perception issues related to their bodies (Office on Women's Health, 2010). As more countries become increasingly industrialized and adopt Western culture, these impossible standards are perpetuated in adolescents. In addition, EDs are much more prevalent in countries with higher incomes, an excess of food, and a greater exposure to Western media (Smink, 2012).

According to Clinton (2014), there is little in terms of effective services to assist people struggling with EDs. The stigmatizing effects of EDs (Griffiths, Mond, Murray, Thornton, & Touyz, 2015) also factor into refusal to seek treatment. A common stigma about people with EDs is the perception that these individuals are purporting their condition as a form of attention-seeking, because their medical condition is not tangible and therefore difficult to diagnose. This stigmatization may deter people from admitting they have an ED and seeking treatment (Griffiths et al., 2015). Further barriers to recovery seem to be the misdiagnosis and inadequate treatment of people with EDs by psychiatrists - the professionals most equipped to assist those with EDs (Jones, 2013). For other social issues that are strongly associated with negative health

outcomes (e.g., drug abuse and homelessness), voluntary organizations have shown the promising results of drop-in treatment centers, potentially suggesting that similar programs would benefit people suffering from EDs. Benefits of such a program include, but are not limited to, a degree of anonymity, improved access to services, flexibility with people's schedules, and motivation of individuals living with EDs (Clinton, Almlöf, Lindström, Manneberg, & Vestin, 2014). The purpose of allowing drop-in treatment is to identify the symptoms of EDs early, discuss potential motivational concerns regarding the disorder, and further establish related therapeutic alliance (Clinton et al., 2014). Although these barriers to services are one factor to address the concern over AN, it is also important to examine factors on a larger scale.

Public Policy Factors

One way health professionals work to create a healthy environment is through the passing of policies (McLeroy et al., 1988). However, EDs have yet to receive much attention at the policy level. This lack of attention is reflected through no direct passing of bills to reduce EDs. Although not related to a bill or a government policy, National Eating Disorders Awareness Week is an annual event that was established 29 years ago (National Eating Disorders Association [NEDA], 2016). The goal of this nationally recognized week is to focus on EDs and to improve public understanding of the related factors, concerns, and treatments (NEDA, 2016). Yet, tangible policies to assist in addressing the issue of EDs and AN are still needed.

The lack of federal attention to EDs prompted a study that surveyed the level of support from the general public for ED policies (i.e., Puhl, Neumark-Sztainer, Austin, Luedicke, & King, 2014). Puhl et al. found that bullying and weight discrimination are psychological and biological risks for EDs, but 71-99% schools sampled supported the policies presented that aim to combat bullying and weight discrimination in schools. Such policies would protect youth from bullying

as well as provide curriculum for schools to prevent EDs. Although Puhl et al.'s study has drawn attention to the importance of targeting EDs, it has not had an impact at the federal level because, to date, no laws have been implemented that directly support ED prevention.

However, policy makers have advocated for laws that would help to prevent EDs. For example, the Federal Response to Eliminate Eating Disorders Act (112 Cong., 2013) proposes funding, research, and education for EDs. However, attempts to pass this act were unsuccessful as recently as 2013 (112 Cong., 2013). Clearly, advocacy for policy implementation is one area in which health professionals can focus on as a way to bring attention to EDs. Currently, the Affordable Care Act (ACA) does give some attention to mental illness including EDs.

Specifically, the implementation of the ACA in 2010 expanded insurance to cover mental health illnesses for many Americans. It accomplished this by establishing the ten essential benefits, one of which being behavior health coverage, which, includes mental health services (U.S. Centers for Medicare and Medicaid Services, 2014). Though not all states require private insurance companies to cover specific mental health conditions such as AN, WA is one that offers such benefits (Washington State Legislature, 2015). In particular, in WA, the treatment of any ED diagnosed under the Diagnostic and Statistical Manual of Mental Health Disorders (DSM) as a mental health illness must be covered (American Psychiatric Association, 2013; Washington State Legislature, 2015).

In addition to the ACA potentially contributing to the prevention of EDs including AN in WA, WA has state-specific requirements that impact students attending all public schools between kindergarten and 12th grade. One such requirement is an outlined curriculum of health and fitness by the Office of Superintendent of Public Instruction (OSPI). The curriculum, titled the Essential Academic Learning Requirements (EALRs), was first developed in 2008 and

implemented in 2009, with a verification report submitted annually to the OSPI (State of Washington, 2016). In the curriculum, ED education begins in the seventh grade and continues through the ninth grade (State of Washington, 2008). Implementing this curriculum is required but can be adapted differently across school districts. In response to the recommendations, more teachers are implementing related lessons in their classrooms (Washington State Department of Health, 2012). However, as previously mentioned, less than 80% of health teachers in WA taught about EDs in 2010 (Washington State Department of Health, 2012). This reflects utilization of the EALRs in WA schools, yet more awareness and education is necessary to address EDs, including AN, in adolescents.

Conclusion

In conclusion, the etiology of AN is complex and not explicitly clear, as it involves the interrelation of many levels of the socio-ecological model (McLeroy et al., 1988). The most substantive factors that contribute to the development of EDs are intra- and interpersonal factors, however. Therefore, Preventing Anorexia in Adolescents Through Empowerment and Education (PAATEE) will focus on factors within these levels.

Section III. Evidence of Program Effectiveness

Program

A program titled Athletes Targeting Healthy Exercise and Nutrition Alternatives (ATHENA) is a primary prevention, harm reduction, health promotion program targeted towards female high school athletes. Its efficacy has been evaluated at least three times (Elliot et al., 2004; Elliot et al., 2006; Elliot et al., 2008) and has been shown to have a favorable impact on the constructs of eating disorders and substance use. This summary of the ATHENA program

will include information gathered from all three evaluations, with a focus on the original evaluation reported in 2004.

Population

The development and onset of eating disorders often begins in adolescence. Much of what people learn during this stage of life influences their behavior, specifically health behavior, as adults. Therefore, many evidence-based interventions for eating disorders are aimed at adolescents for primary prevention efforts. The ATHENA program was targeted at female athletes from sports teams, including dance, drill, and cheerleader teams, in public high schools throughout northwest Oregon and southwest Washington. This population is an important target for eating disorder prevention programs because, although the thin body ideal can be harmful towards females in general, weight loss due to insufficient caloric intake among athletes is an additional concern. Specifically, young athletes with demanding physical tasks expend more energy than the average teenager. Therefore, it is especially important for young female (and male) athletes to eat a diet that provides sufficient calories and micronutrients to maintain a healthy weight and provide specific nutrients (e.g., iron and calcium). Moreover, because people are especially impressionable in their teenage years, education during this time about nutrition, eating disorders, and other mental health concerns can have an impact on the health of the population.

Before implementation of ATHENA, baseline demographics were collected regarding race, age, and parents' education level and reported in the 2004 evaluation. Between the intervention group and the control group, 92% of participants were White, the mean age of participants was fifteen years, and 63% of their parents held a college degree (Elliot et al., 2004). The researchers discuss the limited geographical location and the lack of ethnic minority

representation as limitations on the evaluation of this program. Further evaluations on the efficacy of the ATHENA program for other regions and for minority groups are needed.

Although, this was a limitation to the program, targeting sports teams as a population may be an effective route.

By targeting sports teams, ATHENA was able to reach a large population of teenagers for health promotion outside of the traditional school-based setting (Elliot et al., 2008). Members of sports teams spend significant time together outside of regular school hours and often hold a bond among the group that allows for healthy attitudes and behaviors to be shared and encouraged. Further, members of sports teams typically keep in contact with one another after the sport season, whereas regular classmates would not necessarily see each other again in the next term (Elliot et al., 2006). Therefore, health interventions targeted to sports teams can have the potential for longer lasting impacts due to the ongoing social contact between program participants.

Intervention

The ATHENA program consisted of interventions and exposures related to disordered eating and body-shaping drug use. The evidence-based interventions were administered at nine different high schools. Each intervention team set aside time during regular team practices to participate in the program. Eight sessions, each 45-minutes, were conducted by a trained peer team member at the coach's instruction. The coaches and peer leaders (peers led about 70% of the activities) had scripted lessons to lead the overall group. Each team member had a workbook that matched the others. During these meetings, the teams participated in activities surrounding depression prevention, self-esteem, healthy norms, strength training, sports nutrition (e.g., calcium, carbohydrates, protein), and societal pressures to be thin. In an effort to address

perceptions of media, the athletes were directed to discuss, deconstruct, and remake magazine advertisements of cigarettes, alcohol, and nutritional supplements. In addition, the athletes explored healthy attitudes regarding alcohol by practicing refusal skills and sharing healthy behavior expectations. The athletes developed public service campaigns regarding drug use and disordered eating behaviors and presented them to their teammates. In addition, each athlete was provided with a small guide to sport nutrition and training with information that referred back to the curriculum from the activities they had done during intervention meetings.

A comparable control group (matched for size, average socioeconomic status, and student demographics) was established for each intervention team, with nine control teams in total. Instead of the full intervention curriculum, the athletes on the control teams were provided only with pamphlets with information on disordered eating, drug use, and sports nutrition.

Outcomes

Outcomes of the ATHENA program were measured in the short term (Elliot et al., 2004; Elliot et al., 2006) and long term (Elliot et al., 2008). Short term successes of the intervention group included less ongoing and new use of diet pills, less intention for future use of diet pills, less new use of athletic-enhancing substances, and less intention of disordered eating behaviors or body-shaping drugs. Further results were less intention of vomiting to lose weight, increase of ability to control one's mood, increase in refusal skills, and coincident positive changes in healthy eating behaviors. The researchers also evaluated the effects of the ATHENA program on cigarette, marijuana, and alcohol use. While there was no significant change of the use of these substances in the short term, the long term evaluation found that the intervention group experienced significantly less use than the control group (Elliot et al., 2004; Elliot et al., 2006; Elliot et al., 2008).

At the reassessment in 2008, one to three years after participants' graduation, there was an overall reduction in the use of diet pills, diuretics, laxatives, and self-induced vomiting for both the control group and the intervention group. No significant difference between groups in this reduction indicates that the long term change is not due to the intervention. However, the intervention did seem to have a lasting impact on perceptions of body image. When participants were asked to select the healthiest female physique and the most attractive female physique, the intervention participants indicated significantly heavier body images than did the control participants. In addition, the intervention seemed to have a lasting impact on knowledge of the daily calcium requirement for women. Sixty-six percent of intervention participants indicated that they consumed adequate calcium compared to 40% of control group participants (Elliot et al., 2008).

Study Design

The study design for the 2004 evaluation was a prospective controlled trial with random school assignment to intervention or control conditions. Control and intervention schools were matched by size, average socioeconomic status, and student demographics. The researchers met with athletic directors and coaches at all schools and offered participations to all women's sports teams at the school. Each school signed up at least one or two of their sports teams for the program. Student involvement in the program was voluntary and written consent was obtained from the student if she was 18 years old, or a parent if she was younger than 18 (Elliot et al., 2004).

Confidential questionnaires were administered before the sports season, before the program began in order to establish baseline data and later, within two weeks of the season's end. The survey assessed potential influences from peers, coaches, media, and society on drug

use and disordered eating. Knowledge and characteristics about disordered eating, depression, self-image, and self-esteem were also measured. The researchers used a Likert scale to measure several items such as likelihood of future behaviors or actions. The researchers used analysis of covariance tests to determine baseline equivalences and intervention effects and chi-square analysis to compare interventions and controls. Results were reported with a 95% confidence interval (Elliot et al., 2004; Elliot et al., 2006; Elliot et al., 2008).

Furthermore, the ATHENA program was able to ground itself in a health promotion theory. While this study did not define a specific theory or model explicitly, it is evident that the program targeted several intrapersonal, interpersonal, and sociocultural constructs related to disordered eating and related health behaviors. Further, the researchers measured several participant intentions, which is a key component of the Theory of Planned Behavior (McKenzie, Neiger, & Thackeray, 2013). In addition, subjective norms (peer influence, superior's influence) and self-efficacy, which are also components of the Theory of Planned Behavior, were measured as well.

Conclusion

In conclusion, the ATHENA program is an evidence-based program seemingly grounded in the Theory of Planned Behavior that is utilized to provide nutritional and exercise education and reduce the impact of social norms and media on the health behaviors of high school female athletes. In a primary prevention effort to reduce the prevalence of eating disorders, the ATHENA program indicates successes from short term and longer term evaluations. Though efficacy across populations has not yet been measured, this program has been a successful tool in preventing eating disorders in adolescent female high school athletes (Elliot et al., 2004; Elliot et al., 2006; Elliot et al., 2008). Preventing Anorexia in Adolescents Through Empowerment and

Education (PAATEE) has adapted core components and key features of the ATHENA program, PAATEE is described in detail in the following section.

Section IV. Program Implementation

Focus of Intervention

Preventing Anorexia in Adolescents Through Empowerment and Education (PAATEE) is a primary preventive program that aims to reduce the risk of adolescent females³ from developing anorexia nervosa (AN) by using an evidence-based, multilevel approach. The program intends to reduce the risk of AN by influencing the social environment surrounding body image, increasing self-efficacy in program participants, providing education about eating disorders, and promoting intuitive eating practices⁴.

PAATEE is adapted from Athletes Targeting Healthy Exercise and Nutrition Alternatives (ATHENA) because ATHENA has shown evidence of success with increasing healthy eating behaviors and control of mood, while decreasing intentions of diet pills use and vomiting to lose weight (Elliot et al., 2004). The ATHENA program implicitly used the Theory of Planned Behavior (McKenzie et al., 2013) to target several intrapersonal, interpersonal, and sociocultural constructs related to disordered eating. For these reasons, any activities and education related to those aforementioned behaviors are considered core components and have been adapted for the PAATEE program. Additional core components that have been adapted for PAATEE include: 1) program sessions directed by a facilitator, 2) a peer leader component, and 3) a female-specific target population in Bellingham, Washington. A scripted curriculum is another core component as it ensures all intervention groups receive the same content and makes implementation clear for

³ Future use of the terms “adolescent females” and “female students” are used interchangeably.

⁴ Intuitive eating practices are based on the idea that individuals should pay attention to their natural hunger signals rather than keeping track of caloric intake.

the facilitators and peer leaders alike (Elliot, & Goldberg, 2008). Facilitators and peer leaders will each have a manual to follow in guiding the sessions and student participants will use workbooks to complete activities. Although these materials are to be left in a secure place at the location of the intervention (i.e., the school), a pocket-sized booklet is provided to each student to take home. The booklet includes information on nutrition, normal female maturation, and additional pages for monitoring meals and moods, all of which can help to reinforce what is learned in the program activities (Elliot, & Goldberg, 2008).

Program Mission, Goals, and Objectives

Mission statement. The PAATEE program is an educational resource providing group seminars, one-on-one support, and empowering education for female adolescents to improve their self-efficacy in order to prevent AN and ultimately reduce the prevalence of AN in female adolescents.

Goals. Below is a list of goals for the PAATEE program in order to assist in achieving PAATEE's mission.

- I. Reduce the prevalence of AN in female students.
- II. Increase intuitive eating practices in female students.
- III. Improve health literacy of female students regarding eating disorders.
- IV. Increase the availability of educational and supportive resources for female students regarding eating disorders.
- V. Decrease the use of dieting tools among female students.
- VI. Improve body image ideals in female students.

Objectives. Below is a list of carefully designed objectives aimed to achieve PAATEE's goals.

Process:

- I. By October 25, 2016, the program planners will obtain the ATHENA program materials from the ATHENA website.
- II. On November 17, 2016, the program planners will begin development of the comprehensive program curriculum⁵ by adapting information and activities from the ATHENA program for female high school athletes, to the general adolescent population in the high school classroom setting.
- III. By December 23, 2016, program planners will complete the comprehensive program curriculum.
- IV. By January 1, 2017, program planners will be approved by the Institutional Review Board to collect data on human subjects.
- V. By January 6, 2017, program planners will assemble curriculum into manuals and workbooks for facilitators, peer leaders, and student participants.
- VI. By January 16, 2017, program planners will identify facilitators⁶ from the community to be contracted to implement the program.
- VII. By January 17, 2017, program planners will begin the development of educational brochures and pamphlets for the program.
- VIII. On January 20, 2017, facilitators will begin program training sessions.
- IX. By January 27, 2017, program planners will complete the development of pretest and posttest questionnaires.

⁵ Comprehensive program curriculum in PAATEE refers to education that encompasses nutrition, eating disorder information, media literacy, dangers of dieting tools, and body image ideals. These are all included in the ATHENA curriculum and will be the approach to addressing eating disorders in PAATEE.

⁶ Program facilitators will potentially come from the Washington State Department of Health.

- X. By February 1, 2017, program facilitators will complete training of the comprehensive program curriculum.
- XI. By February 6, 2017, school counselors will be trained in eating disorder risk factors, impacts, and resources.
- XII. By February 6, 2017, school counselors will be given general, necessary eating disorder materials for students to reference in their offices.
- XIII. By February 7, 2017, program planners will complete educational brochures and pamphlets specifically for the program.
- XIV. By February 9, 2017, a high school in Bellingham (A) will be chosen for the pilot test to be implemented in.
- XV. By February 9, 2017, a different high school in Bellingham (B) will be identified as a comparison group for the pilot test program.
- XVI. On February 10, 2017, program facilitators will administer the pretest to all students in class in both the experimental and comparison groups, after obtaining child assent or parental informed consent to collect data.
- XVII. On February 10, 2017, pilot testing of the PAATEE program will begin in high school A.
- XVIII. On February 10, 2017, educational pamphlets (a substitute for the pilot test curriculum) will be given to the comparison group in high school B.
- XIX. By February 13, 2017, program facilitators will divide participants of the pilot test group into groups of 5-6 and choose one student per group to be the peer leader to facilitate program activities for that group.

- XX. By February 13, 2017, school counselors in the pilot test group will have one hour scheduled per day to meet privately with students.
- XXI. On June 19, 2017, groups in high schools A and B will be given their posttests.
- XXII. By August 24, 2017, pilot testing will be complete with any changes to the program implemented and phasing in to the larger target group will begin.
- XXIII. By August 25, 2017, program facilitators will be assigned to up to three schools per district. They will spend one day every two weeks at each school.
- XXIV. By August 28, 2017, PAATEE will be implemented in multiple schools in the Bellingham School District.

Impact Learning:

- I. By the end of the second session, 60% of female students will be able to identify the three macronutrient groups.
- II. By the end of the third session, 100% of female students will show an 8% increase in knowledge of the basics of a nutritious diet.
- III. By the end of the third session, 75% of female students will recognize that not all claims made in advertisements are true.
- IV. By the end of the third session, 75% of female students will recognize that not all products are always effective or safe to use.
- V. By the end of the fourth session, 50% of female students will be able to identify factors contributing to eating disorders.
- VI. By the end of the fourth session, 50% of female students will be able to explain the physical and mental harms of AN.

- VII. By the end of the fifth session, two thirds of female students will be able to challenge body image portrayals in media.
- VIII. By the end of the fifth session, 50% of female students will be able to practice refusal of unhealthy weight loss behaviors.
- IX. By the end of the final session, 100% of female students will show 10% decreased intentions to vomit in order to lose weight.
- X. Six months following the completion of the sessions, 10% of female students will report increased body confidence.
- XI. By the year 2019, female students will demonstrate an 18% increase in knowledge about body image ideals as they relate to the female body misrepresentation in the media.
- XII. By the year 2019, female students will demonstrate a 15% increase in intuitive eating practices.

Impact Behavioral:

- I. After the final session, 15% of female students will increase their healthy eating behaviors.
- II. After the final session, there will be a 15% decrease in diet pill use by female students participating in the program.
- III. Three months after the final session is completed, health harming behaviors related to eating disorders in female students will be reduced by 30%.

Impact Environmental:

- I. After school access to a counselor specializing in eating disorders will be provided to female students for one hour each day sessions are held, weekly throughout the program.

Outcome:

- I. By the 2019 school year, there will be a 10% decrease of disordered eating behaviors among female students in the school that received the intervention.
- II. By the year 2019, one-third of female students will have higher body confidence in the school that received the intervention.

Educational Plan

The PAATEE program aims to reduce the prevalence of AN among female adolescents in the high school setting in Bellingham School District. The purpose of this program is to implement educational sessions that target intrapersonal (knowledge), behavioral (disordered eating habits), and environmental (social environment) factors contributing to AN. The educational sessions will include informative, skill-building activities that focus on healthy eating, perceptions of body image in the media, and warning signs associated with AN. By focusing on these attributes, the program can serve to empower female adolescents to encourage positive body confidence, which could ultimately reduce eating disorders. Because of the sensitive nature of the PAATEE program's curriculum, it is important to obtain feedback before full implementation.

The PAATEE program will be pilot tested and evaluated in one high school for one complete semester in order to assess quality and effectiveness before full implementation at the district level. Though the ATHENA program has already been evaluated multiple times for

effectiveness, adaptation to a new population and setting will require further evaluation to check for the level of fidelity and effectiveness in the new setting.

Key features. The sports team setting is a key component in the ATHENA program. To reach a broader population, PAATEE planners will adapt the setting from high school female sports teams to high school female adolescents in general. The program will be implemented within the already existing health curriculum of the school, using eight 45 minute in-class sessions biweekly. Therefore, it can be implemented without the use of additional classroom hours. Additionally, unlike the ATHENA program, PAATEE will incorporate counselor office hours for one hour each day. The purpose of these office hours is one-on-one support in the event that participants need further help, information, or debriefing after sessions.

The curriculum for the ATHENA program was developed for high school female athletes. As such, the curriculum targets eating disorders from a different perspective than PAATEE. For example, ATHENA caters the healthy nutrition curriculum specifically to athletes, such that it would not fit our target population. Therefore, PAATEE planners will adapt the specific curriculum to be relevant to a general female adolescent population. Specifically, PAATEE will instead discuss healthy eating in terms of intuitive eating, a method of healthy eating that encourages healthy relationships with one's food, mind, and body (Tribole, 2009), while also focusing on the importance of a balanced diet. For example, although ATHENA teaches athletes the importance of carbohydrate loading before and after high intensity exercise, PAATEE will educate high school female adolescents on the importance of macronutrients found in food, which is important for every body's nutritional needs (not unique to athletes' needs).

Program support components. Program support components for PAATEE include training for facilitators so that they are comfortable with the material during implementation. Training sessions are imperative to support the program. The sessions will be provided to facilitators, counselors, and peer leaders prior to program implementation. The school counselors will receive a two-hour seminar training to expand their knowledge to include the sensitive topic of EDs and handling of students with EDs. Program facilitators will receive three, two-hour training sessions to familiarize themselves with the materials and content of the curriculum, such as implementation specifics and program background. These training sessions will also provide the facilitators with strategies to approach the topic of EDs and empathy training, specifically a review sessions centered around AN. Following each session, program facilitators will report to the program planners to develop an understanding of student comprehension as well as address any adjustments that may be necessary to the curriculum or teaching methods. Adapted from the ATHENA program, peer leaders will receive a 90-minute training from facilitators to review the student manual, as well as an orientation to the format of sessions and enthusiasm-building for leading the small groups (Elliot & Goldberg, 2008).

PAATEE incorporates educational sessions to be taught in high school health classes, held in usual health classrooms. Facilitators will make efforts to create a safe space for students by upholding confidentiality and using positive, inclusive, and empowering language. During the sessions, students will gain knowledge about symptoms, factors, types, prevention, and treatment options for eating disorders. The sessions will accomplish these objectives by incorporating group activities and comprehensive reading materials within the health education class. Other sessions provided to female students are counseling sessions, which will be made available an hour each day for students in the counselor's office.

Other programmatic needs. To make this program successful, it is necessary for a school community to agree to implement and maintain the curriculum. It is important that there are compliant educators who are willing and able to teach this new curriculum in their classrooms. Continued community (funding, facilitators, feedback) and school (evaluations, renewal of curriculum) support is necessary for the program to evolve to further address students' needs inside and outside the classroom. A dedicated counseling professional will need to be available to meet with students for private sessions outside of the curriculum in order to address more personal issues related to eating disorders. Financial resources are needed to compensate the professional facilitator as well as the counselors' specialized training for EDs. Additionally, educational materials and workbooks need to be purchased from the ATHENA creators. Otherwise, equipment needs will not surpass those provided in a health classroom setting.

Section V. Program Evaluation

Preventing Anorexia in Adolescents Through Empowerment and Education (PAATEE) will be evaluated to identify issues in the curriculum and improve aspects of the intervention. This section will describe process, impact, and outcome evaluations designed to determine the overall effectiveness of the program.

Process Evaluation

Process evaluation begins prior to the implementation of the program intervention and continues through the pilot testing period. This is to ensure that the program will be implemented according to the design set by the program planners (McKenzie et al., 2013). To select qualified facilitators, PAATEE planners will conduct an in-depth review process to evaluate the credentials of facilitators to implement the program. Other important aspects of the process are

having the facilitators, teachers, peer leaders, and counselors complete necessary trainings according to the timeline described in Section IV. The trainings will prepare these stakeholders to lead PAATEE, allowing the program to be implemented as outlined in the plan. This helps to ensure program fidelity and increase self-efficacy of the stakeholders directly involved with the participants.

Brochures, pamphlets, and the adapted curriculum are all necessary materials to ensure the facilitators can properly implement the PAATEE program. These materials will be completed prior to implementation and evaluated for accurate adaptation from ATHENA. Delivery of program content will be evaluated by measuring: if all eight sessions were conducted, how many of the outlined activities were completed, and if there were any barriers to proper implementation. Readability and usability level by the intended users (i.e., facilitators, peer leaders, student participants) of the manuals and workbooks will be evaluated to further ensure the ease of implementation. By evaluating the content and delivery processes, the program planners can make necessary changes to improve the implementation.

Once PAATEE has been implemented in high school health classes, it is necessary to evaluate the success of the sessions. Therefore during each session, attendance will be taken and tracked⁷ throughout the program. Students who attended at least six of the eight sessions will be included in the evaluation. Although consistent attendance is key for ensuring the involvement of students, participation (e.g. involvement in activities, speaking in discussions) of the students will also be an evaluation component. PAATEE will be evaluated through the use of a pilot test conducted in one Bellingham School District high school prior to full implementation, which

⁷ While attendance is not mandatory, it is important for the program planners to follow students' attendance consistently over the course of the program, as missing multiple sessions can result in exclusion of that student's data from evaluation.

will occur in multiple high schools. This process is to improve the overall quality of the program and remove any issues that occur. Once the pilot test is complete, program planners can move forward with evaluating impact objectives of the intervention.

Impact Evaluation

Impact evaluation assesses the anticipated changes in learning, behavior, and school environment as outlined by the intervention plan (McKenzie et al., 2013). To measure a change in knowledge and behaviors by students, a pretest will be administered before the implementation of PAATEE. Proceeding the conclusion of the program, the same students will complete a posttest, the results of which will provide evidence towards the effectiveness of the program. Evaluators will examine changes in disordered eating behaviors and an increase in body image ideals, confidence, and intuitive eating practices (as defined in Section IV) after completing the program. Knowledge-based questions will measure how well the students retained information regarding eating disorders (EDs), specifically AN. Behavior questions will be measured on a Likert scale and will demonstrate the student's willingness to practice preventive techniques from “strongly agree” to “strongly disagree.” Finally, changes in the school environment will be measured in terms of resources available to female students concerned about AN or EDs, and perceptions of body image ideals. These impact evaluations will provide feedback for program planners and implementers alike, indicating possible areas of improvement for materials or implementation.

To improve PAATEE for future interventions, quality assurance surveys will be completed by facilitators, student participants, and teachers that may be present during sessions. The purpose of these surveys is to identify the components of the PAATEE program that individuals found most helpful and those which need improvement. Ideally, these surveys will be

given after each session when the material is still fresh in individual's minds, contributing to more honest and accurate responses. The last evaluation for impact is a discussion with facilitators, occurring after each session, regarding their perceptions of student understanding and comprehension of session material. These data will be collected with qualitative methods (e.g., recorded discussions and meetings). The effectiveness of PAATEE is heavily dependent on students' comprehension of the material presented in sessions, such that facilitators must be vigilant and able to provide deeper explanations on material they find students struggle with.

The ATHENA program utilized a random controlled experimental design to evaluate the impacts of the program. Being that the PAATEE program is adapted from ATHENA, it is not necessary for PAATEE to expend the extra resources on this type of design. However, the use of a comparison group, as in a quasi-experimental study design, strengthens an evaluation. Therefore, PAATEE will be evaluated using a quasi-experimental design, and assign a comparison group from another school to each intervention group. As with ATHENA, the comparison group will be given only the nutritional pamphlet but no curriculum. The purpose of the PAATEE program is to provide long term, positive, health changes in participants, so it is important that related outcome objectives are evaluated as well.

Outcome Evaluation

Outcome evaluation measures the effectiveness of a program in producing change in the population. As discussed in Section IV, the outcomes PAATEE will be evaluating are related to increasing body confidence and reducing disordered eating behaviors. These objectives will be measured through a posttest relating to the previously completed pretest. To address outcome objectives, PAATEE planners will be evaluating the school environment every two years after completion of the program. For example, the first intervention will end in 2017, therefore the

first evaluation will take place in 2019. This time frame is adapted from the evaluations of ATHENA. An interval must be a long enough period that behavior change can be measured, but not so long that participants will have forgotten the sessions. The focus of the intervention is adolescent behaviors, for this reason timing our evaluations during adolescence is key.

Conclusion

The combination of process, impact, and outcome evaluations will measure the success of each objective. Based on the evaluation, future program planners will be able to assess the effectiveness of PAATEE in the high school setting. If PAATEE proves to be effective, it can lead to adoption and adaptation in other high schools in Bellingham and beyond.

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