# Mindfulness-Based Stress Reduction:

# A Psychotherapeutic Intervention in Patients with Chronic Dermatological Diseases

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## Abstract

Psychological stress plays a vital role in skin disease. The worsening and reoccurrence of signs and symptoms of a wide array of skin diseases have been linked by various studies to stress. Together, stress and skin disease synergistically inhibit occupational, social, and emotional functioning resulting in diminished quality of life (Dixon, Witcraft, & Perry, 2019). Heightened levels of stress may contribute to an assortment of immediate and future adverse outcomes. These outcomes include triggering a skin outbreak, impairing function, behavioral avoidance, intense negative emotions such as shame and embarrassment, and emotional distress such as depression and anxiety (Dixon et al., 2019). The purpose of this paper is to discuss the relationship of stress, anxiety, and depression to the specific chronic skin diseases of acne vulgaris, psoriasis, vitiligo, rosacea, and atopic dermatitis. It will also discuss how a psychotherapeutic intervention called mindfulness-based stress reduction (MBSR) may decrease anxiety and depression in individuals affected by chronic skin diseases. This paper will also highlight the impact of MBSR on treatment adherence to dermatological prescription medications. A pilot program conducted in a dermatology clinic evaluates the effectiveness of an online mindfulness-based stress reduction intervention to decrease patient anxiety and depression. Results indicate clinical significance in that participants noted reduced anxiety and depression symptoms and scores, enjoyed MBSR and would continue MBSR. The potential benefits of this pilot program may include decreased patient anxiety and depression, increased patient satisfaction, increased treatment adherence, improved patient satisfaction of intervention, and improved patient outcomes.


*Keywords:* skin disease, anxiety, depression, mindfulness, stress, dermatology, MBSR

# Mindfulness-Based Stress Reduction: A Psychotherapeutic Intervention in Patients with Dermatological Diseases

The psychological effects of skin disease are often more devastating for the patient than can be objectively evaluated by a healthcare provider. Irrespective of its outward manifestations and severity, conditions of the skin can cause severe negative psychological impacts. Stress is a significant role player in all types of skin disease. Together, stress and skin disease hinder physical, occupational, social, emotional, and mental functioning, resulting in diminished quality of life (Dixon, Witcraft, & Perry, 2019; Salman et al., 2016).

## Problem

One of the most common human diseases causing global burden is skin disease. The World Health Organization's International Classification of Disease 10 classifies more than 1,000 skin or skin-related illnesses (World Health Organization, 2019). Psychological stress plays an essential role in skin disease. The worsening and reoccurrence of signs and symptoms stemming from a wide array of skin diseases have been linked by various studies to stress. Together, stress and skin disease synergistically inhibit occupational, social, emotional, and physical health and functioning resulting in diminished quality of life (Dixon, Witcraft, & Perry, 2019; Salman et al., 2016). This paper will exclusively be looking at the psychological effects of acne vulgaris, psoriasis, vitiligo, rosacea, and atopic dermatitis.

Heightened levels of stress can contribute to an assortment of immediate and future adverse outcomes. Such outcomes include the triggering of a skin outbreak, impaired function, behavioral avoidance, intense negative emotions such as shame and embarrassment, and depression and anxiety (Dixon et al., 2019). Little attention is given to skin disease in the

national and global health debate despite this information and profound impact (Hay et al., 2013). The American Academy of Dermatology Association (2020) stated that in 2013 the cost of skin disease to the United States (U.S.) health care system was $75 billion. The price of skin disease to the U.S. health care system included preventative, medical, and prescription and non-prescription drug costs.

In 2010, the World Health Organization (2011) estimated that the global cost of mental illness was nearly $2.5 trillion. They projected this amount would increase to over $6 trillion by 2030. Per the World Health Organization (2011), in 2009, the entire global health spending was $5.1 trillion, the very next year in 2010, mental illness alone cost $2.5 trillion globally. Almost half of the world's global health spending has gone towards mental illnesses. Depression alone causes a substantial economic burden. Between 2005 and 2010, the financial burden of major depressive disorders in the United States increased from $173.2 billion to $210.5 billion (World Health Organization, 2011).

In 2006, The Agency for Healthcare Research and Quality cited mental healthcare in the U.S. cost $57.5 billion, which was equivalent to the cost of cancer care. However, unlike cancer, the cost of care is not the major cause of the economic burden of mental illness, rather, it is the expenses for social support, loss of income due to unemployment, and a variety of indirect costs due to a chronic disability (National Institute of Mental Health, 2016).

Despite all of this information about the cost and effects of psychological disease, anxiety and depression are under-recognized in dermatology clinics by the healthcare team (Conner, 2017; Dalgard et al., 2014) and that this under-recognition occurs frequently (Picardi et al., 2005). Further problems that were ascertained through personal communications with various dermatologists across the Arizona valley is that dermatologists may feel uncomfortable

having to address mental health issues in their patients. Some dermatologists state it would be easier to refer their patients with anxiety or depression back to their primary care provider or a therapist than to screen patients and intervene themselves. Other dermatologists stated they feel they just don't have the time or specialized knowledge to screen for psychological disorders and then prescribe interventions.

## Purpose and Rationale

The purpose of this paper is to discuss the relationship of stress, anxiety, and depression to the specific chronic skin diseases of acne vulgaris, psoriasis, vitiligo, rosacea, and atopic dermatitis. It will also discuss how a psychotherapeutic intervention called mindfulness-based stress reduction (MBSR) may decrease anxiety and depression in individuals with chronic skin diseases. Finally, this paper will highlight the impact of MBSR on treatment adherence to dermatological prescription medications as well as evaluate post-implementation satisfaction. This implementation project using MBSR desires to decrease stress levels in patients with chronic skin diseases resulting in reduced anxiety and depression. Additionally, the use of MBSR postulates that participants will show increased adherence to their dermatological medications and find satisfaction in MBSR and the results they obtain.

## Background and Significance

### Skin Disease

Skin disease and its sequelae affect people of all races, genders, and ages around the world. Hay et al. (2013) performed a systematic literature review using the skin diseases found in the Global Burden of Disease Study 2010. In this review, Hay et al. (2013) found that in 2010 skin diseases expressed as years lost due to disability were the fourth leading cause of nonfatal burden and was the eighteenth leading cause of worldwide health burden. The

American Academy of Dermatology Association (2020) stated that in 2013, 84.5 million Americans (one in four Americans) were impacted by skin disease.

As the most visible and most considerable organ of the body, the skin has a significant effect on physical appearance. Normal healthy skin plays an essential role in the maintenance of an individual's physical, social, and mental well-being (Salman, Kurt, Topcuoglu, & Demircay, 2016). Studies have suggested that the skin is a significant influencer of self-esteem, social relationships, and the development of personality.

People with the specific chronic skin diseases of acne vulgaris, psoriasis, vitiligo, rosacea, and atopic dermatitis endure higher levels of stress and corresponding social anxiety and depression as compared to those without chronic skin disease. Dixon et al. (2019) state that 33.4–47.5% of dermatology patients experience clinically significant social anxiety, 10.6–45.8% express health anxiety concerns, and 8.7–40% meet the criteria for a generalized anxiety disorder or "pathological worry." Anxiety is well known to cause various general adverse outcomes and may even exacerbate some skin disorders. Research on skin disease has shown significant associations between higher anxiety symptoms and adverse outcomes, including lower self-esteem, stigmatization, worse quality of life, and skin symptom severity (Dixon, Witcraft, McCowan, & Brodell, 2018). Interestingly, there may be a direct correlation between anxiety and depression. Individuals with high social anxiety levels may also have high levels of depression (Gül & Çölgeçen, 2015; Salman et al., 2016).

The pathology of dermatological diseases often extends more profoundly than the skin itself, ultimately, into the very core of the individual, their mind (Connor, 2017). Depression can be a severe psychological issue and is often associated with skin disease. Dalgard et al. (2014) performed an observational cross-sectional multicenter study showing that out of 3,295

subjects with prevalent dermatological conditions the rates of depression, anxiety, and suicidal ideation were 10.1%, 17.2%, and 12.7%, respectively, as compared with 4.3%, 11.1%, and 8.3% in controls. Interestingly, there is a relationship between skin disease severity and depressiveness. Pietrzak et al. (2017) state that in psoriasis patients, higher severity of symptoms reflects depressiveness, and also, the presence of skin lesions exacerbates the course of depression. Studies state that depression interferes with medication adherence in an array of chronic diseases and, thus, negatively affecting treatment outcomes (Pietrzak et al., 2017).

A systematic review performed by Patel, Immaneni, Singam, Rastogi, and Silverberg (2019) showed that 1 in 6 patients with atopic dermatitis had clinical depression and 1 in 8 had suicidal ideation. After synthesizing eight studies on suicidal ideation, Singh, Taylor, Kornmehl, and Armstrong (2017) found that patients with psoriasis were more than twice as likely to have suicidal ideation than patients without psoriasis. Gül and Çölgeçen (2015) state that female patients with acne ages 18-19 years reported suicidal ideation two times more often than those without acne and the likelihood increased to three times more often for male patients with acne ages 18-19 years as compared to those without acne.

**MBSR**

A psychotherapeutic method called mindfulness-based stress reduction (MBSR) is beneficial for people experiencing a wide range of long-term health conditions, including skin diseases. MBSR is a technique developed in 1979 by Dr. Jon Kabat-Zinn. The core of MBSR uses guided body scans, yoga exercises, and meditation practices. Initially, MBSR was designed exclusively for stress management. However, it has evolved to encompass treatment for a variety of health-related disorders, including anxiety, depression, diabetes, hypertension, chronic pain, cancer, and skin diseases (Niazi & Niazi, 2011). MBSR has been shown in

multiple research studies to be a helpful non-pharmacological intervention in treating these various chronic illnesses. A systematic review and meta-analysis showed that MBSR demonstrates promising results in the decrease of anxiety and depression in patients with chronic diseases such as skin disease (Victorson et al., 2015).

Though gaining in popularity due to its growing success in newer research, standard medical treatment does not accept MBSR for the prevention or treatment of any illness or disease. Niazi and Niazi (2011) note that over 200 medical centers around the world offer MBSR as an alternative treatment option to patients with a variety of health-related disorders suffering from physical, psychosomatic, and psychiatric disorders. Notably, recent studies demonstrate the effectiveness of MBSR on the psychological sequelae from chronic skin disease. Montgomery, Norman, Messenger, and Thompson (2016) found higher levels of awareness achieved through MBSR to be associated with lower levels of psychological distress as well as higher levels of dermatological quality of life in patients with chronic skin disease. Montgomery et al. (2016) go on to say that these findings offer evidence that increasing mindfulness may help reduce distress, including anxiety and depression, in people living with visible chronic skin conditions. Interestingly, one study by Kabat-Zinn et al. (1998) suggested that audio-taped guided MBSR practices accelerated the rate of skin clearing in psoriatic patients when used in conjunction with their regular treatments. MBSR may have the potential to decrease anxiety and depression in dermatological patients as well as improve their specific skin condition when added to their skin treatment plan.

In-person MBSR programs led by an instructor is the most popular venue for MBSR. Attending such programs involves individuals interested in engaging in mindfulness to find a class, usually consisting of a larger group of people, and attend it at the pre-scheduled time, as

well as find transportation. These difficulties of an in-person MBSR class have led to a demand for and creation of an online MBSR class that can be performed at any time, therefore, creating greater flexibility for the patient. It is noteworthy to mention that large groups of people in a class or completing the standard eight weeks of MBSR intervention are not necessarily needed to see positive results. Victorson et al. (2015) provide in their systemic review and meta-analysis of mindfulness-based randomized controlled trial evidence for MBSR interventions with fewer than 20 individuals per group, as well as partial support for interventions that are less than the standard eight weeks in duration. Furthermore, research supports the use of electronics to deliver successful mindfulness interventions even though the use of other tools is more often employed (Victorson et al., 2015). The use of electronics could include mobile phone applications or internet-based guided practices via video or audio in which a single person may utilize the MBSR application.

**Internal Evidence**

In a dermatology clinic in the southwestern United States that provides medical, surgical, and aesthetic treatments, there is not an established intervention for patients with anxiety or depression. The clinic does not routinely screen for anxiety or depression, but they do realize the connection between psychological disease and skin disease. There is a great desire within this clinic to improve the overall health outcomes of their patients.

Using MBSR as part of the clinic's holistic treatment plan for dermatological patients may decrease patient anxiety and depression, increase patient adherence to treatment, provide better healthcare outcomes for their patients, and increase patient satisfaction. By offering MBSR, this clinic would like to improve the overall mental and physical health outcomes of their patients with skin disease and see increases in patient treatment adherence.

## PICOT

This inquiry has led to the clinically relevant PICOT question, "In patients with specific dermatological diseases of acne vulgaris, psoriasis, vitiligo, rosacea, or atopic dermatitis (P), how does an online mindfulness-based stress reduction program (I), using the same group pre and post-intervention (C), affect treatment adherence, anxiety, depression, and satisfaction (O) over four weeks (T)?

## Search Strategy

An exhaustive search of the following electronic databases was conducted to answer the previously discussed PICOT question. The databases searched for the literature review included PsychINFO, Allied Health Literature (CINAHL), PubMed, and the Cochrane Library. Keywords included; *skin disease, skin, disease, chronic, dermatology, acne vulgaris, psoriasis, vitiligo, rosacea, atopic dermatitis, eczema, treatment adherence, adherence, holistic, mindfulness, mindfulness-based stress reduction, MBSR, meditation, yoga, awareness, stress reduction, stress, psychological distress, anxiety, depression, psychological,* and *suicide.* The initial search of *disease* and *MBSR* yielded 41 results in CINAHL (Appendix A, Figure A.1), 116 in The Cochrane Library (Appendix B, Figure B.1), and 80 in PubMed (Appendix D, Figure D.1), all had limits set to English language, humans, any age, publication date from 2013-2019. PsychoINFO was used to search for *skin disease* and *depression and anxiety,* yielding 88 peer-reviewed articles (Appendix C, Figure C.1). Combination words of *skin, disease, dermatology, and chronic* were used in PubMed and CINAHL, as well as various combination key words using *anxiety, depression,* and *psychological disorder* and *mindfulness-based stress reduction, MBSR, yoga, meditation, skin, disease, chronic.* A separate search of *holistic, skin, skin disease, dermatology, adherence,* and *treatment adherence* using an

exclusion criterion of articles published within the last five years (Appendix A, Figures A.2, and Appendix D, Figure D.2).

The Boolean connector "or' and "and" were utilized for the main features of the PICOT question, including population, intervention, and outcome. Unpublished works, though reviewed, were regarded as inappropriate for this review. Gray literature was reviewed with no acceptable yields, and hand searching of references was utilized yielding two studies. Included studies involved all people aged 15 years and older, specialty, and community settings in various countries. An extensive review of the literature led to a large yield of articles that was narrowed down to seventeen relevant articles and one professional opinion paper in which research evidence and information were gleaned from for use in this paper. Four of the seventeen studies acted as an auxiliary for each of the four survey tools used in the project implementation discussed in this paper. One article supports the evidence-based practice model, and one article supports the conceptual model, which are both used to guide this paper. Of the thirteen remaining research articles that correlated with this paper, ten were considered the best evidence for the examination of this PICOT question and placed in an evaluation table for the analysis of external evidence (Appendix E).

## Critical Appraisal and Synthesis

Seventeen research studies and one professional opinion paper were included in this literature review. All research studies were evaluated using Melnyk and Fineout-Overholt's rapid critical appraisal. The best ten articles were chosen to be used for synthesis and evaluation (Appendix E and Appendix F). Six of the ten studies that best answered the PICOT question were cross-sectional, creating lower levels of evidence. Of the final ten studies, there were six cross-sectional studies, of which two were Level II, and four were Level III, and four

systematic review studies were included as well (Level I) (Appendix E). Five of the research studies looked specifically at the benefits of MBSR; One was a systematic review that evaluated the effects of MBSR on various types of chronic diseases and the other four showed a relationship between MBSR and chronic skin diseases only. The other five articles discussed anxiety, depression, or stress in patients with chronic skin disease.

Most of the studies included minimal bias except for two studies in which one author had a professional correlation with the research in some aspect, and the other article had a study outcome that was not assessed blindly (Appendix E). Only two of the studies defined a conceptual framework. Having an established conceptual framework is essential to recognize because these structures help guide the researcher in multiple ways throughout the study. For instance, frameworks help to determine if the demonstration of the relevance and need for the research is satisfactory. They also aid in establishing a persuasive line of reasoning and absolute academic rigor in the development of the design and analysis. Undefined conceptual frameworks were extrapolated by observing the repetition of topics and themes within the article. Additionally, some articles provided metaphors and analogies with underlying themes that were deduced through analysis.

The majority of the ten research studies included heterogeneous research groups in that they encompassed men and women from all ages greater and equal to fifteen years. However, the rest were homogeneous because most participants were non-African American and of lighter colored skin types such as Caucasian, Turkish, or Indian. Seven of the articles were conducted outside of the United States, significantly decreasing generalizability (Appendix F). However, most of these studies either had a large sample size, a high level of evidence, or were congruent with previous similar research (Appendix E). Of the six articles that were not

systematic reviews, two of them had a consistent weakness of small sample sizes. The strengths of small studies are that they can be quick to conduct, usually do not cost as much as more extensive studies, and they can often address a research question in a relatively short amount of time. However, if an association is found, it is important to make clear in the conclusions or discussion that it was from a hypothesis-generating study, and more extensive confirmatory research is needed, which each article with this specific limitation did note.

Nevertheless, the results of these ten studies are transferable to those people with a chronic skin disease who are patients of a dermatology clinic. All studies involved participants specifically with chronic skin disease. The systematic reviews analyzed and reviewed studies that utilized participants with chronic skin disease. The majority of participants in the chosen ten studies were either under current dermatological care or had seen a dermatologist in the past regarding their current skin condition. Additionally, to evaluate the participants for a mental disorder, a questionnaire or specialist evaluation was used.

All the studies had strict inclusion and exclusion criteria, which translated into the strength of the study (Appendix E). Also, the majority of the studies found at least one significant result of $p<0.05$ regarding the variable they were studying. Additionally, nine of the articles had results that were congruent with previous research, and one article found partial congruence in their results as compared with previous research.

There were different variables used throughout multiple studies, including anxiety, depression, quality of life, MBSR, meditation, acne vulgaris, psoriasis, vitiligo, rosacea, and atopic dermatitis (Appendix F). Out of the ten chosen articles used in synthesis and evaluation, two discussed depression and skin disease, two discussed anxiety and skin disease, three discussed both depression and anxiety and skin disease, and three discussed MBSR and skin

disease. Interestingly, in the five studies looking at depression, only three used the same depression survey, HADS (Appendix E). It is often difficult to correlate results from various articles when they use different questionnaires and scales of measurement.

All the ten studies found a significant relationship between at least one of their independent variables with the dependent variable. Most of the studies used observational techniques and researcher-developed questionnaires, while a few of them used tested measurements and instrumentation (Appendix E). There were various measurement tools used (Appendix F).

Since several variables were tested amongst multiple study topics, different measurement tools were used. There is research lacking in the study of MBSR used as an intervention specifically to skin disease. A few of the articles opted to use several forms of non-validated questionnaires, making the reliability and validity of the results difficult to ascertain.

A majority of the research articles used the statistical package for social sciences (SPSS) to analyze their data (Appendix E). Interestingly, these ten studies used a variety of statistical tests to determine outcomes. For example, half of the ten studies used some version of SPSS to analyze data. The other five articles used either DisMod-MR, OpenMeta, Chi-square, Fisher's exact, Mann-Whitney and Wilcoxon, Student's t-test, Spearman Correlation, and Pearson's correlation (Appendix E). Noticeably, only one of the four systematic reviews used SPSS.

These ten studies show that chronic skin disease can cause various levels of depression and anxiety, affecting multiple aspects of one's life. Though no direct causation can be made, findings of these studies show that there is a negative correlation between MBSR and anxiety

and depression, as well as a direct relationship between chronic skin disease and both anxiety and depression. Studies have shown that stress is widespread and significant in people with chronic conditions, including skin disease. From this stress, anxiety and depression can occur.

Additionally, certain psychological disorders can decrease treatment adherence causing more negative patient outcomes. Evidence-based research suggests that MBSR could be successful in reducing anxiety and depression so often seen in patients with chronic skin disease, improving treatment adherence, decreasing stress, anxiety, and depression, and ultimately improving patient outcomes.

## Foundational Influence from Synthesis

Research synthesis has shown that MBSR is beneficial in many types of chronic diseases, including chronic skin disease. The synthesis of the research has shown that only a select few chronic skin diseases have been studied in research concerning MBSR. No research was found evaluating the effects of MBSR on acute or intermediate skin care issues or diseases. The chronic skin diseases that have been considered in analysis with MBSR are acne vulgaris, psoriasis, vitiligo, rosacea, or atopic dermatitis. Therefore, this project implementation only includes participants with one or more of these chronic skin diseases shown in research to benefit from MBSR.

Additionally, the synthesis of research has stated that the standard MBSR program is eight weeks long. Studies have shown a more significant impact on participant outcomes using extended MBSR programs. However, due to time constraints, this project was conducted over four weeks. Yet, research synthesis provided partial support for MBSR interventions that are less than the standard eight weeks in duration.

## Conclusions

Clinicians have a persistent desire to care for patients in the best way possible. This paper intends to explore the possibility of using MBSR to decrease the anxiety and depression often found in patients with a skin disease as well as increase treatment adherence. In achieving these outcomes, clinicians can aid their patients in reducing psychological distress, thereby caring more holistically for the patient.

Research establishes the positive impact of MBSR as a non-pharmacological intervention for various types of chronic diseases. Evidence suggests that a higher level of mindfulness can result in decreased anxiety and depression. It has also eluded to the possibility that MBSR can accelerate the rate of skin clearing in certain chronic skin diseases.

There are advantages to an online MBSR program. Firstly, there is little risk involved with performing MBSR. Secondly it is cost effective as it can be found for free online. Thirdly, it can be easily accessed and learned by patients, and patients can use these learned skills for all types of stress and anxiety experienced in their daily lives. Fourthly, and ultimately, MBSR may create an overall enhancement in patients' quality of life. Treating the whole patient, including assessment of their psychological status as well as providing a psychotherapeutic intervention if needed, can help patients in multiple ways. This type of holistic care and intervention can decrease patient stress, anxiety, and depression, increase medication and treatment adherence, produce more positive patient outcomes, and ultimately improve overall patient satisfaction with treatment and results.

## EBP Model and Conceptual Model

*The ACE Star Model of Knowledge Transformation* (ACE) is an evidence-based practice (EBP) model that provides a framework to help understand the relationship between various stages of knowledge transformation (Bonis, Taft, & Wendler, 2007). Each point of the

star represents a transformation of knowledge (Figure G). Moving from one point of the star to the next allows EBP to be placed into the proper aspects of this project's context.

Knowledge discovery represents new knowledge that is discovered through both qualitative and quantitative studies found through empirical research. The evidence summary shows how research is synthesized regarding a problem. Research that is summarized is combined with other sources of evidence such as clinical expertise, and this extensive evidence is translated into the specific population, which makes up the point of the star called translation into practice recommendations (Bonis et al., 2007). This paper has executed an exhaustive search of literature regarding the correlations between anxiety and depression, skin disease, and MBSR. The most relevant research with the most exceptional levels of evidence has been evaluated to be implemented in this paper and project. The ACE explains how knowledge from this exhaustive literature search is converted into a viable and practical psychotherapeutic intervention. The ACE also explains how MBSR affects the health outcomes of those with skin disease.

Integration into practice stands for the implementation of practice change through informal and formal methods. The application of MBSR is the practice change utilized in this project to decrease patient anxiety and depression. It is also applied to increase treatment adherence. Finally, the last point of the star is an evaluation, which includes evaluating the practice change on the outcomes of patients and patient satisfaction (Bonis et al., 2007). At the end of this four-week MBSR intervention, participants will be given repeat surveys along with a satisfaction survey to evaluate outcomes and participant satisfaction.

The ACE provides concepts that are important to foster investigation and reasoning regarding the psychological stress surrounding the various factors affecting or affected by skin

disease. It helps explain how research is collected, reviewed, and applied towards an intervention. This model delivers a framework for systematically putting evidence-based research into practice through the application of practice processes. It helps explain how research studying MBSR applied as an intervention for anxiety and depression in chronic skin disease patients is collected and reviewed.

The ACE explains the nature of the knowledge needed to transform current practice. Bonis et al. (2007) state that knowledge becomes increasingly more useful and useable within patient care as it is translated into the next stage. It is essential to understand all types of research, and put that research together through examination, review, and synthesis, and apply it comprehensively to patients with skin disease. This model is useful in the development of MBSR as a psychotherapeutic intervention for those with chronic skin disease because it depicts the various stages of knowledge transformation as newly discovered knowledge is moved into practice. Much of the research used to create this implementation project is relatively new and not widely studied. This model helps incorporates previous scientific evidence-based research as well as new evidence-based research.

The guiding theoretical framework for this research paper is the *Self-Efficacy Theory* (SET). Taken from social cognitive theory, SET was originated by Alberta Bandura. Self-efficacy is the belief that one has the power to complete a given activity or task related to competency (Bandura, 1977). The ability of a patient's perception of being able to reach their skin disease management goal is vital for patient adherence, the best patient health outcomes, and a decrease in anxiety and depression. The deliverance of the SET can explain the possible increase of self-esteem in patients with skin disease and a pursuant increase in self-efficacy. The SET is being used in this research as an effort to understand and drive behavior change of

psychological disorder through the rise of patient self-efficacy from engaging actively in MBSR.

The three factors that influence self-efficacy are behavior, personal and cognitive factors, and environment (Bandura, 1977) (Appendix H). Though different concepts, Bandura (1997) states that self-efficacy and self-esteem are related. As self-efficacy increases, so too does self-esteem. The thought is that MBSR, which produces positive patient outcomes of decreased psychological distress, will increase patient self-efficacy, and therefore, their treatment adherence will increase. This will ultimately improve patient outcomes and therefore increase patient psychosocial attitudes and self-worth. The SET suggests that self-efficacy develops from mastery in experiences and understanding of a regimen in which the patient is directed and given the ability to overcome obstacles (Bandura, 1977).

The SET is useful to guide practitioners in using a regimen, such as a MBSR program, to empower the patient to overcome any worries or frustrations associated with previous treatment failures and to eliminate any negative preconceived notions of skin disease and its management. Having these patients learn MBSR will theoretically provide them the ability to utilize stress reduction tools that will empower them to work through their stress and decrease their anxiety and depression. Furthermore, since depressiveness is widely known to interfere with medication adherence (Connor, 2017), one would also presume as the patient's psychological symptoms decrease, that their skin disease medication adherence will increase, causing an improvement in their skin condition. The patient would additionally experience improved psychosocial attitudes and self-worth from this improvement in skin condition.

Behaviors, such as treatment adherence, self-esteem, anxiety, and depression, are determined by motivation, feelings of frustration, and performance of treatment regimens

(Bandura, 1977). SET is being used as the conceptual framework to understand how behavior change increases patient self-efficacy. Once patients are empowered to adapt to MBSR and learn tools to combat stress and anxiety in their daily lives, they will experience an increase in self-efficacy, which will increase treatment adherence and provide increased positive patient healthcare outcomes.

## Methods

A pilot program was conducted in the Fall of 2020 over a four-week time frame in a dermatology practice clinic in the southwestern United States. This project utilized two of the dermatology clinic's locations in Arizona, one in Phoenix and one in Scottsdale. Both sites provide medical, aesthetic, and surgical treatments for patients. The key stakeholders include the clinic, nurse practitioner, other providers, front office staff, advanced practice nursing (APN) student, patients, and family/caregivers. Multiple adult patients aged eighteen years or older who are currently under pharmacological treatment, or no treatment, or using any physical modality or not, or are either on or off an antidepressant or an anti-anxiety medication, are included in this project implementation. Other inclusion criteria: Prospective participants are; established with the dermatology clinic, identified by the clinic nurse practitioner (NP), speak and read English, have a documented diagnoses of acne vulgaris, psoriasis, vitiligo, rosacea, or atopic dermatitis, and has access and ability to use a personal e-mail account.

The APN student conducted multiple weekly clinic visits for two weeks to recruit participants. The APN student explained the project, MBSR logs to record daily practices, surveys, and consents to each eligible patient. Eligible patients completed consent, baseline surveys, a demographics form, and provided an e-mail address. The baseline surveys include Patient Health Questionnaire (PHQ-9), Generalized Anxiety Disorder (GAD-7), and possibly a

Dermatologist Directed Questionnaire (DDQ). The specific demographics obtained from participants included ethnicity, age, comorbidities, use of antidepressants, anti-anxiety medications, or prescription dermatological medications, and participants' previous experiences with MBSR, and health insurance.

Many methods are available to assess anxiety and depression. However, one quick, effective, and validated tool used to measure depression in a clinical setting is called the Patient Health Questionnaire (PHQ-9). The PHQ-9 is a valid survey tool to measure depression. It has a sensitivity of 75.7% and a specificity of 80.0% when used to measure depression levels in diabetic patients at an outpatient clinic (Van Steenbergen-Weijenburg et al., 2010).

Additionally, the Generalized Anxiety Disorder (GAD-7) questionnaire is also a quick and validated tool to measure anxiety levels in a clinical setting. In a study conducted in the general population by Löwe et al. (2008), the GAD-7 has a sensitivity of 89% and a specificity of 82% in diagnosing a generalized anxiety disorder.

The Likert scale is a validated tool that this project utilizes to measure patient post-intervention satisfaction with MBSR. The sensitivity and specificity of the Likert scale is 80% and 89.5%, respectively (Koksel et al., 2019).

This project measures adherence to oral and topical acne treatments via the Dermatologist Directed Questionnaire (DDQ), the mini-questionnaire versions. One version of the DDQ is specific to oral therapy, and the other DDQ is specific to topical treatment. Both DDQs consist of four questions. Both mini-DDQs have a sensitivity of 0.47 and a specificity of 0.89 (Pawin et al., 2009). Unfortunately, this tool has yet to be validated. However, there were no other adherence tools specific to skin disease found in the current literature. The DDQ is the

only tool used in this project that is not of the public domain. Dr. Pawin, the lead creator of the topical and oral DDQs, has given this project written permission via e-mail to use both DDQ questionnaires.

Initially, ten female participants agreed to enroll in this project intervention. These ten participants received weekly informational e-mails instructing them on what MBSR practices to engage in for that week, along with a few words of encouragement from the APN student. Participants derived the MBSR practices from a free online MBSR website that they were able to access at any time of their choosing. A MBSR log was attached to each participants' first e-mail. Participants were encouraged to engage in MBSR practices daily. Participants were instructed to record the date, type of MBSR practice they engaged in, and any additional comments onto their MBSR log.

After three weeks of the project implementation, one participant dropped out. At the end of the four-week project implementation, the remaining participants received a repeat of all baseline surveys via e-mail, with the addition of a Likert satisfaction survey. Participants were re-instructed to complete and turn in their online surveys and MBSR log. After one week, non-compliant participants were reminded via e-mail to complete and turn in their online surveys and MBSR log.

Upon the completion of the project and after a reminder e-mail, only three participants completed and returned all of their post-intervention surveys and MBSR log. The three participants comprised of females ages twenty-five, thirty, and fourty years; two Caucasians, and one Hispanic; and current diagnosis of a chronic skin disease of rosacea, acne vulgaris, and vitiligo respectively. All participants had previously engaged in some form of MBSR: two had tried yoga and one performed meditation. One participant had been taking anti-anxiety and

anti-depression medications for “years”. This particular participant was the only one to have other co-morbidities of: Irritable bowel syndrome, attention deficit disorder, anxiety, and depression. All other participants denied any co-morbidities. One participant was currently using prescription topical medications for their skin disease. All participants had active insurance.

## Human Subject Protection

During initial recruitment, the APN student instructed all eligible participants that they may opt-out of the project at any time, and they may refuse to answer any question with which they are not comfortable on any survey or paperwork for the project. The consent for the project also contained this information. A four-digit code of patients’ first two letters of their first name followed by their birthday month in two-digit format was linked to all MBSR log, surveys, demographics, and e-mail addresses in Qualtrics (survey program). All e-mails that sent to the participants utilized their four-digit identifier code. All e-mails were sent to the participants via the APN student’s school e-mail account, which required password and ID name protection. Additionally, all data from Qualtrics employed the participant four-digit code. The contact field was changed in Qualtrics so that only the external reference could be viewed.

Once the data was collected, the APN student placed all de-identified data from Qualtrics into a de-identified master datasheet. When all data was collected, this master data sheet was printed and immediately locked in a file cabinet in the APN’s home office and was only accessible by the APN student. After all information and data were retrieved from participant e-mail, the APN student destroyed all patient e-mails as well as any electronic MBSR logs. As soon as all information and data were extracted and analyzed and outcomes

were measured, the APN student destroyed all surveys and participant information, e-mail addresses and e-mails, MBSR logs, data, and surveys and e-mail addresses on Qualtrics. The master list and consents only existed until project completion, May of 2020. Once the outcomes were measured and evaluated, the master list and consents were destroyed. No digital copies of the master list, consents, or any other part of this project were kept at any time.

This project did consist of a particular intervention detail. If either a participant's pre or post PHQ-9 or GAD-7 survey totaled ten or higher, or if there was any positive answer to question number nine of the PHQ-9, "Thoughts that you would be better off dead or of hurting yourself in some way," the APN student would speak to the NP either at that time (found during pre-survey) or the APN student would call the NP (discovered during post-survey) for immediate referral, and have the dermatology clinic NP decide on the referral course of action. Consents contained the participants' four-digit code and names and would only be accessed upon findings of an abnormal PHQ-9 or GAD-7 survey results. IRB approval from Arizona State University for this project implementation was received on December 21st, 2019.

## Data Collection and Analysis Plan

### Budget and Funding

This project was managed and implemented solely on awarded grant funding and in-kind donations. Other grant funding was provided by Arizona Dermatology and by involved individuals who donated their time to the project. As need dictates, the dermatology clinic is willing to aide in the sustainability of the program by continuing support and funding after the project intervention period comes to an end (Appendix I.1 to I.4). Additionally, participants who turned in their MBSR log and surveys at the end of the four-week project intervention

received a ten dollar Starbucks gift card. Ten dollars is generally considered an appropriate "Thank you" amount, and it is not coercive. The money for these gift cards was provided for by the APN student.

## Results

### Outcomes and Clinical Significance

Statistical analysis of the project data has limited power due to small sample size. Due to the small sample size, other relevant statistical analyses, such as the effects of MBSR on medication adherence, and the relationship of the frequency of performed MBSR exercises to outcomes, could not be established.

A two-tailed Wilcoxon signed-rank test was conducted through Intellectus to examine whether there was a significant difference between GAD-7 and PHQ-9 pre and post scores. The results of the two-tailed Wilcoxon signed-rank test for GAD-7 scores were not significant based on an alpha value of 0.05, $V = 4.00$, $z = -0.58$, $p = .564$. The results of the two-tailed Wilcoxon signed-rank test for PHQ-9 scores were not significant based on an alpha value of 0.05, V = 4.50, z = -0.82, p = .414. These results indicate that the differences between GAD-7 and PHQ-9 scores are both explainable by random variation.

However, though not statistically significant, results are clinically significant. All participants showed a decrease in pre and post GAD-7 and PHQ-9 scores and subjective symptoms after engaging in the MBSR intervention. Of particular interest is that one participant had been taking anti-anxiety and anti-depression medications for at least three years. This participant showed a reduction in both anxiety and depression symptoms and survey scores. This participant showed the greatest decrease in GAD-7 pre and post scores.

All participants reported enjoyment using MBSR, stated they would continue using MBSR, agreed their skin condition improved with MBSR, and indicated they had a reduction in their anxiety/depression symptoms after MBSR. Quotes from participants MBSR logs: “I am sleeping better after using MBSR,” “I felt less stressed after doing my meditation,” “…easier to fall asleep,” “I enjoyed the stretching,” “Felt my mood shift a bit after this to a more positive mindset,” “It was really relaxing to me,” and “I feel calmer after trying visualization.” The biggest barrier to engaging in MBSR practices was collectively agreed upon by the participants as finding time in the day.

**Implications and Sustainability**

The literature agrees that anxiety and depression are prevalent in patients with chronic skin diseases and that dermatology providers frequently under-recognized these psychological disorders. This information leads to the implication that perhaps there is a role for psychological screening for patients with chronic skin diseases who visit dermatology clinics. Dermatology clinic policy will have to change to enforce this and establish protocols to distinguish which patients to survey, to establish the types of surveys used, and to layout an intervention and referral plan.

Due to the prevalence and impact of anxiety and depression in patients with chronic skin disease, providers should, at the very least, inquire as to the psychological disposition of their patients. The dermatologist can then ask further questions as appropriately needed.

Screening for psychological disorders such as anxiety and depression are just as important as screening for diabetes, high blood pressure, and other physical diseases. Screening is the first step in getting help for patients. Anxiety and depression can be severe

illnesses within the dermatological population. As research has shown, they can also complicate other medical conditions and even lead to suicide.

There is a clinical gap in many dermatology offices in both the screening of chronic skin disease patients and available options for timely, appropriate interventions. Providing screening and support options such as referrals and MBSR for patients with chronic skin disease is vital to help dermatological patients adjust psychologically in a positive manner to the sequelae of their skin disease.

A noteworthy implication is that screening and supporting patients with chronic skin disease suffering from anxiety and depression may help build a business case for increased access to psychological services within dermatology clinics (Lamb et al., 2017). Additionally, screening and supporting patients with chronic skin disease would improve patient access and intervention to behavioral healthcare within a specialty setting.

MBSR has been shown in research to decrease anxiety and depression in chronic skin disease patients. All three participants in this project intervention showed a decrease in both their anxiety and depression after the implementation of an online MBSR program. Dermatologists can comfortably and quickly provide MBSR. Furthermore, ancillary staff can educate patients on MBSR, thereby avoiding interruption of the providers' daily workflow.

Once anxiety and depression are recognized in skin disease patients, MBSR can be used in conjunction with other interventions. Through screening and intervening, patients will likely feel better, increase medication adherence, have lower levels of anxiety and depression, show improved medical outcomes, all resulting in improved satisfaction with treatment.

Sustaining the MBSR project requires the dermatology clinic to either screen their patients or, at the very least, initiate a discussion with their patients about anxiety and depression. The site will have to keep offering their patients information and education regarding MBSR. Providers and clinic staff will need to be educated on MBSR, and pamphlets would be necessitated for ease of patient education. A company protocol regarding screening and intervention would need to be established for MBSR sustainability.

## Discussion

### Limitations

The first apparent limitation to this study is that only three participants completed the project. Lack of participants made descriptive data analysis inept, and it precluded any chance of resultant correlations or significance through analysis. Additionally, all three participants were female and had self-reported mild skin symptoms.

Part of this project was to look at the effects of MBSR on medication adherence. However, no data analysis was able to be performed regarding this as only one participant was currently taking oral prescription medication. Furthermore, that same participant was the only participant who was presently taking anti-anxiety and anti-depression drugs, again, not allowing for any type of analysis or comparisons to be made.

The MBSR online program was set up for the participants so that they could perform it at home at a time of their convenience. However, this method did not create accountability for the participant, and it was based on the honor system as there was no program to track the number of completed practices.

This project did not, however, have complete blinding of participants; they knew the purpose of the project and the desired end goal. The samples were drawn from one specialized

dermatology clinic. By including participants from only one clinic site, boundaries on the generalizability of any results are created.

**Recommendations for Future Research**

Though the findings of this project were not statistically significant, each participant did show a decrease in both their anxiety and depression levels after the MBSR intervention and stated they had decreased skin condition symptoms. This decrease in anxiety and depression from engagement in MBSR practices does agree with previous research. However, future studies should use a MBSR program in which the participants' involvement in each exercise can be monitored. A more significant number of participants, both male and female, and with a greater variety of skin disease severity should be used.

As research has stated, many dermatology clinics under-recognized anxiety and depression issues in their patients. As evidenced by this project clinic site, no psychological screening or communication about anxiety and depression is performed with chronic skin disease patients. Therefore, future studies should examine the benefits of a clinic protocol for screening and for anxiety and depression in patients with chronic skin disease.

Future research should also use multi-sites for recruiting possible participants. It would additionally be beneficial to glean clinician ratings of skin severity to evaluate the effects of MBSR on the outward signs of chronic skin disease. Finally, future studies need to look at a greater variance of ethnicities. It is advisable to look at and evaluate participants' quality of life and get participants who are on chronic skin disease medication to assess the impact of MBSR on medication adherence.

This project did, however, find two important considerations for future studies to continue to utilize. First, it was found very beneficial to have the participants record their

subjective comments after engaging in a MBSR exercise. Obtaining participant subjective comments provides greater insight into the immediate benefits of MBSR. Secondly, the evaluation of participant satisfaction to the MBSR program proved valuable. Having participants complete a satisfaction survey after a MBSR program intervention provided a better understanding of how participants felt about the program overall. A satisfaction survey may expose the weaknesses and strengths of the MBSR program, aid in supporting the results of the MBSR program, and better understand the benefits MBSR provided the participant.

## Summary

Psychological stress is prominent in patients with chronic skin disease. Stress can result in adverse outcomes for patients with chronic skin disease, including anxiety and depression. Patients with chronic skin disease have increased levels of anxiety and depression as compared to patients without chronic skin disease. MBSR is a psychotherapeutic intervention that providers can comfortably and efficiently provide to their patients. Patients can learn MBSR on their own and use the skills they acquire from it to combat all types of stressors.

Implementation of this pilot program in a dermatology clinic showed that patients with chronic skin disease experienced a reduction in anxiety and depression survey scores and symptoms after engaging in MBSR. MBSR has the potential to help patients manage their daily stressors better, increase their treatment adherence, and provide for them better overall outcomes and satisfaction levels.

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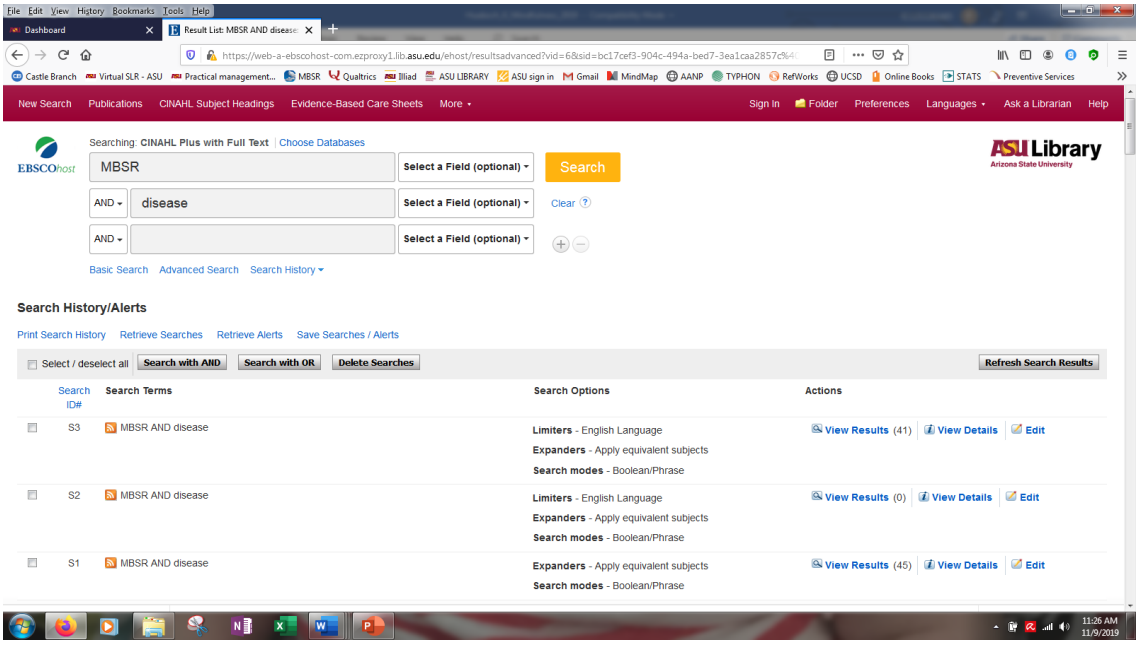
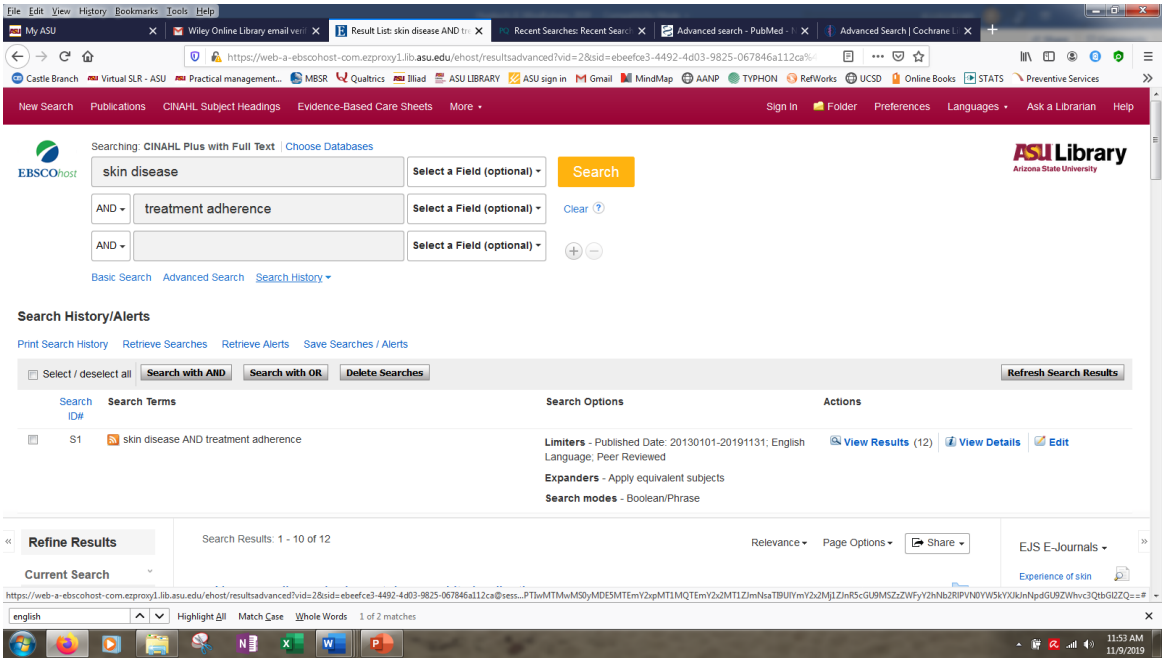
# Appendix A
## Search Strategy 1

## CINAHL

### Figure A.1




### FigureA.2

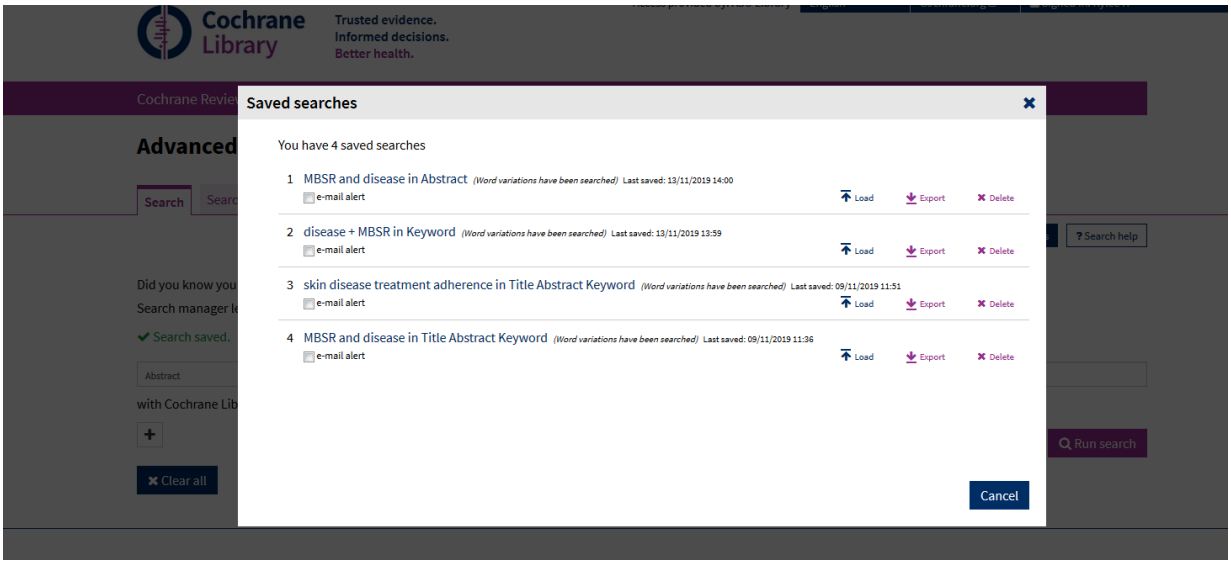


# Appendix B

## Search Strategy 2

Cochrane Library

Figure B.1

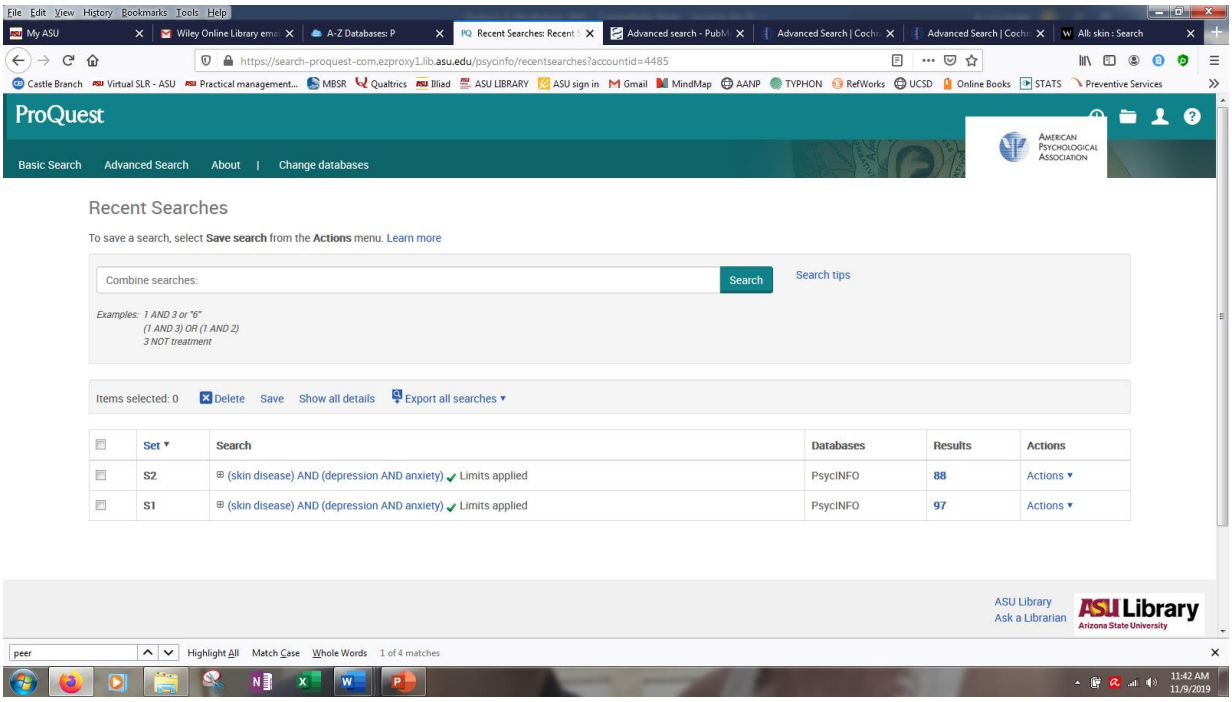


# Appendix C

## Search Strategy 3

PsycINFO

Figure C.1



# Appendix D

## Search Strategy 4

PubMed

Figure D.1

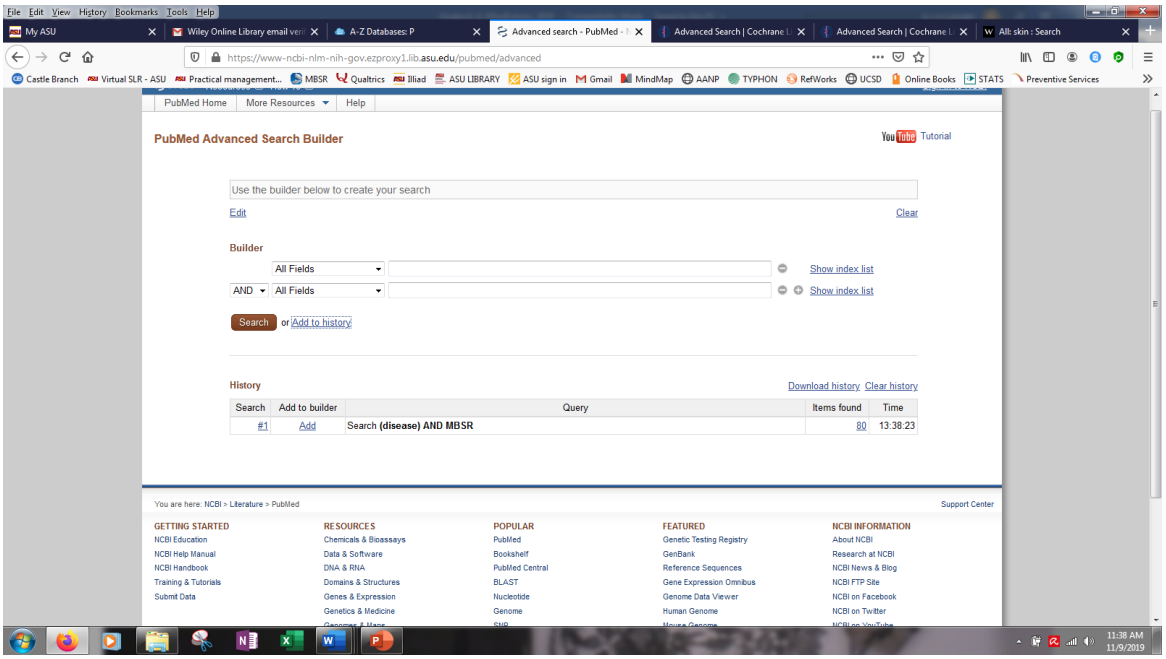
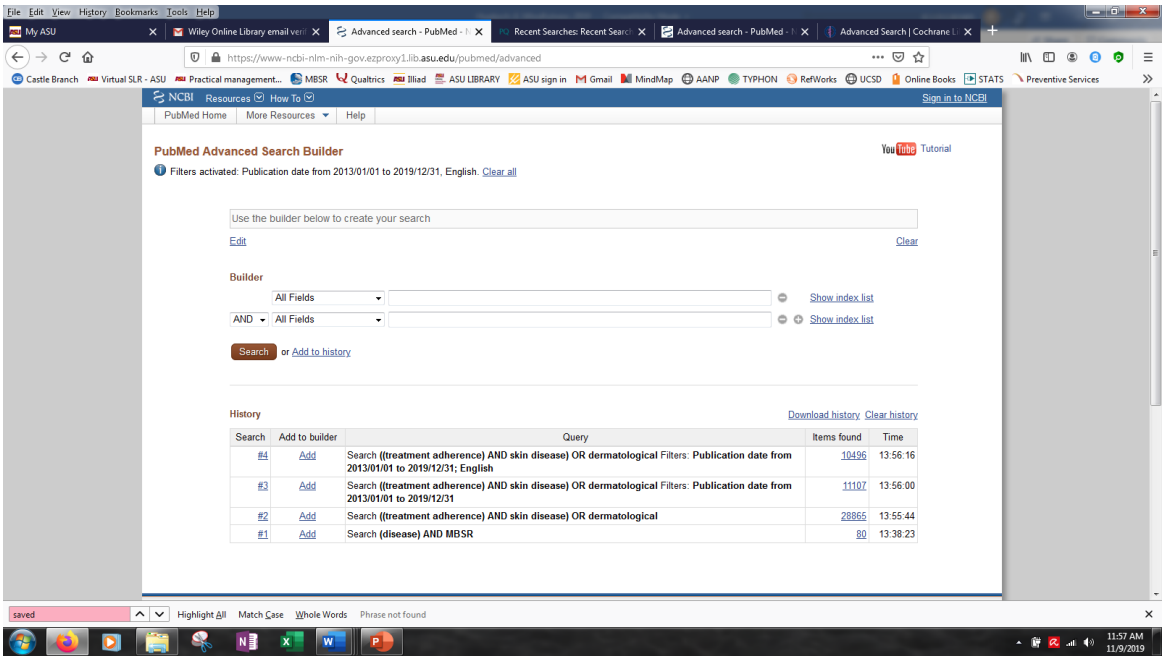



Figure D.2



Appendix E

Table 1

*Evaluation Table*

| Citation | Theory/ Conceptual Framework | Design/ Method/ Purpose | Sample/Setting | Major Variables Studied and Their Definitions | Measurement/ Instrumentation | Data Analysis | Findings/ Results | Level of evidence/ Decision for Use/Application to Practice |
|---|---|---|---|---|---|---|---|---|
| Dalgard et. al, 2018. Dermatol-ogists across Europe underestimate depression & anxiety: results from 3,635 dermatological consultations<br>**Country:** Europe<br><br>**Funding:** None<br><br>**Bias:** none reported | Social and behavioral science theory | **Design:** Observational cross-sectional multicenter study<br>**Purpose:** to estimate the concordance between clinical assessment of dep and anx by a derma and ass with the HADS | N = 3,635<br>**Demographics:** Not disclosed<br>**Setting:** 13 outpt derm clinics in Europe<br>**Inclusion:**<br>-read/write local language<br>-not having severe pscyh<br>-18 yrs & older<br>**Exclusion:**<br>-< 18 years<br>-non-derm pts | IV: dep<br>IV: anx<br>DV: HADS<br><br>**Time frame of the intervention** – 11//2011 to 2/2013 | HADS to measure anx & dep | SPSS 24<br>K<br>Fleiss | High conco betw dermas & HADS when no dep (79.7%) & no anxiety (70.8%). Dermas underes dep in 5.8% of consults and anx 11.2% | **Level of Evidence:** II<br>**Strength:** high # of consults, results were significant.<br>**Weakness:** did not disclose severity of pt skin disease, pt reported anx & dep, no detailed instr to dermas to assess anx or dep<br>**Conclusion:** significant results of this study agree with previous literature and studies & showed dermas in Europe underestimate mood d/o's |
| Dixon et. al, 2018. Stress and skin disease quality of life: The moderating role of anxiety sensitivity social concerns | Stress and adaptation model | **Design:** Cross sectional<br>**Purpose:** gain insight into pscyho factors affecting SD, examining | N = 237<br>**Demographics:** M = 76, F = 161, over 18 yrs<br>**Setting:** online<br>**Inclusion:**<br>-over 18 yrs<br>-speak and read English | IV: AS<br><br>DV: SD<br>DV II: stress<br>DV III: QOL<br><br>**Time frame of the intervention** – several wks | MTurk<br>ASI-3<br>Skindex-16 | SPSS statistics version 23<br>PROCESS macro for SPSS version 2.16.1<br>Sig level | Decreases in AS result in increased psychological well-being | **Level of Evidence:** III<br>**Strength:** sig results, results congruent with previous studies,<br>**Weakness:** self-reported measures, SD not verified by physician,<br>**Conclusion:** results suggest decreasing AS improves psychological well-being and breaks skin symptom and stress cycle in |

**# -** number, **aa –** alopecia areata, **ad –** atopic dermatitis, **AN –** Asian, **anx –** anxiety, **AS –** anxiety sensitivity, **ASI-3 –** Anxiety Sensitivity Index-3, **asses –** assessment, **AV –** acne vulgaris, **B –** Black, **BDI –** Beck Depression Inventory, **betw –** between, **conco –** concordance, **dep –** depression, **derma(s) –** dermatologist(s), **derm –** dermatology, **diff –** different, **DLQI –** Dermatological quality of life scale, **d/o –** disorder, **ds –** disease, **du –** decubitus ulcer, **dx –** diagnosis, **F –** female, **fsd –** fungal skin disease, **f/u –** follow-up, **HADS –** Hospital Anxiety & Depression Scale, **improv –** improvement, **info –** information, **instr –** instruction, **k –** Kohen's Kappa, **lit –** literature, **M –** male, **MBSR –** mindful-based stress reduction, **mc – molluscum contagiosum, med –** medication, **MTurk –** Amazon's Mechanical Turk through TurkPrime, **neuro –** neurological, **NF –** nonfatal, **nmsc –** non-melanoma skin cancer, **NOS –** Newcastle-Ottawa Scale, **NR –** non-randomized, **outpt –** outpatient, **PICOS** - Population, Interventions, Comparators, Outcomes, Study Design, **PRISMA –** preferred reported items for systematic reviews and meta-analysis, **psych –** psychosis, **psycho –** psychological, **pt(s) –** patients(s), **QOL –** quality of life, **RCTs –** randomized controlled studies – **sig –** significance, **SD –** skin disease, **SI –** suicidal ideation, **sig –** significant, **ST –** short term, **tx –** treatment, **UK –** United Kingdom, **underes(d) –** underestimate(d), **USA –** United States of America **val –** validated, **vw –** viral warts, **W –** White, **yr(s) –** year(s), **wks -** weeks

| Citation | Theory/ Conceptual Framework | Design/ Method/ Purpose | Sample/Setting | Major Variables Studied and Their Definitions | Measurement/ Instrumentation | Data Analysis | Findings/ Results | Level of evidence/ Decision for Use/Application to Practice |
|---|---|---|---|---|---|---|---|---|
| **Country:** USA<br><br>**Funding:** None<br><br>**Bias:** author R.T.B. is on the CONSENTYX Advisory Board and has been the Principal Investigator of clinical trials performed for Golderma Laboratories, L.P. and Novartis | | AS role and its relationship to stress and SD QOL | -location in USA<br>-current dx of skin ds with active symptoms over past 4 wks<br>-no skin ds exclusions<br>**Exclusion:**<br>-non English speaking<br>- **Attrition:** | | | was 0.05 two tailed | | SD. |
| Gül & Çölgeçen, 2015. Personality traits and common psychiatric conditions in adult patients with acne vulgaris<br>**Country:** Turkey | Psycho-social theory | **Design:** prospective cohort study<br>**Purpose:** investigate personality traits and common psych conditions in pts with adult AV | N = 40<br>**Demographics:** F = 34, M = 6, 25-41 yrs of age<br>**Setting:** Bozok University Medical School derm outpatient clinic<br>**Inclusion:**<br>-current dx of adult AV<br>-25 yrs of age or | IV: Adult pts with acne<br>DV I: somatization<br>DV II: depression<br>DV III: anxiety | Symptom checklist 90-revised Eysenck personality questionnaire-revised short form | SPSS version 17 Mann-Whitney U test Spearman correlation analysis <0.05 is sig | Dep $p<0.001$, anx $p<0.001$ Strong positive correlation betw somatization, dep, anx and AV | **Level of Evidence:** II<br>**Strength:** control group, results consistent with previous studies, no pts given systematic txt for AV<br>**Weakness:** self-reported by pts, small sample size<br>**Conclusion:** common psych conditions occur with considerably high rates in adult pts with AV |

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| Citation | Theory/ Conceptual Framework | Design/ Method/ Purpose | Sample/Setting | Major Variables Studied and Their Definitions | Measurement/ Instrumentation | Data Analysis | Findings/ Results | Level of evidence/ Decision for Use/Application to Practice |
|---|---|---|---|---|---|---|---|---|
| **Funding:** none noted<br>**Bias:** none noted | | | older<br>**Exclusion –** Neuro, psych, medical, alcohol, substance abuse co-morbidities or med that may cause psych ds | | | | | |
| Hay et. al, 2013. The Global Burden of Skin Disease in 2010: An analysis of the prevalence & impact of skin conditions<br>**Country:** UK, USA, Australia, Italy, Africa, Ethiopia, India, other global studies utilized<br>**Funding:** Grant from Bill & Melinda Gates Foundation<br>**Bias:** none stated | Social cognitive theory | **Design:** systematic lit review<br><br>**Purpose:** to determine top derm ds NF burden for 187 countries | N = 895 country-years of data<br>**Demographics:** M & F with eczema, psoriasis, AV, pruritus, aa, du, urticaria, scabies, fsd, impetigo, abscess, & other bacterial skin ds, cellulitis, vw, mc, & nmsc.<br>**Setting:** Data from 82 countries<br>**Inclusion:** -1980-2010 with data on relevant ds<br>**Exclusion:** -self-reported data unless val -occupational groups -non-random studies | IV: skin ds<br>DV: health burden<br><br>**Time frame of the intervention** – 1990-2010 | Baysian meta-regression tool World databases ICD 10 | DisMod-MR | Skin ds causes large and sig burden on derm pts in global context | **Level of Evidence:** I<br>**Strength:** severity of ds was considered, sig results<br>**Weakness:** missing quality data at regional level, only focused on most prevalent skin ds, may have underestimated burden<br>**Conclusion:** in 2010, SD was 18th leading cause of health burden worldwide |

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| Citation | Theory/ Conceptual Framework | Design/ Method/ Purpose | Sample/Setting | Major Variables Studied and Their Definitions | Measurement/ Instrumentation | Data Analysis | Findings/ Results | Level of evidence/ Decision for Use/Application to Practice |
|---|---|---|---|---|---|---|---|---|
| | | | -sample size <100<br>-experimental arm of clinical trial<br>-estimates found and not data<br>-studied specific groupings | | | | | |
| Montgomery et. al, 2016. The import-ance of mindfulness in psych-osocial distress and quality of life in derm-atology patients<br>**Country:** UK<br>**Funding:** Ecomonomic & social research council<br>**Bias:** none reported | Quality of life theory | **Design:** cross-sectional<br>**Purpose:** Examine relationship betw mindfulness & distress in derm pts | N = 120<br>**Demographics:** M = 35, F = 84, not reported = 1, W = 104, AN = 5, B = 1, other = 8, not reported = 2<br>**Incl:**<br>-pt at one hospital<br>-literate<br>-dx acne<br>**Exc**<br>-primary pscy dx affecting skin<br>-skin cancer | IV: Mindfulness<br>DV I: anx<br>DV II: dep | Five Facet Mindfulness Questionnaire<br>Five point scale SD subjective severity<br>Skin Shame ScaleBrief Fear of Negative Evaluation<br>HADS<br>DLQI | Hierarchical regression analyses | Clinically sig positive correlation levels of anx ($p$<0.05). | **Level of Evidence:** III<br>**Strength:** outcomes congruent with previous studies, sig correlation between mindfulness and pscyho distress<br>**Weakness:** cross-sectional precludes strong conclusions, objective severity of SD used, sample predominantly W F, samples only from one derm clinic.<br>**Conclusion:** higher levels of mindfulness are associated with reduced psycho distress and improved derm QOL |
| Niazi & Niazi, 2011. Mindfulness-based stress reduction: A non-pharm-acological | Mindfulness Theory | **Design:** systematic review<br>**Purpose:** determine efficacy of MBSR in tx | N = 18<br>**Demographics:**<br>-both genders<br>**Setting:** multiple<br>**Inclusion:**<br>RCTs<br>-English-language | IV: MBSR<br><br>DV: chronic ds<br><br>**Time frame of the intervention** – anytime | -anx, dep, stress, QOL<br>-recurrence & relapse of ds | Researchers abstracted info themselves for each article | All studies showed improv in ds condition after MBSR | **Level of Evidence:** I<br>**Strength:** Pubmed and Cochrane searched, initial results 2,607 articles, 32 found relevant after first screen, and 18 of these 32 were full text.<br>**Weakness:** no data analysis |

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|---|---|---|---|---|---|---|---|---|
| approach for chronic illnesses<br>**Country:** Pakistan<br><br>**Funding:** None<br><br>**Bias:** none noted | | of chronic ds | -humans<br>**Exclusion:**<br>-animal studies<br>-not full text articles<br>-funded research | | | | | performed, only researcher summary of results<br>**Conclusion:** MBSR may help a broad range of pts cope with their clinical and non-clinical problems |
| Patel et. al, 2019. Association between atopic dermatitis, depression, and suicidal ideation: A systematic review and meta-analysis<br>**Country:** USA<br>**Funding:** None<br>**Bias:** none noted | Cognitive Theory | **Design:** systematic review<br><br>**Purpose:** Determine the complex relationship between AD and dep | N = 106<br>**Demographics:**<br>**Setting:**<br>-M & F<br>**Inclusion:**<br>-cross-sectional or cohort study<br>-assessed: AD and/or suicide<br>-at least 20 subjects with AD<br>-any language<br>**Exclusion:**<br>-reviews<br>-editorials<br>-duplicated studies | IV: AD<br><br>DV 1: suicide<br>DV 2: dep<br><br>**Time frame of the intervention** – 1963-2018 | NOS | OpenMeta | 1 in 6 persons with AD had clinical dep, 1 in 4 dep symptoms, 1 in 8 SI. | **Level of Evidence:** I<br>**Strength:** clinically significant and relevant<br>**Weakness:** AD measured with diff dep scales, self-reported dep<br>**Conclusion:** pts with AD have a higher risk of dep and SI |

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| Citation | Theory/ Conceptual Framework | Design/ Method/ Purpose | Sample/Setting | Major Variables Studied and Their Definitions | Measurement/ Instrumentation | Data Analysis | Findings/ Results | Level of evidence/ Decision for Use/Application to Practice |
|---|---|---|---|---|---|---|---|---|
| Pietrzak et. al, 2017. Depressive-ness, measured with Beck Depression Inventory, in patients with psoriasis. **Country:** Poland **Funding:**Med-ical University of Lublin Funds **Bias:** selection bias | Pyschodynami c theory | **Design:** cross-sectional non prospective **Purpose:** identify demographic and clinical factors predisposing dep during course of psoriasis | N = 239 **Demographics:** -pts with psoriasis: ages 15-76 yrs -31.8% F -health controls: 123 pts ages 17-74 yrs, F = 32.5% **Setting:** a derm medical center in Poland **Inclusion:** -current dx of psoriasis **Exclusion:** -hx of recent myocardial ds -mental disorders -immuno-suppressive usage -no anti-depression meds | IV: psoriasis DV: dep **Time Frame:** 2014-2016 | BDI | Shapiro-Wilk test Mann-Whitney U-test Kruskal-Wallis test Pearson's chi-square Fisher's exact test Spearman rank correlation coefficients | Multivariate analysis = independent predictors of any grade of dep correlated sig with presence of psoriasis | **Level of Evidence:** III **Strength:** no pts on anti-depression meds, results similar to majority of past research **Weakness:** cross-sectional, selection bias, control group were other derm pts **Conclusion:** pts with psoriasis regardless of severity are at increased risk of dep |
| Salman et. al, 2016. Social anxiety and quality of life in vitiligo and acne patients with facial involvement **Country:** Turkey | Interpersonal Theory | **Design:** cross-sectional controlled **Purpose:** compare levels of depression, anxiety, and | N = 74 acne study participants **Demographics:** M = 34, F = 40, over 18 yrs. 37 vitiligo, 37 acne, & 74 age/sex matched health controls over 18 yrs **Setting:** outpt derm | IV: acne DV1: anxiety/QOL/depres sion **Time frame of the intervention** –avg interview 40 min | Subjective: Visual analog scale of 10 cm Objective: EATG LSAS (Sn 73.66% and Sp 76.70%) HADS (Sp of 79& and Sn of | SPSS Kolmogorov -Smirnov test Chi square test Student's t-test Pearson's correlation | Social anxiety, depression and anxiety levels of acne patients were significantly higher than health controls 6.4 | **Level of Evidence:** III **Strength:** all aspects of social anxiety addressed, results congruent with previous studies, **Weakness:** cross-sectional design, relatively small sample size **Conclusion:** facial acne was shown to cause increased levels of social anxiety, depression, and impaired QOL. It is important to have |

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|---|---|---|---|---|---|---|---|---|
| **Funding:** None<br><br>**Bias:** none noted | | QOL in acne pts vs non-acne pts | clinic<br>**Inclusion:**<br>-over 18 yrs<br>-dx vitiligo or acne (lesions visible at least 1m)<br>**Exclusion:**<br>-another other facial condition, not mentally able to use questionnaire<br>**Attrition:** 0% | | 83%)<br>DLQI (Sp = 81% and Sn = 83%). | | +/1 6.2 ($p$<0.05). QOL was negatively correlated with social anxiety and depression | psychological assessment for each acne pt. |
| Victorson et. al, 2015<br>**Country:** USA<br>**Funding:** None<br>**Bias:** none noted | PICOS Framework | **Design:** systematic review and meta-analysis<br><br>**Purpose:** Determine benefits of MBSR on various populations and conditions | N = 59<br>**Demographics:**<br>M = 25%<br>F = 75%<br>**Setting:** various<br>**Inclusion:**<br>-MBSR program 2 wks or longer<br>-RCTs<br>**Exclusion:**<br>-f/u, observational, and NR studies<br>-intensive programs<br>-inpatient | IV: MBSR<br><br>DV1: various population conditions<br><br>**Time frame of the intervention** – 2002 - 2012 | PRISMA<br>Cochran Collection | Hedge's g<br>Cochrane risk of bias tool<br>SPSS version 22 | Partial evidence for MBSR to provide ST benefits across wide range of medicine-relevant populations<br>-MBSR is superior to no txt at all | **Level of Evidence:** I<br>**Strength:** large # of studies, significant evidence for ST benefit of MBSR in managing symptom burden and affecting modifiable health behaviors<br>**Weakness:** publication bias was not examined across included studies, many studies failed to report risk bias and/or blinding, for several analytic comparisons, the homogeneity of variance assumption was not met<br>**Conclusion:** partial evidence for ST effectiveness of MBSR on various lifestyle medicine-relevant contexts |

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# Appendix F

## Synthesis Table

| | | | | | **Author** | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Dalgard | Dixon | Gul | Hay | Montgomery | Niazi | Patel | Pietrzak | Salman | Victorson |
| **Year** | 2018 | 2018 | 2015 | 2013 | 2016 | 2011 | 2019 | 2017 | 2016 | 2015 |
| **Design/Level of Evidence:** | CS/II | CS/III | CS/II | SR/I | CS/III | SR/I | SR/I | CS/III | CS/III | SR/I |
| | | | | | **Study Characteristics** | | | | | |
| **Demographics** | | | | | | | | | | |
| Age (yrs) | 18 yrs and > | 18 yrs and > | 25 yrs and > | All ages | 18 yrs and > | All ages | All ages | 15-76 yrs | 18 yrs and > | All ages |
| Male/Female | Both genders | 73/161 | 6/34 | Both genders | 35/84 | Both genders | Both genders | 163/76 | 34/40 | Both genders (25%/75%) |
| **Setting:** | | | | | | | | | | |
| AM | | X | | | | | X | | | X |
| FO | X | | X | X | X | X | | X | X | |
| **Sample Size** | | | | | | | | | | |
| | 3,635 | 237 | 40 | 895 | 119 | 18 | 106 | 239 | 74 | 59 |
| **Measurement Tools Used** | | | | | | | | | | |
| ASI-3 | | X | | | | | | | | |
| BDI | | | | | | | | X | | |
| BFNE | | | | | X | | | | | |
| BMRT | | | | X | | | | | | |
| DASS-21 | | X | | | | | | | | |
| DLQI | | | | | | | | | X | |
| EPQ | | | X | | | | | | | |
| FFMQ | | | | | X | | | | | |
| GSSS | | X | | | | | | | | |
| HADS | X | | | | X | | | | X | |
| LSAS | | | | | | | | | X | |
| Previous Study Results | | | | | | X | X | | | X |
| SC 90-R | | | X | | | | | | | |
| Skindex-16 | | X | | | | | | | | |
| SS | | | | | X | | | | | |
| SSS | | | | | X | | | | | |
| WD | | | | X | | | | | | |
| | | | | | | | | | | |

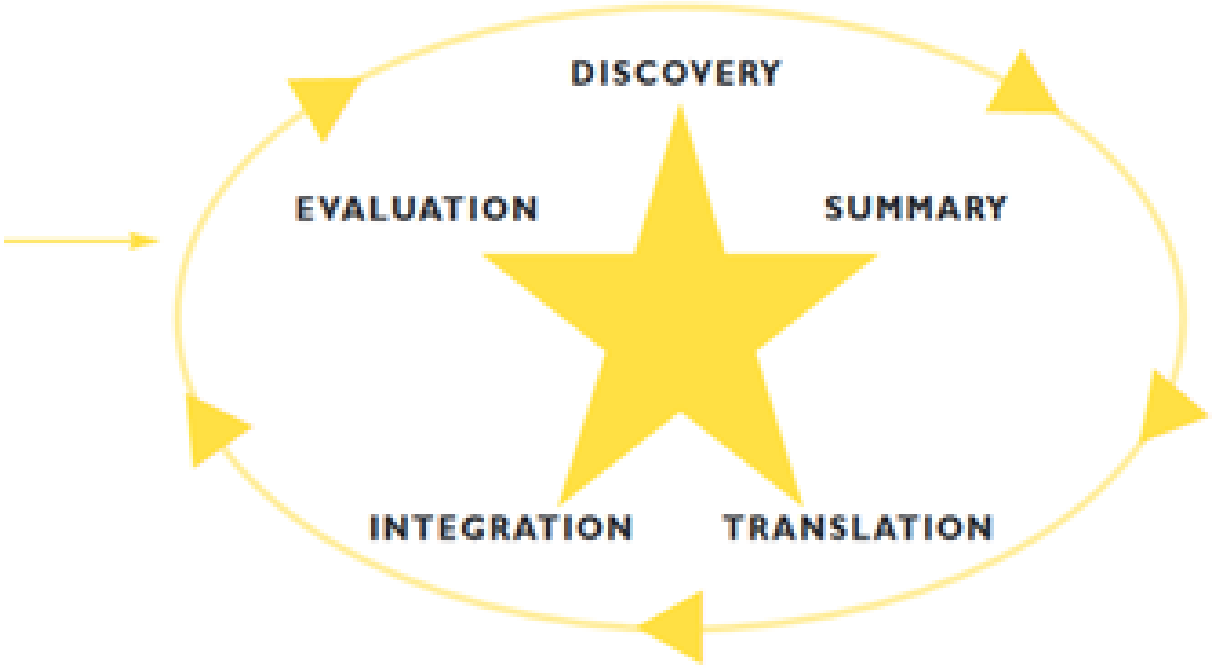
**AM –** America, **Anx –** anxiety, **ASI-3 –** Anxiety Sensitivity Index-3, **AV –** acne vulgaris, **BDI –** Beck Depression Inventory, **BFNE –** brief fear of negative evaluation, **BMRT** – Baysian meta-regression tool, CS – cross sectional, **CST –** cross sectional controlled, **DASS-21** – Depression Anxiety and Stress Sclases-21, **Dep –** depression, **DLQI –** dermatological quality of life scale, **ds –** disease, **EPQ –** Eysenck Personality Questionnaire, **F –** females, **FFMQ –** five facet mindfulness questionnaire**, FO –** foreign country, **GSSS –** Global self-reported severity of skin disease, **HADS –** hospital anxiety and depression scale, **HGF –** high glycemic food, **hr –** hour, **LSAS –** Liebowitz social anxiety scale, **M –** male, **MBSR –** mindful-based stress reduction, **Mn –** mean, **N –** number of total participants or studies, **Pt –** patient, **QOL –** quality of life, **SC 90-R –** Symptoms checklist 90-revised, **SD –** skin disease, **SR –** systematic review, **SS –** subjective severity**, SSS** – skin shame scale, WD – world database**, ↑–** increases, **↓–** decreases

| **Interventions** | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Examination of stress and its relationship to SD, anx, & dep | | X | | | | | | | | |
| Dermatologists assessed pt dep | X | | | | | | | | | |
| Surveys | | | X | | X | | | X | X | |
| Review of literature | | | | X | | X | X | | | X |
| MBSR | | | | | | X | | | | |
| **Major Findings** | | | | | | | | | | |
| Evaluatd Dep Level | ↓ | | | | | | | | | |
| Anxiety | | | | | | | | | | |
| Suicidal Ideation shown to increase with SD | | | X | | | | X | | | |
| Adherence to Treatment | | | | | | | | | | |
| Anx shown to increase with SD | | | X | | X | | | | ↑ | |
| Burden of SD | | | | ↑ | | | | | | |
| Mindfulness effect on dep | | | | | ↓ | ↓ | | | | |
| Mindfulness effect on anx | | | | | ↓ | ↓ | | | | |
| Dep shown to increase with SD | | | X | | X | | X | X | | |
| Stress is related to increased dep & anx | | X | | | | | | | | |
| Benefit from MBSR on various clinical and non-clinical symptoms in multiple people with and without ds | | | | | | | | | | X |
| QOL | | | | | | | | | ↑ | |

**AM –** America, **Anx –** anxiety, **ASI-3 –** Anxiety Sensitivity Index-3, **AV –** acne vulgaris, **BDI –** Beck Depression Inventory, **BFNE –** brief fear of negative evaluation, **BMRT** – Baysian meta-regression tool, CS – cross sectional, **CST –** cross sectional controlled, **DASS-21** – Depression Anxiety and Stress Sclases-21, **Dep –** depression, **DLQI –** dermatological quality of life scale, **ds –** disease, **EPQ –** Eysenck Personality Questionnaire, **F –** females, **FFMQ –** five facet mindfulness questionnaire**, FO –** foreign country, **GSSS –** Global self-reported severity of skin disease, **HADS –** hospital anxiety and depression scale, **HGF –** high glycemic food, **hr –** hour, **LSAS –** Liebowitz social anxiety scale, **M –** male, **MBSR –** mindful-based stress reduction, **Mn –** mean, **N –** number of total participants or studies, **Pt –** patient, **QOL –** quality of life, **SC 90-R –** Symptoms checklist 90-revised, **SD –** skin disease, **SR –** systematic review, **SS –** subjective severity**, SSS** – skin shame scale, WD – world database**, ↑–** increases, **↓–** decreases

Appendix G

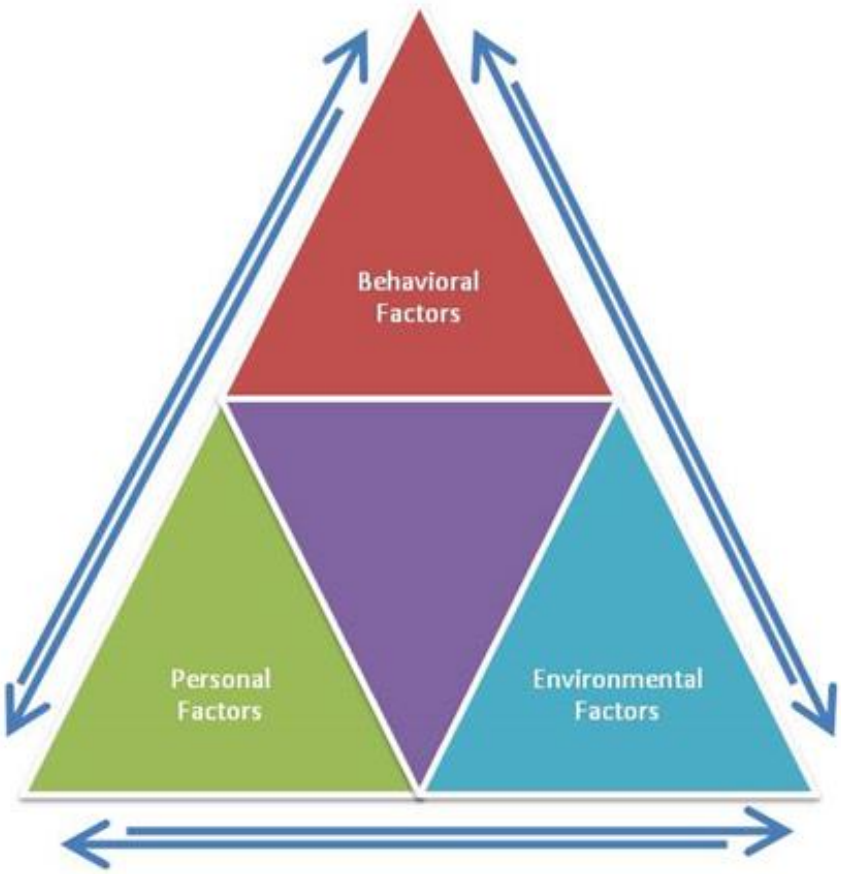
The ACE Start Model of Knowledge Transformation




ACE Star Model of Knowledge [Online image]. (2012).

Appendix H

Self-Efficacy Model




Self-Efficacy Model [Online image]. (2010).

# Appendix I

## Estimated Budget Plan

Proposed Expenses

Figure I.1

| | Expenses | In-Kind Support |
|---|---|---|
| **Personnel** | | |
| Project Director (Kylee Huesbch, RN)<br>$40/hr for 20 hours/ week x 12 weeks | $2120 (21%) | $7680 (79%) |
| Consultant, Dr. Thrall, DNP, RN, FNP-BC,<br>$60/hr for 15 hours/wk x 12 weeks | (0%) | $10800 |
| Kylee Huebsch, RN, Office Assistant, gather and prep data for analytics<br>$14/hr for 2 hours/wk x 12 weeks | (0%) | $336 |
| Tirsa Quartullo, DNP, @ $75/hr<br>4 hours/week for 12 weeks | | $3,600.00 |
| Lee-Anne Berumen, Office Manager, 1 hour/week @ $30/hr for 15 weeks | | $450.00 |
| Office staff/MA for pamphlet education and patient recruitment. $14/hr x 4hrs for 4 weeks. | | $224.00 |
| **Meeting Room & Equipment** | | |
| Meeting Room<br>(3) 90-minutes meetings at $75/hr | $225 | |
| Refreshments for Meetings<br>Up to 4 people at $12pp | $144 | |
| Research & meetings printouts, misc office supplies | $70 | |
| Cell phone to call patients for 12 weeks | $400.00 | |
| **Travel Reimbursement for Personnel** | | |
| 50 miles roundtrip x 8 recruitment of participants, x | $540 | |

| | | |
|---|---|---|
| 3meetings @ .45/mile | | |
| **Tuition, books, fees** | | |
| ASU May 2017 – May 2019 (estimated along with 1 year leave of absence.) | $78,000 | $9500 |
| **TOTAL:** | $81,499 | $32,590 |

Project Timeline Showing Quarterly Benchmarks

Figure I.2

| **Activity** | **Responsibility** | **1st Quarter Fall 2017** | **2nd Quarter Summer 2018** | **3rd Quarter Fall 2019** |
|---|---|---|---|---|
| Project Development & IRB Approval | Project Director | X | | |
| Exhaustive Evidence-Based Literature Review | Project Director | X | | |
| Baseline Data Collection and Analysis | Project Director/ APN/Office Staff | | X | |
| Present Initial Data Analysis & Project Foundation to Key Stakeholders | Project Director/APN | | X | |
| Project Implementation Guideline Development | Project Director/APN | | | X |
| Project Evaluation, Data Analysis, Sustainability Plan | | | | X |

Budget Plan: Projected Cost

Figure I.3

*Projected cost*

| Expense Item | Expenses | In-Kind Support |
|---|---|---|
| Personnel | | |
| Project director (DNP student) $40/hr for ~20 hrs per week x 12 weeks | $1,920 (20%) | $7,680 (80%) |
| Advanced practice provider @ $45/hr for 15hrs/week x12 weeks | $4,104 (38%) | $6,696 (62%) |
| Dermatologist DNP @ $75/hr 4 hours/week for 12 weeks | $3,600 | |
| Office manager 1 hour/week @ $30/hr for 15 weeks | $450.00 | |
| Office staff/MA for pamphlet education and patient recruitment. $14/hr x 4hrs for 4 weeks. | | $224 |
| Equipment/Materials | | |
| Paper educational pamphlets $5/pt x 20 pts | $100 | |
| Office/Operations | | |
| Utilizing dermatology clinic for navigation sessions and recruitment for 16 hours per week for 12 weeks (office space, electricity, air conditioning) | | $600.00 |
| Utilizing wellness center for outcome data collection and statistical analysis (office space, electricity, air conditioning) | | $400.00 |
| $10 Incentives for participants who complete the intervention | $200 | |
| Total Expenses | $10,374 | $15,600 |

Timeline with Quarterly Benchmarks: Project Timeline

Figure I.4

| Task | Semester | | | |
|---|---|---|---|---|
| | Fall 2018 | Summer 2018 | Fall 2019 | Spring 2020 |
| Literature Review | | | | |
| Synthesize evidence | | | | |
| Plan project intervention | | | | |
| Finalize Project intervention | | | | |
| Finalize Project instrumentation and outcomes | | | | |
| Apply to Institutional Review Board | | | | |
| Implement Project/Intervention | | | | |
| Complete Data Analysis | | | | |
| Disseminate via University Presentation | | | | |