

EATING DISORDER SCREENING, EVALUATION, AND REFERRAL IN THE PRIMARY
CARE SETTING

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Eating Disorder Screening, Evaluation, and Referral in the Primary Care
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ABSTRACT

Nearly one person out of 20 is at risk of developing an eating disorder in his or her lifetime. Young teens and young adults are at the greatest risk of developing an eating disorder, as peak onset is between the ages of 13-14, and 17-18. Identifying individuals at a young age and at early stages of an eating disorder has the greatest chance of remission without relapse when treated by an eating disorder (ED) program. Early intervention is also the best predictor of success in treatment. Primary care providers and interdisciplinary professionals serve a crucial role in identifying symptoms of an eating disorder. Suspicions of disordered eating should prompt appropriate screening and timely referrals to a multidisciplinary ED program.

After extensive literature review and synthesis, an educational presentation was created as a resource to serve the need for improved eating disorder recognition and screening in adolescents and young adults. The presentation was given to interdisciplinary professionals in two university settings. The content included symptoms of disordered eating, screening tools, appropriate diagnostic tests, and methods for referral to a specialty program. Attendees were given a pre-test and post-test before and after the presentation, and were also asked to evaluate the presentation.

The scores on the respective tests, and the responses on the evaluation, reflected the effectiveness of the presentation. The attendees' knowledge of ED content had increased based on the gathered data. The overall improvement from the averaged pre-test to post-test score was approximately 24 percent. Moreover, nearly every attendee reported his/her knowledge of eating disorders had improved after attending the presentation. Approximately 91% (90.91%, n=18) indicated he or she had an increased understanding of eating disorders. A majority of the attendees reported he or she would recommend the ED presentation to other clinicians and interdisciplinary professionals. Evidence suggests primary care providers' efforts to screen,

identify, and refer individuals he/she suspect to have an eating disorder to a multidisciplinary ED team will significantly improve detection and treatment of an ED individual. In turn, improved screening and referrals should decrease morbidity and mortality.

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CHAPTER ONE. INTRODUCTION AND PROBLEM STATEMENT

Eating disorders are among the most commonly diagnosed psychiatric problems. Eating disorders are classified by the Diagnostic and Statistical Manual of Mental Disorders, (5th ed.; DSM-5; American Psychiatric Association [APA], 2013) as a psychological disorder characterized by abnormal eating behaviors. Eating disorders can lead to one or more of the following destructive behaviors: binge eating, purging, fasting, excessive exercise, or other compensatory actions (APA, 2013). Eating disorder prevalence has been steadily increasing in recent decades. Approximately 24 million U.S. citizens of all ages and genders suffer from an ED (Eating Disorder Statistics; National Association of Anorexia Nervosa and Associated Diagnoses [ANAD], 2014). Ten to fifteen percent of those affected are men—a statistic that should be taken cautiously, as males are less likely to seek treatment due to the perception of eating disorders as a female disorder (ANAD, 2014). A female has a 0.5 to 4.2% likelihood of developing anorexia, bulimia, and/or binge-eating disorder in her lifetime (ANAD, 2014).

Approximately one out of 100 people will develop anorexia nervosa in their lifetime, regardless of sex or ethnic background (Sabel, Gaudiani, Statland, & Mehler, 2013). Approximately 20% of anorexia nervosa individuals' progress to chronic eating disorders, and such disorders represent the number one cause of death for females between the ages of 15 and 24 (Sabel, et al., 2013). Eating disorders have the greatest mortality rate of all psychiatric disorders. As reported on the ANAD website (2014), the American Journal of Psychiatry (2009) has approximated the percentages of individuals of various eating disorders who will die from their disorder: 4% for anorexia nervosa, 3.9% for bulimia nervosa, and 5.2% for eating disorder not otherwise specified. Actual death rates may be underestimated, because the medical complications associated with an eating disorder are often reported as the cause of death. Eating

disorder individuals frequently die due to complications such as heart failure, organ failure, suicide, or malnutrition, causing considerable variance in mortality rates across studies and resources (ANAD, 2014).

The development of an eating disorder is multifactorial, but certain risk factors can put an individual at a greater risk for developing such a disorder. According to Mehler and Anderson (2010), females are more likely to develop an eating disorder than males by a factor of 2-3:1. Adolescents and people in their early twenties have the greatest probability of developing an eating disorder. The development of an ED peaks at 13-14 and 17-18 years of age. However, eating disorders can develop at any stage of life (Mehler & Anderson, 2010). Individuals in an upper socioeconomic class within a westernized society are at a higher risk of developing an eating disorder, as cultural pressures glorify thinness. Personality traits such as perfectionism, self-criticism, mood lability, and high-novelty seeking behaviors may put an individual at greater risk for developing an eating disorder. An additional major risk factor that is often overlooked is a family history of eating disorders. Eating disorders can develop after environmental influences, such as, learned behaviors. However, evidence suggests approximately 50-70% percent of eating disorders exhibit some form of a genetic component (Mehler & Anderson, 2010). Finally, sexual orientation (homosexuality) or predisposing psychiatric disorders (depression, anxiety, obsessive-compulsive disorder, and posttraumatic stress disorder) can increase the likelihood of an eating disorder (Mehler & Anderson, 2010).

Eating disorders are impossible to effectively diagnose and treat without a full grasp of their definitions and characteristics. Anorexia nervosa is defined in the DSM-5 as a distortion of body image and excessive dieting which leads to severe weight loss (APA, 2013). Initially, anorexic individuals are obsessed with losing weight. In later stages of the disorder, the

individual has a pathological fear of becoming overweight or obese. Bulimia nervosa is characterized by frequent episodes of binge eating followed by harmful behaviors, such as self-induced vomiting, to avoid weight gain. Binge eating disorder is defined as recurring episodes of eating a significant amount of food in a short period, more than most people would consume under similar circumstances (APA, 2013). Other Specified Feeding or Eating Disorder (OSFED) is diagnosed by a variety of symptoms from anorexia nervosa, bulimia nervosa, binge eating disorder, or atypical eating behaviors. Individuals with OSFED do not fit all of the DSM-5 criteria, but still display disordered eating characteristics (APA, 2013). Each of these disorders is explored in greater depth in later sections.

In the primary care setting, nearly half of eating disorders go undiagnosed. Eating disorders are known as the “great pretender” of the decade, as the physical signs and symptoms of an ED can manifest similarly to other common disease processes (Mehler & Anderson, 2010). Individuals often visit healthcare centers with complaints of weight loss, amenorrhea, hair loss, fatigue, and dizziness, along with many other complaints. Such symptoms can be indicative of many health conditions, and are not exclusive to eating disorders. Consequently, primary care providers often inadvertently attribute the symptoms to other common diseases. The inadvertent errors typically delay ED screening, referral to an ED specialist, and ultimately ED treatment.

Significance

Detecting and identifying disordered eating in the primary care setting may prevent as many as two-thirds of at-risk individuals from developing a serious disorder (Sim, et al., 2010). Adequate screening and diagnosis may lead to early detection and treatment, followed by decreased morbidity and mortality. A lack of treatment facilities, available beds, and trained ED professionals further complicates access to ED evaluation and treatment. In North Dakota, the

only eating disorder treatment center (inpatient and outpatient) is located in Fargo. From Fargo, the next nearest treatment center is in Sioux Falls, South Dakota (246 miles) or in Minneapolis, Minnesota (236 miles). Therefore, the need for more dedicated ED services and resources cannot be understated.

CHAPTER TWO. LITERATURE REVIEW AND SYNTHESIS

Presenting Complaints

Individuals with disordered eating may present to primary care providers with a myriad of complaints. Eating disorders are a multisystem disorder with an array of physical, cognitive, and behaviors, signs, and symptoms. These individuals' complaints are often mistaken and masked as other diseases (Mascolo, Trent, Colwell, & Mehler, 2012). Often, females with disordered eating present with weight changes, amenorrhea, or irregular menses. Men may experience impotence, decreased libido, decreased muscle mass, and atrophy of extremities. Other symptoms commonly seen are cold intolerance, weakness, syncope, dizziness, and dental issues. The gastrointestinal system is sensitive to disordered eating, and individuals may report abdominal pain, gastroesophageal reflux, and constipation. Affected individuals may also have a number of dermatological complaints such as hair loss, lanugo hair, discoloration of the skin, and callus and/or scars on the dorsum of the hand. Finally, neuropsychiatric presentations of memory loss, insomnia, depression, anxiety, obsessive behavior, seizures, and suicidal ideations are commonly seen in individuals with disordered eating. Though many symptoms may seem non-life threatening, a disordered eating individual can also experience chest pain, heart palpitations, arrhythmias, edema, and shortness of breath—all of which require urgent attention and intervention (Academy for Eating Disorders, 2012).

Diagnosis

The symptoms of disordered eating may be ambiguous. Consequently, more than half of all cases go undiagnosed. This failure in diagnosis is problematic, because early detection correlates with an improved outcome for ED individuals (Pritts & Susman, 2003). As many

adolescents are seen by primary care providers, these clinicians play a pivotal role in screening and referral for accurate diagnosis—and ultimately, successful treatment for those affected.

Anorexia nervosa primarily affects adolescent girls and young women. In addition to the previously mentioned hallmarks of distorted body image and excessive dieting, a pathological fear of becoming obese is a core characteristic of the disorder. The DSM-5 criterion focuses on behaviors such as restricting caloric intake in diagnosing the disorder (APA, 2013).

On the contrary, bulimia nervosa is characterized by binge eating episodes with purging behaviors (APA, 2013). The DSM-5 diagnostic criteria for bulimia nervosa are frequent episodes of binge eating (lack of control and eating an amount of food larger than most people would eat during similar time) and recurrent inappropriate compensatory behaviors (purging, laxative misuse, diuretics, enemas, fasting, or excessive exercise). The binge eating and inappropriate compensatory behaviors must occur at least once a week for three consecutive months (2013). The individual's self-evaluation is influenced by body shape and weight (Birmingham & Treasure, 2010).

While similar in some respects, binge eating disorder is also classified in DSM-5 (2013) with diagnostic characteristics similar to bulimia nervosa—but without the use of compensatory behaviors. The disorder is associated with marked distress and feelings of lack of control. Full evaluation of the symptoms and behavior of the afflicted individual is imperative to avoid confusion of these two related, but very different, disorder.

The diagnosis of other specified feeding or eating disorder (OSFED) is given when a disordered eating pattern does not meet the criteria for anorexia nervosa, bulimia nervosa, and/or binge eating disorder. According to the DSM-5 criteria, to be diagnosed with OSFED, an individual must present with atypical feeding and/or eating behaviors (APA, 2013). The

behaviors must cause clinically significant distress or impairment of daily functioning. An OSFED diagnosis will be made if an individual has various symptoms of a DSM-5-classified eating disorder, but do not fully meet all specific DSM-5 criteria (APA, 2013). For example, an individual may have an intense fear of gaining weight and eat an excessive amount of food in a short period of time, but episodes only occur once every other week. The individual exhibits anorexia nervosa and binge-eating traits, but does not meet full criteria for a specific diagnosis.

Assessment

In primary care, if an individual is suspected of having any form of disordered eating, the primary care provider (PCP) should refer the individual to ED specialists for diagnosis and treatment. However, the PCP may need to determine the individual's medical stability, prompting an emergent referral or a routine follow-up for soonest available appointment. Gathering an accurate history of present illness is essential, as this can guide initial diagnostic and laboratory investigation. Additionally, a complete past medical history, social history, physical examination, and laboratory tests should be obtained. This information will assist the primary care provider in determining the severity of the disorder, and will dictate whether the individual needs an immediate evaluation.

The primary care provider should pay particular attention to cardiac status, dermatologic changes, and assess for signs of purging or self-harm (Norrington, A., Stanley, R., Tremlet, M., & Birrell, G., 2011). Laboratory tests are also important diagnostic tools in determining medical stability. However, laboratory results within normal limits do not exclude seriousness of the disorder (Rosen, 2010). Initial laboratory orders should include a complete cell count, comprehensive metabolic panel (including sodium, chloride, calcium, potassium, magnesium, glucose, BUN, creatinine, total protein, albumin, AST, ALT, alkaline phosphates, and total

bilirubin), and urine analysis (Norrington, et al, 2011). Another recommended test for suspected, at-risk individuals is an electrocardiogram, which assesses heart rate, QTc, and underlying arrhythmias (Norrington, et al, 2011). Additional laboratory tests to consider, depending on the individual's presenting complaints, include: amylase, if the individual has confirmed or is suspicious of purging; thyroid stimulating enzymes to assess for any metabolic disturbances; and/or reproductive hormones (estrogen, prolactin, and testosterone) which can assess reproductive and endocrine changes associated with eating disorders (Norrington, et al, 2011). Based on the test results, a primary care provider should be prepared to refer an at-risk individual to an ED specialist for more specialized care.

Medical complications from eating disorders can be serious and life threatening. In my experience at the Eating Disorders and Weight Management Center (EDWMC) in Fargo, ND, the ED specialists performed in-depth assessments and physical examinations on all ED individuals. A comprehensive care ED team typically consists of a registered nurse (RN), social worker, psychologist, medical specialist, and dietitian. When a provider or ED individual approaches an ED team, the RN or the social worker performs an intake assessment on the individual. This intake focuses on pertinent background information such as demographics, past medical history, social history, history of present illness, and also addresses any concerns specific to the individual. After the intake, the individual is scheduled for an appointment where he or she meets with the entire ED team. The RN and social worker will coordinate the appointment and determine if any additional resources are needed. The RN will additionally make medical-related and follow-up phone calls, answering questions and/or concerns, and dealing with medication refill requests.

The social worker determines if any additional community resources or programs are needed for the individual. For example, imagine an afflicted individual from low socioeconomic status who is driving a long distance from home to receive ED treatment. The social worker will arrange for lodging, food, and any other necessities which may be needed to facilitate treatment, and ease external burdens on the individual.

After the RN and social worker have provided initial care and service for the individual, an appointment with the psychologist is arranged. During this appointment, a thorough psychological assessment is performed. The psychologist may determine if the individual meets specific diagnostic criteria, and ascertain an ED diagnosis. The psychologist also counsels the individual and helps to identify the cause of the eating disorder to improve treatment.

The next member of the ED team the individual will see is the medical specialist. The medical specialist will obtain a complete history, physical examination, and diagnostic tests. Using this information, the medical specialist determines the severity, amount, and duration of follow-up appointments needed based on medical stability.

Finally, the individual meets with the dietitian. During this meeting, the dietitian will discuss a diet and nutrition plan appropriate for the diagnosis and severity of the disorder. The specialized plan the dietitian provides is an integral part of the individual's treatment.

Screening

Early detection of eating disorders in primary care is extremely important. Early detection can assist the ED individual in accessing care sooner, early detection and treatment dramatically improves an individual's ultimate result (Bratland-Sanda & Sundgot-Borgen, 2013). The problem is ED symptoms are often non-specific, meaning there is a strong need for individual screening in primary care clinics. A large amount of literature has been devoted to the

causes, medical management, evaluation, and treatment of eating disorders, but little attention has been devoted the best and most sensitive screening tools for use in primary care.

A number of self-reported inventory screening tools are used to screen for a variety eating disorders, including: SCOFF, EDI-3, EAT, and BITE. These tools are described in greater detail below. These tools are valuable, because face-to-face interview screening methods may miscalculate the prevalence of eating disorders as a result of denial and minimization of symptoms (Sandberg & Erford, 2013). The ED project suggests the use of the SCOFF screening tool as an initial questionnaire due to its usability and quick administration. Extensive screening tools have been evaluated below in comparison to SCOFF.

SCOFF

The SCOFF questionnaire, with the acronym based on the test's five behavioral questions, was developed to simplify and minimize the screening time for non-specialist primary care providers and individuals who may display ED characteristics (Morgan, Reid, & Lacy, 1999). The SCOFF questionnaire's five questions are addressed to specific features of anorexia nervosa and bulimia nervosa: Do you make yourself feel *Sick* because you feel uncomfortably full? Do you worry you have lost *Control* over how much you eat? Have you recently lost more than *One* stone (6.35 kg) in a three month period? Do you believe yourself to be *Fat* when others say you are too thin? Would you say *Food* dominates your life? This tool can be administered very quickly and easily to individuals of all ages, genders, and ethnicities. Scoring is simple, as one point is given for every "yes" answer. A score of two or more indicates a high likelihood of anorexia nervosa or bulimia nervosa. "The threshold at two or more positive answers to all five questions was 100% sensitive for anorexia and bulimia nervosa, separately and combined with specificity of 87.5% for controls" (Morgan, et al., p 1467, 1999).

EDI-3

The Eating Disorder Inventory-3 (EDI-3) is a widely used tool for assessing the symptoms and characteristics of an eating disorder. The tool effectively measures attitudes, behaviors, and traits associated with eating disorders (Sandberg & Erford, 2013). The EDI-3 is tailored to females between 13 and 53 years of age. The tool is written at a fourth grade level, has been translated into multiple languages, and takes about 20 minutes to complete. Within the tool are twelve subscales addressing drive for thinness, bulimia, body dissatisfaction, and psychological components of an ED. The validity and reliability of the EDI-3 is considered moderate to high (Sandberg & Erford, 2013).

EAT

The Eating Attitudes Test (EAT) was the first tool developed to measure symptoms of anorexia nervosa. EAT is now one of the most widely used self-reporting instruments for evaluating eating disorders (Sandberg & Erford, 2013). The EAT has been translated into seven different languages and has been adapted to the EAT-26 for adolescents and adults.

Administration and scoring of the EAT is simple and can be done by any disciplinary professional. The EAT-26 has been deemed the best screening tool, as well as, the most widely used tool in nonclinical populations. The EAT-26 reliability is 0.86 and suggested variability in estimated internal consistency (Gleaves, Pearson, Ambwani, & Morey, 2014). Though the tool is ideally suited for school settings, athletic programs, and fitness centers, however, EAT can be administered in pediatric and general clinical practice settings (Sandberg & Erford, 2013).

BITE

The Bulimic Investigatory Test, Edinburgh (BITE) is a self-reporting inventory used to identify those with binge eating and/or bulimia nervosa. The BITE tool is also useful in

measuring severity of the disorder, and is often used to measure an individual's progress in treatment. The BITE can be used on male or female adolescents, as well as young adult females. Scoring of the BITE requires the administrator and interpreter to possess a graduate degree in psychology, counseling, and/or a related field. The BITE is of adequate reliability and validity, as the BITE has an internal consistency of 0.96 for the symptom scale, and 0.62 for the Severity scale (Henderson & Freeman 1987). Overall, the BITE is successful in detecting bulimia and binge eating, but scoring is not user friendly.

Referral

Care from the aforementioned ED team improves the success for individuals afflicted with the various eating disorders. After completing treatment at a comprehensive ED tertiary care facility, nearly 70% of individuals with bulimia nervosa, and 27% to 50% with anorexia nervosa, will not show obvious signs or symptoms specifically suggesting an eating disorder (Williams, Goodie, & Motsinger, 2008). Therefore, the net result of referring ED individuals to a comprehensive ED team cannot be overstated.

The type and intensity of treatment may vary for a person with an eating disorder depending on the severity of his or her particular disorder. According to The Practice Guidelines for the Treatment of Patients with Eating Disorders (2008), five levels of treatment are available and the level of treatment is determined on an individual basis. The five levels of care include outpatient, intensive outpatient, partial hospitalization, residential, and inpatient. The intensity and duration of treatment depends on the individual's medical stability, insurance coverage, duration of the eating disorder, and the status of co-morbid mental and physical disorders.

Most treatment programs have admission criteria for the various levels of care. Level 1 is for individuals who are stable and can be monitored on an outpatient basis. Level 2 requires a

more intensive outpatient treatment regimen and includes more involvement of the interdisciplinary team. Level 3 consists of partial hospitalization, where ED individuals are hospitalized during the day and return home in the evening. Level 4 is a residential treatment center, serving individuals that need extensive care, but are otherwise medically stable. Finally, Level 5 is inpatient hospitalization for those medically unstable with severe symptoms (Williams, Goodie, & Motsinger, 2008).

Current Costs of Eating Disorders

As reported in the Eating Disorders Coalition (2014), anorexia is the third most common chronic condition in adolescents. The economic burden and cost of healthcare services for treatment can be devastating for the individual and family. In the United States, eating disorder treatment can cost \$500 to \$2,000 per day, depending on the severity and level of treatment (inpatient care versus outpatient care). Inpatient treatment for ED may need extended care where costs can be extensive (Hudson, Hiripi, Pope, & Kessler, 2007). On average, outpatient treatment can cost over \$100,000 in total (National Coalition of Eating Disorder, 2014).

When examining the financial burden of an eating disorder, another important consideration is that some eating disorders are conditions that can plague an individual for his or her entire life. As a result, accumulating costs due to multiple treatments, therapies, and hospitalizations is an unfortunate fact of life for these individuals, and paying for ED services can be a major hurdle. Not every patient has insurance; therefore, the costs become private pay. If the patient cannot afford services, then access to care might suffer.

Third-party payers can also be a challenge when treating an ED patient. Every individual entering treatment requires prior authorization to his or her third-party payer to ensure coverage for the treatment costs. For many reasons, a third-party payer may deny coverage, which can

delay treatment or cause additional challenges for the patient and/or ED staff. Specific criteria must be met for coverage, and these requirements are different for every third-party payer.

Project Framework

The logic model is a systematic and visual tool used to evaluate the effectiveness of program planning. Created over 20 years ago, the logic model was initially used for identifying performance measures (McCawley, 2014). Program managers and evaluators have used this model to describe logical connections for program resources, activities, intended outputs, and various audiences. The objective of the logic model is to provide a series of steps connecting the proposed program with the intended results (Logic Model Development Guide, 2004). The logic model also allows the user to gather and use information to continuously improve programs. The logic model is also useful in determining short-, intermediate-, and long-term outcomes related to a specific problem or event (McCawley, 2014).

The logic model is an effective evaluation tool because of the ability to facilitate effective program planning, implementation, and evaluation (Logic Model Development Guide, 2004). The two main components of the logic model are planned work and intended results. The planned work comprises resources, inputs, and activities. Comparatively, the intended results are seen in outputs, outcomes, and overall impact. Overall, the logic model assists the user to link the problem or situation to the intervention (inputs and outputs) and the impact (outcome) (McCawley, 2014).

CHAPTER THREE. DESIGN

A clinical rotation at the Eating Disorders and Weight Management Center (EDWMC) in Fargo, North Dakota led to the formulation of the ED project. Staff at the EDWMC were frustrated with inappropriate or delayed referrals from primary care providers and urgent care providers. Eating disordered individuals were often not referred until late in the disorder process. As a result, individuals often became medically unstable before they had been seen at the EDWMC. Adequate screening and diagnosis may lead to earlier detection and treatment, which should reduce morbidity and mortality in individuals with eating disorders. The ED team wanted to create a way to educate outreach primary care providers and related professionals to increase awareness of eating disorders. The ED project's main objective was to improve screening and improve referrals to ED specialists more quickly.

Project Design

The ED project was developed after performing a systematic literature review of current research findings and evidence-based data. The project was focused on creating an educational presentation for clinicians and related professionals to raise awareness of eating disorders. The goal of the project was to facilitate primary care providers' ability to recognize eating disordered individuals and to make the referral to an appropriate ED treatment center. The presentation provided attendees with basic ED information, screening tools, recommended laboratory and diagnostic tests, as well as methods for referral. The logic model design was used in the eating disorder project. Each section of the logic model has been highlighted and discussed separately. The project inputs and output section of the logic model is discussed below (Figure 1).

Inputs		Outputs		Outcomes		
ED Team: ED BSW ED RN ED Director ED Provider Committee Dietitian Psychologist	Interdisciplinary collaboration for accurate information and coordinated care	Health Care Professionals	Interdisciplinary education and knowledge add benefit to attendees	Attendees received resources and information from the ED team useful for practice and/or questions	Attendees have Improved understanding of ED. Attendees will know whom to contact for ED questions and care.	
Research Literature Review	Developed, reviewed, and approved ED presentation customized and applicable to a variety of health care providers and settings.		Presented information on EB ED diagnosis, treatment and referral	Attendees have up to date information, resources, clinical guidelines, and applicable evidence based recommendations available for reference	Attendees indicate that new knowledge, skills and strategies for care of the ED patient Attendees have the resources to facilitate expedited communication with ED specialists	
Expenses	Presentation and presentation materials offered to attendees at no cost		Attendees received free packets and printed information provided by presenter and donated by ED program	Attendees informed that consultation and references are free	Attendees have unlimited access to references anytime as the resources and handouts are not copyrighted	
Technological Services	Coordinated IT services and polycom access at NDSU Wellness Center, Bemidji State University, and Sanford Health in Fargo, ND		ED experts: RN, BSW, and dietician were able to participate via technology ED RN and ED BSW via polycom services	Attendees were able to communicate and ask questions regarding ED referral and processes to ED experts	Attendees can put faces to names of ED experts after polycom presentation and have knowledge regarding who to contact for collaboration and referral	
Agencies	Universities, ED program, and independent practitioners were invited to presentation		Agencies worked together	Facilitated communication and collaboration of agencies	Agency and practitioner collaboration will ultimately benefit student identification and referral	

Figure 1. Logic Model Inputs and Outputs.

Inputs and Outputs

Designing the ED project required extensive preparation. Planning the ED project required close collaboration with the ED team, completing a comprehensive literature review, addressing potential expenses, synchronizing technological services, and coordinating with the agencies are identified in the input section of the logic model. The output section of the ED

project can be divided into two sections: (1) what we do; and (2) who we reach. “What we do,” reflects the physical pieces of the project. Interdisciplinary coordination was needed for accurate and updated ED information used in the presentation, lecture, and resources. The handouts were a significant part of the presentation. Each attendee received a packet with detailed information and additional resources for ED care. Additionally, IT services were integral to both presentations as discussed below.

“Who we reach” represents the individuals affected by the presentation. Healthcare professionals were the targeted audience for the ED project, although ED individuals are indirectly affected as a result of the presentation. Clearly, none of this work has any value without making a positive impact on the people on the forefront of this issue, both provider and patient alike.

In order to achieve the project objectives, it was necessary that attendees received appropriate education and tools. The input and output section of the logic model ensured proper planning was implemented to achieve such objectives. This section of the logic model was an integral piece of project design for this reason.

Stakeholders

Successful implementation of a quality improvement project required a well-developed team of ED experts and additional personal. The team consulted with experts in behavioral health, ED management, and support staff throughout the creation of the project. Unforeseen viewpoints, questions, and plausible solutions were discovered through collaboration with these experts. This collaboration was crucial to ensure that the attendees were given accurate information regarding ED care and appropriate channels for consults and/or referrals.

A number of stakeholders were instrumental in implementation of the ED project. Nicholee Lange, a doctor of nursing practice student, directed the project. Her work would have been impossible without the expert guidance of her team. Of particular note, Tina Lundeen, DNP, FNP-BC, a professor at North Dakota State University, provided expert guidance for the project. Dr. Lundeen was uniquely qualified for this role, as she is an eating disorder medical specialist and the recipient of the 2014 American Academy of Nurse Practitioner State Award for Excellence. Dr. Lundeen's presence afforded credible and reliable information about screening, diagnosis, management, and need of referral for eating disorder individuals.

The other team members were equally crucial. For instance, the project relied on Stephen Wonderlich, Ph.D., a Chester Fritz distinguished professor, associate chair for the Department of Neuroscience at the University of North Dakota, and the Director of Clinical Research at The Neuroscience Research Institute. Additional committee members included Dr. Daniel Friesner, Ph.D., and Professor Kara Falk, MS, FNP. Dr. Friesner, a NDSU professor and Associate Dean for Student Affairs and Faculty Development, provided his knowledge and experience to continuously improve the ED project. Professor Falk, a practicing nurse practitioner and NDSU professor, enhanced the committee with her clinical expertise, knowledge, and experience with ED. Both members enriched the project through their ability to create and build a vibrant project built on their multifaceted and diverse expert backgrounds.

The ED project could not have been implemented without the help of a contact person at each university. North Dakota State University and Bemidji State University each had an individual contact person for the ED project dissemination. The NDSU director contacted the author asking for a 30 minute presentation for their clinicians on management of eating disorder individuals. She arranged a date and time for the ED team to present at their facility. The NDSU

director reached out to the NDSU Wellness Clinic clinicians and related staff about the ED presentation and lecture. Additionally, a counselor at BSU contacted staff at the EDWMC requesting information about ED care. The BSU counselor became the contact person for BSU and facilitated arrangements for the ED presentation at BSU. The contact person also recruited area participants that had expressed interest in eating disorder education.

In sum, the committee members collaborated to develop, review, and approve of the presentation and references. Special recognition is due to the EDWMC support staff and the university contact persons, as they were vital to project success. Additionally, the Information Technology departments at the universities and Sanford Health were essential to the implementation of the presentation, and their assistance is sincerely appreciated.

Literature Review and Resources

A comprehensive literature review was essential to creating an up-to-date, evidence-based, and accurate ED project. The literature review was fundamental in developing the presentation, resources, and the evaluation methods given to attendees. The ED project team customized the presentation and resources to be applicable to a variety of interdisciplinary professionals in various settings. The ED team reviewed and approved all information to ensure its validity and reliability.

Presentation attendees received an ED project packet, reference guide, and algorithm. The packet gave cited and evidence-based information regarding ED care (see Appendix E and F). The packet also gave contact information with names and numbers regarding consults and referrals. The reference guide is a tool for primary care providers containing concise and applicable information necessary when caring for an individual with an eating disorder. The reference guide, created from the literature review, gave an overview of ED definitions,

diagnoses, physical examination findings, laboratory findings, and information for consults and referrals. Finally, the algorithm was created from the SCOFF screening tool and was developed to assist the provider's decision on referring an ED individual. The algorithm contains comprehensive interview questions to guide the provider with the physical assessment and order recommended laboratory tests. The presentation and its resources provided attendees with evidence-based tools, developed to assist providers and interdisciplinary team members to improve screening and referral of ED individuals.

Expenses

Expenses and resources were taken into consideration when planning the ED project. Among the expected expenses were paper, travel, and driving costs associated with visiting the universities hosting the ED project's presentations. Handout materials were another expense to be accounted for, as the presentation and resources were provided at no cost to attendees. The expenses were graciously covered by the North Dakota State University (NDSU) School of Nursing (paper for resources) and the Sanford ED program (resource packets).

Technology

Technological services and expertise were a key component of the ED project. The team anticipated the need for a Microsoft Office PowerPoint presentation, a computer projection monitor, and polycom video communication. Accordingly, the team coordinated with skilled people at NDSU and Bemidji State University (BSU) to ensure that the presentations could proceed without error or delay. Polycom communication access was also utilized at Bemidji State University between attendees and ED experts at Sanford Health in Fargo, ND. Without the expertise of these groups and the people who drive them, the ED project and presentations simply could not have moved forward.

Agencies

The ED project team had the pleasure of collaborating with two agencies, among them North Dakota State University and Bemidji State University. At the beginning of the project, while the presentation was in creation, a rural clinic contacted Sanford Health's Eating Disorders and Weight Management Center in Fargo, North Dakota hoping to obtain information on ED individuals. The project team believed this would be a great location to initiate the project, but time constraints, access, and scheduling conflicts sadly foreclosed this option. Fortunately, the aforementioned universities were willing and able to accommodate the project and presentation, and were instrumental in the successes that were achieved.

Data Collection

The pre-test and post-test questions for the ED project were developed using current, evidence-based information obtained from the comprehensive literature. The test questions were reviewed and approved by the ED project team. The questions were written based on each course learning objective. The questions were multiple choice and true/false questions as demonstrated in Appendix C.

The presentation attendees were also asked to complete a short evaluation. The evaluation consisted of questions regarding the overall impression of the presentation, as well as its contents, applicability of the information presented, and suggestions for improvement. In the weeks following the ED presentation, a follow-up email was sent to the attendees to determine if any unanswered questions or concerns were discovered for ED project team to address.

IRB Approval

The North Dakota State University Review Board oversees research projects conducted through the university. The board serves to protect the safety, rights, and welfare of all

participating individuals in NDSU research projects. Additionally, the United States government, through the Department of Health and Human Services, Food and Drug Administration, and other agencies, regulates the research of human subjects. The purpose of these agencies is to ensure risks to participants are minimal, any risks are reasonably related to the benefits of the program, recruitment procedures are fair, subjects are informed and able to make an independent decision regarding participation, privacy and confidentiality are protected, and additional protections have been established for vulnerable groups. The North Dakota State University Research Board conducts research in accordance with these regulations and policies.

Additionally, North Dakota State University holds approved FederalWide Assurance with the Office of Human Research Protections. The FederalWide Assurances require the NDSU Review Board to review and to certify human subjects' rights are ensured and protected prior to initiation of research.

Attendees were informed at the beginning of the presentation that the lecture was part of a NDSU dissertation project. Attendees were told pre-test questions, post-test questions, and an evaluation after the presentation would be used for data collection. Completing these evaluations would be considered consent to use his/her responses for data collection. Each attendee was informed he/she could opt out of completing the evaluation tools or leave the presentation at any time. The attendees were also assured their answer and responses would remain anonymous and used only for the purpose of the ED project.

CHAPTER FOUR. EVALUATION

Evaluation Methods

As previously noted, the ED project presentation was evaluated using six pre-test and post-test questions, which were crafted to evaluate the learning objectives of the presentation (Appendix C). The tests were created after a systematic literature review from EBSCO and CINAHL databases was performed. The ED project committee members reviewed and approved the pre-test and post-test questions before dissemination. The tests were taken in person, before and after the presentation. The attendees completed the tests anonymously. The attendees at North Dakota State University and Bemidji State University received identical questions. In addition to the pre-test and post-test questions, the attendees were also asked to evaluate the presentation. The evaluation was designed after the ED project reviewed multiple evaluation tools. The questions were developed using a Likert-type scale and free-text response. The evaluation was specifically designed to gather attendee's education background for demographic information, the usefulness of resources and information provided, and opinions or perceptions of the overall presentation. Additionally, the learning objectives were more broadly evaluated through short answer responses.

The ED project team chose a pre-test and post-test as an evaluation method because the design is simple and standardized. The pre-test and post-test is a logically developed assessment method used to test educational learning (Polit & Yang, 2016). A key advantage of this testing design is that the pre-test establishes a firm benchmark against which to measure growth or knowledge obtained. The post-test then gauges whether assumed prerequisites have been achieved following the presentation (Guidelines for Pre- and Post-Testing, 2008). Overall, pre-test and post-tests measure the attendee's knowledge, cognitive learning, and acquired skills.

These tests are then easily scored, and are relatively easy to analyze using statistical procedures (Polit & Yang, 2016).

The ED project presentations were not given an identical form at the two universities. Providers at the NDSU Wellness Center requested a 30 minute presentation. The director of the Wellness Center informed the team that mostly providers would be in attendance. Therefore, the content of the presentation was tailored to clinicians and related professionals. To best use the time allotted, the presentation was focused on basic background information, signs and symptoms of eating disorders, screening tools, appropriate diagnostic and laboratory tests, and an explanation of the referral process. A month following the NDSU presentation, the contact person at Bemidji State University reached out to the EDWMC to provide ED education. However, upon arrival we learned that the majority of attendees would be licensed social workers, therapists, dieticians, athletic trainers and related professionals. The presentation was altered to be applicable to those in attendance rather than medical providers. The BSU presentation was three hours in length. Therefore, the same information that was provided at NDSU was also given to BSU attendees, but in much greater detail. Because of the additional time allotted, greater detail was added to the presentation and EDWMC staff joined the presentation through polycom. The EDWMC registered nurse/care coordinator, the social worker/case coordinator, and the dietitian presented and answered questions.

Objectives

The ED project team developed the following objectives to be achieved through the presentations. Each of these objectives is explored in greater detail in succeeding sections:

- 1.) At the conclusion of the ED presentation, the attendees will have the basic knowledge to identify, assess, and refer eating disorder individuals. Attendee's knowledge will be evaluated through pre-test and post-tests.
- 2.) At the conclusion of the presentation, attendees will identify appropriate laboratory and diagnostic tests necessary for evaluating the medical status and stability of an eating disorder individual. Attendee's knowledge will be evaluated through pre- and post- tests.
- 3.) At the conclusion of the presentation, attendees will indicate whether the reference guide and algorithm may be useful in practice. The utility of the reference guide and algorithm will be determined on the post presentation evaluation.

Inputs	Outputs		Outcomes		
ED Team: ED BSW ED RN ED Director ED Provider Committee Dietitian Psychologist	Interdisciplinary collaboration for accurate information and coordinated care	Health Care Professionals	Interdisciplinary education and knowledge add benefit to attendees	Attendees received resources and information from the ED team useful for practice and/or questions	Attendees have improved understanding of ED. Attendees will know whom to contact for ED questions and care.
Research Literature Review	Developed, reviewed, and approved ED presentation customized and applicable to a variety of health care providers and settings.		Presented information on EB ED diagnosis, treatment and referral	Attendees have up to date information, resources, clinical guidelines, and applicable evidence based recommendations available for reference	Attendees indicate that new knowledge, skills and strategies for care of the ED patient Attendees have the resources to facilitate expedited communication with ED specialists
Expenses	Presentation and presentation materials offered to attendees at no cost		Attendees received free packets and printed information provided by presenter and donated by ED program.	Attendees informed that consultation and references are free	Attendees have unlimited access to references anytime as the resources and handouts are not copyrighted
Technological Services	Coordinated IT services and polycom access at NDSU Wellness Center, Bemidji State University, and Sanford Health in Fargo		ED experts: RN, BSW, and dietician were able to participate via technology ED RN and ED BSW via polycom services	Attendees were able to communicate and ask questions regarding ED referral and processes to ED experts	Attendees can put faces to names of ED experts after polycom presentation and have knowledge regarding who to contact for collaboration and referral
Agencies	Universities, ED program, and independent practitioners were invited to presentation		Agencies worked together	Facilitated communication and collaboration of agencies	Agency and practitioner collaboration will ultimately benefit student identification and referral

Figure 2. Logic Model Short-Term Outcomes.

Objective Evaluation

- 1) At the conclusion of the ED presentation, the attendees will have the basic knowledge to identify, assess, and refer eating disorder individuals. Attendee's knowledge will be evaluated through pre-test and post- tests.

The first objective was measured through the use of a pre-test and post-test, which were evaluated systematically to determine if each objective was met following the ED project

presentation. This objective focused on identifying, assessing, and referring ED individuals. The presentation contained extensive information on identifying signs and symptoms of an eating disorder, assessing medical instability and complications, and methods for referral when an eating disorder is observed. The information behind the first objective was taught through the use of a PowerPoint presentation and lecture. The objective was evaluated through questions 3 and 5 on the pre-test and post-test (see Appendix C). Question 3 examined the attendees' ability to identify important pieces of the assessment. Question 5 examined the attendees' ability to implement appropriate referrals. A table was created to display detailed information regarding the objectives, pre-test and post-test information, method of content dissemination, and the number of PowerPoint slides dedicated to each topic (Table 1).

- 2) At the conclusion of the presentation, attendees will identify appropriate laboratory and diagnostic tests necessary for evaluating the medical status and stability of an eating disorder individual. Attendee's knowledge will be evaluated through pre- and post- tests.

The second objective was aimed at increasing primary care providers' and interdisciplinary team members' awareness about the importance of ordering appropriate diagnostic tests to determine medical stability of an ED individual. The PowerPoint presentation, lecture, and resources contained information regarding recommended laboratory tests for an ED individual. Question 4 on both the pre-test and post-test examined the attendees' ability to identify appropriate laboratory and diagnostic tests for an ED individual (Appendix C). The question and methods of education for the second objective are demonstrated in Table 1.

- 3) At the conclusion of the presentation, attendees will evaluate whether the reference guide and algorithm may be useful in practice. The utility of the reference guide and algorithm will be determined on the post presentation evaluation.

The third objective was to determine if primary care providers and interdisciplinary team members agreed the reference guide and algorithm were useful in clinical practice. This objective was measured by the post-presentation evaluation. The evaluation included two questions regarding this objective and the resources' utility in practice. Evaluation question 4 was a Likert-type scale used to evaluate the use of the reference guide and algorithms in practice. The second question used to evaluate the third objective was a free-text response question. Question 10 on the evaluation examined attendees' perception of the reference guide and algorithm (Appendix D). Once again, a table was developed to examine the methods used and to evaluate whether the third objective was met (see Table 1).

Table 1

Objective Evaluation and Assessment Questions

Question	Available Answers	Method of Education	PowerPoint Slides (#)
Objective One: Demonstrate the need to identify, assess, and refer eating disorder individuals			
Pertinent comprehensive assessment questions of a suspected eating disorder patient should include:	a. rate and amount of weight change, nutritional status, method of weight control, compensatory behaviors, menstrual history, and growth and development history; b. rate and amount of weight change, dietary intake and exercise, family history; c. nutritional status, methods of weight control, rate and amount of weight change; d. risk factors, family history, length and type of eating disorder, growth and development history	Lecture and PowerPoint Presentation	Identification: 22
			Screening: 4
			Assessment: 3
			Referral: 3
Question	Available Answers	Method of Education	PowerPoint Slides (#)
If suspecting and eating disorder in a patient, the clinician should:	a. continue to monitor for the next three months; b. call an eating disorder specialist to determine next plan of action; c. counsel patient on the consequences of their decision to continue his/her eating disorder; d. admit the patient to the nearest hospital for monitoring and laboratory findings	Lecture and PowerPoint Presentation	Identification: 22
			Screening: 4
			Assessment: 3
			Referral: 3
Objective Two: Identify appropriate laboratory and diagnostic tests necessary for evaluating the medical status and stability of an eating disorder individual			
Which of the following initial diagnostic tests should be ordered on every suspected eating disorder patient:	a. complete blood count, basic metabolic panel, thyroid function tests; b. basic metabolic count, EKG, amylase, lipase; c. basic metabolic count, gonadotropins, HcG, thyroid function tests, and amylase; d. complete blood count, complete metabolic panel, EKG	Lecture and PowerPoint presentation	Diagnostic Tests: 7
Objective Three: Determine if the reference guide and algorithm will have utility in practice with ED			
I feel the reference guide and algorithm will be useful in my practice.	On a scale of 1 to 5: 1 strongly disagree, 2 disagree, 3 neutral, 4 agree, and 5 strongly agree	Lecture, PowerPoint Presentation, and Handout	Algorithm: 1
What do you think will be most useful to you on the reference guide and/or algorithm?	Short answer question	Lecture, PowerPoint Presentation, and Handout	Algorithm: 1

NOTE: In Table 1 the objective is paired with the corresponding teaching methods. For the objectives that were taught, at least in part, using PowerPoint, the corresponding PowerPoint slides are matched to the objectives.

CHAPTER FIVE. RESULTS

Presentation of Findings

As explained in the previous chapter, the information and resources developed by the ED project team were presented to groups at North Dakota State University and Bemidji State University. A 30-minute presentation was requested by North Dakota State University staff due to time constraints, as opposed to Bemidji State University where attendees requested a half-day presentation. Accordingly, the Bemidji State University presentation was approximately three hours in length. North Dakota State University had nine total attendees and Bemidji State University had eleven total attendees. North Dakota State University and Bemidji State University were given the same pre-test, post-test, and evaluation. The evaluation was separated by university setting, but the attendees' responses remained anonymous.

A total of 22 pre-tests and post-tests were collected. Of the 22 tests, only 14 pre-tests and post-tests were labeled correctly in regard to pre-test and post-test. Therefore, 8 tests were discarded from data collection as the tests were not labeled in respect to pre-test or post-test. Therefore, the ED project team could not use the tests for accurate data collection. Nine post-presentation evaluations were obtained from North Dakota State University, and 11 evaluations were collected from Bemidji State University. Multiple evaluation short answer questions were left blank; in addition, a number of attendees indicated the question was "not applicable" to him/her.

Pre-Test and Post Test Results

The pre-test and post-test were administered prior to and following the presentation. Each test was comprised of six questions (Appendix C). The pre-test and post-test results from each university were combined due to the limited number of attendees in each group. The ED project

team wanted to provide anonymity for attendees and therefore, averaged both presentation results. Following the lecture and PowerPoint presentation, the average post-test score was approximately 76% (n=14). The overall improvement on the pre-test to post-test score was approximately 23%. The pre-test and post-test was written for primary care providers; however, a number of non-clinical, interdisciplinary professionals were included in the sample. The results of the pre-test and post-test are summarized in Figure 3.

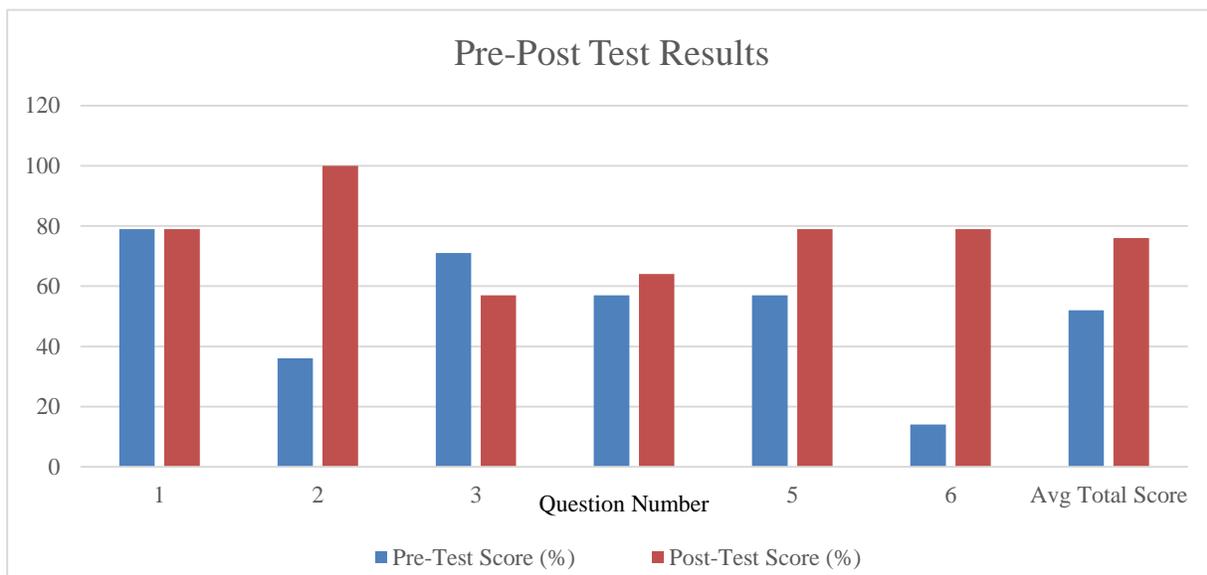


Figure 3. Number and Percent Correct on Pre-Test and Post-Test.

Presentation Evaluation

An evaluation of the ED project presentation was given to attendees following the North Dakota State University presentation. The demographics in this setting reflect that approximately 56% (n=9) of the attendees were clinicians, 22% (n=2) were nurses, and 22% (n=2) were other interdisciplinary team members. The overall review of the presentation, its contents, and resources was positive and demonstrated attendees had improved their understanding of eating disorders (Appendix G). Approximately 22% (n=2) described the overall presentation as excellent, 67% (n=6) identified as above average, and one (11%) individual did not complete the

question. One-third of attendees strongly agreed (33%, n=3), and two-thirds (67%, n=6) agreed, their understanding of eating disorders had improved after the lecture and PowerPoint presentation. Attendees identified he/she had acquired new skills and information about ED care as demonstrated by 89% (n=8) who agreed, and 11% (n=1) who strongly agreed. The attendees will be able to implement new strategies in their practices for ED patients as demonstrated by approximately 67% (n=6) who agreed, 22% (n=2) who were neutral, and 11% (n=1) who did not complete the question. The attendees were also asked about the utility of the reference guide and algorithm in practice. Eleven percent (n=1) strongly agreed, 56% (n=5) agreed, and 11% (n=1) were neutral. However, two attendees (22%) left the question blank. Finally, 56% (n=5) strongly agreed, and 44% (n=4) agreed, that they would recommend the ED presentation to others.

An evaluation of the ED project presentation was also given to attendees following the Bemidji State University presentation. The overall presentation was evaluated as positive, and the attendees verified they had improved their understanding of ED (Appendix H). The demographics at Bemidji State University reflected approximately 18% (n=2) clinicians, and 82% (n=9) other interdisciplinary team members. Various attendees indicated he or she was a “licensed social worker,” “therapist,” among many others. At Bemidji State University, 36% (n=4) identified the overall presentation was excellent, 46% (n=5) indicated as above average, 9% (n=1) identified was average, and 9% (n=1) did not complete the question. As to whether the attendees’ understanding of eating disorders had improved after the lecture an PowerPoint presentation, approximately 36% (n=4) strongly agreed, 46% (n=5) agreed, 9% strongly disagreed (n=1), and 9% (n=1) did not complete the question. Attendees identified they had acquired new skills and/or information about the care for an ED patient after attending the ED project presentation as described by 36% (n=4) who strongly agreed, and 36% (n=4) who agreed.

However, an important consideration is 9% (n=1) strongly disagreed, and 18% (n=2) did not complete the question. As to whether the attendees would be able to implement new strategies into practice as a result of the ED project presentation, approximately 72% (n=8) agreed, 9% (n=1) were neutral, and 9% (n=1) strongly disagreed. The attendees were asked whether the reference guide and algorithm were useful in practice. Twenty-seven percent (n=3) strongly agreed, 36% (n=4) agreed, 9% (n=1) were neutral, and 9% (n=1) strongly disagreed, and 18% (n=2) did not answer the question. Finally, nearly half (46%, n=5) strongly agreed, 27% (n=3) agreed, and 9% (n=1) strongly disagreed that they would recommend the ED presentation to others. Eighteen percent (n=2) did not complete the question.

Inputs	Outputs	Outcomes			
ED Team: ED BSW, RN ED Director ED Provider Committee Dietitian Psychologist	Interdisciplinary collaboration for accurate information and coordinated care	Health Care Professionals			
Research Literature Review	Developed, reviewed, and approved ED presentation customized and applicable to a variety of health care providers and settings.		Interdisciplinary education and knowledge add benefit to attendees	Attendees received resources and information from the ED team useful for practice and/or questions	Attendees have improved understanding of ED. Attendees will know whom to contact for ED questions and care.
Expenses	Presentation and presentation materials offered to attendees at no cost		Presented information on EB ED diagnosis, treatment and referral	Attendees have up to date information, resources, clinical guidelines, and applicable evidence based recommendations available for reference	Attendees indicate that new knowledge, skills and strategies for care of the ED patient Attendees have the resources to facilitate expedited communication with ED specialists
Technological Services	Coordinated IT services and polycom access at NDSU Wellness Center, Bemidji State University, and Sanford Health in Fargo		Attendees received free packets and printed information provided by presenter and donated by ED program.	Attendees informed that consultation and references are free	Attendees have unlimited access to references anytime as the resources and handouts are not copyrighted
Agencies	Universities, ED program, and independent practitioners were invited to presentation		ED experts: RN, BSW, and dietician were able to participate via technology ED RN and ED BSW via polycom services	Attendees were able to communicate and ask questions regarding ED referral and processes to ED experts	Attendees can put faces to names of ED experts after polycom presentation and have knowledge regarding who to contact for collaboration and referral
		Agencies worked together	Facilitated communication and collaboration of agencies	Agency and practitioner collaboration will ultimately benefit student identification and referral	

Figure 4. Logic Model Intermediate-Term Outcomes.

Evaluated Objectives

Objective One

The purpose of the first objective was to evaluate attendees' ability to identify, assess, and refer ED individuals. Evaluation of the first objective yielded mixed results. Question 3 on the pre-test and post-test represented a decrease in attendee knowledge as demonstrated by a 14% proficiency decrease from the pre-test to the post-test. Approximately 71% (n=10) of attendees answered this question correct on the pre-test. However, following the presentation, only 57% (n=8) of attendees answered this correctly on the post-test.

A second question was administered on the pre-test and post-test to evaluate the first objective. Question 5 on the pre-test and post-test reflected that the attendees' knowledge had increased, as a 14% improvement occurred from the pre-test to the post-test. Fifty-seven percent (n=8) answered the question correctly on the pre-test, as compared to 71% (n=10) on the post-test.

In sum, the first objective fulfilled the intermediate goals of the ED project. The attendees received up-to-date information, clinical resources, clinical guidelines for ED patient care, and evidence-based recommendations for ED care. The presentation attendees were informed about methods of patient consultation with ED experts. Attendees were also given the opportunity to ask questions regarding ED consults and the referral process to ED experts in Fargo, North Dakota. Furthermore, the polycom access enabled attendees to put faces to the Sanford Health Eating Disorder and Weight Management Center staff.

Objective Two

The second objective was intended to educate attendees about the appropriate diagnostic tests for an ED individual. Approximately 57% (n=8) answered the question pertaining to

Objective Two (Question 4) correctly on the pre-test. Comparatively, nearly 64% (n=9) of attendees were able to identify the correct answer on the post-test. This represented a 9% improvement from the pre-test to the post-test.

The intermediate goals of the logic model were met by the second objective. Attendees were given accurate, up-to-date, and evidence-based information regarding appropriated laboratory and diagnostic tests. Recommended ED laboratory and diagnostic tests were provided to attendees in the PowerPoint presentation, reference guide, and algorithm. The information was reviewed and approved by ED experts on the ED project team.

Objective Three

The third objective was geared towards determining whether clinicians and interdisciplinary team members considered the reference guide and algorithm to be useful in clinical practice. The evaluation included two questions regarding the reference guide and algorithm and its usefulness in practice. Question 4 on the presentation evaluation utilized the Likert-type scale. According to the attendees' responses, approximately 65% agreed or strongly agreed the reference guide and algorithm would be useful.

Question 10 on the evaluation was a free text question. The question asked attendees to identify the most useful part of the reference guide and/or algorithm. The attendees at both universities gave a variety of answers. A number of positive responses were identified. Multiple attendees listed the algorithm as most helpful. Other attendees indicated they appreciated the algorithm and reference guide for clinically assessing ED patients. Additional responses are found on Appendix G and H from NDSU and BSU, respectively.

The intermediate goals of the logic model were met. The attendees received ED resources given which were up-to-date and evidence-based. The algorithm and reference guide were

provided free to the attendees. Additionally, the reference guide and algorithm provided contact information if consultation and/or referral may be necessary.

Qualitative Responses

Four short answer questions were included on the post-presentation evaluation. Question 8 asked the attendees, “What questions do you still have after attending this session?” A few themes were identified in the free text responses. Attendees indicated they wanted additional information on the therapist’s assessment of an ED individual. One comment from an attendee hoped for more information on, “scope of practice, communication, how to avoid splitting, dealing with resistance, and how to ask specific enough questions.”

Question 9 on the evaluation asked, “What do you think were the most helpful or valuable aspects of the session you attended today?” The evaluation findings discovered the attendee’s profession affected the free text responses. For example, many of the clinicians indicated the “warning signs,” “complications of an ED,” and “ways to specifically assess an ED individual were most helpful.” However, some of the licensed counselors felt the techniques to improve collaboration between clinicians and psychologist were most helpful.

Question 10 requested information about the algorithm, “What do you think will be most useful to you on the reference guide and/or algorithm?” Many attendees indicated the algorithm would be the most useful information given to him or her. As one attendee remarked, “The decision tree method will be helpful as a guide”. In addition, many attendees indicated the laboratory values available in the reference guide will be helpful in assessing the stability of an ED patient.

Finally, question 11 queried, “How could the session be improved to be more beneficial to you?” The responses were very different from one another as few common answers were

found. Two comments from attendees at North Dakota State University conveyed a desire for a longer ED presentation, and additional time to ask questions. Other suggestions listed by attendees involved discussing the treatment of ED patients and ways primary care providers can collaborate with ED specialists while patient is in treatment.

The presentation received an overall positive response from the attendees. Attendees' scores largely improved between the pre-test to the post-test. The Likert-type scale responses on the evaluation were also useful in identifying that a majority of attendees agreed or strongly agreed that they had learned something new about eating disorders and found information applicable to their respective practices. The feedback on the short-answer questions allowed the ED project to improve the presentation between agencies and implement changes for the future. In Chapter 6, a discussion of findings are explored in greater detail.

CHAPTER SIX. DISCUSSION AND CONCLUSIONS

As has been previously discussed, the ED project presentation was given to groups at North Dakota State University and Bemidji State University. The attendees at North Dakota State University were primarily clinicians and nurses, whereas the audience at Bemidji State University had various backgrounds in social work, therapy, clinical practice, and dietetics, among others. Due to time constraints for the attendees at North Dakota State University, this presentation was only 30 minutes, whereas the Bemidji State University staff requested a half-day presentation. The availability of more ample time allowed for a more in-depth presentation at Bemidji State University. However, the disparity in presentation time, various professional backgrounds, and content depth made comparing the results of the two presentations difficult.

Interpretation of Results

All three objectives were achieved, but to varying degrees. In objective one, a significant increase in correct answers from the pre-test to the post-test for Question 5 was realized, indicating the first objective was met. The second objective was also met because more attendees were able to correctly identify appropriate laboratory and diagnostic tests following the presentation. Finally, in the evaluation of objective three, attendees' responses regarding the algorithm and reference guide were positive, and reflected that these resources were well-received. Attendees' responses on the post-presentation evaluation demonstrated the algorithm and reference guide has utility in clinical practice. The ED team suspects one of the reasons for the decreased proficiency or minimal improvement in some of the pre-test to post-test results was as a result of the various professional backgrounds. The pre-test and post-test was written for clinicians. Therefore, the test was not tailored to the variety of interdisciplinary team members.

Nearly every attendee reported his or her knowledge of eating disorders had improved after attending the ED project presentation and lecture. This was confirmed by the fact that greater than 90% of attendees (90.91%, n=18) indicated they had an increased understanding of ED. As described in detail in the previous chapter, scores on the pre-test to the post-test had increased significantly. The average score on the pre-test was 52.37%, compared to the post-test average score of 76.19%. Moreover, three of the post-tests scores were 100%. In addition to the content-related questions, the attendees demonstrated a high level of acceptance for the ED project presentation through the free text responses on the evaluation. Many of the written responses revealed the presentation was “very good,” “helpful,” or “informative”. Overall, the post-test and evaluation responses were positive and demonstrated that attendees showed they had increased their knowledge of eating disorders and related issues.

Limitations

The overall attendance was a relatively small sample size. Twenty-two people attended the presentations at North Dakota State University and Bemidji State University. These attendees were from various professional and institutional backgrounds, and included clinicians, nurses, university education staff, psychologists, dietitians, and others, which were not specified. The various backgrounds of the attendees appeared to play a role in the overall pre-tests, post-tests, and evaluation, as the presentation was directed at primary care providers and healthcare staff. The nonmedical attendees did not appear to find the overall presentation as useful as the medical professionals. In addition to reconstructing the pre-test and post-test questions to be applicable to interdisciplinary professionals, question 3 and 6 could have been improved. One could argue multiple correct answers for question 3, making this a difficult question to complete. Also, the correct answer for question 6 was taken from only one study and therefore affected results.

Finally, the pre-test and post-test questions were averaged from both university presentations. This made it impossible to determine which presentation attendees had the greatest improvement.

In the weeks following the presentation, the ED project team wanted to contact each attendee to assess whether the presentation had been useful in clinical practice. Due to the limited sample size, data collection was problematic. As a result, contact information was not gathered on each attendee, including email, phone number, or professional affiliation. The limited contact information made conducting a follow-up phone calls and e-mails difficult. A group e-mail was sent to the staff at North Dakota State University and attendees Bemidji State University following the presentation, but a more detailed evaluation could have been obtained if complete contact information was gathered.

Increased sample size would have provided greater richness of results. A total of 14 pre-tests and post-post tests were collected, and 20 evaluations were completed, by attendees at both universities. Overall, 22 pre-tests and post-tests were obtained; however, 8 had to be thrown out as they were not labeled as “pre-test” or “post-test.” Therefore, the mislabeled pre-tests and post-tests could not be used for data analysis. Among the 20 evaluations gathered, several were incomplete and questions were left unanswered.

The rural clinic which contacted the EDWMC for information regarding eating disorders would have been a useful implementation site. Aforementioned, the presentation was written for primary care providers and dissemination in such locations would have been beneficial. Educating PCPs to identify signs and symptoms, administer screening tools, implement recommended diagnostic and laboratory tests, and begin the referral for eating disorder individuals would have been of great value.

Inputs	Outputs		Outcomes		
ED Team: ED BSW ED RN ED Director ED Provider Committee Dietitian Psychologist	Interdisciplinary collaboration for accurate information and coordinated care	Health Care Professionals	Interdisciplinary education and knowledge add benefit to attendees	Attendees received resources and information from the ED team useful for practice and/or questions	Attendees have improved understanding of ED. Attendees will know whom to contact for ED questions and care
Research Literature Review	Developed, reviewed, and approved ED presentation customized and applicable to a variety of health care providers and settings.		Presented information on EB ED diagnosis, treatment and referral	Attendees have up to date information, resources, clinical guidelines, and applicable evidence based recommendations available for reference	Attendees indicate that new knowledge, skills and strategies for care of the ED patient Attendees have the resources to facilitate expedited communication with ED specialists
Expenses	Presentation and presentation materials offered to attendees at no cost		Attendees received free packets and printed information provided by presenter and donated by ED program.	Attendees informed that consultation and references are free	Attendees have unlimited access to references anytime as the resources and handouts are not copyrighted
Technological Services	Coordinated IT services and polycom access at NDSU Wellness Center, Bemidji State University, and Sanford Health in Fargo		ED experts: RN, BSW, and dietician were able to participate via technology ED RN and ED BSW via polycom services	Attendees were able to communicate and ask questions regarding ED referral and processes to ED experts	Attendees can put faces to names of ED experts after polycom presentation and have knowledge regarding who to contact for collaboration and referral
Agencies	Universities, ED program, and independent practitioners were invited to presentation		Agencies worked together	Facilitated communication and collaboration of agencies	Agency and practitioner collaboration will ultimately benefit student identification and referral

Figure 5. Logic Model Long-Term Outcomes

Recommendations

Data collected from the ED project was disseminated to the Sanford Health Eating Disorders and Weight Management Center staff members. The author discussed findings and evaluation recommendations from the completed project. The author attended weekly meetings with the EDWMC staff in Fargo, North Dakota to update staff on progress and findings over the

course of 12 weeks. One of the recommendations following the ED project was to distribute and enable access to the ED PowerPoint presentation for all Sanford Health clinicians and staff from outreach facilities. The author of the ED project presentation created a voice over PowerPoint to make accessible ED care information available at any time and to their convenience.

Encouraging healthcare professionals to call or consult on an ED patient will improve patient outcomes and timely access to appropriate ED care. Providing clinicians and interdisciplinary team members with contact information for the Eating Disorders and Weight Management Center will allow open lines of communication regarding patient care, consultations, and referrals.

Overall, the ED project presentation was recognized to be a useful tool for clinicians and interdisciplinary team members, as nearly every attendee found the presentation to be above-average or excellent in terms of overall quality. Results also identified the presentation was useful for improved care of ED individuals. The attendees' evaluation responses also suggested the algorithm and reference guide might be a helpful tool in practice.

Future Recommendations for Practice Improvement

Disseminating ED information to primary care providers on a much larger scale would improve practice and the overall care for individuals suffering from an eating disorder. In order to educate as many primary care providers as possible, the ED project presentation materials should be distributed to multiple venues. A good first step would be to deliver the presentation to members of the North Dakota Nurse Practitioner Association. This group is comprised of nurse practitioners, nurses, and graduate nurse practitioner students in the state of North Dakota. Although, a drawback to such a presentation is few or no evaluations would be obtained from physicians. In order to eliminate this gap, the ED project presentation could be delivered to the

North Dakota Academy of Family Physicians. The North Dakota Academy of Family Physicians represents hundreds of physicians and medical students in the state of North Dakota. The usefulness of selecting the North Dakota Nurse Practitioner Association and the North Dakota Academy of Family Physicians would be in targeting audiences, which may care for an individuals with an eating disorder, as well as, potentially refer individuals to the Eating Disorders and Weight Management Center at Sanford Health in Fargo, North Dakota.

Dissemination Strategies

In attempting to reach multiple providers caring for ED individuals, the ED project could implement multiple dissemination methods on a much broader scale. A video presentation could be created to be accessed remotely and at any time. A number of small group sessions could be offered, similar to that at Bemidji State University, where attendees receive information, ask questions, and partake in group discussions. A lecture could be added to the curriculum for nurse practitioners, physician's assistants, and medical students. The ED project presentation could also be implemented at various conferences. Creating these venues for dissemination would improve the ED project and its impact on overall care for ED individuals. Information would be disseminated at a local, regional, state, and nationwide level as the greatest way to potentially influence and improve ED recognition, screening, and referrals to ED specialists. The ED project information could be offered to the Eating Disorders and Weight Management Center in Fargo, North Dakota for another provider or staff member to use and publish.

Caring for an individual suffering from an eating disorder extends beyond primary care providers. In addition to educating primary care providers, the ED project information may be valuable to professionals in other interdisciplinary fields. Eating disorders individuals may cross paths with athletic trainers, college coaches, counselors, school nurses, and orthopedic

associates, among others. Availability of ED information and increased awareness of eating disorders in general, could benefit other professionals in identifying and recognizing symptoms consistent with an eating disorder.

On April 5, 2016, a showcase of the Doctor of Nursing Practice projects will be given at North Dakota State University to demonstrate the progression of the graduate students' progress, outcomes, and recommendations. The showcase includes a limited explanation of the problem and/or situation, the project objectives, theoretical framework, project design, project findings, and interpretations. The event will be open to any individual interested in attending, and will also allow presenter and project questions.

Along with presenting the information at the poster presentation sessions, the ED project will disseminate its findings and results to the Eating Disorders and Weight Management Center staff and core team members. These professionals will be given a hard copy of the ED project PowerPoint presentation, reference guide, and algorithm. A voiceover recorded PowerPoint was also disseminated to the Center for its future use.

Implications for Advanced Nursing Practice

Nurse practitioners will be the future of primary care. "NPs make up the most rapidly growing component of the primary care workforce" according to the American Academy of Nurse Practitioners (Nurse Practitioners in Primary Care, 2016). Primary care nurse practitioners arguably have the greatest access to young, adolescent females and males. Therefore, they play a crucial role in ED sign and symptom identification. Nurse practitioners continue to fill the shortage in primary care left by the migration of physicians to specialty care (Nurse Practitioners in Primary Care, 2016). Eating disorders will continue to be known as the "great pretender" disorder of the decade. Physical symptoms cause the differential diagnosis to be complicated and

include multiple disease processes. The SCOFF screening tool has 100% sensitivity and specificity to anorexia nervosa and bulimia nervosa, playing a pivotal role in suspected individuals (Morgan, et al., 1999). Early detection and early comprehensive ED treatment demonstrates the greatest success for remission without relapse. Comprehensive, multidisciplinary ED treatment programs have been shown to improve morbidity and mortality (Mehler & Anderson, 2010).

Collaboration with ED specialists is of great importance, as the primary care nurse practitioner may resume care for all other conditions and/or acute episodic base care. Open lines of communication with ED specialists will improve overall health of ED individuals. Therefore, collaboration is crucial. Primary care and interdisciplinary team member efforts to screen, identify, and refer all individuals suspected of having an eating disorder will significantly improve treatment outcomes.

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APPENDIX A. NDSU IRB AMENDMENT REQUEST



January 15, 2015

Dr. Tina Lundeen
Nursing
222K Sudro Hall

Re: IRB Certification of Exempt Human Subjects Research:
Protocol #PH15138 , "Eating Disorder Screening, Evaluation, and Referral in the Primary Care Setting"

Co-investigator(s) and research team: Nicholee Lange

Certification Date: 1/15/15 Expiration Date: 1/14/18
Study site(s): Sanford Health Clinic Wheaton, MN and Bemidji, MN
Sponsor: n/a

The above referenced human subjects research project has been certified as exempt (category # 1, 2) in accordance with federal regulations (Code of Federal Regulations, Title 45, Part 46, Protection of Human Subjects). This determination is based on the original protocol materials (received 1/13/15).

Please also note the following:

- If you wish to continue the research after the expiration, submit a request for recertification several weeks prior to the expiration.
- The study must be conducted as described in the approved protocol. Changes to this protocol must be approved prior to initiating, unless the changes are necessary to eliminate an immediate hazard to subjects.
- Notify the IRB promptly of any adverse events, complaints, or unanticipated problems involving risks to subjects or others related to this project.
- Report any significant new findings that may affect the risks and benefits to the participants and the IRB.

Research records may be subject to a random or directed audit at any time to verify compliance with IRB standard operating procedures.

Thank you for your cooperation with NDSU IRB procedures. Best wishes for a successful study.

Sincerely,

Kristy Shirley

Digitally signed by Kristy Shirley
DN: cn=Kristy Shirley, ou=NDSU, ou=SPA,
email=kristy.shirley@ndsu.edu, c=US
Date: 2015.01.15 14:19:36 -0600

Kristy Shirley, CIP, Research Compliance Administrator

For more information regarding IRB Office submissions and guidelines, please consult www.ndsu.edu/irb. This Institution has an approved FederalWide Assurance with the Department of Health and Human Services: FWA00002439.

INSTITUTIONAL REVIEW BOARD

NDSU Dept 4000 | PO Box 6050 | Fargo ND 58108-6050 | 701.231.8995 | Fax 701.231.8098 | ndsu.edu/irb

Shipping address: Research 1, 1735 NDSU Research Park Drive, Fargo ND 58102

NDSU is an EO/AA university.

APPENDIX B. EATING DISORDER POWERPOINT PRESENTATION

Outpatient Care of Eating Disorders

Nicholee Lange

Eating Disorder Truths

1. You can't tell by looking at someone whether they have an eating disorder
2. Families are not to blame
3. Families can be the patients' best allies in treatment
4. ED are not choices, but serious biological illnesses
5. ED affect all people
6. ED carry increased risk for suicide and medical complications
7. Genes play a role, but environment enhances situation
8. Full recovery is possible

Statistics

- Approximately 24 million Americans have an ED
 - AN is 3rd most common chronic illness in teens
- Lifetime Prevalence: 0.5-4.2%
- Mortality
 - 4% of AN
 - 3.9% of BN
 - 5.2% EDNOS
- AN has a 12x higher death rate in females 15-24 yo than any other cause

(ANAD, 2014)

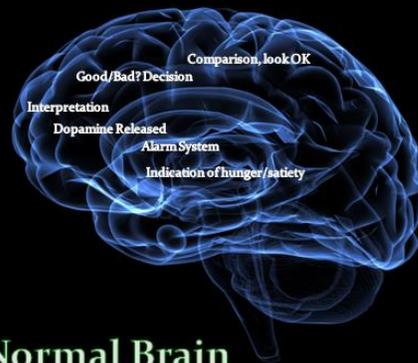
Statistics Cont.

- Among gay men, 14% suffer from BN and over 20% have AN
- About 72% of alcoholic women <30 yo have an ED
- Approximately 20% of ED will die without treatment, with treatment it is reduced to 2-3%
- With treatment, up to 60-70% will recover

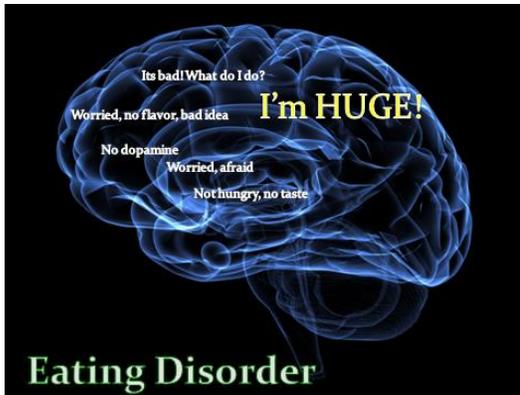
(ANRED, 2014)

Eating Disorders

- Psychological component
- Social component
- Biological component



Normal Brain



Eating Disorder

Risk Factors	
Gender	F>M by 2-3:1 ratio
Age	Teens and early 20s, peaks at years 13-14 and 17-18; Can happen at any age Girls starting to worry about weight by ages 9-10 yo, 60-70% trying to reduce weight
Location	Westernized societies; upper socioeconomic class and valuing slimness
Personality	AN: Sensitive, perfectionistic, self-critical BN: Impulsive, emotional intensity, mood labile Binge-eating: novelty seeking, harm avoidance, low self-directedness
Family History	50-70% heritable
Interest Groups	Dancers, body builders, models, wrestlers, athletes, actors
Sexual Orientation	Increased in gay males and heterosexual females
Psychiatry	Depression, anxiety, ADHD, PTSD, OCD

Mehler & Olson, 2010

Eating Disorders

- Known as a "Great Pretender" along with HIV/AIDS, TB, and syphilis in past decades, presenting to PCP in disguised forms
- Common Presentations to PCP offices:
 - Loss of periods, weight loss, and symptoms of vomiting
 - Weight loss, dieting concerns, amenorrhea
 - Complaints compatible with organs
 - Failure to grow according to age
 - Positive survey responses
 - High risk: sport (female triad) and/or sexual orientation (Mehler & Anderson, 2010)

Female Athlete Triad

- Need two of the following for increased risk
 - Disordered eating
 - Amenorrhea (eumenorrhea)
 - Osteoporosis

STRESS FRACTURES

- Affects GnRH, LH, FSH, and leptin

Eating Disorder Behaviors

- Self-Induced Vomiting- 90%
- Laxative Abuse- 60%
- Starvation/Fasting- 50%
- Diet Pills- 50%
- Diuretic Abuse- 15%
- Ipecac Syrup- 8%
- Other Purging Behaviors
 - Insulin Abuse
 - Prolonged Lactation
 - Enemas
 - Chewing and Spitting-20%
 - Rumination-30%
 - Sweating-5%
- Water Loading- 30%

Physical and Physiological Changes associated with Eating Disorders

Dermatologic

- Wasting
- Lanugo
- Dry skin
- Russell's sign
- Acrodermatitis
- Hypercarotenemia
- Acrocyanosis

Russell's Sign



Acrodermatitis

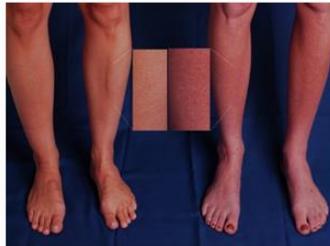


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Hypercarotenemia



Acrocyanosis



Wasting and Lanugo



Neurological Effects

- Pseudoatrophy
- Reduced seizure threshold
- Cerebral hypoperfusion

Cardiovascular Effects

- Structural alterations
 - Decreased mass
 - Mitral valve prolapsed
- Rhythm Changes
 - **Prolonged QTc**
 - Arrhythmias
- Bradycardia
- Hypotension
- Myopathy
- Sudden Cardiac Death

Neuroendocrine

- Cortisol levels increase
- Severe hypothyroidism
- Ovarian dysfunction
 - 6 months after amenorrhea, osteopenia begins
 - Growth Retardation- may not reverse

Gastrointestinal

- Dental Erosion
- Sialadenosis
- Esophageal Rupture
- Delayed Gastric Emptying
- Gastric Rupture
- G.I. Bleed
- Constipation/Diarrhea

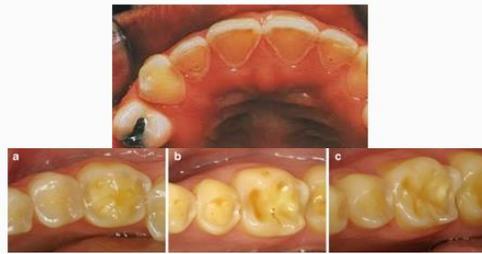
Petechial Hemorrhage



Sialadenosis



Dental Erosions



Eating Disorder Clues Cont.

- Dental Complications
 - Erosions, seen on upper teeth
 - Increase in cavities
 - Temperature sensitivities
- Don't brush after purging
 - Toothpaste is acidic
 - Use baking soda or swish and spit water

Renal

- Impaired concentration
- Reduced GFR
- Nephropathy

Electrolytes

- Dehydration
 - Weakness, fatigue
- Hypokalemia
 - Weakness, reduced gut motility, cardiac arrhythmias
- Hypophosphatemia
 - Muscle weakness, fatigue, CHF, respiratory failure
- Hypomagnesemia
 - Muscle cramps, weakness, unfocused vision, impaired short term memory, heart arrhythmias
- Hypoglycemia
 - Seizure, stupor, coma

Refeeding Edema

- From protein malnutrition
 - Lack of albumin
 - Don't give Lasix d/t the disordered kidney problems
 - Use ted hose, elevation, and high protein diet



Heme

- Decreased WBC
- Neutropenia
- Lymphocytes (increased or decreased)
- Decreased platelets
- Cytokines (increased when cortisol up, then decreased with refeeding)
- Pancytopenia- all cells fall
 - Usually patients die from illness=too chronic

Permanent Changes

- Dental enamel erosion
- Growth retardation
- Bone demineralization
- CNS changes?

Possible Physical Examination Findings

General Appearance:
Emaciated, sunken cheeks, sallow skin, flat affect; may be normal weight or overweight

Vital Signs:
Bradycardia, hypotensive, hypothermic, orthostasis

Skin:
Dry skin, lanugo, dull or brittle hair, nail changes, hypercarotenemic, subconjunctival hemorrhage

HEENT:
Sunken eyes, dry lips, gingivitis, loss of tooth enamel on lingual and occlusal surfaces, dental caries, parotitis

Breast:
Atrophy

Cardiac:
Mitral valve prolapse, click or murmur, arrhythmias

Abdomen:
Scaphoid palpable loops of stool, tender epigastrium

Extremities:
Edema, calluses on dorsum side of hand (Russell's Sign), acrocyanosis, Raynaud's phenomenon

Neuromuscular:
Trousseau's sign (hypocalcemia), diminished DTRs

Screening Tools

Screening for Eating Disorders

SCOFF Questionnaire

1. Do you make yourself Sick because you feel uncomfortably full?
2. Do you worry you have lost Control over how much you eat?
3. Have you recently lost Over 14 lbs in a three-month period?
4. Do you believe yourself to be Fat when others say you are too thin?
5. Would you say that Food dominates your life?

Each "yes" equals 1 point, a score of 2 indicates a likelihood of anorexia nervosa or bulimia.

"All participants found the questions and the term "SCOFF" acceptable. Setting the threshold at two or more yes answers to all five questions provided 100% sensitivity for anorexia and bulimia" (Morgan, 2000).

Screening Continued...

- CHEDS
 - Used by Sanford at the initial intake
 - 35 questions regarding body weight, eating, thoughts, and behaviors
 - 7 questions which identify compensatory behaviors within last 7 days.

Screening Continued...

EDDS Questionnaire

- EDDS (Eating Disorder Diagnostic Scale)
- 22 questions
 - Questions asking specific levels on a scale of 0-6
 - Yes/No questions
 - Episode based questions of numerical value (e.g. How many times per week have you induced vomiting? 0-14, etc)

Used in the identification of AN, BN, and Binge-eating disorder

Screening Continued...

EAT

- EAT-26 (Eating Attitude Test) is a widely accepted tool used largely to identify eating disorder risk factors and need for consultation.
- Includes 26 questions on body mass index, behaviors, and attitudes associated with eating.
- This tool does not yield a diagnosis

Diagnostic Criteria for Anorexia Nervosa

DSM 5:

- <85% of expected weight
- Intense fear of gaining weight or becoming fat
- Disturbed perception of body weight or shape
- Amenorrhea

(Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Washington, DC, American Psychiatric Association, 1994).

Bulimia Nervosa

DSM 5:

- Eating larger than most would eat during similar period of time
- A sense of lack of control over eating
- Binging and compensation occurs at least twice a week for 3 months
 - Purging Type*: person compensates food intake through vomiting or laxatives
 - Non-Purging Type*: person has used other inappropriate compensatory behaviors, such as fasting or excessive exercise

Binge-Eating

DSM 5:

- Binge eating episodes are associated with three or more of the following:
 - Eating until feeling of uncomfortably full
 - Eating large amounts of food when not physically hungry
 - Eating much more rapidly than normal
 - Eating alone because you are embarrassed by amount of food eaten
 - Feeling disgusted, depressed, or guilty after overeating
- Binge eating occurs, on average, at least 2 days a week for six months
- The binge eating is not associated with regular use of inappropriate compensatory behavior

(Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition. Washington, DC, American Psychiatric Association, 1994).

EDNOS- Previously used

- Does not meet the criteria for AN, BN, Binge eating
 - Individuals may experience a combination of symptoms
- Individual may restrict, binge, and/or use compensatory behaviors
 - Compensatory behaviors may occur after eating small amounts of food
- May repeatedly chewing and spitting out food, without swallowing

Avoidant/Restrictive Food Intake Disorder (ARFID)

DSM 5:

- Symptoms do not match the criteria for traditional eating disorder diagnoses
- Experience clinically significant struggles with eating and food

Other Specified Feeding or Eating Disorder (OSFED)

DSM 5:

- The presentation does not meet the specifics of another disorder

Unspecified Feeding or Eating Disorder (UFED)

DSM 5:

- Do not meet the full criteria of any of the Feeding or Eating Disorder criteria
- May be used if insufficient information to make a more specific diagnosis (ER)

Co-morbid Conditions

Study:

- 105 eating disorder in-patients in order to examine rates of comorbid psychiatric disorders and the chronological sequence in which these disorders developed.
- Eighty-six patients, 81.9% had Axis I diagnoses in addition to their eating disorder
 - Depression
 - Anxiety
 - Substance dependence

Psychol Med. 1994 Nov;24(4):859-67

Another Study in BMC Psychiatry: Nov 2013;13:295

Lifetime comorbid diagnosis (DSM-IV)			
Axis I (clinical syndromes)	%	Axis II (personality disorder)	%
Affective Disorder	50.5	Cluster A (odd)	9.9
Major Depressive Disorder	37.0	Paranoid	5.1
Dysthymia	16.7	Cluster B (dramatic)	17.2
Substance Abuse	25.5	Bordelines	13.0
Alcohol	10.9	Cluster C (anxious)	53.7
Cannabis	6.3	Self-unsure	11.4
Others	10.9	Dependent	9.4
Anxiety Disorder	52.1	Obsessive compulsive	44.3
Panic Disorder	10.4		
Social phobia	19.3		
Specific phobia	8.9	Non-specific	
OCD	13.8	Negativistic	6.3
Generalized Anxiety Disorder	14.6	Depressive	21.9

Initial Evaluation

- Determine
 - Diagnosis
 - Nutritional Status
 - Severity
 - Perform psychosocial evaluation
 - Comprehensive history and physical

Medical Complications

Complication Type	Anorexia Nervosa	Bulimia Nervosa
Cardiovascular	Arrhythmia, Bradycardia, Conduction defects (long QTc), ECG abnormalities (low voltage, T-wave inversion, ST-segment depression, Hypotension, Mitral valve prolapse, Peripheral edema, Sudden cardiac death)	Arrhythmia, diet pill toxicity (palpitations, hypertension), Emetine cardiomyopathy (pinks group), Mitral valve prolapse, Peripheral edema
Dermatologic	Carotenosis, Dry skin, Brittle nails, Lanugo, Starvation-associated pruritis	Russell's sign (calluses on dorsum of hand from purging)
Endocrine	Amenorrhea, Hypercholesterolemia, Hypercortisolemia, Hypoglycemia, Impaired temperature regulation, Infertility, Neurogenic diabetes insipidus, Osteopenia/osteoporosis, Thyroid abnormalities	Amenorrhea, Hypoglycemia, Irregular menses, Mineralocorticoid excess, Osteopenia
Gastrointestinal	Abnormal LFTs, Acute gastric dilation from refeeding, Bloating/fullness, Constipation, Delayed gastric emptying, Refeeding pancreatitis, Slowed gastrointestinal motility	Acute gastric dilation, Cathartic colon, Constipation from laxative abuse, Dental erosion, Esophageal rupture, Esophagitis, Gastroesophageal reflux, Mallory-Wais syndrome, Pancreatic gland swelling, Post-binge pancreatitis

Medical Complications Continued...

Hematologic	Anemia (normocytic, normochromic), Decreased erythrocyte sedimentation rate, Mild leukopenia with relative lymphocytosis, Thrombocytopenia	None usually associated
Metabolic	Dehydration, Electrolyte imbalance, Increased serum carotene, Refeeding syndrome	Electrolyte imbalances
Neurologic	Cognitive impairment, Pseudoatrophy (enlarged cerebral ventricles and external cerebrospinal fluid spaces), Seizures	Cognitive impairment, Cortical atrophy, ventricular enlargement, peripheral neuropathy
Pulmonary Mediastinal	Decreased pulmonary capacity	Aspiration pneumonitis, Pneumomediastinum precipitated by vomiting, Pneumothorax or rib fractures
Renal	Increased blood urea nitrogen concentration, Renal stones	Increased blood urea nitrogen concentration, Renal stones

(Williams, Goodie, & Motinge, 2008).

Initial Labs

- CBC
- CMP
- UA
- TSH
- ECG

CBC

- Leukopenia
- Anemia
- Thrombocytopenia

CMP

- **Hypoglycemia** (\downarrow poor nutrition, \uparrow insulin omission)
- **Hyponatremia** (\downarrow water loading or diuretics)
- **Hypokalemia** (\downarrow vomiting, laxatives, diuretics, refeeding)
- **Increase bicarbonate** (\uparrow vomiting, \downarrow laxatives)
- **Increased BUN** (\uparrow dehydration)
- **Increased Creatinine** (\uparrow dehydration, renal dysfunction, poor muscle mass)
- **Hypocalcemia** (\downarrow slightly, poor nutrition at bones expense)
- **Hypophosphatemia** (\downarrow poor nutrition and refeeding)
- **Hypomagnesaemia** (\downarrow poor nutrition, laxatives, and refeeding)
- **Increased protein/albumin** (\uparrow in early malnutrition, \downarrow in later malnutrition)
- **Increased Total Bilirubin** (\uparrow liver dysfunction)
- **Increased AST and ALT** (\uparrow liver dysfunction)

TSH and Pancreatic Enzymes

- TSH
 - Low to normal thyrotropin
 - Normal or slightly low T₄ (Sick euthyroid syndrome)
- Pancreatic Enzymes
 - Amylase (\uparrow vomiting, pancreatitis)
 - Lipase (\uparrow pancreatitis)

ECG

- Bradycardia
- Arrhythmias
- Low-voltage changes
- Prolonged QTc interval
- T wave inversion
- Occasional ST segment depression

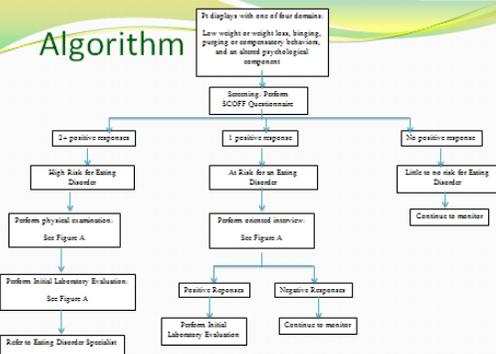
Other Potential Labs

- If Amenorrhea present
 - HcG
 - LH
 - FSH
 - Prolactin
 - Estradiol
- Labs Symptom Dependent
 - Vitamin D
 - Vitamin B12
 - folic acid
 - Niacin
 - Thiamine
 - ferritin, TIBC
 - testosterone (AN in men)

Exercising with an Eating Disorder

- Consequences:
 - Estrogen deficient (infertility, vaginal/breast atrophy, osteopenia)
 - Stress fractures
- How to:
 - Set strict parameters: day, time, location
 - Avoid numbers
 - Choose instructors carefully
 - Avoid triggering environments

Algorithm



Considerations with Referrals

- Medical Status
- Suicidality
- Weight percentage, BMI
- Motivation to recover
- Comorbid disorders
- Is structure needed for weight gain/eating?
- Compensatory behaviors
- Environment

Referrals

Characteristic	Residential Treatment	Inpatient Hospitalization
Medical Status	Stable (not requiring NG, IV or daily labs)	Adults: HR <40 bpm; BP <90/60; Glucose <40 mg/dL; K ⁺ <3; Temp. >40°C; Dehydration, hepatic, renal or cardiovascular compromise, poorly controlled diabetes
Suicidality	Depending on level of risk	Specific plans with lethality or intent
Weight, %	Generally < 8%	<8%: acute weight decline with food refusal even if not <8% of health weight
Motivation to Recover	Poor to fair: pt preoccupied with intrusive thoughts & e/hes a day; cooperation with highly structured treatment	*Very poor to poor motivation, preoccupied with intrusive thoughts, uncooperative with treatment or structured environment
Comorbid Disorder		Any existing psychiatric disorder requiring hospitalization
Structure needed for weight gain/eating	Needs supervision at all meals or will restrict	Needs supervision during and after all meals; special feeding modality (NG, IV)
Ability to control compulsive exercising	Rarely a sole indication for increasing level of care	
Purging Behavior	Can ask for and use support from others or use CBT skills to inhibit purging	Needs supervision during or after meals; unable to control daily episodes of purging
Environmental stress	Others able to provide at least limited support and structure	Severe family conflict or problems; inadequate support

Urgent Referral

- AN
 - <75% ideal body weight or ongoing weight light despite intensive mgmt
 - Refusal to eat
 - Body fat <10%
 - Heart rate <50 bpm during daytime and <45 bpm at night
 - Systolic pressure <90%
 - Orthostatic changes in pulse >20 bpm or blood pressure >10 mm Hg
 - Temperature <96.0 F
 - Arrhythmia
- BN
 - Syncope
 - Serum K⁺ <3.3 mmol/L
 - Serum Cl < 88 mmol/L
 - Esophageal tears
 - Cardiac arrhythmia and prolonged QTc
 - Hyperthermia
 - Suicide risk
 - Intractable vomiting
 - Hematemesis
 - Failure to respond to outpatient treatment

AN Fatalities

- Suicide
- Multiple organ system failure
- Arrhythmias
- Electrolyte imbalances
- Heart failure
- Renal failure

BN Fatalities

- Suicide
- Gastric rupture
- Esophageal rupture
- Fluid/electrolyte
- Renal failure
- ipecac

Medications

- FOOD is the best medicine!
- BN
 - Prozac 60-80 mg reduces purging, some evidence for citalopram
 - Topamax (SE: word retrieval problems, surpresses appetite)
- AN
 - Zyprexa, seroquel, risperdal- helpful with rigidity thinking (SE: weight gain)
 - Cyproheptadine: antihistamine (lots of SE)

Questions

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APPENDIX C. PRESENTATION ATTENDEE PRE-TEST AND POST-TEST

- 1.) True/False: Eating disorders are most commonly caused by an individual's environment and external influences.
- 2.) A simple, quick, and highly sensitive eating disorder screening tool used in primary care includes:
 - a. EDE
 - b. SCOFF
 - c. BITE
 - d. EAT
- 3.) A pertinent comprehensive assessment questions of a suspected eating disorder patient should include:
 - a. Rate and amount of weight change, nutritional status, method of weight control, compensatory behaviors, menstrual history, and growth and development history
 - b. Rate and amount of weight change, dietary intake and exercise, family history
 - c. Nutritional status, methods of weight control, rate and amount of weight change
 - d. Risk factors, family history, length and type of eating disorder, growth and development history
- 4.) Which of the following initial diagnostic tests should be ordered on every suspected eating disorder patient:
 - a. Complete blood count, basic metabolic panel, thyroid function tests
 - b. Basic metabolic count, EKG, amylase, lipase
 - c. Basic metabolic count, gonadotropins, HcG, thyroid function tests, and amylase
 - d. Complete blood count, complete metabolic panel, EKG
- 5.) If suspecting an eating disorder in a patient, the clinician should:
 - a. Continue to monitor for the next 3 months
 - b. Call an eating disorder specialist to determine next plan of action
 - c. Counsel patient on the consequences of their decision to continue his/her eating disorder
 - d. Admit the patient to the nearest hospital for monitoring and laboratory findings
- 6.) Which of the following eating disorders has the greatest probably of mortality?
 - a. Anorexia Nervosa
 - b. Bulimia Nervosa
 - c. Binge-Eating Disorder
 - d. Eating Disorder Not Otherwise Specified

APPENDIX D. PRESENTATION ATTENDEE EVALUATION

Program Evaluation: <i>Please circle the number that best describes your level of agreement</i>	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. My understanding of eating disorders has improved after today's session	1	2	3	4	5
2. I feel I have acquired new skills and/or information about the care for an eating disorder patient	1	2	3	4	5
3. As a result of my participation, I will be able to implement new strategies into my practice for eating disorder patients	1	2	3	4	5
4. I feel the reference guide and algorithm will be useful in my practice	1	2	3	4	5
5. I would recommend this session to others	1	2	3	4	5

6. How would you rate the overall quality of this session? *(please circle one number)*

Poor	Below Average	Average	Above Average	Excellent
1	2	3	4	5

7. What is your title (please check only one option)

- a. Clinician (MD, DO, NP, PA)
- b. Nurse
- c. Nurse's assistant
- d. Other (please specify) _____

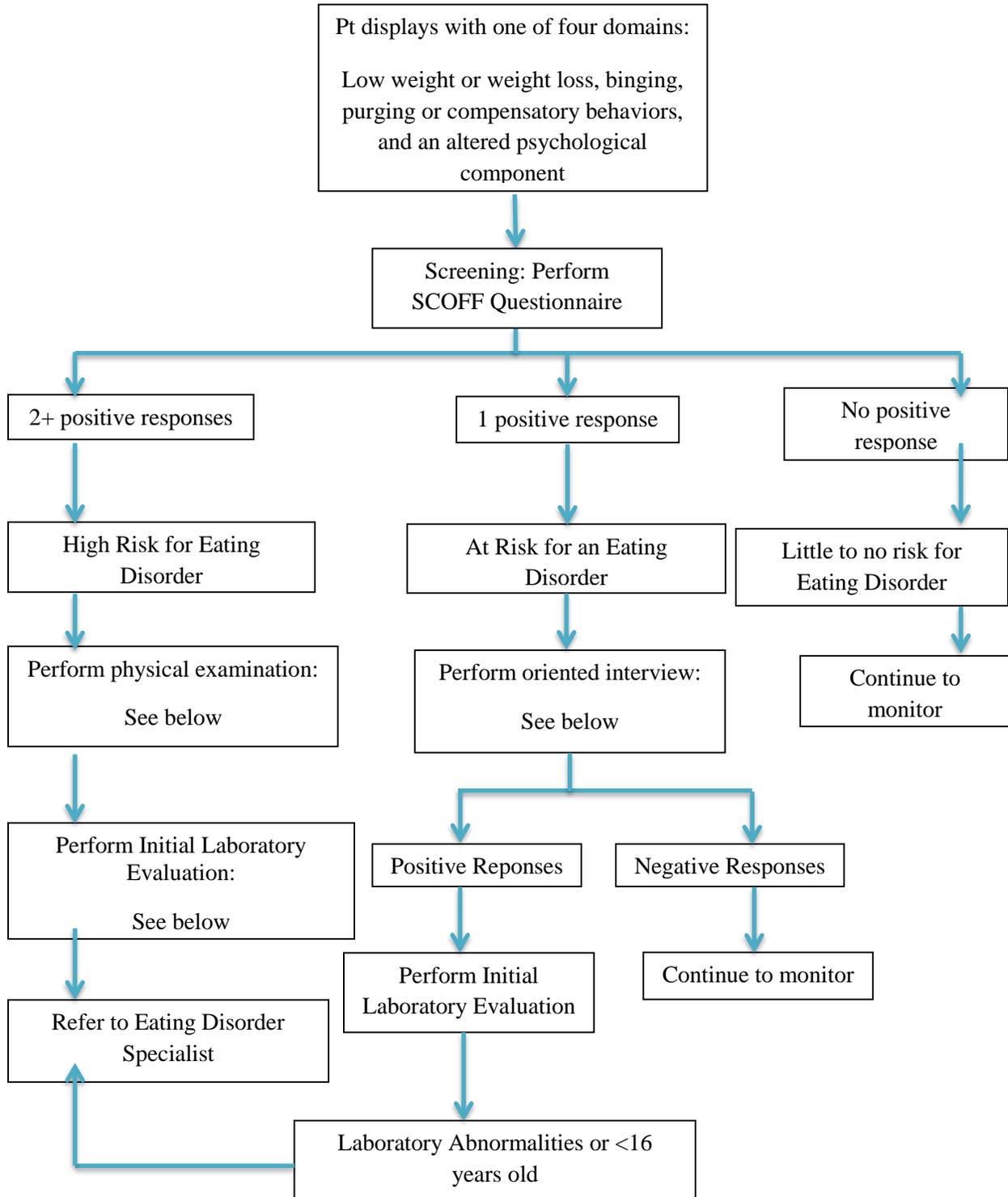
8. What questions do you still have after attending this session? Please list any topics related to the care of eating disorder patients that you would like to receive additional information about or items that need further clarification. Your suggestions will be used to structure future sessions.

9. What do you think were the most helpful or valuable aspects of the session you attended today?

10. What do you think will be most useful to you on the reference guide and/or algorithm?

11. How could the session be improved to be more beneficial to you?

APPENDIX E. EATING DISORDER ALGORITHM RESOURCE



Comprehensive Assessment and Interview	<p>Assess:</p> <ul style="list-style-type: none"> • Rate and amount of weight loss/change • Nutritional status • Methods of weight control 	<p>Review:</p> <ul style="list-style-type: none"> • Compensatory behaviors (vomiting, dieting, exercising, insulin misuse, diet pills, OTC supplements, laxatives, ipecac, diuretics). How much is he/she using and how often? • Dietary intake and exercise • Menstrual History in Females (hormone replacement therapy, i.e. OCP) • Comprehensive growth and development history, temperament, and personality traits <p>*A positive response would be an abnormal finding given developmental stage, age of patient, and height, weight, BMI</p>
Physical Examination	<p>Vital Signs:</p> <ul style="list-style-type: none"> • Supine and standing heart rate and blood pressure • Respiratory rate • Temperature (look for hypothermia <96°F or 35.6 °C) • Height, weight, and BMI (note changes from previous measurements) 	<p>Examination:</p> <ul style="list-style-type: none"> • Oral and Dental • Cardiorespiratory • Gastrointestinal • Musculoskeletal • Neuropsychiatric • Dermatologic
Initial Laboratory Tests	CBC	Leukopenia, anemia, or thrombocytopenia
	CMP	<ul style="list-style-type: none"> • Glucose: decrease or increased • Sodium: water loading/laxative use • Potassium: Decreased in vomiting, laxatives, diuretics, refeeding • Chloride: decrease in vomiting and increased in laxatives • Creatinine: Increased in dehydration, renal dysfunction, poor muscle mass; may be normal • Calcium: slightly decreased in poor nutrition • Phosphate: decreased due to poor nutrition or refeeding • Magnesium: decrease due to poor nutrition, laxatives, refeeding • Total protein/albumin: increase in early malnutrition at the expense of muscle mass; decreased in later malnutrition • AST/ALT: increased in liver dysfunction
	Thyroid Function Tests	Low to normal thyrotropin, normal or slightly low thyroxine (T4) (Sick euthyroid syndrome)
	EKG	Bradycardia or other arrhythmias, low voltage changes, prolonged QTC interval, T-wave inversions, and occasional ST segment depression
	Other	<ul style="list-style-type: none"> • Amylase: increased in vomiting and pancreatitis • Lipase: increased in pancreatitis • Gonadotropins: low LH and FSH, Low estradiol in women, low testosterone in males • HCG

Diagnostic Criteria

Anorexia Nervosa: DSM-5:

- Persistent restriction of energy intake leading to significantly low body weight (in context of what is minimally expected for age, sex, developmental trajectory, and physical health).
- Either an intense fear of gaining weight or of becoming fat, or persistent behaviour that interferes with weight gain (even though significantly low weight).
- Disturbance in the way one's body weight or shape is experienced, undue influence of body shape and weight on self-evaluation, or persistent lack of recognition of the seriousness of the current low body weight.

Bulimia Nervosa: DSM-5:

- Recurrent episodes of binge eating. An episode of binge eating is characterised by both of the following:
 - Eating, in a discrete period of time (e.g. within any 2-hour period), an amount of food that is definitely larger than most people would eat during a similar period of time and under similar circumstances.
 - A sense of lack of control over eating during the episode (e.g. a feeling that one cannot stop eating or control what or how much one is eating).
- Recurrent inappropriate compensatory behaviour in order to prevent weight gain, such as self-induced vomiting, misuse of laxatives, diuretics, or other medications, fasting, or excessive exercise.
- The binge eating and inappropriate compensatory behaviours both occur, on average, at least once a week for three months.
- Self-evaluation is unduly influenced by body shape and weight.
- The disturbance does not occur exclusively during episodes of Anorexia Nervosa.

Binge Eating Disorder: DSM-5

- Recurrent episodes of binge eating. An episode of binge eating is characterised by both of the following:
 - Eating, in a discrete period of time (e.g. within any 2-hour period), an amount of food that is definitely larger than most people would eat during a similar period of time and under similar circumstances.
 - A sense of lack of control over eating during the episode (e.g. a feeling that one cannot stop eating or control what or how much one is eating).
- The binge eating episodes are associated with three or more of the following:
 - eating much more rapidly than normal
 - eating until feeling uncomfortably full
 - eating large amounts of food when not feeling physically hungry

- eating alone because of feeling embarrassed by how much one is eating
- feeling disgusted with oneself, depressed or very guilty afterward
- Marked distress regarding binge eating is present
- Binge eating occurs, on average, at least once a week for three months
- Binge eating not associated with the recurrent use of inappropriate compensatory behaviours as in Bulimia Nervosa and does not occur exclusively during the course of Bulimia Nervosa, or Anorexia Nervosa methods to compensate for overeating, such as self-induced vomiting.

Avoidant/Restrictive Food Intake Disorder (ARFID): DSM-5

- An Eating or Feeding disturbance as manifested by persistent failure to meet appropriate nutritional and/or energy needs associated with one (or more) of the following:
 - Significant loss of weight (or failure to achieve expected weight gain or faltering growth in children).
 - Significant nutritional deficiency
 - Dependence on enteral feeding or oral nutritional supplements
 - Marked interference with psychosocial functioning
- The behavior is not better explained by lack of available food or by an associated culturally sanctioned practice.
- The behavior does not occur exclusively during the course of anorexia nervosa or bulimia nervosa, and there is no evidence of a disturbance in the way one's body weight or shape is experienced.
- The eating disturbance is not attributed to a medical condition, or better explained by another mental health disorder. When it does occur in the presence of another condition/disorder, the behavior exceeds what is usually associated, and warrants additional clinical attention.

Other Specified Feeding or Eating Disorder (OSFED): DSM-5

A diagnosis might then be allocated that specifies a specific reason why the presentation does not meet the specifics of another disorder (e.g. Bulimia Nervosa- low frequency). The following are further examples for OSFED:

- **Atypical Anorexia Nervosa:** All criteria are met, except despite significant weight loss, the individual's weight is within or above the normal range.
- **Binge Eating Disorder** (of low frequency and/or limited duration): All of the criteria for BED are met, except at a lower frequency and/or for less than three months.
- **Bulimia Nervosa** (of low frequency and/or limited duration): All of the criteria for Bulimia Nervosa are met, except that the binge eating and inappropriate compensatory behaviour occurs at a lower frequency and/or for less than three months.
- **Purging Disorder:** Recurrent purging behaviour to influence weight or shape in the absence of binge eating

- **Night Eating Syndrome:** Recurrent episodes of night eating. Eating after awakening from sleep, or by excessive food consumption after the evening meal. The behavior is not better explained by environmental influences or social norms. The behavior causes significant distress/impairment. The behavior is not better explained by another mental health disorder (e.g. BED).

Unspecified Feeding or Eating Disorder (UFED): DSM-5

- According to the DSM-5 criteria this category applies to where behaviours cause clinically significant distress/impairment of functioning, but do not meet the full criteria of any of the Feeding or Eating Disorder criteria. This category may be used by clinicians where a clinician chooses not to specify why criteria are not met, including presentations where there may be insufficient information to make a more specific diagnosis (e.g. in emergency room settings).

Laboratory Tests

- CBC with differential
- CMP
- Calcium
- Magnesium
- Phosphorus
- Liver function tests
- Urine analysis
- TSH
- EKG

Anorexia Nervosa:

HcG, testosterone (in men), vitamin D, vitamin B, ferritin, TIBC; amylase (if suspect vomiting)

Bulimia Nervosa:

Amylase, Lipase

Associated Laboratory Abnormalities	
Whole Body	Low weight and BMI, low body fat percentage
Cardiovascular	Bradycardia, AN: ST-T wave abnormalities, increased PR interval, 1 st degree heart block prolonged QTc BN: hypokalemia widened QRS, increased P-wave amplitude, increased PR interval, increased supraventricular and ventricular ectopic rhythms, torsade des pointes

Central Nervous System	CT, PET, fMRI: may show some cortical atrophy, ventricular enlargement, abnormal cerebral blood flow, decreased gray and white matter, seizures
Endocrine/Metabolic	Hypokalemia, hypomagnesaemia, hypophosphatemia, hypercholesterolemia, hypoglycemia Urinalysis: dehydration (increased spec grav, osmolality) Thyroid testing: decreased T3 with increase in reverse T3 (AN) Serum cortisol: increased in AN Vitamin assay: folate, B12, niacin, and thiamine deficiencies in AN
Gastrointestinal	LFTs: occasionally abnormal Amylase: increased in purging, increased pancreatic amylase Gastric motility testing: decreased, anorectal dysfunction Endoscopy: inflammation or Barrett's esophagus Stool Guaiac: positive d/t laxatives or purging
Genitourinary	Renal function tests: increased blood urea nitrogen, decrease GFR, decreased serum creatinine, renal failure (rare), renal calculi, hypokalemia
Hematologic	CBC anemia (normocytic, microcytic, or macrocytic), leucopenia, low erythrocyte sedimentation, thrombocytopenia Other: decreased ferritin, B12, folates
Integument	Vitamin assays: increased serum carotene, niacin deficiency
Muscular	Enzyme tests: creatine kinase in severe malnutrition
Oropharyngeal	Serum amylase: increased Dental enamel erosion
Pulmonary	PFTs: decreased pulmonary capacity
Reproductive	Serum gonadotropins: decreased estrogen, testosterone in men, LH, FSH
Skeletal	Bone scans and DEXA: may show osteopenia or osteoporosis

Table 2 : Medical Management of Acute Anorexia Nervosa Referral Reference

(Arch Dis Child Educ Pract Ed 2012;97:48-54 doi:10.1136/adc.2010.199885)

System	Test/investigation	Yellow alert	Red alert
FBC (looking for bone marrow depression)	WCC	<4.0 x 10 ⁹ /l	<2.0 x 10 ⁹ /l
	Neutrophils	<1.5 x 10 ⁹ /l	<1.0 x 10 ⁹ /l
	Hb	<11.0 g/dl	<9.0 g/dl
	Acute Hb drop		Yes
	Platelets	<130 x 10 ⁹ /l	<110 x 10 ⁹ /l
Electrolytes	Potassium	<3.5 mmol/l	<3.0 mmol/l
	Sodium	<135 mmol/l	<130 mmol/l
	Magnesium	0.5–0.7 mmol/l	<0.5 mmol/l
	Phosphate	0.5–0.8 mmol/l	<0.5 mmol/l
	Urea	>7 mmol/l	>10 mmol/l
Liver function	Bilirubin	20–40 µmol/l	>40 µmol/l
	Alk Phos [*]	110–200 U/l	>200 U/l
	AST	40–80 IU/l	>80 IU/l
	ALT	45–90 U/l	>90 U/l
	GGT	45–90 U/l	>90 U/l
	Albumin	<35 g/l	<32 g/l
	CK	>170 ng/ml	>250 ng/ml
ECG	Glucose	<3.5 mmol/l	<2.5 mmol/l
	Pulse rate	<50	<40
	QTc		>450 ms
	Arrhythmia		Present

Urgent Referrals

Anorexia Nervosa:

- <75% ideal body weight or ongoing weight loss despite intensive mgmt
- Refusal to eat
- Body fat <10%
- Heart rate <50 bpm during daytime and <45 bpm at night
- Systolic pressure <90%
- Orthostatic changes in pulse >20 bpm or blood pressure >10 mm Hg
- Temperature <96.0 F
- Arrhythmia
- Unstable electrolyte abnormalities, see above table (Medical Management of Acute Anorexia)
- Suicide risk

Bulimia Nervosa:

- Serum K⁺ <3.2 mmol/L
- Serum Cl < 88 mmol/L
- Syncope with LOC
- Esophageal tears
- Cardiac arrhythmia and prolonged QTc
- Hypothermia
- Suicide risk
- Intractable vomiting
- Hematemesis
- Failure to respond to outpatient treatment

References

- Brown, C. A., & Mehler, P. S. (2013). Medical complications of self-induced vomiting. *Eating Disorders: The Journal of Treatment and Prevention*, 21 (4), 287-294.
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APPENDIX G. NDSU EVALUATION RESULTS AND QUALITATIVE DATA

Program Evaluation: <i>Please circle the number that best describes your level of agreement</i>	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. My understanding of eating disorders has improved after today's session	1	2	3	4 (66.67%, n=6)	5 (33.33%, n=3)
2. I feel I have acquired new skills and/or information about the care for an eating disorder patient	1	2	3	4 (88.89%, n=8)	5 (11.11%, n=1)
3. As a result of my participation, I will be able to implement new strategies into my practice for eating disorder patients	1	2	3 (22.22%, n=2)	4 (66.67%, n=6)	5
4. I feel the reference guide and algorithm will be useful in my practice	1	2	3 (11.11%, n=1)	4 (55.56%, n=5)	5 (11.11%, n=1)
5. I would recommend this session to others	1	2	3	4 (55.56%, n=5)	5 (44.44%, n=4)

6. How would you rate the overall quality of this session? *(please circle one number)*

Poor	Below Average	Average	Above Average	Excellent
1	2	3	4	5
			(66.66%, n=6)	(22.22%, n=2)

7. What is your title (please check only one option)

- a. Clinician (MD, DO, NP, PA): (55.56%, n=5)
- b. Nurse : (22.22%, n=2)
- c. Nurse's assistant: (0%, n=0)
- d. Other (please specify) _____: (22.22%, n=2);
"Director, n/a"

8. What questions do you still have after attending this session? Please list any topics related to the care of eating disorder patients that you would like to receive additional information about or items that need further clarification. Your suggestions will be used to structure future sessions.

- Great job!
- If a patient has no insurance how do we get them treated?
- More ICD-10 diagnoses and discussion re diagnosis
- Nice job!

9. What do you think were the most helpful or valuable aspects of the session you attended today?

- Awareness
- The labs to obtain and importance of referrals
- Algorithm, Review of DSMV
- Screening/Algorithm
- Background info- how patients present
- The whole presentation

10. What do you think will be most useful to you on the reference guide and/or algorithm?

- Tools available for assessing
- Algorithm
- Algorithm
- Can't pinpoint anything, just the algorithm in general

11. How could the session be improved to be more beneficial to you?

- CME, more treatment overview, follow up, working as PCP team with EDI people
- Longer time to ask more questions
- More info on treatment

APPENDIX H. BSU EVALUATION RESULTS AND QUALITATIVE DATA

Program Evaluation: <i>Please circle the number that best describes your level of agreement</i>	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. My understanding of eating disorders has improved after today's session	1 (9.09%, n=1)	2	3	4 (45.45%, n=5)	5 (36.36%, n=4)
2. I feel I have acquired new skills and/or information about the care for an eating disorder patient	1 (9.09%, n=1)	2	3	4 (45.45%, n=5)	5 (36.36%, n=4)
3. As a result of my participation, I will be able to implement new strategies into my practice for eating disorder patients	1 (9.09%, n=1)	2	3 (9.09%, n=1)	4 (63.63%, n=7)	5
4. I feel the reference guide and algorithm will be useful in my practice	1 (9.09%, n=1)	2	3 (9.09%, n=1)	4 (36.36%, n=4)	5 (27.27%, n=3)
5. I would recommend this session to others	1 (9.09%, n=1)	2	3	4 (27.27%, n=3)	5 (54.54%, n=6)

6. How would you rate the overall quality of this session? (*please circle one number*)

Poor	Below Average	Average	Above Average	Excellent
1	2	3	4	5
		(9.09%, n=1)	(36.36%, n=4)	(45.45%, n=5)

7. What is your title (please check only one option)

a. Clinician (MD, DO, NP, PA): (18.18%, n=2)

b. Nurse : 0

c. Nurse's assistant: 0

d. Other (please specify) _____: (81.81%, n=9);

“Mental health, LICSW-therapist, Retention Counselor, LICSW, LP, LICSW, Administrator, health education”

8. What questions do you still have after attending this session? Please list any topics related to the care of eating disorder patients that you would like to receive additional information about or items that need further clarification. Your suggestions will be used to structure future sessions.

- More info- psych interventions
- Scope of practice, communication, how to avoid splitting, dealing with resistance, how to ask specific enough questions
- GPA and ED?

9. What do you think were the most helpful or valuable aspects of the session you attended today?

- It is all helpful!
- Thorough presentation of more of medical aspects of ED will assist with clinical psychological practice
- Learning that it can be hereditary? Always believed it was caused by family dynamics or childhood trauma!
- Roles of each team member and their collaborative approach
- Getting a closer look at medical monitoring issues. Affirmation of the need to collaborate on medical and psych/emotional issues
- Health complications that can result from an eating disorder
- Signs
- Free flowing interventions appropriate

10. What do you think will be most useful to you on the reference guide and/or algorithm?

- Very useful
- The decision tree method will be helpful as a guide
- Can't pinpoint one thing specifically, great information!
- Lab values- once collected- what extent of abnormal lab values to be concerned or watchful waiting

11. How could the session be improved to be more beneficial to you?

- Improve quality of telepresentation
- Excellent: was great to have the staff from Fargo patched in
- 1. When program offer alternative methods of treatment? Would be typical in the western U.S. 2. How to be collaborative on campus
- Take more time
- Very good presentation. Very informative. Thank you.
- It might be helpful to walk through the path of assessment and treatment though the client's eyes or family.

APPENDIX I. EXECUTIVE SUMMARY

The National Association of Anorexia Nervosa and Associated Diagnoses (2014) estimates approximately 24 million U.S. citizens of all ages and genders suffer from an eating disorder. Women have a lifetime prevalence of 0.5 to 4.2 percent likelihood of developing anorexia, bulimia, and/or binge-eating disorder in their lifetime. Approximately 20% of anorexia nervosa progress to chronic eating disorders and have a higher mortality rate for women between the ages of fifteen and twenty-four than any other cause of death in the United States. Approximated by the *American Journal of Psychiatry* (2009), 4% for anorexia nervosa individuals, 3.9% for bulimia nervosa, and 5.2% for eating disorder not otherwise specified (ANAD, 2014) die from an eating disorder, respectively. However, ED mortality statistics may be underestimated as the medical complications of an eating disorder are often times reported as cause of death.

In the primary care setting, nearly half of eating disorders go undiagnosed. Eating disorders are known as a “great pretender” because the physical signs and symptoms of an eating disorder can manifest similarly to other common disease processes. Therefore, symptoms of disordered eating are often times missed by primary care providers due to ineffective screening. Also, detecting and identifying disordered eating in the primary care setting may prevent as many as two-thirds of disordered eating individuals from developing a serious disorder (Sim, et al, 2010). Adequate screening and referrals may lead to early detection and treatment, thereby leading to a decrease in morbidity and mortality.

The SCOFF questionnaire was developed to simplify and minimize length of time for non-specialist primary care providers to screen individuals who display eating disorders characteristics. The SCOFF questionnaire has only five questions addressing specific features of

anorexia nervosa and bulimia nervosa. The screening tool can administered very quickly and easily to individuals of all ages, genders, and ethnicities. Two or more positive answers was 100% sensitive for anorexia and bulimia nervosa, separately and combined with specificity of 87.5% (Morgan, et al., 1999).

A clinical rotation at the EDWMC in Fargo, ND led to the formulation of the eating disorder project. Multiple shortcomings in referrals from primary care providers to the ED program were observed. Referrals were delayed from onset of symptoms leading to many medical complications that may have been prevented with timelier referrals. The project was developed after a systematic literature review was conducted from current research findings and evidence-based data. Research identified ED is often disguised to primary care providers in multiple somatic complaints leading to misdiagnosis by primary care providers and ultimately delayed referral to an ED specialist (Mehler & Anderson, 2010). The project design focus was to create an educational presentation for clinicians and interdisciplinary team members as a way to raise awareness of eating disorders. The presentation provided an overview of eating disorder prevalence, etiology, definitions, assessments, laboratory and diagnostic tests, and tools for screening and referrals.

The eating disorder educational presentation for primary care providers and interdisciplinary team members was evaluated through six pretest and posttest questions related to the content of the presentation. The pre-test post-test questions were completed at the time of the presentation. The tests were taken in person and were administered before and after the presentation, respectively. The attendee's answers were anonymous. In addition to the pretest and posttest questions, an evaluation was administered. The evaluation contained questions regarding attendee's education background information, his/her thoughts about the presentation,

the presenter, usefulness of resources and information provided, and any additional feedback for the presentation. The learning objectives were also more broadly evaluated through short answer responses which allowed attendees to develop and state thoughts or opinions regarding the information and/or impression of the presentation.

Attendee's knowledge of ED content evidently increased and was observed through data analysis. The average score for the pre-tests was 52.37% (n=14). Following the lecture and PowerPoint presentation, the average post-test score was approximately 76.19% (n=14). The overall improvement from the averaged pre-test to post-test score was 23.82%. Approximately 91% (90.91%, n=18) indicated they had increased understanding of ED. The attendees demonstrated a high level of acceptance for the ED presentation through the short-answer qualitative data. Many of the written responses reported the presentation was very good, helpful, or informative.

Disseminating ED information to primary care providers on a much larger scale would improve practice and the overall care for an ED individual. In order to educate as many primary care providers as possible, presentations dissemination should be distributed to multiple venues. In attempts to reach multiple providers caring for eating disordered individuals, the ED project could implement multiple dissemination methods. A video presentation would be created to be access remotely and at any time. A number of small group sessions could be offered, similar to that in Bemidji State University, where attendees receive information and are able to ask questions and partake in group discussions. The ED presentation could also be implemented at various conferences. Creating these venues for dissemination would improve the ED project and its impact on overall care for an ED individual. Information would be disseminated at a local, regional, state, and nationwide level as the greatest way to potentially impact and improve ED

recognition, screening, and each ED individual's outcome from treatment at an ED specialty program. The ED project information could be offered to the EDWMC for another provider or staff member to use and publish. Caring for an eating disorder individuals extends beyond primary care providers. In addition to educating primary care providers, the ED information may be valuable to many other healthcare interdisciplinary fields. Eating disorder individuals may cross paths with athletic trainers, college coaches, counselors, school nurses, orthopedic associates, among many others. Eating disorder information and awareness could benefit other professionals in identifying and recognizing symptoms consistent with ED characteristics.

Primary care providers and interdisciplinary team members probably have the greatest access to young, adolescent females and males; therefore, they play a crucial role in ED sign and symptom identification. Future recommendations are to facilitate a continuation of ED education, resource dissemination, an increase in the number of referrals, and efficiency of ED individual access to direct care. Providing clinicians and interdisciplinary team members ED program contact information will allow open lines of communication regarding patient care, consultations, and referrals. Encouraging health care professionals to call or consult on an ED patient will aid patient success and timely access to appropriate ED care. Furthermore, primary care and interdisciplinary team members efforts to screen, identify, and refer all individuals suspicious of an eating disorder will significantly improve treatment and decrease morbidity and mortality.