


2016

Medical Interns', Residents' and Attending Physicians' Attitudes Towards Integrative Medicine and Recommended Treatments for Patients with Psoriasis

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Philadelphia College of Osteopathic Medicine

Department of Psychology

MEDICAL INTERNS', RESIDENTS' AND ATTENDING PHYSICIANS' ATTITUDES
TOWARDS INTEGRATIVE MEDICINE AND RECOMMENDED
TREATMENTS FOR PATIENTS WITH PSORIASIS

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Submitted in Partial Fulfillment of the Requirements of the Degree of

Doctor of Psychology

April 19, 2016

**PHILADELPHIA COLLEGE OF OSTEOPATHIC MEDICINE
DEPARTMENT OF PSYCHOLOGY**

Dissertation Approval

This is to certify that the thesis presented to us by Jennifer L. Pacyon on the 19th day of April, 2016, in partial fulfillment of the requirements for the degree of Doctor of Psychology, has been examined and is acceptable in both scholarship and literary quality.

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Acknowledgements

I would first like to express my deepest appreciation to my dissertation committee, Dr. Barbara Golden, Dr. Robert DiTomasso and Dr. Michael Becker, for their unwavering guidance and support through this process. Not only did you provide your knowledge and expertise, but you all also provided the emotional support and guidance that I needed to get through this process. Thank you for lending an ear when I needed it and providing me with encouragement when I thought there was no way I would successfully see the end of this project.

I would like to dedicate this dissertation to my mom. I couldn't possibly think of a better gift to give you than this. Your journey in life has not been easy, but you used your struggles to teach me how to fight my own. You taught me not to settle, to know my worth, to work hard for what I want and to never feel sorry about any of that. You taught me to be courageous when scared, tenacious when vulnerable and to take risks rather than remain stagnant. You taught me that love is always stronger than hate. It is because of you that I went up, above and beyond. Because of that, and so much more, thank you.

Lastly, I would like to thank my sisters, Kelly and Lisa, as you both have also helped to mold me into the person I am today. You both have experienced obstacles in life that you handled with grace (yes, you can have *some* grace) and unimaginable strength. You were my first friends in life and will be my best friends for the rest. You both provided insurmountable support and encouragement, not just through this journey, but throughout everything. For that, I will always be thankful.

Abstract

Background: Psoriasis is a multifactorial disease that effect approximately 7.5 million Americans. There are a variety of traditional treatments for psoriasis (e.g. topical medications, biologics) that for many, are effective in combating the disease. However, traditional treatments often have aversive side effects and may not be appropriate for every patient (e.g. pregnant women). Additionally, the efficacy of these medications are variable leaving some looking for adjunctive treatment options. There is increasing evidence to support the use of adjunctive treatments for psoriatic patients (e.g. psychotherapy, mindfulness). However, research is variable in regards to medical professionals' attitudes towards integrative medicine (IM) as well as what types of adjunctive treatments they are recommending for psoriatic patients.

Methods: A total of 105 allopathic (MD) and osteopathic (DO) interns, residents and attending physicians completed surveys to measure their attitudes towards IM and to determine what traditional and adjunctive treatments they recommend.

Results: Results indicated no significant difference between MD and DO participants' attitudes towards IM. There were no significant difference in attitudes towards IM between MD interns, residents and attending physicians. However, DO attending physicians had significantly more positive attitudes toward IM compared to DO residents. Notably, psychotherapy was the second highest recommended treatment in this study, second only to topical medications (78%).

Conclusion: This study suggests no significant difference between MD and DO attitudes towards IM. However, the study suggest that time in the field may increase positive attitudes towards IM for the DO orientation. This study also suggests that medical professionals, both of the MD and DO orientation are open to recommending adjunctive treatments to their patients as 3 of the top 5 treatment recommendations in this study were adjunctive.

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Chapter 1: Introduction

Statement of the Problem

Psoriasis, which affects approximately 7.5 million Americans, is the most prevalent autoimmune disorder in the United States (National Psoriasis Foundation, 2016). Psoriasis is a chronic skin condition in which skin cells grow too quickly causing thick, raised scaly patches, also known as plaques, to develop on the skin. Common areas include the scalp, around the elbows or knees and the lower back although the condition can develop anywhere on the body (National Psoriasis Foundation, 2016). Symptoms range from mild in which there are a few scaly patches to severe in which large portions on the body are covered, resulting in immobility and hospitalization. Those affected by psoriasis are required not only to deal with the pain and discomfort of the disease but also with the visible, embarrassing plaques that cover their skin (Li & Armstrong, 2012; Raho, Koleva, Garattini, & Naldi, 2012).

Typical treatments for psoriasis include topical agents such as corticosteroids and injectable (systemic or biologic) medications that help to slow the rate of skin growth, reduce inflammation and suppress the overactive immune system (Armstrong, Robertson, Wu, Schupp, & Lebwohl, M., 2013). Phototherapy is also an option for psoriasis sufferers. Some patients are offered Psoralen Plus Ultraviolet A, also known as PUVA or photochemotherapy, which slows the growth of skin cells and gradually reduces the appearance of plaques (Fortune, et al. 2003). Although these treatments have been shown to be effective, each comes with potentially dangerous side effects. Corticosteroids and systemic/biologic treatments suppress the immune system (National Psoriasis Foundation, 2016; British Association of Dermatologists, 2008). Patients with a suppressed immune system may be more likely to contract illnesses and infections and are less likely to be able to defend themselves against their illnesses. Additional

side effects include Hypothalamic Pituitary Adrenal (HPA)-axis suppression, low blood count, nervous system problems, heart failure, various cancers and further immune system dysfunction (National Psoriasis Foundation, 2016; British Association of Dermatologists, 2008). Photo or light therapies also come with an extensive risk of side effects including an increased risk of skin cancer, exacerbation of symptoms, skin damage and irreversible eye damage (Wolff, 1990). Although there are a variety of treatments now available to psoriatic patients, some studies have suggested that many patients continue to be dissatisfied due to medication side effects and symptoms that remain, despite their treatment (Armstrong, et al., 2013, & Uhlenhake, Kurkowski, & Feldman, 2010). Additionally, most of the available medications address the most common type of psoriasis, plaque psoriasis, and are not recommended for other forms of the disease (National Psoriasis Foundation, 2016).

Researchers have identified several factors that increase the likelihood of a flare up or exacerbation of symptoms; these include dry, cold climates, infections (e.g. streptococcal pharyngitis), skin lacerations/injury and various medications (National Psoriasis Foundation, 2016). Additionally, stress has been identified as a major factor that increases the likelihood of a psoriatic flare up (Evers, et al. 2010). Numerous studies throughout the past two decades have demonstrated a strong connection between stress and the exacerbation of physical problems in psoriatic patients (e.g. increased pain, plaque development), as well as emotional problems (e.g. perceived disability) (Schmid-Ott, et al. 2009, Chapman, & Moynihan, 2009, Segerstrom, & Miller, 2004). Incidentally, studies have demonstrated that reducing stress has decreased physiological symptoms of the disorder as well as the emotional issues that arise from the disorder (e.g. perceived disability). (Evers et al., 2010; Enamandram, & Kimball, 2013 & Schmid-Ott, et al. (2009).

There is increasing evidence to support the use of adjunctive interventions in the treatment of stress for medical patients, including patients with psoriasis. There are a variety of options available to physicians who treat psoriatic patients; these can be used alone as an alternative therapy or in conjunction with traditional medicinal practice as a complementary treatment. These integrative treatments include, but are not limited, to psychotherapy, including cognitive behavioral therapy, mindfulness based stress techniques, exercise, diet/nutrition and mind/body interventions such as acupuncture and acupressure (De Brouwer, et al. 2013, Schut, et al., 2013, Fortune, Richards, Griffiths, & Main, 2004 & Fortune, et al., 2003). Research suggests that using these strategies to reduce stress also reduces physical psoriatic symptoms by decreasing patient distress and anxiety, helping the patients improve their self-esteem and self-efficacy in treating the disease, and by increasing adherence to treatment regimens (Fortune et al., 2004; Fortune et al., 2003, Mizara, Papadopoulos, & McBride, 2012, Grillo, Long, & Long, 2004).

Psoriatic patients are often treated by primary care physicians and dermatologists. In the United States, prospective physicians may attend one of two programs, an osteopathic (DO) or an allopathic program (MD). Although there are many similarities between the two programs, the two differ in regard to medical philosophy and patient care (American Osteopathic Association, 2014, American Medical Association, 2014). DO programs emphasize a biopsychosocial model of clinical care, which conceptualizes a patient's symptoms as a dynamic interconnection of biological, psychological and social factors, including stress (Engel, 1980, Penney, 2013, American Osteopathic Association, 2014). Past studies have been conducted on MD and DO physician and student attitudes regarding integrative care and have found that DO's tend to have a more positive view of integrative care, compared with their MD counterparts

(Berman, Singh, Hartnoll, Singh, & Reilly, 1998). However, recent research suggests that the gap between the two orientations is narrowing and that MD's also have favorable attitudes towards integrative care. Although research has shown that the attitudes of both groups towards integrative care are generally favorable, there is no specific information to date concerning the attitudes of each of these groups towards adjunctive treatments for stress with the psoriatic population. Additionally, there is limited information on the types of recommendations they would make for these patients in order to reduce their stress.

Purpose of the Study

Medical research suggests that stress has a detrimental effect on psoriatic symptoms. For many patients, failure to address and treat stress may impede successful treatment of their symptoms. However, relatively little is known about the attitudes of medical interns, residents and attending physicians regarding integrative care for psoriasis; little is known, in fact, about whether or not they would even recommend adjunctive treatments for this population. The main purpose of this study is to examine the attitudes of medical interns, residents and attending physicians regarding integrative medicine and also to determine the types of adjunctive treatments that these individuals would recommend to their psoriatic patients. A better understanding of their attitudes towards the use of adjunctive treatments to address stress may help to determine if there is a need for training and education in the medical community regarding the benefits of stress management for psoriasis.

Chapter 2: Literature Review

Introduction to Psoriasis

Psoriasis affects approximately 7.5 million Americans and is the most prevalent autoimmune disorder in the United States (National Psoriasis Foundation, 2016). Psoriasis is a chronic skin condition in which skin cells grow too quickly, causing thick, raised scaly patches, also known as plaques, to develop on the skin. Common areas include the scalp, around the joints and the lower back although the condition can develop anywhere on the body (National Psoriasis Foundation, 2016). The disease can appear in different forms, each with its own symptom presentation. Plaque psoriasis, the most common form of the disease, is characterized by red scaly patches on the skin that typically appear on the elbows, knees, scalp and trunk of the body (National Psoriasis Foundation, 2016). Guttate psoriasis is the second most common type of psoriasis (10% of psoriatic patients) and is characterized by lesions on the skin that have the appearance of water-drops; these often appear on the trunk and limbs (National Psoriasis Foundation, 2016). Other less common forms of psoriasis include inverse psoriasis (located in skin folds such as the underarms), pustular psoriasis (pustules appear rather than plaques) and erythrodermic psoriasis, a rare (and most severe) type of psoriasis in which the majority of the skin is inflamed, reddened and painful to touch (National Psoriasis Foundation, 2016). Symptoms can range from mild in which there are a few scaly patches, to severe in which large portions on the body are covered resulting in immobility and hospitalization (National Psoriasis Foundation, 2016, Li & Armstrong, 2012; Raho, Koleva, Garattini, & Naldi, 2012).

Stress, The Immune System and Psoriasis

Recent pathophysiological explanations of psoriasis emphasize the role of immunological abnormalities in symptom presentation (National Psoriasis Foundation, 2016). T lymphocytes,

also known as T cells, is a type of white blood cell that is central to cell health and immunity (National Psoriasis Foundation, 2016). These cells typically travel throughout the body searching for potentially dangerous antigens, such as bacteria and viruses. Once an antigen is detected, the T cell becomes activated and exhibits an immune response in order to destroy the antigen. However in psoriasis, T cells become activated without the presence of a foreign substance. The cells come to the surface of the skin and proliferate rapidly, which is evidenced by the appearance of plaques on the skin (National Psoriasis Foundation, 2016).

British researchers examined T cell function with a small sample of psoriatic (n=15) and non-psoriatic patients (n=15) who were exposed to a brief psychological stressor within a laboratory setting (Schmid-Ott, et al., 2009). Psychological stress induced a sudden increase in T cell activation for both groups. However, psoriatic patients had significantly higher activation of T cells than the healthy controls (Schmid-Ott, et al., 2009). Additionally, the researchers found differences in natural killer (NK) cell presentation; these are cells that trigger the immune system to respond (Schmid-Ott, et al., 2009). Both groups had an increase in NK cell activity, but the psoriatic patients maintained high levels of NK cell activity for one hour after the psychological stressor had ended (Schmid-Ott, et al., 2009). This study suggests that psoriatic patients' experiences of stress on a cellular level are fundamentally different from the experiences of those without the disease. Psoriatic patients had a heightened physiological response not only to the initial stressor but also for a lengthy period after the stressor had dissipated. This heightened and prolonged stress response places added demands on the already dysfunctional immune system, thereby perpetuating and often worsening psoriatic symptom presentation (Schmid-Ott, et al., 2009). Additionally, Segerstrom and Miller (2004) conducted a meta-analysis of 300 empirical studies over a 30-year period, both of chronic and of acute stress and their effects on the immune

system. The researchers found that acute stress (stress lasting only minutes) was associated with adaptive immune system responses, but they also found that chronic stress suppresses cellular and humoral functioning (Segerstrom & Miller, 2004).

Stress also activates the hypothalamic-pituitary-axis (HPA-axis) and autonomic nervous system, both of which interact with the immune system and its overall ability to function (Evers, et al., 2010). To further examine the effects of stress on the immune system, Evers et al. (2010) measured the cortisol levels and self-reported daily stressors of 62 patients over a 6 month period. The researchers found that participants with consistently low cortisol levels were also the participants who reported high daily stress. The researchers suggest that these results are consistent with frequent reports of hypocortisolism in individuals diagnosed with various stress-related disorders; this may be due to over activity of the HPA-axis (Evers et al., 2010, Heim, Ehlert, & Hellhammer, 2000, Fries, Hesse, Hellhammer & Hellhammer, 2005, & Miller, Chen & Zhou, 2007). The results of the study also demonstrated a direct relationship between stress levels, cortisol levels and psoriatic symptoms. More specifically, the results demonstrated that individuals who reported high levels of daily stressors reported an increase in psoriatic symptoms. The results are significant because the study demonstrates a relationship between psychological stress and psoriatic symptoms. Therefore, when treating a patient with psoriasis, it is important for the medical professionals to monitor their patients' stress as well as to be aware of how stress impacts the disease and its symptom presentation. Additionally, if stress is present, the medical professional should incorporate stress management into the patients' treatment plans.

Psoriasis is widely considered as a multifactorial disease, meaning its presence and severity depends of an array of variables (Higgins, 1999). The biopsychosocial model of psoriasis, proposed by Rapp and colleagues (1997), provides a useful explanation of how

multiple patient variables come together and contribute to symptom presentation. According to this model, an individual is predisposed to particular genetic factors that increase the likelihood of developing the disease, the type of psoriasis developed (e.g. guttate, pustular) and the disease severity (Rapp, et al., 1997). The particular presentation of symptoms subsequently impacts the patient's psychological, physical and social functioning (Rapp et al., 1997). As the physical symptoms of psoriasis worsen, physical disability (perceived or actual) and psychological distress also increase. More specifically, the physical symptoms of psoriasis negatively impact psychological wellbeing and increase the chances of psychological distress. Additionally, psoriatic patients also experience an increased risk of alcohol/drug abuse, occupational impairment and an increased risk of suicide (Rapp, et al., 1997).

To further explore this model, Rapp and colleagues (1997) examined the effects of psoriasis on the psychological, physical and social wellbeing of 317 psoriatic patients. Participants were asked to complete a variety of questionnaires that examined disease severity, physical disability, psychological distress, and psoriasis related stressors (e.g. appearance of one's skin) (Rapp et al., 1997). Participants reported that psoriasis had a significant impact on their daily physical functioning such as cleaning, bathing, sleep and physical movement as well as a negative impact on preferred leisure activities such as sports, travel and exercise (Rapp et al., 1997). Participants also reported that psoriasis negatively impacted social interactions and their overall social lives. Participants reported that psoriasis negatively impacted social contact such as going out in public, sexual or intimate relationships, making physical contact with others (e.g. shaking hands) and even going out to socialize (Rapp et al., 1997). A large percentage of participants felt that psoriasis impacted their ability to go swimming in public; it was also a detriment to using the services of a barber/ hairdresser or to using public facilities (Rapp et al.,

1997). Last, participants felt that psoriasis impeded their ability to get promoted at work, limited their job opportunities and interfered with on their plans for the future (Rapp et al., 1997).

Suicidality was also assessed and results indicated that 25 percent of the sample had the desire to die at some point in their lives due to their symptoms and 8 percent currently did not want to live because of their symptoms (Rapp et al., 1997). Notably, approximately 1.6 percent engaged in self-injurious behavior or attempted suicide because of their psoriatic symptoms (Rapp et al., 1997).

In addition to physical and social issues, psychological and emotional stress has been well documented with psoriatic sufferers and has been implicated as a significant factor that can exacerbate psoriatic symptoms (Young, 2005, Evers, et al., 2010). Young (2005) suggests that the emotional and psychological burdens that accompany psoriasis are often equal to or worse than the psoriatic symptoms themselves. Many psoriasis sufferers report feeling ashamed, hopeless and anxious, indicating that their self-confidence is significantly impacted (Young, 2005). A survey conducted by the National Family Opinion (NFO) of 502 psoriatic patients between the ages of 18 and 35 found that 91% of patients reported that psoriasis directly impacted their self-confidence with 17% of respondents stating that it impacted their self-confidence “greatly” (Young, 2005). Platonic and romantic relationships are also negatively impacted by psoriasis and this can exacerbate patient stress. Coinciding with Rapp et al.’s (1997) study, 49% of the NFO participants reported a sense of reluctance to engage in physical contact; 30% felt reluctant to engage in casual physical contact (e.g. shaking hands), and 38% reported that psoriasis directly interfered with sex and intimacy (Young, 2005). Problems associated with intimacy appeared to be more prevalent in younger participants, with nearly half of all

participants between the ages of 18-24 reporting stress and anxiety during intimate situations (Young, 2005).

Psoriasis sufferers experience stress from their perceptions of being misunderstood by others (Young, 2005). Patients often worry that others may think that they are contagious or that something is fundamentally wrong with them. Patients often find themselves having to explain their symptoms to others, such as explaining to a hairdresser, prior to getting their hair done, that they have psoriasis. Psoriatic sufferers often dread having to explain their symptoms to others and fear the stigma that is attached to their disease. Nearly 74% of the NFO participants stated that they preferred not to be in public when they were having a flare up, fearing that they would be considered an “outcast” by others (Young, 2005).

In order to deal with the stress derived from their symptoms, many psoriasis sufferers develop a variety of ways of coping (Rapp, Cottrell & Leary, 2001). Some wear more clothing to cover plaques (e.g. long sleeves and pants in the summer), some use additional medications to help reduce chronic itch or pain, and some rely on friends and family for support (Rapp, Cottrell & Leary, 2001). Unfortunately, some psoriasis sufferers manage their stress in less adaptive ways, potentially creating additional problems or exacerbating their symptoms further. Some sufferers deal with their stress by excessive eating, avoidance of public situations and avoidance of sex and intimacy (Rapp, Cottrell & Leary, 2001). Some patients report using alcohol to cope with the stress related to their symptoms. Alcohol abuse has been identified as a significant risk factor for psoriatic patients and several studies have demonstrated a high prevalence of alcohol abuse with those who have the disease (Smith & Fenske, 2000; Higgins, 2001, & Barrucand, Emsellern, Tilikete, & Aubin, 1997). Studies also suggest that alcohol has additional, adverse effects for psoriatic patients, apart from the traditional physical side effects experienced by the general

population. More specifically, preliminary studies suggest that male psoriatic patients who drink alcohol have treatment responses less favorable than those who do not drink (National Psoriasis Foundation, 2016). Therefore, the way that patients cope with their stress, whether in positive or maladaptive ways, likely affects their psoriatic symptoms.

Overall, stress appears to play a significant role in symptom presentation and the exacerbation of symptoms due to its negative effects on the immune system. More specifically, stress impedes HPA-axis functioning and disrupts the normal functioning of specific cells (e.g. NK cells) responsible for immune system regulation and healthy skin growth. There are various types of medication options available to psoriatic sufferers to treat their symptoms; however, they are limited because they only address only the physical component of the disease.

Traditional Treatments for Psoriasis

Psoriasis is a chronic condition for which there is no cure. Traditional medical treatments are targeted towards controlling the physical symptoms of the disease, such as reducing redness, scaling and skin inflammation. Typical treatments for psoriasis include topical agents such as corticosteroids, systemic and biologic medications as well as various ultraviolet light therapies that help to slow the rate of skin growth, reduce inflammation and suppress the overactive immune system (Armstrong, Robertson, Wu, Schupp, & Lebwohl, 2013).

Topical agents such as moisturizers and ointments that often contain corticosteroids are the most common (and often frontline) treatments for psoriasis (National Psoriasis Foundation, 2016, Givan, Pearce, & Feldman, 2009). Corticosteroids are synthetic drugs that closely resemble the naturally produced hormone, cortisol (National Psoriasis Foundation, 2016, Givan, Pearce, & Feldman, 2009). The synthetic hormone is then combined with a steroid that works by reducing the immune system's inflammatory response (National Psoriasis Foundation, 2016,

Givan, Pearce, & Feldman, 2009). These drugs are generally used for patients with mild to moderate symptom and are used to reduce scaling, itching, redness and skin inflammation at the area of application (National Psoriasis Foundation, 2016, Givan, Pearce, & Feldman, 2009).

Systemic medications are another class of medications that can be taken orally or intramuscularly and are generally used for patients with moderate to severe psoriasis (National Psoriasis Foundation, 2016). Systemic medications are protein based immunosuppressant or immunomodulatory drugs, targeting the immune system responses that perpetuate psoriasis (Simaliakova, 2011, & National Psoriasis Foundation, 2016). Methotrexate, a systemic drug commonly used to treat cancer and rheumatoid arthritis, is often used in low doses with patients with severe symptoms who have not responded favorably to less invasive, topical treatments (Simaliakova, 2011, & National Psoriasis Foundation, 2016). Methotrexate works by blocking certain enzymes of the immune system, which slows cell growth, particularly of the skin (Simaliakova, 2011, & National Psoriasis Foundation, 2016).

A subtype of systemic medications is referred to as a biologic. Biologic medications, (e.g. Etanercept) are genetically engineered medications that are prescribed for moderate to severe plaque psoriasis and have been shown to be an effective treatment option (National Psoriasis Foundation, 2016). Studies have found that biologics are generally effective, with 43% to 93% of patients experiencing a significant decrease in symptoms (Reich, Burden, Eaton & Hawkins, 2012). Biologic medications are often considered to be more sophisticated than systemic medications because they interfere with the pathogenesis of psoriasis and have fewer side effects (National Psoriasis Foundation, 2016). Rather than compromise the entire immune system as traditional systemic medications would, biologics target specific cells that are responsible for the

development and maintenance of the disease (The Psoriasis Association, 2014, National Psoriasis Foundation, 2016).

Rather than using corticosteroids, systemic and biologic medications, psoriatic patients can also consider utilizing ultraviolet (UV) light therapy as an alternative to the more traditional treatment routes (Archier, et al., 2012). Psoralens ultraviolet A or PUVA therapy is a type of photochemotherapy that utilizes ultraviolet A light to treat plaques on the skin (Archier, et al., 2012). With this treatment, the patient is given a topical or oral light-sensitizing medication called psoralen and is then exposed to UVA light (Archier et al., 2012). Research on PUVA therapy has demonstrated promising results, with the majority of patients achieving remission or a significant reduction in symptoms after 12-15 weeks of treatment (Archier et al., 2012, Berneburg, et al., 2013).

Side Effects of Traditional Treatments

Although effective, corticosteroids come with potential side effects that may deter patients from using the medication or may influence the patient to discontinue the medication prematurely (National Psoriasis Foundation, 2016, Givan, Pearce, & Feldman, 2009). Common side effects of corticosteroids include minor irritation and cosmetic issues including stretch marks, skin thinning, dryness and redness (National Psoriasis Foundation, 2016, Givan, Pearce & Feldman, 2009). More serious complications include hyperglycemia, Cushing syndrome and adrenal insufficiency also known as Hypothalamus-Pituitary-Adrenal axis suppression (National Psoriasis Foundation, 2016, Givan, Pearce, & Feldman, 2009).

Although systemic treatments have also been shown to be an effective treatment for those who may not have responded to less invasive topical treatments, the side effects that are associated with this class of drugs can be a deterrent because they are detrimental. Because

methotrexate can be used as a chemotherapy drug in high doses, patients using this drug in high doses often experience side effects similar to those patients undergoing cancer treatment. These symptoms include nausea and vomiting, extensive hair loss and liver dysfunction (National Psoriasis Foundation, 2016 & Lee, et al., 2012). Additional side effects of this drug include cirrhosis of the liver, abnormal blood counts, lung problems and sensitivity to sun light (National Psoriasis Foundation, 2016 & Lee, et al., 2012).

An analysis of nationwide healthcare insurance information in Germany revealed that systemic medications were the most commonly prescribed medication for psoriasis by primary care and internal medicine physicians as well as by dermatologists (Mrowietz & Domm, 2013, Augustin, Shafer, & Reich, 2011). However, dermatological journals have suggested that these medications should not be prescribed due to significant issues that can occur after the patient discontinues the medication. More specifically, studies warn that patients may experience a reoccurrence or significant exacerbation of symptoms after discontinuation of the drug (Mrowietz & Domm, 2013, Augustin, Shafer, & Reich, 2011).

Women who are pregnant or plan to get pregnant in the future face an additional challenge with psoriatic treatment. Many of the traditional medications prescribed by physicians for psoriasis are not cleared for use in pregnancy. For example, methotrexate is classified as pregnancy category X (contraindicated) (Gromnica-Ihle & Kruger, 2010). It is occasionally used by physicians to induce abortion and can cause significant birth defects or termination of pregnancy if used when a woman is pregnant, or even when used months before the woman gets pregnant (Creinin, 1997, Lloyd, Carr, McElhatton, Hall & Hughes, 1999). When placed on a systemic agent, patients must remain on the medication for months if not years at a time. For women who are interested in becoming pregnant, this can interfere significantly with their ability

to plan a family. Additionally, for women who become pregnant during treatment, there is a significant chance of birth defects and even death of the child in-utero. Additionally, studies with women who discontinue these medications due to pregnancy have shown a significantly flare-up in symptoms post-delivery (National Psoriasis Foundation, 2016).

Biologic medications are considered safer than traditional systemic medications, but they also come with a variety of side effects (The Psoriasis Association, 2014, National Psoriasis Association, 2016). Biologic medications suppress the immune system thereby making the patient more easily susceptible to infection. Furthermore, due to its suppressive effects, the patient is less likely to be able to fight an infection should one be contracted. Minor side effects include injection site reactions, dizziness, headache and stomach pain (The Psoriasis Association, 2014). More severe side effects include upper respiratory infections, serious disorders of the nervous system (e.g. multiple sclerosis) inflammation of the nerves of the eye, blood disorders and an increased risk of various cancers (National Psoriasis Foundation, 2016). Additionally, because this class of medication has not been on the market for an extended period of time, the long term side effects of these medications are relatively unknown (The Psoriasis Association, 2014). For example, biologic medications, such as Humera and Enbrel, are classified at pregnancy category B (Butler, Heller & Murase, 2014). Extensive studies that provide a clear picture of the potential risks of biologics during pregnancy have not yet been conducted. Additionally, women who are pregnant or plan to become pregnant face the same challenges as those who are taking systemic medications (e.g. birth defects) (National Psoriasis Foundation, 2016).

PUVA treatments also come with physical side effects. Due to the frequent exposure of UV rays, patients receiving PUVA treatment are at a significantly increased risk for side effects

that affect the skin and immune system (National Psoriasis Foundation, 2016, Archier et al., 2012, Berneburg, et al., 2013, Wolff, 1990). Minor side effects of UV treatments include skin irritation and sunburn. More severe side effects include local or systemic immunosuppression as well as extensive and permanent skin or eye damage. Additionally, chronic exposure to UV rays leads to photocarcinogenesis, which includes significant changes in the immune system and genetic changes that often lead to skin cancers (e.g. squamous cell carcinoma) (Matsumura & Ananthaswamy, 2004, Archier et al., 2012).

Although these treatments have been shown in studies to be effective in treating psoriasis, they come with a variety of potentially dangerous side effects. Some of these side effects create minor daily inconveniences such as headache or sun sensitivity. However, others are quite serious and can deter some patients from remaining on the medication or taking the medication at all. In addition to the side effects, these medications are not able to treat all patients nor do they provide the same relief for everyone. Among 4,862 patients who responded to a biannual national survey administered by the National Psoriasis Foundation, 52.3% were dissatisfied with the traditional medical treatments that they were receiving (Armstrong, et al., 2013).

These traditional treatments also fail to address a major exacerbating factor of psoriasis-stress. Adjunctive treatments, which fall under the realm of integrated medicine, should be considered for psoriatic patients who appear to be experiencing significant stress in their lives. Research in the area of physician-patient relationships in regards to psoriatic treatment suggests that patients want their physicians to acknowledge their stress and frustration, including how the disease impacts their daily functioning (Uhlenhake, Kurkowski, & Feldman, 2010). Additionally, patients wished that their physicians were not only more compassionate, but also that they were more cognizant of the social-impact of their disease (Uhlenhake, et al., 2010). Based on the

research of stress and its negative effects on the immune system as well as its impact on psoriasis symptom presentation, the medical field should be urged to consider adjunctive treatments when treating psoriatic patients.

Integrated Care & Adjunctive Treatments for Psoriasis

Trends in research on treatment satisfaction for psoriatic patients suggest that nearly half of all patients are dissatisfied with their traditional medical regimen (Armstrong, Robertson, Wu, Schupp, & Lebwohl, 2013). Additionally, research suggests that many patients have an expectation that adjunctive treatments will be suggested to them by their physician. In 2008, researchers conducted a study with 1150 patients, inviting them to focus groups to gain a better understanding of their perspectives towards complementary and alternative medicine (CAM) and its role in their medical care (Ben-Arye, Frenkel, Klein & Sharf, 2008). The results of the study indicated that patients held a general expectation that their practitioners would suggest CAM treatments to them, that their physicians have knowledge about various CAM treatments and offer CAM treatments to them in the same office as the physician (Ben-Arye, et al., 2008).

There is increasing evidence to support the use of adjunctive interventions for the treatment of psoriasis. Adjunctive treatments, as defined by the National Cancer Institute (2016) are treatments that are generally used together with more traditional treatments with the purpose of assisting the primary treatment. Adjunctive treatments are often used in integrated care, a model of medical care that combines evidenced-based traditional treatments with adjunctive therapies (National Cancer Institute, 2016). There is greater interest from the medical community in regard to integrative medicine and the utilization of adjunctive treatments to treat stress in the medical population. There are a variety of options available to treat stress with psoriatic patients; these can be used alone as an alternative therapy or in conjunction with

traditional medicinal practice. These adjunctive treatments include but are not limited to psychotherapy, including group therapy and cognitive behavioral therapy and mind-body practices.

Group Therapy

The effectiveness of group therapy for psoriatic patients experiencing stress has been studied since the 1960s and has been found to be an effective form of adjunctive treatment for psoriasis (Shulte, Cormane, Dijk & Wuite, 1985). Group therapy is often utilized for psoriatic patients with the intentions to improve the patient's quality of life, improve the patient's ability to cope with stressors related to the illness and provide moral support to patients (Shulte et al., 1985). Shulte & colleagues (1985) asked 42 psoriatic patients to complete a 10 week group therapy program. Sessions occurred one time per week for two hours and followed a duo-formula group therapy (DFGT) model. In accordance with this model, group sessions were led by a patient with psoriasis and a physician (duo-facilitators) and focused on the physical and emotional aspects of the disease, including chronic pain, depression and anxiety (Shulte et al., 1985). At the end of 10 weeks, the participants reported a significant reduction in anxiety and depression as well as the development of new coping skills to combat negative emotional and physical symptoms (Shulte et al., 1985).

A smaller scale study with 8 psoriatic patients was conducted by Seng and Nee (1997); patients were asked to participate in 7 sessions of group therapy. Topics of discussion in therapy included education about psoriasis and its treatments, coping strategies to manage the physical and social problems of the disease and coping strategies to manage stress (Seng & Nee, 1997). At the conclusion of the study, 6 of the 8 participants reported a better understanding of their disease as well as an increased feeling of acceptance regarding their conditions (Seng & Nee,

1997). In regard to stress, 3 of the participants reported the program helped them gain a new perspective on dealing with stress and the other 5 participants reported that the program helped them learn new ways to cope with stress (Seng & Nee, 1997).

Psychotherapy/Cognitive Behavioral Therapy

There is increasing evidence to support the use of psychological interventions for the treatment of psoriasis. More specifically, preliminary studies suggest that psychotherapy reduces the psychological symptoms associated with the disease as well as the physiological symptoms, such as a reduction in redness, pain and visible plaques on the skin (Fortune, et al., 2002) A variety of psychotherapy programs have been developed in medical settings and are offered to patients as an adjunctive option. One such program, the Psoriasis Symptom Management Program (PSMP) consists of psychoeducation about the disease, treatment options including the efficacy of each treatment, stress management techniques as well as cognitive techniques to address maladaptive thoughts and beliefs about psoriasis (Fortune et al., 2002). Patients who participated in the program reported an overall decrease in physical symptom severity at the end of treatment as well as at a 6 month follow up (Fortune, et al., 2002). Additionally, patients also reported a decrease in anxiety, depression and perceived disability compared with the control group (Fortune, et al., 2002).

As discussed previously, psoriatic patients demonstrate differences in cortisol levels after stressful experiences. Cognitive behavioral therapy (more specifically, cognitive behavioral stress programs or CBS), have been shown to reduce cortisol activity for individuals with various inflammatory disorders (Schut, et al., 2013). German researchers examined the effects of a 10-14 week CBS training program on 28 patients with atopic dermatitis (Schut, et al., 2013). Atopic dermatitis is similar to psoriasis because it is an hereditary inflammatory disease, involves

cortisol and HPA-axis reactivity, is similar in symptom presentation (e.g. dryness and chronic itch), is exacerbated by stress and has been shown to affect a patient's life in a variety of ways, including occupational, social and psychological domains (Schut, et al., 2013). Patients were randomly assigned to the CBS or control group; endocrine stress levels and skin status were measured before and after treatment (Schut, et al., 2013). At completion of the study, patients in the CBS group showed a reduction in HPA-axis reactivity, remained calmer during psychological stress and showed a lowered cortisol secretion to acute stress compared with the control group (Schut, et al., 2013).

CBS programs involve cognitive restructuring which entails examining and modifying maladaptive thoughts and beliefs that a patient may have regarding their disease. Negative schemas about their symptoms, such as helplessness or hopelessness negatively impact their stress levels, which in turn can exacerbate symptoms (Mizara, Papadopoulous & McBride, 2012). Mizara, Papadopoulous and McBride (2012) examined the schemas of psoriatic and eczema patients, compared with healthy controls, and found a significant difference between groups. Patients with psoriasis were more likely to endorse the following schemas: emotional deprivation, social isolation, defectiveness, failure, vulnerability to harm, subjugation and emotional inhibition (Mizara, et al., 2012).

CBS also aims to help the patient examine and improve their problem solving strategies (Schut, et al., 2013, Mizara et al., 2012). For example, some patients with psoriasis may employ an avoidance problem solving strategy in which they may avoid seeking treatment, may not adhere to their treatment regimen or may engage in activities that exacerbate their symptoms, such as drinking alcohol (Schut, et al., 2013, Mizara et al., 2012). CBS techniques help the patient identify any maladaptive strategies and guide the patient in making gradual modifications

to his or her strategy to help improve patient wellbeing and reduce symptoms. (Schut, et al., 2013).

Mindfulness Techniques

Mindfulness Based Stress Reduction, or MSBR, combines mindfulness meditation and yoga practices with the ultimate goal of reducing a patient's overall stress. Originally developed for patients with chronic pain, it has been shown to be effective for people with a variety of physical syndromes (Kabat-Zinn, 1982, Chisea & Serretti, 2009). The foundation of MSBR is mindfulness meditation, which consists of placing one's attention on the present moment, of nonjudgmental awareness, curiosity, openness and acceptance of all internal and external experiences (Chisea & Serretti, 2009, Bishop, Lau, & Shapiro, 2004, Kabat-Zinn, 1994). MSBR includes three distinct techniques including body scan, sitting meditation and yoga practice (Kabat-Zinn, 1990, Chisea & Serretti, 2009). Body scan includes gradual awareness of one's body and sensations and also utilizes specific breathing and relaxation techniques; the meditation component includes focusing one's awareness on breathing, cognitions and various distractions that enter one's mind (Kabat-Zinn, 1990, Chisea & Serretti, 2009). Finally, the yoga component focuses on breathing, stretching and postural positioning designed to strengthen the musculoskeletal system (Kabat-Zinn, 1990; Chisea & Serretti, 2009).

Researchers examined the effects of MSBR on 37 psoriatic patients currently receiving PUVA therapy and UVB phototherapy (Kabat-Zinn, et al., 1998). Participants were randomly assigned to the experimental group who listened to MSBR guided audiotapes while receiving phototherapy, or to the control condition who received phototherapy alone, each for approximately 40 treatment sessions (Kabat-Zinn, et al., 1998). At the conclusion of the study, patients in the experimental group reached their skin clearance goal 3.8 times faster than the

control group, suggesting that MBSR is an effective adjunctive treatment for psoriatic symptoms and can be paired effectively with traditional, well-established medical treatments (Kabat-Zinn, et al., 1998).

A variety of other empirically supported complementary and adjunctive treatments are available to psoriatic patients in helping to control stress. Acupuncture is a treatment utilized by some patients and research has suggested some promising results both in reducing stress and in reducing psoriatic symptoms (Cabioğlu, et al., 2012, National Psoriasis Foundation, 2016). Additionally, research has suggested that acupuncture is one of the most popular forms of complementary medicine, compared with other treatments (Perry, Dowricka & Ernsta, 2014). Acupuncture is thought to work by synthesizing and releasing specific neurotransmitters in the brain that are related to positive feelings and relaxation, thereby facilitating a calming and relaxed state (Cabioğlu, et al., 2012). Liao & Liao (1992) examined the effects of acupuncture with 61 psoriatic patients who were not responding to traditional treatment. Patients had been diagnosed with psoriasis, on average, for 16 years and for the purposes of this study, received, on average, 9 sessions of acupuncture. At the conclusion of treatment, nearly half of the patients (30) were found to be in complete or near complete remission of symptoms; another 25 percent (14) reported 2/3 skin clearance, and 8 patients reported 1/3 skin clearance (Liao & Liao, 1992).

These studies on adjunctive therapies and techniques demonstrate the effectiveness of integrative care on psoriatic outcome and presentation. Because stress can exacerbate psoriatic symptoms, controlling the patients' stress is vital to their care. Traditional medicines, which include corticosteroids, systemic medications, biologics and light therapies do not address patient stress. This suggests that integrative treatments are a necessary component to patient care and

should be utilized alongside traditional treatments. Studies have been conducted on physicians' and medical students' attitudes toward adjunctive treatments and have demonstrated some promise that the medical community is getting closer to adopting adjunctive treatments as a vital component of psoriatic treatment. However, past research indicates that some physicians, particularly allopathic physicians, may be less open than their osteopathic counterparts to these treatments. Additionally, there is no research to date on exactly what type and how often the medical community is actually recommending adjunctive treatments to their patients.

Medical Professionals' Attitudes towards Integrated Care

In the United States, prospective and current physicians attend one of two programs, an osteopathic (DO) or an allopathic (MD) program. Allopathic programs, in which one ultimately obtains a medical doctor (MD) degree, is perhaps the most well-known to the general public, but the doctor of osteopathic medicine degree (DO), is gaining increased awareness. In regard to education and training, the two programs have many similarities. Both programs require the student to acquire a strong foundation in basic medical education, primary and emergency care skills and medical ethics; they also engage in clinical rotations in various domains of medical practice such as gynecology, psychiatry and internal medicine (American Medical Association, 2014, American Osteopathic Association, 2014). Additionally, both programs require internship, residency, fellowships and continuing education throughout their careers (American Osteopathic Association, 2014).

Although there are many similarities between the two programs, the two differ in regard to medical philosophy and patient care. One main distinction in the education of osteopathic physicians is in the use of osteopathic manipulative treatment (OMT) as well as increased education and training in the musculoskeletal system (American Osteopathic Association, 2014).

OMT, a non-medicinal treatment, involves the use of the physicians hands to help prevent, diagnose and treat various illnesses by utilizing specific techniques (e.g. stretch, resistance training and pressure) intended to facilitate the body's natural ability to heal itself (American Osteopathic Association, 2014, Paulus, 2013). These programs also emphasize the “whole person approach” to medical treatment, treating the entire patient rather than the patient's symptoms alone; there is also an extensive focus on preventative care (American Osteopathic Association, 2014).

Osteopaths emphasize treating the whole person and are dedicated to a whole-person approach to patient care (Engel, 1980, Penney, 2013). This dedication is evident in their philosophy which is outlined in the four basic tenets of osteopathic care (Penney, 2013). The four basic tenets include: 1. The body is an entire functioning unit, consisting of the body, mind and spirit; 2. The body is capable of self-healing, self-maintenance and self-regulation; 3. Body structure and function are interrelated and reciprocal, and 4. Rational treatment of the patient should be based on the first three tenets of osteopathic philosophy (Engel, 1980, Penney, 2013).

DO programs also emphasize a biopsychosocial model of clinical care, which conceptualizes a patient's symptoms as a dynamic interconnection of biological, psychological and social factors (Engel, 1980 & Penney, 2013). These factors influence patient coping, symptom presentation and perception, patient functioning and prognosis. This model also provides a framework for the relationship between the patients' subjective experiences of their symptoms and their impact on medical outcomes (e.g. accurate diagnosis, compliance to physician recommendations) (Engel, 1980 & Penney, 2013).

Trends in research suggest that MD programs are holding strong to the biomedical model of patient care. This model emphasizes the biological/physiological component of illness but

often fails to acknowledge other lifestyle factors that contribute and exacerbate illness (Jaini & Lee, 2015). Jaini and Lee (2015) completed a systemic review of research conducted on the biopsychosocial model and allopathic medical education going back to the 1970's. The study aimed to determine whether or not allopathic programs incorporated the biopsychosocial model into their curriculum (Jaini & Lee, 2015). Results indicated a significant trend in research in the biopsychosocial model in medical school, particularly since the year 2000 (Jaini & Lee, 2015). However, the researchers found that only 5 allopathic medical schools incorporated the biopsychosocial model into the medical curriculum (out of the 136 MD schools available in the United States at the time the research was conducted) (Jaini & Lee, 2015). It is important to note that this research study can report only on what has been disclosed by the school (e.g. it is not clear if the other medical schools still incorporate the biopsychosocial model but did not report it) (Jaini & Lee, 2015). However, it suggests a possible discrepancy between patient care models between MD's and DO's.

However, many medical students do report interest in integrative care and want it to be a part of their general medical training. A study conducted with 308 medical students sought to gain a better understanding of their perspectives towards CAM treatments (Flaherty, Fitzgibbon & Cantillon, 2015). Overall, students reported that doctors who had general knowledge of CAM provided better care to their patients (Flaherty, Fitzgibbon & Cantillon, 2015). Additionally, the majority of students who utilized CAM in the past had more positive attitudes towards CAM treatments than those who did not (Flaherty, Fitzgibbon & Cantillon, 2015). Sixty-eight percent of participants expressed interest in studying CAM as a part of their medical education (Flaherty, Fitzgibbon & Cantillon, 2015).

Several studies have examined the use of integrated care, particularly complementary and alternative medicine, on osteopathic and allopathic primary care physicians. Berman and colleagues (1998) found that osteopathic practitioners had more training in complementary treatment, considered it to be more legitimate form of treatment and were more likely to have used it. However, the results of this study on 849 physicians should be interpreted with caution because there were a disproportionate number of allopathic participants compared with osteopathic participants (66 and 783, respectively) (Berman, Singh, Hartnoll, Singh, & Reilly, 1998).

To examine the attitudes of osteopathic medical students towards adjunctive treatment, as well as their utilization of such treatment, researchers administered questionnaires to 635 DO students from 7 universities across the United States (Kanadiya, Klein & Schubrook, 2012). The results demonstrated that 83% of students self-reported the use of at least one form of adjunctive treatment with 10.9% using only one adjunctive treatment and 72.1% using at least 2 or more (Kanadiya, Klein & Schubrook, 2012). The most commonly recommended forms of adjunctive treatments for patients and non-patients included yoga, meditation, relaxation, massage and spirituality (Kanadiya, Klien & Schubrook, 2012). The study also demonstrated that fourth year DO students were more likely than first year students to recommend adjunctive treatments and women were more likely than men to recommend such treatment. Notably, the results of the study also showed that these students were significantly more likely to recommend adjunctive treatments to non-patients (such as friends), compared with patients.

Although research has suggested that osteopaths are more likely to support adjunctive treatment, the gap between osteopaths and allopaths appears to be narrowing. Lie and Boker (2006) examined the attitudes, use and information-seeking of complementary and alternative

treatments by surveying 667 allopathic medical students, interns and medical faculty. Overall, the research suggested allopathic medical students, interns and faculty demonstrated positive attitudes towards adjunctive treatments and frequently utilized adjunctive modalities (Lie & Boker, 2006). The results of the study also suggested that medical faculty were among the most likely to integrate alternative treatments into their instructions and had more positive attitudes about its use (Lie & Boker, 2006). Additional research with allopathic medical students found that many endorse the idea that western medicine would benefit from alternative treatments, that education about these treatments should be included in the medical curriculum and that adjunctive treatments were of personal importance to them (Chaterji, et. al., 2007). However, other studies with medical students have indicated that medical students have positive attitudes towards the principles of CAM but not necessarily to CAM treatment (Abbott, Hui, Hays, Mandel, Goldstein, & Winegarden, et al., 2009).

Trends in attitudes towards integrative medicine demonstrate that physician attitudes are changing, but the research has not been consistent in regard to the direction of the change. One longitudinal study examined the attitudes and knowledge of physicians towards CAM treatment in 2004 and then again in 2012 (Wahner-Roedler, Lee, Chon, Cha, Loehrer & Bauer, 2014). Results of the study showed that physicians in 2012 demonstrated significantly more positive attitudes towards CAM and also that physicians showed an increased willingness to suggest CAM treatments to their patients (Wahner-Roedler, et al., 2014). Interestingly, physician knowledge about CAM did not change, suggesting that further educational interventions regarding CAM may be needed in medical training (Wahner-Roedler, et al., 2014). However, not all research shows an increased interest in CAM treatments. A study conducted in the UK in 2014 compared endorsements of CAM by general practitioners in 1999 and again in 2014 (Perry,

Dowricka, & Ernsta, 2014). Results indicated an overall decrease in CAM endorsement by physicians from 1999 (38%) to 2014 (19%) (Perry, Dowricka, & Ernsta, 2014).

Some studies suggest that certain characteristics of a physician may influence attitudes towards integrative care and professional practice. More specifically, results from a 2003 study with 423 osteopathic physicians indicated that female physicians were significantly more likely than male physicians to talk to their patients about CAM (Kurtz, Nolan & Rittinger, 2003). Additionally, it appears that younger physicians are more likely to use CAM themselves, compared with older physicians. Results from the same study indicated that physicians aged 35 and younger were significantly more likely than those aged 60 and older to use CAM themselves (Kurtz, Nolan & Rittinger, 2003). Last, results suggested that physicians were more likely to suggest CAM treatment to patients with (a greater number of OR more severe?? ?) chronic conditions, when traditional therapies fail or are less effective and when psychiatric/behavioral concerns are present (Kurtz, Nolan & Rittinger, 2003).

Although there is substantial research to suggest that osteopaths and a growing number of allopaths are in support of adjunctive treatment, the research in this area is very broad. These studies examine students' and medical professionals' attitudes and utilization of adjunctive treatments in general but to date, no research has been conducted on their attitudes about adjunctive treatments for psoriasis. Additionally, research has suggested that a difference in attitudes depends of the level of experience medical professionals have (Lie & Boker, 2006). More specifically, professionals with more experience, such as residents and attending physicians, may be more likely to suggest and utilize adjunctive treatments compared with those with less experience, such as medical interns, who have less experience in the field (Lie & Boker, 2006).

Conclusion

Psoriasis is a chronic condition that affects patients in a variety of domains: from the physical effects of the disease to its psychological and social impact on daily functioning. This impact on daily functioning can directly affect the patient's stress, which has been shown to disrupt immune system and central nervous system functioning. This added stress and negative changes to the immune and central nervous system can exacerbate psoriatic symptoms. More specifically, psoriasis can produce stress, and this stress subsequently worsens psoriasis, causing a destructive disease cycle. The cyclic nature of this problem highlights the need for psoriatic patients to manage their stress levels.

Chapter 3: Hypothesis

Hypothesis I:

Osteopaths will score higher (more positive) on ratings that measure attitudes towards integrated medicine, compared with allopaths.

Hypothesis II:

Attending physicians will score higher (more positively) on ratings that measure attitudes towards integrating medicine, compared with interns and residents, regardless of medical orientation.

Hypothesis III:

Osteopaths will recommend significantly more adjunctive treatments to their psoriatic patients to address their stress, compared with allopaths.

Chapter 4: Method

Design & Design Justification

This study utilized a quantitative, quasiexperimental, between subjects survey design. This particular design was chosen because survey instruments were administered to a group of participants and then the data were further examined for similarities and differences between groups. A quasiexperimental design was most appropriate for this study because random assignment of participants was not possible. Participants were assigned to their particular groups based on their medical orientation and professional status. More specifically, participants were assigned to one of six groups, (1) MD intern, (2) MD resident, (3) MD attending physician, (4) DO intern, (5) DO resident, and (6) DO attending physician.

Participants

For this study, medical interns, residents and attending physicians that were in the process of completing or had already completed an allopathic (MD) or osteopathic (DO) program were asked to participate voluntarily via online request (e.g. email request). To determine the appropriate sample size for the study, a power analysis was conducted and revealed that a minimum of 99 participants ($n = 99$) were needed with .80 power and a medium effect size of $f^2 = .15$. This study aimed to obtain 150 participants (approved by the IRB) because it was anticipated that some participants would be excluded due to missing data. At the conclusion of data collection a total of 120 participants engaged in the study. However, 15 participants were later excluded due to missing data. Therefore, a total of 105 participants ($n = 105$) were included in this study.

Descriptively, 57.5% of participants identified as having an osteopathic orientation and 42.5% identified as allopathic. In regard to professional status, 35.8% of participants were

attending physicians; 45.3% were residents, and 18.9% were interns. Demographic information revealed a relatively close split between male and female participants, with 57.5% of respondents being male and 42.5% participants being female. In regard to ethnicity, the majority of respondents (65.1%) identified as Caucasian; 23.6% identified as Asian/Pacific Islander; 3.8% were African American; 3.8% Hispanic/Latino, and 6.6% chose not to disclose their ethnicity. Of the participants, 26.4% reported that either they or someone close to them had psoriasis. To determine the degree of knowledge participants had in regard to psoriasis, participants were asked to report the degree of training they had in the diagnosis of the disease. Nearly half of participants (50.9%) reported having either a “good” or “great” deal of training; 42.6% reported having “some” training, and 2.8% reported having no formal training in diagnosing psoriasis, although all participants indicated that they had general knowledge of the disease. Participation in the study was open to all medical professionals, given that they met the broad inclusion criteria outlined in this study.

Inclusion Criteria

Inclusion criteria for participation in this study included currently being enrolled in or have already completed a medical doctor (MD) or doctor of osteopathic medicine (DO) degree program at the time of data collection. Current students (interns) must have been in good academic standing and recognized as an active student within their institutions (e.g. not currently on academic probation or currently taking a leave from school). Participants with psoriasis or those with close family members who have the disease were permitted to participate in the study.

Exclusion Criteria

Exclusion criteria included students who were on academic probation, on academic leave or otherwise were not currently an active student in their programs at the time of data collection.

Medical professionals who were not currently MD or DO interns, residents or attending physicians were also excluded (e.g. nurse practitioners, physician assistants).

Recruitment

Participants were obtained through email requests to participate in the study. More specifically, an email was sent to possible participants with a brief explanation of the study and a link to participate in the study (see Appendix A). Some osteopathic interns, residents and attending physicians were recruited through an osteopathic hospital's DO student directory via email request after receiving permission from the hospital's Institutional Review Board (IRB). Some allopathic interns, residents and attending physicians were recruited through a medical university's MD alumni directory via email request after receiving permission from the university's IRB. Both universities are in the eastern Pennsylvania area. In order to recruit additional participants, Listserv's from organizations such as the Society of Teachers of Family Medicine, as well as social media outlets (LinkedIn and Facebook) were also utilized. After completion of the survey, participants were offered entry into an optional reward drawing as an incentive for participating in the study. The optional reward drawing was not linked to the original survey. Upon completion of the survey, participants were provided with a separate link, transferring them to a new webpage where they could input their personal information for the drawing (the researcher required a way to contact the participants that won the drawing). Participants were advised that their personal information would not be linked to their original survey responses and that the drawing was completely voluntary.

Measures

Demographics Questionnaire: This questionnaire was specifically designed for the purposes of this study and aimed to obtain: (1) demographic information (e.g. gender, ethnicity), (2)

information about the respondent's professional background (e.g. medication orientation, professional status) and (3) degree of training in psoriasis (see Appendix B). Items on the questionnaire included statements such as "Have you had formal training in the diagnosis of psoriasis (e.g. classes, medical rotation?)" and "Do you, a family member or close friend have psoriasis?" This questionnaire was posted on SurveyMonkey.com. Validity and reliability information is not available for this questionnaire.

Integrative Medicine Attitudes Questionnaire (IMAQ): The IMAQ (2003) is a 29-item questionnaire that measures healthcare providers' attitudes regarding integrative medicine (Schneider, Meek & Bell, 2003) (see Appendix C). Items on the questionnaire include statements such as "Healing is not possible when a disease is incurable" and "The physician's role is primarily to treat disease, not to address personal change and growth of patients" (Schneider, Meek & Bell, 2003). The IMAQ utilizes a 7 point Likert scale, ranging from 7 "*absolutely agree*" to 0 "*absolutely disagree*" (Schneider, Meek & Bell, 2003). In regard to scoring, respondents who absolutely agree with a positive statement or absolutely disagree with a negative statement are given a score of 7 points (Schneider, Meek & Bell, 2003). Respondents who absolutely disagree with a positive statement or absolutely agree with a negative statement are given a score of 1 (Schneider, Meek & Bell, 2003). Approximately half of the items are reverse scored. A sum is then taken of the participants responses, which are referred to as the participants' integrative medicine attitude score (Schneider, Meek & Bell, 2003). Higher scores are indicative of a more positive attitude towards integrative medicine. This measure which was originally in Microsoft Word format was adapted so that it could be completed on the SuveryMonkey.com website, after permission from the author was obtained.

Internal reliability consistency of the IMAQ was examined by utilizing an item-to-item correlation, which ranged from $-.32$ to $.67$, as well as cronbach's alpha ($.89$) (Schneider, Meek & Bell, 2003). The authors report that several negative item-to-item correlations were expected due to the proposed subscales, but they also report that this did not significantly affect cronbach's alpha (Schneider, Meek & Bell, 2003). Further revision of the instrument, which included the removal of 2 items, resulted in reliability improvements to the entire 29 item instrument as well as to the Openness and Relationship subscales (cronbach's alpha = $.92$, $.91$ and $.72$ respectfully) (Schneider, Meek & Bell, 2003).

The factorial validity of the measure was examined using principle component extraction and varimax rotation with the Eigen value set as over one (Schneider, Meek & Bell, 2003). Further exploration of the items and the measure's overall structure revealed a 2 factor model that explained 38% of the total variance in the responses (Schneider, Meek & Bell, 2003). The first factor, Openness, comprising 20 items, had factor loadings of $.36$ to $.79$ and was responsible for 26% of the total variance (Schneider, Meek & Bell, 2003). The second factor, Physician-Patient Relationship, comprising the remaining 11 items, was responsible for the remaining 12% of the variance (Schneider, Meek & Bell, 2003). Discriminant validity was also tested with the finalized 29 item IMAQ with 2 groups of physicians that were expected to differ, relative to their attitudes towards alternative treatments (Schneider, Meek & Bell, 2003). The two groups consisted of a group of American Holistic Medical Association (AHMA) conference attendees who were thought to be more open to complementary treatments and a group of general internists from an academic medical center (Schneider, Meek & Bell, 2003). The total score for the AHMA group was significantly higher ($t = 12.05$, $df = 191$, $p < .001$) (194 , $SD 19$) than the

general internist group (160, SD 20) (Schneider, Meek & Bell, 2003). This suggests that the IMAQ is a useful and valid tool in differentiating attitudes regarding alternative medicine.

Patient Vignette & Recommendations for Psoriatic Treatment Questionnaire: The patient vignette outlines the experience of a mock patient who presents with psoriasis and indicates that she has experienced a recent flare in symptoms (see Appendix D). The vignette also includes a stress component. More specifically, the mock patient reports stress related to her symptoms (e.g. embarrassment), as well as life stressors that occur around the time of the flare up (e.g. break up with a significant other). The stress component was included for two reasons: (1) in order to determine if the participant would recognize that stress should be addressed as part of the patient's treatment, and (2) the adjunctive treatments that the participant would recommend to the patient to address her stress. The Recommendations for Psoriatic Treatment Questionnaire aimed to gather information on the types of treatment recommendations that the participants would make to the patient presented in the vignette (see Appendix E). More specifically, the questionnaire aimed to collect information on (1) whether or not participants would recommend non-medical adjunctive treatments for their patients with psoriasis, (2) what type of adjunctive treatments they would recommend, and (3) what type of traditional treatments they would recommend. Participants had the option to choose from four traditional options: topical medications/corticosteroids, biologic medications, methotrexate and PUVA/phototherapy. Participants also had the option to choose from 10 adjunctive options: psychotherapy, cognitive behavioral therapy, group therapy, general exercise, diet/nutritional support, vitamins/supplements, yoga/pilates/tai chi, mind-body therapies, acupuncture/acupressure and herbs/natural remedies. Last, participants had the option to input, manually, any treatment

recommendation that they would make, in addition to those that were listed (under the “other” section of the questionnaire).

Procedure

All survey questions were integrated into an online format and uploaded to the SurveyMonkey.com website. Potential participants received a link to the site along with a request to participate in the study and brief information regarding the study. Participants were asked to participate in a study about the treatment of psoriasis, as well as their attitudes towards integrated care. They were advised that their participation was completely voluntary and that they could discontinue the study at any time. Participants were asked to complete the demographic questionnaire and then were asked to complete the 29-item IMAQ. They then read the patient vignette, which included the patient’s symptoms (symptom history and present symptoms) as well as current psychological and social stressors. Participants then selected treatments that they would recommend to the mock patient (provided to them in a checkbox format). As stated previously, if the treatment recommendation was not listed they were asked to input their treatment options in the “other” section. Last, participants were asked if they would like to be entered into the optional reward drawing for their participation. All participants received the same questionnaire in the same format, with the treatment recommendations questionnaire being completed last.

Chapter 5: Statistical Plan

Hypotheses

Hypothesis I: Osteopaths will score higher (more positively) on ratings that measure attitudes towards integrated medicine, compared with allopaths.

Hypothesis II: Attending physicians will score higher (more positive) on ratings that measure attitudes towards integrating medicine, compared with interns and residents, regardless of medical orientation.

Hypothesis III: Osteopaths will recommend significantly more adjunctive treatments to their psoriatic patients to address their stress, compared with allopaths.

In order to reduce the chances of a Type II error, a power analysis was conducted and power was set at 0.80. The power analysis was also conducted to determine the number of participants necessary to obtain an 80% power and a medium effect size of $f^2 = .015$ at the .05 level and revealed that a minimum of 99 participants were required. As stated previously, a final total of 105 participants were included in this study.

To test the first and second hypotheses, a 2x3 factorial analysis of variance (ANOVA) was utilized. The first independent variable was the medical background of the students, with 2 levels (osteopathic or allopathic); the second independent variable was the professional status of the participant, with 3 levels (intern, resident and attending physician). The dependent variable, which was on a continuous scale, was the reported attitudes of the participants, relative to integrated care. The alpha level was set as $\alpha = 0.05$.

Prior to running the *F* test for ANOVA, a test of assumptions was conducted. First, ANOVA maintains the assumption of normality which assumes that the dependent variable is an approximation of a multivariate normal distribution. Therefore, a test for outliers was run (i.e. a boxplot) before performing the ANOVA to determine if any extreme outliers needed to be removed (French et al., 2014). No outliers were removed from this study.

ANOVA also assumes that each independent variable is mutually exclusive and independent from another (Field, 2013). In this particular case, the independent variables are

mutually exclusive because the first independent variable is assessing medical orientation and the second independent variable is assessing current professional status in the medical field.

Last, factorial ANOVA also assumes homoscedasticity of error variances (French, et al., 2014). This means that errors in measurement should remain consistent throughout the scale and should not change across values. If the variances of the two groups are significantly different from each other, an estimate of within-group variance cannot be computed (French et al., 2014). Homoscedasticity was tested by conducting a Levene's Test of Equality of Error Variances (French, et al., 2014).

To test the third hypothesis, (determining if significant differences existed between the average number of treatments and medical orientation), three separate independent sample t-tests were computed. As with the *F* test for ANOVA, a test of assumptions was conducted for this set of tests. The t test for independent sample means assumes that random sampling from a defined population has occurred (Field, 2012). That is, that each member of the population had an equal chance of participating in this study. Second, there is an assumption that samples are independent from one another (Field, 2012). More specifically, there should be no overlap between the participants in one sample as compared with the other (as would be seen in a dependent samples t-test). For this study, the samples were mutually exclusive because participants were divided by medical orientation and no participant in the study identified as having an MD and DO degree. As in the *F* test for ANOVA, the t-test assumes that scores are normally distributed in a population (Field, 2012). According to the Central Limit Theorem, even if a population distribution is not normal, the sampling distribution of the means approaches normality as the sample size increases. The t-test is robust with regard to deviations from the normality assumption. Scatterplots revealed that the distributions of the dependent variable appeared

relatively normal. Last, the t-test assumes that population variances are equal; this was tested by conducting a Levene's Test of Equality of Error Variances (French, et al., 2014).

Chapter 6: Results

A 2x3 factor ANOVA was conducted in order to determine if: osteopaths scored higher (more positively) on ratings that measured attitudes towards integrated medicine, compared with allopaths (Hypothesis I), as well as whether attending physicians scored higher (more positively) on ratings that measured attitudes towards integrative medicine, compared with interns and residents, regardless of medical orientation (Hypothesis II). More specifically, the 2x3 factorial ANOVA was performed to determine if any main effects and/or an interaction existed between medical orientation (IV 1), professional status (IV 2) and attitudes towards integrated care (DV). Medical orientation (IV 1) had two levels: MD and DO. Professional status (IV 2) had 3 levels: intern, resident and attending physician. Results indicated no significant main effects for medical orientation and professional status in regard to attitudes towards integrated care at the .05 significance level. The test of the main effect for medical orientation was not significant, $F(2,100) = 1.69, p = .19$, and likewise the main effect for professional status was not significant, $F(1,100) = .05, p = .83$. However, the interaction effect was determined to be significant, $F(2,100) = 3.98, p = .02$.

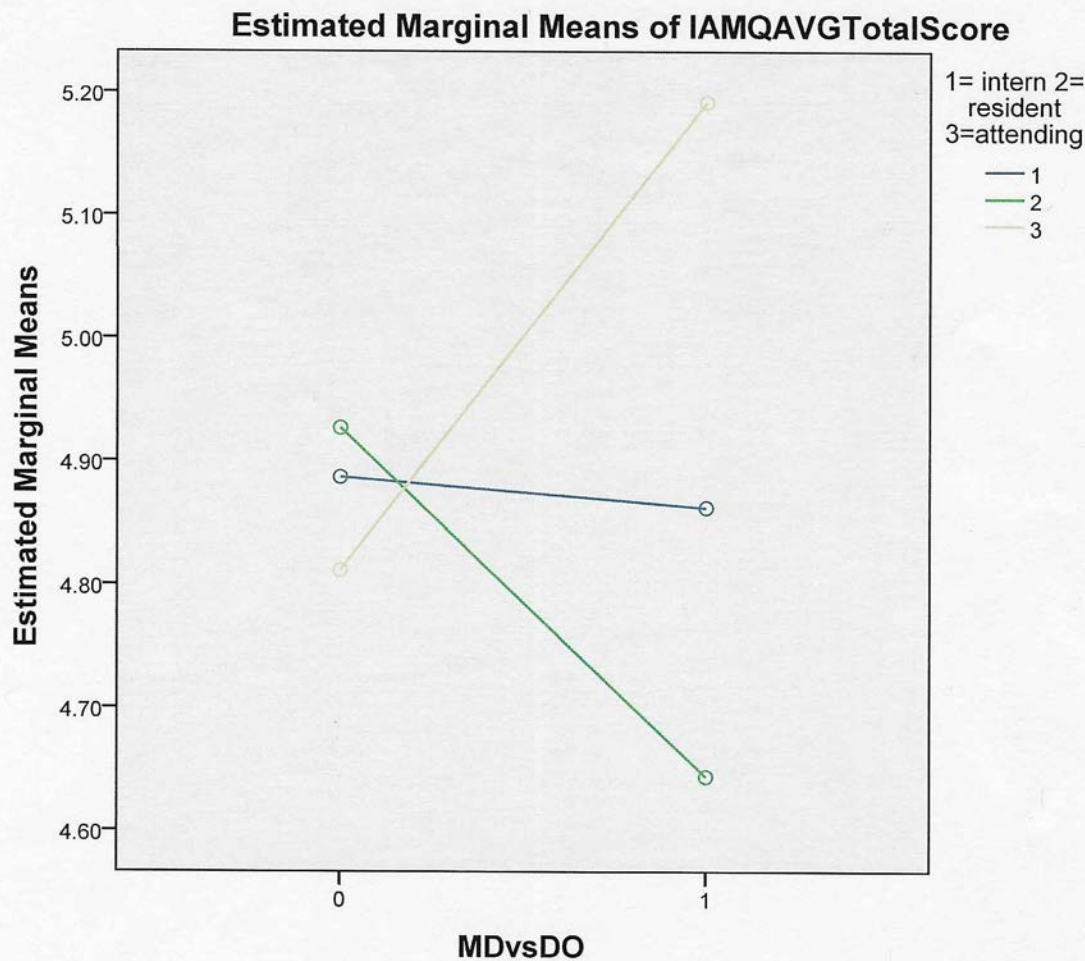
To determine where the significant difference existed, two simple main effects analysis using an ANOVA and post hoc Tukey analysis, when relevant, was conducted. The means of the MD's for interns, residents and attending physicians were compared, as well as the means of the DO's for interns, residents and attending physicians, on the IMAQ measure. Results of the analysis found no significant differences between DO interns and DO residents or between DO interns and DO attending physicians. However a significant difference was found between DO

residents and DO attending physicians at the .05 significance level (see Table 1). More specifically, DO attending physicians had significantly more positive attitudes towards integrative care, compared with DO residents. There were no differences between MD interns, residents and attending physicians. These findings are shown in Figure A.

Table 1: Test of Between-Subjects Effects

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	3.686	5	0.737	2.576	0.031
Intercept	2080.57	1	2080.57	7268.02	0
levelrecoded	0.969	2	0.485	1.693	0.189
MDvsDO	0.013	1	0.013	0.045	0.833
levelrecoded * MDvsDO	2.278	2	1.139	3.979	0.022
Error	28.626	100	0.286		
Total	2570.416	106			
Corrected Total	32.313	105			

Figure A: Interaction Effect (Average Total Score for IMAQ) for Osteopathic Participants



To test whether osteopaths recommended significantly more adjunctive treatments to their psoriatic patients to address their stress, compared with recommendations from allopaths (Hypothesis III), an additional 2x3 factor ANOVA (as shown in Table 2) was performed. The 2x3 factor ANOVA was performed to determine if any main effects and/or an interaction existed between medical orientation (IV 1) and number of non-traditional (adjunctive) treatments recommended (DV). A second independent variable was added (professional status – IV 2) to determine if this variable influenced the number of non-traditional treatments that were recommended. The independent variables had levels that were the same as indicated previously. Results indicated no significant main effects for medical orientation, $F(1,98) = .00$, $p = .99$, and

professional status, $F(2,98) = 2.12$, $p = .13$, in regard to the number of non-traditional recommendations made at the .05 significance level. No significant interaction was found. Hypothesis III was not supported and was therefore rejected.

Additional Analyses

Additional analyses were conducted to determine if any significant difference existed between medical orientation, professional status, traditional treatments and total treatments (traditional and non-traditional treatments combine). First, a 2x3 factor ANOVA was conducted to determine if any main effects and/or an interaction existed between medical orientation (IV 1), professional status (IV 2) and number of traditional treatments recommended (DV). The independent variables had levels that were the same as those indicated previously. Results indicated no significant main effects for medical orientation, $F(1,99) = 1.42$, $p = .24$, and professional status, $F(2,99) = .37$, $p = .69$, in regard to number of traditional recommendations made at the .05 significance level. No significant interaction was found.

Last, A 2x3 factor ANOVA was performed to determine if any main effects and/or an interaction existed between medical orientation (IV 1), professional status (IV 2) and number of total treatments (traditional and adjunctive) recommended (DV). The independent variables had the same levels indicated previously. Results indicated no significant main effects for medical orientation, $F(1,97) = .57$, $p = .45$, and professional status, $F(2,97) = 2.24$, $p = .11$, in regard to number of total recommended treatments at the .05 significance level. No significant interaction was found.

To determine if significant differences existed between the average numbers of treatments (traditional, adjunctive and total treatments) and medical orientation (DO and MD), three separate independent sample t-tests were computed. Because this number of significant

tests would be expected to capitalize on chance, a Bonferroni correction was calculated by taking the alpha level at .05 and dividing it by the number of tests to be performed. The corrected alpha level was determined to be .02.

The first independent samples t-test was conducted to compare the average number of recommended traditional treatments by each of the medical orientations. Levene's test for equality of variances was not significant ($F=.03$, $p=.86$). Results indicated that there were no significant differences between the number of traditional recommendations between the MD ($M=2.58$, $SD=1.22$) and DO ($M=2.40$, $SD=1.22$) orientation; $t(103)=-.74$, $p=.46$. The second independent samples t-test was conducted to compare the average number of recommended adjunctive treatments by medical orientation. Levene's test for equality of variances was not significant ($F=1.54$, $p=.22$). Results indicated that there were no significant differences between the number of adjunctive recommendations between those of the MD ($M=4.16$, $SD=3.05$) and those of the DO ($M=4.15$, $SD=2.66$) orientation; $t(102)=-.005$, $p=.996$. The third independent samples t-test was conducted to compare the average number of total treatments by medical orientation. Levene's test of equality of variances was not significant ($F=1.13$, $p=.29$). Results indicated that there were no significant differences between the number of total recommendations between those of the MD ($M=6.82$, $SD=3.50$) and those of the DO ($M=6.54$, $SD=3.22$) orientation; $t(101)=-.41$, $p=.29$.

Additional tests were conducted to examine the collected data for descriptive purposes. A chi-square test of independence was performed for each of the 14 treatment options to examine the relationship between the two medical orientations and treatment recommendations. More specifically, the purpose of conducting this set of tests was to determine if significant differences existed between each treatment recommendation and medication orientation. For example, to

determine if more DO's recommended corticosteroids than MD's. Because this number of significance tests would be expected to capitalize on chance, a Bonferroni corrected was calculated by taking the alpha level at .05 and dividing it by the number of tests to be performed. The corrected alpha level was determined to be .004.

Results indicated no significant differences; MD participants were no more or less likely to recommend any of the 14 treatments than DO participants. The 14 chi-square tests of independence included the comparison of medical orientation (DO=1, MD=2) and the following treatments: topical medications/corticosteroids ($X^2(1) = .92, p=.34$), biologic medications ($X^2(1) = 3.22, p=.07$), methotrexate ($X^2(1) = .10, p=.76$), PUVA/phototherapy UVA/UVB ($X^2(1) = .40, p=.53$), psychotherapy/mental health counseling services ($X^2(1) = .34, p=.56$), cognitive behavioral therapy ($X^2(1) = .112, p=.29$), group therapy ($X^2(1) = .68, p=.41$), diet/nutritional support ($X^2(1) = 1.34, p=.25$), herbs/natural remedies ($X^2(1) = 1.98, p=.16$), general exercise ($X^2(1) = .24, p=.63$), acupuncture/acupressure ($X^2(1) = .02, p=.90$) and mind-body therapies ($X^2(1) = .001, p=.97$).

Descriptive statistics were generated to further examine the average number of traditional, adjunctive and total treatments that were recommended by participants. Results indicated that participants recommended, on average, a total of 2.47 of 4.0 traditional treatments ($m = 2.47, SD = 1.22$) and an average of 4.15 of 10.0 adjunctive treatments ($m=4.15, SD=2.82$) to the mock patient. Overall, participants recommended, on average, a total of 6.66 treatments of the 14 traditional and adjunctive treatments presented to them ($M = 6.66, SD=3.33$).

Last, descriptive statistics were examined to determine the percentage of participants that requested each treatment option, both traditional and adjunctive. The most highly recommended treatment was topical medication/corticosteroids (traditional), with 78.3% of participants

recommending this treatment. The second most common treatment recommended by participants was psychotherapy (adjunctive), with 75.5% of participants recommending this treatment.

Additional treatments were recommended by participants at the following rates:

PUVA/Phototherapy (70.8%), general exercise (61.3%), diet/nutritional support (58.5%), biologic medications (57.5%), cognitive behavioral therapy (47.2%), mind-body therapies (41.5%), methotrexate (39.6%), vitamins/supplements (33.0%), yoga/Pilates/tai chi (31.1%), group therapy (26.4%), acupuncture/acupressure (20.8%) and herbs/natural remedies (17.9%).

Chapter 7: Discussion

Overall, the results of the study suggest that there are no significant differences between osteopaths and allopaths in regard to attitudes towards integrative medicine. Attitudes towards integrative medicine were generally positive across the board for both medical orientations and are in line with Lie and Boker's (2006) study, suggesting that the gap between the two orientations is narrowing. This is contrary to research studies in the past that suggest that osteopaths have more positive attitudes towards integrative care than their allopathic counterparts. The reason for this finding is likely due to the similarities in medical training. Overall, medical school for allopaths and for osteopaths is quite similar. According to the Cecil Textbook of Medicine (2003), apart from teaching OMM in DO programs, medical training for DO and MD students is indistinguishable. Medical students, regardless of orientation, are exposed to the same material, are exposed to the same medical rotations (e.g. dermatology, cardiology) and both are engaged in conventional internships and residency programs. This trend is also evident in the area of postgraduate medical education in training of residents. More specifically, residency programs that were once distinctly accredited either by osteopathic or by allopathic organizations are now merging together as one entity.

In July of 2015, the Accreditation Council for Graduate Medical Education (ACGME) (which accredits MD residency training programs) and the American Association of Colleges of Osteopathic Medicine (AACOM) (which accredits DO residency training programs) began the transition process into one accreditation system, further narrowing the differentiation between the experiences of students in both orientations (American Osteopathic Association, 2016). This merger, which is predicted to be completed by 2020, allows DO practitioners to continue their medical education at originally ACGME-only sites (American Osteopathic Association, 2016). Under this agreement, all AOA and AACOM members will merge to ACGME organizations and students in both orientations will have access to the same residency training sites (American Osteopathic Association, 2016). Some argue that this merger will only continue to dissolve the distinctiveness between the two orientations. For example, one study conducted prior to the merger found that only 39.5% of DO residents enrolled in ACGME residency programs “frequently” utilized OMM, compared with 67.9% of DO residents in AOA approved programs (Allee, Pollack & Malnar, 2005). Despite this, the merger agreement does promise to maintain the unique qualities of osteopathic training, although how this will occur is unclear at this time.

In regard to treatment recommendations, this present study did not find a significant difference between the number of traditional, adjunctive and total treatments being recommended by MD and DO participants. These results are likely an extension of the participant’s medical training. More specifically, if both orientations have generally the same attitudes towards integrative medicine as this study suggests, it is quite plausible that they would make the same number of adjunctive recommendations to their patients. More specifically, if one has more favorable views towards integrative medicine, he or she may be more likely to suggest more adjunctive treatments. However, that relationship was not examined within the scope of

this study and may be considered in future studies. It may also be that participants who had more knowledge of integrative care suggested more adjunctive treatments to their patients. Perhaps those who were not as knowledgeable about adjunctive treatments did not choose to recommend as many (if any) adjunctive treatments to the mock patient; again, this was not examined in this study. Past research examined physician knowledge of the medical efficacy of CAM treatments. The findings of a survey conducted in 2004 with California physicians found that physicians' recommendations of CAM treatments was negatively influenced by the limited availability of CAM medical norms (Milden & Skokols, 2004). Additionally, 61% of physicians reported that they did not have enough information about CAM safety or efficacy (Milden & Skokols, 2004). This also coincides with Wahner-Roedler and colleagues' 2014 longitudinal study discussed previously, which demonstrated that physicians' knowledge of CAM treatments did not change over an 8 year period (from 2004 to 2012) (Wahner-Roedler, et al., 2014).

In regard to recommendations of adjunctive treatments, the scope of this study aimed to examine what treatments would be recommended rather than the reasons why particular treatments were recommended. Future research may be interested in examining the reasons why participants recommended certain treatments and the reason why they may recommend one treatment over another. More specifically, are there particular reasons why medical professionals would recommend one adjunctive treatment over another? Various factors may influence clinical decision making such as knowledge of the treatment, whether or not there is substantial evidence to support the efficacy of the adjunctive treatment or whether or not the medical professional has personal experience with the adjunctive treatment. It would also be interesting to determine what types of adjunctive treatments that patients ask their medical providers about because studies have suggested that patients do expect their physicians to be knowledgeable about adjunctive

treatments and many patients also expect their physicians to recommend adjunctive treatments to them (Ben-Arye, et al., 2008).

This study did not find a significant difference with regard to attitudes towards integrative care between interns, residents and attending physicians, with one exception. A significant difference was found between DO residents and attending physicians with the same orientation; these latter have significantly more positive attitudes towards integrative care, compared with residents. These results coincide with Lie and Boker's (2006) study which suggested that medical faculty were more likely to integrate alternative treatments into their practices, compared with medical interns and residents; however, their study was conducted with allopathic subjects. The results suggest that experience in the field, compared with medical education, may have an influence on attitudes towards integrated care, at least for the osteopathic orientation. More specifically, as DO practitioners gain more experience in the field, they may be more open to, and more knowledgeable of integrative medicine and how to implement it in their practices. Perhaps when traditional medications are not effective enough, are not an option for the patient (e.g. during pregnancy) or are not addressing other needs of the patient (e.g. stress), osteopathic attending physicians are more open to non-traditional treatments, compared with interns and residents who have limited experience outside of traditional medical education. As stated earlier, patients generally have an expectation that their physicians will recommend adjunctive treatments. Perhaps osteopathic physicians feel more pressure to be knowledgeable of and make more recommendations for adjunctive treatments due to their theoretical background.

This study was also exploratory in nature because it aimed to examine what treatments, particularly adjunctive treatments, participants would recommend to their patients. As expected, the 4 traditional treatment options presented to participants were frequently recommended by

participants. Unexpectedly however, some adjunctive treatments were recommended as often as, or more often than, traditional treatments. For example, psychotherapy was the second most highly recommended treatment. Nearly 75% of participants indicated that they would recommend psychotherapy to the mock patient. This recommendation was second only to the most conventional (and least invasive) treatment, topical medications/corticosteroids, which 78% of participants recommended. This suggests that the majority of participants recognized the utility of psychotherapy for their patients, recognized the stress-skin connection and determined that psychotherapy would be a beneficial treatment for their patients. With psoriatic patients being twice as likely to experience depression as the general population, psychotherapy may likely be an essential treatment for many psoriatic patients (National Psoriasis Foundation, 2016).

Implications

There are several possible implications from this study. This study demonstrates the narrowing of differences between the osteopathic and allopathic orientations. Decades ago, the distinction between the two programs was significant but it appears that there are more similarities than differences between the two programs. At one time, it was believed that osteopaths had the upper hand on adjunctive treatments, holistic and integrated care, but it appears that a level playing field is forming. Both orientations had a generally positive attitude towards integrated care. Additionally, neither orientation suggested significantly more adjunctive treatments to their patients. This indicates that MD's and DO's not only had similar attitudes towards integrated care but also made the similar number and type of recommendations to the mock patient.

The results of this study also indicate that medical interns, residents and attending physicians, regardless of orientation, are generally aware of the stress-skin response and many are open to recommending adjunctive treatments to their patients. About 75% of participants recommended psychotherapy to the mock patient in this study, suggesting that the participants were able to identify patient stress and took a step to address the patient's stress. Psychotherapy was the second most highly recommended treatment to the mock patient, second only to topical treatment (78%). This suggests that participants perceive psychotherapy as a viable and important treatment option for their patients and recommend this adjunct treatment nearly as much as they recommend the most common conventional treatment.

This study aims to raise awareness regarding the impact that stress can have on psoriasis, particularly how stress can exacerbate symptoms (Evers, et al. 2010). This study will also raise awareness regarding how ignoring the impact of stress can impede or affect treatment. Without addressing stress as a major component of the disease, many physicians may fail to approach the treatment of psoriasis in a complete and holistic manner.

In line with awareness, this study allows the opportunity for advocacy. More specifically, this study provides insight into what is being recommended by physicians for psoriatic patients and provides more information about available treatment options to psoriatic patients. In order to disseminate this information to a larger audience, the investigators plan to submit this study (manuscript) to the National Psoriasis Foundation, with intentions of providing the information to consumers via their website (psoriasis.org).

Limitations

There were several limitations to this study. First, many of the participants who identified as having an osteopathic orientation were pooled from one osteopathic medical school in Philadelphia, Pennsylvania. In this particular area of the United States, the medical community is highly competitive and often offers adjunctive and complementary treatments to their patients. Additionally, this area of the nation in particular has an increased focus on psychotherapy in the medical setting; this is also gaining increased interest in the medical community. Because the study involved many participants from one geographical location, the results may not be representative of the medical population in other parts of the country.

The subjects do not necessarily generalize to the population at large in regard to demographic information as well. More specifically, in this study 65.1% of respondents identified as Caucasian but the national average of Caucasian physicians is 48.9% (Association of American Medical Colleges, 2013). Additionally, 23.6% of respondents identified as Asian/Pacific Islander but this ethnic group accounts for only 11.7% of the national average (Associational of American Medical Colleges). However, some ethnic populations were adequately represented within this study. According to the Association of American Medical Colleges (2013) 4.1% of the medical workforce is composed of African Americans. Within this study, 3.8% of participants identified as African Americans, which is a close approximation of the national average.

Additionally, the sample size utilized in this study, although exceeding the standards of the power analysis, was not particularly large. This could influence the external validity of the results because the sample size utilized was relatively small ($n = 105$) and may not represent the general population of interest.

The low response rate to the surveys in this study also limits the generalizability of the results to the target population (Fowler, 1984). Fowler (1984) suggests that the lower the response rate, the higher the sample bias because individuals who have an interest in the research are more likely to participate versus those who have no interest. Further, it is suggested that individuals who participate are essentially self-selected and the final sample may have little relationship to the original sample of interest (Fowler, 1984, Starr, 2012).

Another limitation of this study has to do with the use of self-report measures. Survey research may have been negatively influenced by self-report biases and may not reflect actual attitudes of integrated care (Hawkshead & Krousel-Wood, 2007). Additionally, respondents may have overestimated or underestimated their potential recommendation of adjunctive treatments with this medical population. Furthermore, some participants may not have adequate information regarding psoriasis, of adjunctive treatments for psoriasis or understand the role of stress on the disease, thereby impacting the way they respond. More specifically, some respondents indicated that they had “some” or “little” knowledge about psoriasis. Having limited knowledge about the disease may have influenced the type of recommendations that they made to patients. Respondents may feel uncomfortable recommending non-traditional treatments to their patients if they are not highly knowledgeable about the disease.

This study asked respondents to make recommendations to one mock patient who disclosed to the participant that she was experiencing stress. Perhaps this voluntary self-disclosure of stress by the patient prompted the participant to make recommendations to address patient stress. However, it cannot be determined within the scope of this study if participants would have made recommendations for patients to reduce their stress had self-disclosure not occurred. More specifically, would participants make recommendations for the patient to reduce

her stress (e.g. make recommendations for integrated care) if the mock patient disclosed only her physiological symptoms? Unfortunately, this cannot be answered within the scope of this study. Additionally, there is the question about whether or not the participants' responses to the mock patient would generalize to their decision-making with actual patients.

Finally, in the present study, participants were not asked if they specialized in a particular area of medicine (e.g. dermatology, family medicine, cardiology). This is a limitation to the present study because the participants' amount of exposure to psoriatic patients is unclear. For example, it would be predicted that a dermatologist would have more exposure to psoriatic patients than would a cardiac surgeon. This leads to the question about a dermatologist's being more likely to suggest adjunctive treatments to their psoriatic patients, compared with other specialist or generalists, Neither did this study ask participants how long they had been in the field. This too seeks an answer to the question about the amount of time in the profession affecting attitudes and recommendations (e.g. would a physician who has been in the field for 20 years respond differently than a participant who has been a physician for 3?) These questions cannot be answered within the scope of this study.

Future Research

Future research should examine actual medical professional knowledge about the use of adjunctive treatments to treat stress, as well as how stress impacts psoriatic symptomology. Some participants may not have suggested adjunctive treatments for their patients who experience stress due to a lack of understanding about the stress-skin response and also about how stress impacts the immune system. With the growing popularity and increased empirical evidence of psychotherapy to treat patients with a variety of skin and autoimmune disorders,

future research should examine physician knowledge and utilization of psychotherapy (e.g. CBT) to treat patients with psoriasis.

This study supports the idea that MD's and DO's have similar attitudes towards integrative medicine. However, limited information has been found regarding how information regarding IM is disseminated to students in medical school (e.g. integrated into traditional lecture, optional elective classes and various experiences). This study did not examine how information was disseminated to students (e.g. Was IM information provided to students or did students need to seek it for themselves? Are students mandated to learn about IM?) How is IM information presented to them? (e.g. the attitudes of the instructors and the institution in general regarding IM). Future research is urged to examine how this information is disseminated to medical students, as well as if the way in which IM information is presented has changed over time (20 years ago versus today). Studies examining how information is disseminated to students might provide a clearer picture on the reason why the gap between MD's and DO's is narrowing as well as the reason why some participants had more favorable views of IM, compared with others.

Participants in this study were asked to read a vignette about a mock patient with an identified stress component. Having the stress component included in the vignette may have skewed participants' decisions to recommend adjunctive treatments to the patient when otherwise they may not have done so. Future research may consider eliminating the stress portion of the vignette or may simply ask participants what they would have or what they have recommended to their patients with psoriasis.

Research areas of interest may include the development of incentive programs to medical professionals who implement a more holistic approach to treatment and incorporate adjunctive

treatments into their medical regime, but only if research continues to support the efficacy of incorporating adjunctive treatments into a patient's treatment regimen, compared with using traditional treatments alone. It may also be beneficial and informative to examine further the personality characteristics of physicians that are more apt to prescribe adjunctive treatments to their patients in an effort to target more effectively educational and training programs to physicians or students in need of this training. It would also be helpful to examine the way in which medical schools (both DO and MD) present adjunctive treatment information to their students.

This study will also help to raise awareness of the impact that stress has on the presentation and treatment of psoriasis and the importance of identifying and addressing patient stress in the doctor's office. The limitations of the study are similar to studies that utilize convenience samples and survey research. No-response and response biases could affect the external validity of the study and limit the ability to generalize the findings to the specific population at large (Fowler, 1984, Hawkshead & Krousel-Wood, 2007). In addition to this, the students pooled for this study are generally from one geographical location, further limiting the generalizability of this study. However, this study may be a catalyst for future research that can address a variety of related questions and issues. Future research should focus on student and physician knowledge of the stress-skin response in relation to psoriasis; it should also place emphasis on their knowledge about the use of adjunctive treatments to address patient stress (e.g. are they actual aware that stress impacts psoriasis and are they aware that adjunctive treatments have been shown to be helpful).

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Appendix A

Dear Medical Interns, Residents and Attending Physicians,

Hello, my name is Jennifer Pacyon and I am a doctoral candidate at the Philadelphia College of Osteopathic Medicine's Clinical Psychology program. I'd like to invite you to participate in a study that aims to understand medical interns, residents and attendees views of integrated medical care as well as what they would recommend to their patients diagnosed with psoriasis.

This study should not take any longer than 10-15 minutes to complete.

In order to participate, you need to:

1. Currently be a medical intern, resident or attendee.
2. Working towards or hold a MD (allopathic) or DO (osteopathic) degree.
3. Have knowledge of psoriasis (e.g. completed course work and/or managed patients with the disease).

Upon completion of the study, you will have the option to be enrolled in a raffle to receive a \$50.00 Amazon gift card. Your responses will be anonymous and confidential and you may discontinue the study at any time without penalty.

If you are interested in completing the study, please click the following link:

<https://www.surveymonkey.com/r/L7RMVHJ>

If you have any questions or concerns, please feel free to contact me directly at Jenniferpac@pcom.edu or my dissertation chair, Dr. Barbara Golden, Psy.D., ABPP at barbarago@pcom.edu.

Thank you again for taking the time to participate in my research project. Your time is greatly appreciated.

Regards,

Jennifer L. Pacyon, MA. MS.

Appendix B

Demographic Questionnaire:

1. Are you currently a medical intern, resident or attending physician?
2. Please specify whether you are intern, resident or attending physician?
3. If an intern, are you currently in good academic standing? (not on academic probation).
4. Please indicate whether you are in (or completed) an MD (allopathic) or DO (osteopathic) or program.
5. In what type of medical setting do you provide services?
6. What is your gender?
7. What is your ethnicity? (please select all that apply).
8. Do you have general knowledge of psoriasis?
9. Do you, a family member or close friend have psoriasis?
10. Have you had formal training in the diagnosis of psoriasis (e.g. classes, medical rotation)?

Appendix C

Integrative Medicine Attitude Questionnaire (IMAQ)

Absolutely disagree 1 2 3 4 5 6 7 Absolutely agree

- 1) A patient is healed when the underlying pathological processes are corrected or controlled. _____ item1
- 2) The physician's role is primarily to promote the health and healing of the physical body. _____ item2
- 3) Patients whose physicians are knowledgeable of multiple medical systems and complementary and alternative practices (i.e., Chinese, Ayurvedic, Osteopathic, Homeopathic, etc.), in addition to conventional medicine, do better than those whose physicians are only familiar with conventional medicine. _____ item3
- 4) Physicians should warn patients to avoid using botanical medicines (herbs) and dietary supplements until they have undergone rigorous testing such as is required for any pharmaceutical drug. _____ item4
- 5) It is appropriate for physicians to use intuition ("gut feelings") as a major factor in determining appropriate therapies for patients. _____ item5
- 6) The spiritual beliefs and practices of physicians play no important role in healing. _____ item6
- 7) The spiritual beliefs and practices of patients play no important role in healing. _____ item7
- 8) It is irresponsible for physicians to recommend acupuncture to patients with conditions like chemotherapy-related nausea and vomiting or headache. _____ item8
- 9) End of life care should be valued as an opportunity for physicians to help patients heal profoundly. _____ item9
- 10) It is not desirable for a physician to take therapeutic advantage of the placebo effect. _____ item10

- 11) Healing is not possible when a disease is incurable.
 item11
- 12) Physicians knowledgeable of multiple medical systems and complementary and alternative practices (i.e., Chinese, Ayurvedic, Osteopathic, Homeopathic, etc.), in addition to conventional medicine, generate improved patient satisfaction.
 item12
- 13) Therapeutic touch has been completely discredited as a healing modality.
 item13
- 14) Physicians who model a balanced lifestyle (i.e. Attending to their own health, social, family and spiritual needs, as well as interests beyond medicine) generate improved patient satisfaction.
 item14
- 15) Quality of life measures are of equal importance as disease specific outcomes in research.
 item15
- 16) Chiropractic is a valuable method for resolving a wide variety of musculoskeletal problems (beyond back pain).
 item16
- 17) The physician's role is primarily to treat disease, not to address personal change and growth of patients.
 item17
- 18) Massage therapy often makes patients "feel" better temporarily, but does not lead to objective improvement in long-term outcomes for patients.
 item18
- 19) The innate healing capacity of patients often determines the outcome of the case regardless of treatment interventions.
 item19
- 20) A strong relationship between patient and physician is an extremely valuable therapeutic intervention that leads to improved outcomes.
 item20
- 21) Physicians who strive to understand themselves generate improved patient satisfaction.
 item21
- 22) Instilling hope in patients is a physician's duty.
 item22

23) Physicians should be prepared to answer patient's questions regarding the safety, efficacy, and proper usage of commonly used botanical medicines such as Saw Palmetto, St. John's Wort, Valerian, etc.

— item23

24) Counseling on nutrition should be a major role of the physician towards the prevention of chronic disease.

— item24

25) Physicians should avoid recommending botanical medicines based on observations of long-term use in other cultures and systems of healing, because such evidence is not based on large randomized controlled trials.

— item25

26) Osteopathic manipulative therapy is a valuable method for resolving a wide variety of musculoskeletal problems (beyond back pain).

— item26

27) Information obtained by research methods other than randomized controlled trials has little value to physicians.

— item27

28) It is ethical for physicians to recommend therapies to patients that involve the use of subtle energy fields in and around the body for medical purposes (i.e. Reiki, Healing touch, Therapeutic touch, etc.)

— item28

29) Physicians who strive to understand themselves provide better care than those who do not.

— item29

Reverse-code the following items when scoring the IMAQ: 1, 2, 4, 6, 7, 8, 10, 11, 13, 17, 18, 25, 27.

Add demographic items as needed.

Appendix D

Dissertation Vignette

A 20 year old woman with a known history of psoriasis presents with a recent psoriatic flare-up. She has psoriasis plaques on her knees, elbows and shins. In the past 6 months however, her lesions have become more widespread and have started to appear all over her trunk and scalp. She reports that the lesions are itchy, irritating and somewhat painful. She also confides in you that she is very embarrassed by her plaques and her flare-up has caused her significant emotional distress. In addition to this, she reports breaking up with her boyfriend of 4 years around the time of her latest flare up. She is no longer spending time with friends, is increasingly more anxious and withdrawn because of her symptoms and is looking to you for treatment.

Appendix E

Indicate below the treatment recommendations you would give to this patient:

1. Topical Medication/Corticosteroids
2. Biologic medication (e.g. Entercept)
3. Systemic Medications (e.g. Methotrexate)
4. PUVA/Phototherapy (UVA/UVB)
5. Psychotherapy/Mental Health Counseling
6. Cognitive Behavioral Therapy
7. Group Therapy (e.g. Support Groups)
8. Diet/Nutritional Support
9. Herbs/Natural Remedies (e.g. Dead Sea Salt/ Tea Tree Oil)
10. General Exercise
11. Yoga/Pilates/Tai Chi
12. Acupuncture/Acupressure
13. Mind-Body Therapy (e.g. Mindfulness, Meditation)
14. Other, please list: _____