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Melanoma Cancer Survivors: An Online Community Perspective and Prevention Effort

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Abstract

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MS, Iona College,1993

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Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Public Health

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Abstract

Melanoma cancer is a major public health issue and has been associated with tanning and exposure to ultraviolet radiation. Minimal information is known about prevention efforts specific to survivors of melanoma cancer who participate in an online community. Surveys of this community differ from previous research of individuals through nononline research; the online community is more likely to be younger in age, comfortable seeking health information using Internet resources, and more advanced in technological capabilities. The main aim of this cross-sectional study was to investigate the impact of age, gender, and race on melanoma prevention efforts (health maintenance and skin protection), controlled for education, marital status, and income, in an online community. The health belief model was the theoretical framework of this study. The study sample consisted of 101 volunteer melanoma cancer survivor participants from an online community of the American Cancer Society cancer survivor network who completed an online survey. Chi-square tests and multiple regression analyses were applied to address the research questions. Study findings revealed that women and participants with higher education levels and income levels had significantly better prevention and health maintenance efforts. These results provide an opportunity for organizations to develop programs, services, and policies for online communities to keep them abreast of prevention measures to manage their health and to promote positive social change.

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Dedication

This research study is dedicated to my father, Melvin Chung, who overcame melanoma cancer and is the best father a daughter could ever wish to have. The strength and courage he showed in overcoming this disease is priceless and shall never be forgotten. I started this research study because of him, and through all my research. I am finally smiling because I have completed my doctoral degree, which was not only a goal but also a lifetime commitment to public health.

To my mother, Lileth Chung, my sisters, Karen, Sheryl and Tatjana Chung, and my husband, Jeffrey Karfonta: Thanks for all your support and believing in me.

In addition, this dedication is also for my uncle, my father's brother, Victor Chung, who died on April 19, 2020. He was a man of great character, and I was pleased to be his niece. He lost his life to COVID-19, the pandemic that has changed the world and lives of every human being. This pandemic has impacted our world and the need to continue my quest in public health to make our world safer is now and forever a journey.

My final dedication is to all those who continue to play a vital role in public health and make our world a safer place for all human beings, as I intend to do with my gained knowledge and experience in public health.

" It is not how you start your public health journey, it is how you finish that counts, the road is long and fill with many challenges, face them head on and continue until you reach your destination" as I have done.

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Thank God for giving me the strength and wisdom to embrace this journey.

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Thank you, Professor Edward Irobi, a professor who always had encouraging words to say. Professor Irobi stated that I worked endlessly to complete my proposal and said, "It is not how you start but how you finish that counts." He may not know this, but these words not only set me on a course to complete my Ph.D. degree, but is a statement I will carry and remember with me for the rest of my life.

To Dr. Chinaro Kennedy, my URR, I would like to thank you for assisting me and providing your guidance so that I could complete my research study.

To Dr. Margaritis, Dr. Irobi, and Dr. Kennedy: You were God sent. God works in mysterious ways, and I know I could not have completed my degree without God placing each of you in my life. I will forever be grateful.

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Chapter 1: Introduction to the Research

Introduction

Melanoma skin cancer is not a diagnosis anyone wants to hear. Melanoma cancer is a fundamental public health issue and one of the deadliest forms of skin cancer. Melanoma cancer has been associated with many deaths and the importance of prevention measures is a key factor for survival. The incidence rate of melanoma cancer has continued to increase in the United States. Melanoma incidence in the 21st century has increased due to indoor tanning, outdoor exposure to the UV exposure to sun which has been associated with an increase risk of developing melanoma cancer (Chang et al, 2014). . The prevention efforts of melanoma survivors are important. More information pertaining to long-term melanoma survivors and their behavior is necessary to develop effective interventions (Vogel et al., 2017). Ultraviolet radiation (UVR) sun exposure is a fundamental factor associated with melanoma cancer occurrence. Melanoma cancer associated with UVR exposure in which the damage occurred to the skin prior to the first melanoma cannot be amended, which can result in a risk of future melanoma (Vogel et al., 2017). Different patterns of skin cancer types are associated with various forms of sun exposure, including sunburns being linked to the risk of cutaneous melanoma, basal-cell carcinoma being connected with recreational ultraviolet (UV) sun exposure, and squamous-cell carcinoma correlated to residential UV sun exposure (Savoye et al., 2018).

Research of younger adults compared to older adults in the United States, several European countries, and Australia have indicated more sunburns among the younger adults even though they have prevention information and sun-protective intentions

(Diffey & Norridge, 2009 andMakin, Warne, Dobbinson, Wakefield, & Hill, 2013). The survival rates of patients with Stages I to IV melanoma have been computed by the Melanoma Staging Database (Balch et al., 2009). Early detection of melanoma cancer has been documented in research as a means for surviving this disease (Dessinioti et al., 2018; Ferris et al., 2017; Goldstein et al., 2018; O'Shea et al., 2017; Robinson et al., 2016). There has been an improvement for melanoma survival within the past two decades, and in 2001–2003, 92% of people diagnosed survived for 5 years after diagnosis in comparison to the 88% survival rate from 1989–1991 (Shaikh et al., 2015).

The American Joint Commission on cancer developed the staging system for melanoma cancer to identify the severity of melanoma; this labeling is called *TNM staging* (Balch et al., 2010). Each of the stages has a description of the spread of the melanoma cancer and its severity by categories. T was categorized as *tumor*, which provides a description of the thickness of the tumor; N was described as the *node*, which indicates the spread of melanoma to the lymph nodes; and M was described as *metastasis*, which provides an indication if the melanoma has invaded other organs and levels of the protein lactate dehydrogenase in the blood (Gershenwald et al., 2017).

The categorized stages of melanoma were described in stages relevant to the TNM staging as follows: (a) Stage 0 (in situ) in which the cancer cells have inhibited the top layer of the cell but not spread; (b) Stage I includes cancer cells that have penetrated the skin but have not impacted the lymph nodes; (c) Stage II in which the cancer cells present a higher risk of penetrating the skin but have not spread to other parts of the body; (d) Stage III, in which the cancer cells have spread to the lymph nodes but have not

impacted other organs; and (e) Stage IV, wherein the cancer cells have invaded the lymph nodes, the skin, and other organ parts within the body (Gershenwald et al., 2017).

In melanoma cancer research with exposure to UVR, researchers have found an increased risk of developing melanoma (Ting, Schultz, Peterson, & Walling, 2007; Wu, Han, Laden, & Qureshi, 2014). The public continues to be informed of the dangers associated with melanoma cancer; however, many people continue practicing unsafe prevention measures. Gershenwald and Guy (2015); Le Clair and Cockburn (2016); and Boniol, Autier, Boyle, and Gandini (2012) specified tanning and unprotected exposure to UVR are major risk factors related to melanoma cancer. Skin cancer is preventable when precautionary measures are taken to reduce the risk of the damaging effects from exposure to UVR (Brinker et al., 2017; Mays, Murphy, Bubly, Atkins, & Tercyak, 2016; Vogel et al., 2017).

In this study, I conducted an online survey of melanoma cancer survivors without using traditional format methods, such as mailings, telephone calls, focus groups, and face-to-face interactions. Younger adults are more likely to use the Internet compared to older adults (Anderson & Perrin, 2017; Hunsaker & Hargittai, 2018; König, Seifert, & Doh, 2018). In addition, older adults have more concern related to skin cancer beliefs and sun protection practices related to sunscreen, sun protective clothing, and shade seeking protection (Anderson & Perrin, 2017; Hunsaker & Hargittai, 2018; König et al., 2018). Age has been related to more awareness of skin cancer, its causes, and prevention strategies among people ages 50–59 and there has has been more knowledge of skin

cancer symptoms and awareness of skin cancer survivability for people ages 40–49 years (Walkosz et al. 2017).

In this research, I focused on an online community of melanoma cancer survivors to determine if they respond similarly or differently in relationship to prevention efforts from traditional studies conducted with nononline findings. Women younger than 40 years of age (16–25 years) engage in indoor tanning compared to women 40–49 years, and they also engaged in more frequent indoor tanning (Lazovich et al., 2016).

In past studies, the online community has been specified as using the Internet to seek and share information. There is a high probability that the population from this research will be younger adults using the Internet. Older participants are also expected to be taking more protective measures as revealed with past nononline melanoma survivor studies. Vogel et al. (2017) surveyed long-term melanoma cancer survivors and found the disclosure of a lifetime of sunburns prior to diagnosis. The research was case control with participants from a previous cross-sectional survey; they were asked to report on their UVR exposure and protection measures within the past year. Pinault and Fioletov (2017) with the Canadian Community Health Survey used a cross-sectional survey of Canadians 12 years of age or older and found an association between sunburns and men and younger participants. Women took more protective measures when exposed to the UVR (Pinault & Fioletov, 2017).

Background

Research articles pertaining to melanoma cancer survivors and prevention methods provide a foundation for this research. There are advantages to conducting

research online compared to nononline settings. Wright (2005) stated that online survey and survey authoring software packages provide an opportunity to make contact with participants who may be in distant locations; online surveys allow the researcher to reach out to participants who may be difficult to contact; and the convenience of gathering automated data collection can shorten a researcher's effort and time for the analysis of the data. Many groups and organizations have an online presence to communicate with individuals they may not be able to contact using traditional research methods. Horrigan (2001) stated individuals in virtual communities have grown tremendously with hundreds of thousands of people regularly engaging online regarding various topics and interests. Conducting research online provides an opportunity to gather data that can be difficult to obtain using traditional methods, including communities, cases, and groups that may only be accessible online. With the format of traditional research studies, this can be challenging due to a large, concentrated group of people conducting face-to-face discussions of topics, such as cyberstalking, online stock trading, and the pros and cons of virtual dating (Wright, 2005).

The relevance of this research is that it aims to reach a community of online melanoma cancer survivors who may be in various locations, who would not otherwise be accessible for capturing their prevention efforts with this disease in a traditional setting. This can enable a researcher conducting research online to gather data from individuals who share similar interests, attitudes, beliefs, and values regarding an issue, problem, or activity (Wright, 2005). Individuals may not want to share health information with some traditional research methods (e.g., face to face and focus groups) but may

share that information online. This can include individuals who have health conditions or other diseases (e.g., HIV, eating disorders, and physical disabilities); online, they may feel less stigmatized compared to traditional research methods (Wright, 2005).

Bowen, Burke, Hay, Meischke, and Harris (2015) assessed a communication intervention to improve preventive behaviors in melanoma families using a web-based format. The authors' findings supported intervention; melanoma cancer survivors were engaged in self-examination of their skin and sun protection behaviors considerably after the intervention. Participants were more involved in screening and sun protection behavior after diagnosis; the most frequently visited page was the risk information sheet (96%), followed by how to protect skin from the sun (78%), and talking to family (64%) and providers (61%) (Bowen et al., 2015). This research revealed melanoma cancer survivors can benefit from a website that assists in enhancing or improving their future health behaviors.

Colantonio, Bracken, and Beecker (2014) conducted a meta-analysis based on a systematic review of melanoma cancer and found a correlation between skin cancer and tanning beds. This was based on observational studies from Medline, Scopus and Cumulative Index to Nursing, and Allied Health Literature. Colantonio et al. (2014) determined that the use of tanning beds is associated with a melanoma cancer diagnosis. Glenn, Chen, Chang, Lin, and Bastani (2017) surveyed melanoma cancer survivors regarding prevention practices. Glenn et al. found from the survey feedback the belief of the possible severity of the disease resulted in participants conducting more frequent self-exams. Palesh et al. (2014) conducted research with melanoma survivors and health

behaviors by collecting data from a health needs survey. The researchers concluded that melanoma cancer survivors specify a need for psychosocial support and prevention of further skin cancer. The research concluded melanoma survivors expressed a need for the prevention of skin cancer.

Vogel et al. (2017) conducted case-control research using a cross-sectional survey for comparing measures of UVR exposure and protection behaviors among long-term melanoma survivors and controls. The research included participants 25–59 years of age. The findings revealed melanoma cancer survivors were less likely to disclose sun exposure on weekdays, sunburns, and indoor tanning compared to the control group. Pinault and Fioletov (2017) conducted a cross-section study with the Canadian Community Health Survey and surveyed participants 12 years of age or older with sunburns. The findings revealed women engaged in more protective measures compared to men when they were exposed to UVR, and sunburns were common among men and younger participants.

Stole, Nilsen, and Joranger (2019) conducted cross-sectional research with the health belief model, studying knowledge, beliefs, attitudes, and sun-tanning behavior interventions. Participants revealed they had perceived barriers to sun protection and believed sun tanning made them look and feel better. Seite, Del Marmol, Moyal, and Friedman (2017) conducted cross-sectional international research and presented a questionnaire both online and by telephone to participants based on gender and age. The researchers' questions focused on sun exposure and protection, risk knowledge, and self-

examination. Seite et al. (2017) found that women had more knowledge of risk factors associated with melanoma cancer and took more preventive measures compared to men.

Fischer, Wang, Yenokyan, Kang, and Chien (2016) conducted cross-sectional population-based research from the U.S. 2015 National Health Interview Survey data involving skin cancer prevention and indoor tanning related to behaviors. The researchers concluded that participants who engage in indoor tanning had sunburns and avoided sun protection and skin cancer screening. Holman et al. (2015) explored participants' use of sunscreen on the face and other parts of the body using cross-section research with the Summer Consumer Styles survey. The findings revealed that few adults applied sunscreen on the face and body; women applied sunscreen to their face and skin more compared to men (Holman et al., 2015).

Caretti, Mehregan, and Mehregan (2015) conducted cross-sectional research of African American adults, ages 60–91 years, regarding whether they worry about skin cancer based on their skin tone. The researchers presented a 17-item questionnaire to participants to self-report their perceptions of skin disease and awareness of skin cancer. Participants disclosed they were less concerned about skin cancer due to their darker skin tone (Caretti et al., 2015). Mays, Atkins, Ahn, and Tercyak (2017) conducted a cross-sectional study exploring indoor tanning behavior and beliefs within a community of non-Hispanic White young adult women. The participants were women ages 18 to 30, who had tanned indoors within the past year. The participants completed a survey and the findings revealed younger participants relied on indoor tanning initiation, had stronger

beliefs about the benefits of tanning, greater perceived susceptibility to indoor tanning risks, and stronger beliefs about physical appearance (Mays et al., 2017).

Problem Statement

The research problem is that there is a paucity of studies investigating the impact of variables, such as age, gender, and race, on behaviors and attitudes of preventing skin cancer among an online population of melanoma survivors. These populations differ from nononline individuals in several characteristics, such as younger age, seeking health information using Internet resources, and having more advanced technological capabilities (Martin et al., 2016; Mattsson, Olsson, Johansson, & Carlsson, 2017; Vogel et al., 2017). Thus, I investigated the impact of age, gender, and race on melanoma prevention efforts (health maintenance and skin protection) in an online community. I compared these results to previous studies of nononline communities to see if differences exist between the two communities regarding melanoma prevention behaviors. The gap in knowledge is whether the two groups of melanoma cancer survivors exhibit similar or different prevention behaviors. Younger people in research have been noted as being more at risk for melanoma cancer from tanning and not taking prevention measures (Bonial et al., 2012; Daniel et al., 2018). Women are more likely to practice prevention efforts (Chen et al., 2016; Seite et al., 2017). White melanoma cancer survivors are more likely to engage in riskier nonprevention efforts than other races and ethnicities (Mays et al., 2016; Parsons et al., 2018). In this research among online melanoma cancer survivors, I expected the age of the sample population to be younger. Younger adults are more prone to use the Internet for information (Mattsson et al., 2017). Older adults are

expected to practice more prevention efforts (Vogel et al., 2017). Research conducted in this area will contribute to answering whether online melanoma cancer survivors' melanoma prevention behaviors are similar to or different from the melanoma prevention behaviors of nononline melanoma survivors.

A *cancer patient* is an individual who has been diagnosed with cancer (National Cancer Institute, 2015). Martin et al. (2016) found information is needed to develop public health interventions when considering technological capabilities and preferences. The American Cancer Society cancer survivors network consists of cancer patients, survivors, and caregivers in an online peer support community (Fallon, Driscoll, Smith, Richardson, & Portier, 2018). Advances in technology within online communities allow interactions and the sharing of health information for preventive health. The Internet has enabled a vast community to share their experiences and access information pertaining to health issues. The Internet is used by cancer patients for informational support and care (Mattsson, Olsson, Johansson & Carlsson, 2017). Internet panels are used to gather survey data because they are cost-effective and allow the researcher to contact large and diverse groups more rapidly compared to traditional research methods (Hays, Lui, & Kapteyn, 2015). It is essential for melanoma cancer survivors to engage in protective measures (Kricker et al., 2007). The risk of melanoma can be reduced by people who have had melanoma reducing recreational sun UV exposure at any age.

In research conducted by Kricker et al. (2007) they interviewed and recorded the participants' residential history to determine the effect of sun exposure on risk of multiple primary melanomas compared with people who have one melanoma. The research

consisted of 2,023 participants with a first primary melanoma that was the control group, and 1,125 who had multiple primary melanomas. The study concluded there was an increased risk early in life associated to ambient UV exposure from recreational exposure. Kricker et al. revealed that melanoma cancer survivors can reduce their risk of possibly developing other melanomas by reducing their UV exposure. UVR exposure resulting in melanomas with damage done to the skin prior to the first melanoma cannot be ameliorated, which can result in an increased risk of a subsequent melanoma (Vogel et al., 2017). Sunburns have been associated with an increased risk of melanoma cancer. Severe sunburns and UVR related to an increase risk of melanoma cancer was reported from participants surveyed (Savoye et al., 2018).

Purpose of the Study

The purpose of this quantitative research study was to explore the association between age, gender, and race-ethnicity of an online community of melanoma cancer survivors in relationship to tanning and prevention behaviors. Prior research has been conducted on melanoma cancer survivors, but this research is different because it aims to research melanoma cancer survivors in an online community. Age, gender, and race/ethnicity were the main variables studied. In secondary research conducted by the National Cancer Institute's Surveillance, Epidemiology, and End Result program, age, gender, and race/ethnicity were variables studied in relationship to melanoma cancer survivors (Ward-Peterson et al., 2016). Age, gender, and race/ethnicity have been categorized in many studies as common variables of melanoma cancer survivors.

Additionally, older melanoma cancer survivors engage less in tanning activities (Vogel et al., 2017).

Stole, Nilsen and Joranger (2019) investigated participants in cross-sectional research based on the health belief model and explored knowledge, beliefs, attitudes, and sun-tanning behavior interventions. The research revealed that 80% of the participants had perceived barriers to sun protection, and they had beliefs in the benefits of sun tanning, which they said made them feel good and look better. The age varies in research studies pertaining to melanoma cancer prevention efforts. Most research studies have documented in their findings support younger individuals who tan as more at risk for developing disease (Karagas et al., 2014). This research intended to explore the online melanoma cancer survivors and provide an opportunity to evaluate their responses in comparison to traditional research techniques applied in researching melanoma cancer survivors. Vogel et al. (2017) found that melanoma survivors in the age range of 25–59 used more prevention methods when tanning and younger age groups were more prone to tanning. The aim of this research was to judge the measures of UVR exposure and protection behaviors associated with long-term melanoma survivors and controls. There was a large group of participants for the research, 726 (67.7%) long-term melanoma survivors and 657 (60.9%) controls. This research consisted of long-term melanoma cancer survivors and noncancer controls from previous case-control research in which participants were surveyed from a cross-sectional research for UVR exposure and protection within the past year. The recruitment of the participants was by mail to take part in the research online to answer survey questions on sun protection behaviors. The

long-term melanoma cancer survivors reported more sun protection behavior, sunburns,

and suboptimal UVR protection behavior compared to the control group. Older long-term

melanoma cancer survivor adults from the research revealed less sun exposure in

comparison to the control group. The analysis was fully adjusted for the confounders of

age, sex, education, income, current smoking status, phenotype risk score, freckles,

moles, family history of melanoma, sun exposure data reported prior to diagnosis,

outdoor activity sun exposure, mean sunscreen use, and number of sunburns. Melanoma

cancer survivors reported less high sun exposure during weekdays ($OR = 0.72$ [0.55 –

0.94]) $p < 0.0001$, sunburns (OR $= 0.40$ [0.30 – 0.53]) $p < 0.0001$, or indoor tanning (OR

$= 0.20$ [0.09 – 0.44]) $p < 0.0001$, in comparison to the control group. The odds ratios

based on the findings revealed an association of melanoma cancer survivors having less

high sun exposure during weekdays, sunburns, and indoor tanning when compared to the

comparison group. The National Cancer Institute (2019) revealed an increase in incidence

of melanoma cancer for White, non-Hispanic (both sexes), and American Indian/Alaskan

Native women. It is the highest for White men and lowest among Black women. In this

proposed research, I sought online melanoma cancer survivors' feedback from a survey

and evaluated their responses to determine if this online community of melanoma cancer

survivors share similar or different beliefs and behaviors pertaining to melanoma

prevention efforts compared to traditional research conducted previously. Widemar and

Falk (2018) acknowledged the issue of preventing skin cancer is essential to identify

the population at risk with their sun habits and the need to supply them with

information to practice protective measures against solar radiation. UVR exposure has

been documented in several studies as a primary source correlated to melanoma cancer (Daniel, Gassman, Fernandez, Bae, & Tan, 2018; Shoemaker, Berkowitz & Watson, 2017; Vogel et al., 2017). Both UVA and UVB rays are noted as being affiliated with sunburn and linked to directly causing damages to the DNA by inducing the formation of thymine-thymine cyclobutane dimers (Shih et al., 2018).

Many researchers have shown how the health belief model theory and prevention efforts of melanoma cancer survivors and individuals engaging in risky behaviors when it comes to protecting their skin from possible harmful consequences are younger in age. Women in comparison to men report taking more preventive measures, and White people compared to other race/ethnic group reveal similarities and differences in their preventive approach with traditional research methods. This research among an online population was aimed at evaluating age, gender, and race/ethnicity for possible similarities and differences compared to nononline communities previously researched.

Research Questions and Hypotheses

The aim of the research was to answer the following questions and test the associated hypotheses:

RQ1: Does age of melanoma cancer survivors have a relationship with how often they engage in prevention efforts in an online community?

$H_0$1: There is no relationship between age of melanoma cancer survivors and how often they engage in prevention efforts in an online community.

H_a1: There is a relationship between age of melanoma cancer survivors and how often they engage in prevention efforts in an online community.

RQ2: Does gender of melanoma cancer survivors have a relationship with how often they engage in prevention efforts in an online community?

$H_0$2: There is no relationship between gender of melanoma cancer survivors and how often they engage in prevention efforts in an online community.

H_a2: There is a relationship between gender of melanoma cancer survivors and how often they engage in prevention efforts in an online community.

RQ3: Does race-ethnicity of melanoma cancer survivors have a relationship with how often they engage in prevention effort in an online community?

$H_0$3: There is no relationship between race-ethnicity of melanoma cancer survivors and how often they engage in prevention efforts in an online community.

H_a3: There is a relationship between race-ethnicity of melanoma cancer survivors and how often they engage in prevention effort in an online community.

Conceptual Framework

Theories provide a conceptual framework to describe the reasons for explaining behaviors. The health belief model is a theory that has been commonly used in research to promote health, develop intervention, and prevention strategies. Becker, Drachman, and Kirscht (1974) stated that the health belief model provides an interpretation for individual perceptions of susceptibility to a disease, the severity of the disease, and the benefits associated with courses of action that can be taken to prevent the disease.

In applying this theory to this research, the data gathered provided an assessment of the health beliefs of this online community of melanoma cancer survivors related to

tanning. The health belief model has been associated with the perceived risk of people modifying their behavior due to the risk involved in being exposed to a disease. The health belief model was applied to this research to illustrate that participants being aware of the risk involved in tanning, which has been linked to melanoma cancer, may result in some changing their behavior and using preventive measures when tanning (e.g., using sunscreen, wearing protective clothing).

Janz and Becker (1984) stated that the health belief model consists of perceived threats that make up the areas of (a) perceived susceptibility, the belief about the risk of a disease and perceived severity, the individual belief of the seriousness of the disease; (b) perceived threat, which determines if someone will take action related to the disease; (c) perceived benefits, whether individual belief about a new behavior will decrease the disease; (d) perceived barriers are the challenges one may encounter in taking on new behavior; (e) cues to action, which includes both internal and external factors that may motivate an individual to make changes in their behavior; and (f) self-efficacy, which relates to a person's belief they have the capacity to make changes (Bandura, 1977).

Stole, Nilsen, and Joranger (2019) investigated participants in a cross-sectional study based on the health belief model to explore the knowledge, beliefs, attitudes, and sun-tanning behaviors interventions. The study revealed 80% of the participants had perceived barriers to sun protection, and they had beliefs in the benefits of sun tanning, which made them feel good and look better. As described in this study, people engage in tanning based on the belief it makes them look better and makes them feel good about themselves.

The conceptual framework for this study was based on past melanoma cancer research studies that have been conducted using traditional methods with nononline participants (Brewer et al., 2015; Buchanan et al., 2018; Lazovich et al., 2016; Mays et al., 2016; Rodriguez et al., 2017; Stapleton & Crabtree, 2017: Vogel et al., 2017 and Widemar, & Falk, 2018.). These studies have included skin examinations, skin protection practices, sun avoidance, engaging in outdoor activities, and the individual perceptions of the possible risk associated with the disease. Melanoma cancer survivor behavioral patterns discussed in previous research are correlated to this disease. Maintaining health, taking prevention actions, avoiding the harmful effects of the sun, and perception of possible risk of disease are major issues for prevention. It is essential to explore melanoma cancer survivors' prevention efforts in an online community to address their behavioral practices and compare them to past research of nononline communities to evaluate the similarities and differences for developing public health awareness and prevention measures. There has been limited research into the prevention efforts of online melanoma cancer survivors. The American Cancer Society has a network of melanoma cancer survivors, and people use technology to share and obtain health information. Exploring the online community of melanoma cancer survivors provides an opportunity to gather information from a specific population on their prevention behaviors.

The survey questions in this study present a groundwork for possible responses being associated with this population prevention efforts. Chen et al. (2016) studied 150 participants ages 18–88 years regarding skin protection behaviors. The researchers

focused on gender differences after melanoma treatment for 6 years. Women limited outdoor activity and sought more shade when outside compared to men. Men, however, wore a wide brim hat more often than women did. Women wore sunglasses, pants that reached the ankles, and long-sleeve shirts more often than men. In addition, after being diagnosed with melanoma, women engaged in more changes in behavior to prevent future melanoma, worried more about melanoma, and had been using sunscreen protection less often prior to melanoma diagnosis. Age was not statistically significant in the findings (Chen et al., 2016).

The questions used in this study appear in Appendix B and were previously used by Chen et al. (2016). The survey is a public domain document and is allowed use for future research only if cited in the research. Chen et al. (2016) has stated, "This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited(p.1) Melanoma cancer prevention efforts were evaluated based on health maintenance, skin protection, and sun avoidance behavior (Chen et al., 2016). The questions were analyzed for similarities and differences in response to the online community of melanoma survivors and past studies of nononline communities of melanoma survivors.

Nature of the Research

The nature of the research was quantitative, and I used a nonexperimental cross-sectional survey design. The survey instrument administered in this research focused on age, gender, and race/ethnicity differences in skin protection behavior among melanoma

cancer survivors in an online community. The traditional survey format applied by Chen et al. (2016) was a telephone survey with a script for participants to provide responses. The findings of the research showed 87% of the 150 participants used skin self-examination for any suspicious markings, 94% stated they wear skin protective clothing, which was more relevant for women than men.

To recruit online participants, I posted information pertaining to the research and instructions online to the American Cancer Society Network of survivors. Participants were associated with the American Cancer Society Survivor Network of melanoma cancer survivors, have access to a computer, and share healthcare information online. Participation was voluntary, and instructions were posted on the website to access the survey questions for the research. Information was provided on the site to inform them of the research and to inform participants that research results were used for research information and for publication to contribute to future research studies, awareness, and prevention. Findings were based on quantitative analysis to reveal similar or different relationships for each of the variables pertaining to melanoma prevention.

Operational Definitions

Cancer Survivors: The term *cancer survivor* refers to anyone living with a diagnosis of cancer (Wilbur, 2015).

Nononline Melanoma Cancer Survivors: Melanoma cancer survivors surveyed outside of an online community network

Online: Using a computer to communicate with other computers or of or about a computer connected to another computer (Cambridge Dictionary, n.d.).

Online Melanoma Cancer Survivors: Melanoma cancer survivors in the American Cancer Society's Survivors Network online community.

Traditional Surveys: Paper, telephone, face-to-face interviews, focus groups, and mailings.

Assumptions, Limitations, and Scope of the Research

The limitations of the research are online-based Internet research for participants which may have selection bias. Some participants for the research may or may not decide to participate in the research. In addition, e-mail addresses in an online survey do not allow the identification of individuals. The research takes into consideration this community of melanoma cancer survivors online participants and does not include responses from nononline participants. The research does not represent an entire population of melanoma cancer survivors. Due to the nature of the study being conducted online. there is a chance of recall bias in which participants may not remember past events. Recall bias can result from data collection in which the recall of participants reporting and trying to remember past events that can result in recall error which can be inaccurate or incomplete (Brusco & Watts, 2015). Cross-sectional design studies involve the assessment of attitudes and knowledge and disease traits to validate the reliability of studies (Kesmodel, 2018). Cross sectional design can result in selection and information bias. Selection bias may occur if the sample is not representative of the overall population being studied for analysis. Information bias is another factor to consider which can occur when there is unintentional or intentional misreporting from the participants.

Past nononline research studies have revealed women are more likely to engage in tanning in comparison to men (Heckman, Darlow, Kloss, Munshi, & Manne, 2015; Hillhouse et al., 2016 and Parsons et al., 2018). The most common age group engaged in tanning as noted in previous studies have been in the age range of 16-25 (Lazovich et, al., 2016 and Stapleton & Crabtree, 2017).). In terms of race/ethnicity, past research findings have revealed White women in comparison to Black and non-White Hispanics are more likely to engage in tanning behavior (Mays et al., 2016; Parsons et al., 2018). Age, gender, and race/ethnicity are common themes in relation to melanoma cancer and prevention efforts, which have been documented in research findings. Each of these variables, as mentioned previously are findings from studies applying traditional research techniques in a nononline population. This proposed research of melanoma cancer survivors within an online community explored and evaluated the responses and revealed if they were similar or different from past research findings.

Significance of the Research

The online community of melanoma cancer survivors has information that can set forth additional knowledge to support prevention applications. Using the Internet to conduct research in the online melanoma cancer survivor's community to explore prevention efforts within this population might be useful for more effective planning awareness and prevention interventions. The Internet is a place where people seek and share information concerning health issues. This propose research intends to administer survey questions online from a previous survey developed by Chen et al. (2016), which includes questions relevant to (a) health maintenance; (b) skin protection; (c) sun

avoidance behavior; (d) participation in outdoor activities before and after the diagnosis of melanoma cancer; and (e) worrying about melanoma cancer before and after diagnosis. These are questions pertinent to melanoma cancer survivor's prevention efforts.

Providing a platform to research melanoma cancer survivors in an online community presents a contribution to social change for prevention, awareness, and contribute to future studies. Traditional research among this population has involved surveys of melanoma cancer participants with mailings, face-to-face interviews, and focus groups but not among melanoma cancer survivors in a community where information is shared and communicated online. This proposal explored the prevention efforts and beliefs of melanoma cancer survivors and provides an opportunity to evaluate the responses from an online perspective versus that of the nononline population from past research findings for similarities or differences. Melanoma cancer is a disease that is a public health concern in society. Today, technology is a major outlet for individuals to connect and share health concerns and information. This online study can assist with capturing this community of melanoma cancer survivors and their feedback in their prevention efforts to aid in future public health awareness. This research can be used by other researchers to develop additional awareness for cancer survivors.

Glenn et al. (2017) conducted a survey from the California Cancer Registry (CCR) on melanoma survivors who were 18 to 50 years old at the time of diagnosis and had a child less than 17 years old. The participants were surveyed with questions pertaining to their skin examination prevention practices and their perceptions of the severity of skin cancer. Participants were surveyed by choosing between a web-based

survey or a telephone survey. Chen et al. found that, even with a diagnosis of melanoma, less than one in five survivors surveyed reported conducting monthly skin self-exams. Most of the participants of the research had been diagnosed with melanoma cancer prior to the age of 50 and were raising children, which was a criterion for participants to be in the research. Parents who had their children examined by a professional were more likely to have one or more family members with melanoma. The participants with a history of more than one case in the family were concerned about their children being at risk for this disease and had them seen by a health care professional. The research did disclose these participants were not practicing self-examination as recommended; they did more for their children.

Bowen et al. (2015) conducted research reviewing families consisting of melanoma cancer survivors randomly selected to receive an intervention package. The research evaluated melanoma prevention behaviors before and after the intervention using a web-based multicomponent intervention to increase the exchange of risk information and family communication. The researchers analyzed data from Suntalk Research, which consisted of a randomized controlled trial of web-based communication and support intervention funded by the National Cancer Institute. The intervention for the survivors consisted of receiving web-based multicomponent intervention focused on increasing family communication and the exchange of risk information. They investigated skin self-examination, sun protection behavior, provider screening, and the health belief theory based on perceived risk for developing future melanoma cancer in terms of protection behavior change. Data collected were age, gender, and ethnic/racial

background. The analysis was descriptive of all variables to identify any outliers or unusual data points. The research concluded there may be a greater perceived risk of developing melanoma cancer along with worrying due to ineffective protection behavior before regarding more engagement in protective measures after diagnosis.

This research study provided information pertaining to factors associated with melanoma cancer prevention in an online community and their prevention efforts with this disease. In addition, in next chapters I discuss if similar or different patterns exist between online and nononline communities of melanoma cancer survivors to customize prevention strategies for both groups. This study provided an opportunity to gather information and learn from an online community and provide insight into their prevention efforts to elevate future research studies.

<div align="center">**Summary**</div>

Melanoma cancer is a major disease in the United States. Melanoma has been associated with exposure to UVR from tanning. There is an increase in melanoma cancer associated with UVR from the sun or from tanning beds (Li, Kulkarni, Trinkaus, & Cornelius, 2018). Past researchers have examined melanoma cancer survivors regarding traditional survey methods involving mailings, focus groups, phone interviews, and face-to-face interviews, as it relates to age, gender and race/ethnicity. These findings provided feedback related to the online community of melanoma cancer survivors' prevention efforts. Although scholars have researched melanoma cancer survivors, there have been no studies investigating melanoma cancer survivors in an online community network. It is essential to learn from this online community of melanoma cancer survivors and

compare their responses with those of past research findings that used mailings, focus groups, and face-to-face and phone interview formats. This proposed research will provide prevention efforts information and awareness for the benefit of public health.

Chapter 2 contains a review of the current literature on melanoma cancer survivors and traditional methods applied in surveying this population as it relates to the risk factor of tanning. In Chapter 2, I present studies to support the conceptual framework on tanning and the risk factors from research designs in research findings and their outcomes. The studies reviewed were focused on age, gender, and race/ethnicity findings in relation to the risk factors of tanning and prevention efforts.

Chapter 2: Literature Review

The purpose of this research was to investigate the association between age, gender, and race-ethnicity of an online community of melanoma cancer survivors in relationship to tanning and cancer prevention. This chapter contains a methodical and comprehensive review of research literature to determine the various research problems studied in the associations of tanning and melanoma cancer. Discussions on the review of the literature and the challenges faced in these findings are examined and explained.

Literature Search Strategy

A literature search was conducted through electronic medical and social science databases. These included MEDLINE, CINAHL, *Journal of the American Medical Association*, National Cancer Institute Comprehensive Cancer Databases, PUBMED, and ProQuest to conduct this literature review databases. The searches included the key terms *melanoma cancer, melanoma cancer and support groups, melanoma cancer and tanning, melanoma cancer and age, melanoma cancer and gender, melanoma cancer and race/ethnicity, melanoma cancer and ethics, conducting online surveys*, and *the health belief model*. The websites of the American Cancer Society, Academy of Dermatology, and the National Institute of Health specific to melanoma cancer were visited to gather information. The literature review included primary studies of several peer-reviewed, published studies. Articles were retrieved digitally. A gap needs to be addressed for online melanoma cancer survivors and risk factors in relation to tanning. This online community of melanoma cancer survivors is essential to research to acquire information on their beliefs and behaviors to analyze if their responses are similar to or different from

those of participants in nononline traditional surveys. Non-peer-reviewed studies and studies greater than 10 years ago were not included.

Literature Review

The conceptual framework for this research is based on past research findings with traditional methods used to explore prevention efforts of nononline populations. Tanning is one of the risk factors associated with melanoma. Sun exposure and tanning have been associated with melanoma cancer based on research.

Seidenberg, Noar, and Sontag (2017) conducted research of female college students in the southeastern United States at a public university and analyzed their responses with an online questionnaire pertaining to tanning bed use involving the history and age of risky tanning behaviors. The participants ($n = 134$) were sent e-mail invitations regarding their tanning bed use within the past year. Participants were presented with questions on tanning behavior involving using a tanning bed 10 or more times, tanning indoors for more than 10 minutes, no eye protection while tanning indoors, tanning indoors nude, and falling asleep while tanning indoors. The research also required participants respond regarding indoor tanning burns they may have received and if they experienced burns from tanning indoors more than three times. Age, sunburn, tendency, frequency of sun-protective behavior and self-reported skin color were used as control variables for the research. The research results revealed 20 was the median age; 6% of participants identified as Hispanic and 96% identified as Caucasian. The findings revealed 55% tanned for the first time before the age of 18, and protective clothing was reported as being used by 84% when in the sun. In addition, 51% reported being out in

the sun with no protection and experiencing burns. Seidenberg, Noar and Sontag (2017) stated in their findings that delaying tanning bed usage may assist with decreasing skin cancer risk, burning, cumulative UV exposure, and risky tanning behaviors.

Lazovich et al. (2016) conducted a case-control study in Minnesota with 681 patients diagnosed with melanoma cancer and 654 control participants. The ages of participants were 25-49 years. The research was conducted using a traditional format of surveys with a letter mailed to the participants with a follow-up phone call to take part in the research. The participants in the research were provided with a self-administered questionnaire via telephone interview. Questions were related to sun exposure, sunburns, sunscreen use, and indoor tanning. The findings revealed women younger than 40 years old were engaging in indoor tanning at an early age, 16–25 years, and disclosed they participated in more indoor tanning. The number of median tanning sessions was reported as 100–40. Women who tanned indoors were younger than 30 years old and were six times more likely in the case group compared to the control group. The results for the men participants were inconsistent by age. Indoor tanning for women based on the odds ratio finding was by the anatomic site for melanoma on the trunk. Lazovich et al. (2016) stated the increased rates in the United States may be associated with indoor tanning for women at an earlier age than for men, based on women engaging in indoor tanning comparative to diagnosis.

Parsons et al. (2018) conducted research in Salt Lake City, Utah, at the Huntsman Cancer Institute. Free annual cancer screening is provided for the community and advertised through various media via social media, flyers, and telephone hotlines.

Participants for the research were recruited randomly and requested to complete a self-reported questionnaire. The questionnaire included age, sex, race, number of changing moles, family or personal history of skin cancer, skin cancer risk behaviors, the number of times they engaged in indoor tanning, and whether they engaged regularly in photoprotective behavior. Parsons et al.'s (2018) participants were 88% White (n = 282), and 60% female (n = 191); 51% (n = 164) reported a family history of skin cancer, and 17% stated they had a personal history of skin cancer. Participants in the research reported 12% of both a family and a personal history of skin cancer. Having noticed a mole changing on their body was reported by 34%; without the aid of the AAD-sponsored screening, 45% disclosed they would not have had a skin examination. In addition, 75% to 90% of the participants were taking part in photoprotective behaviors, and 52% revealed a history of minimal skin cancer risk behaviors.

Exposure to UVR both from the sun and through artificial light has been associated with melanoma cancer. Studies have supported the association of the risk of melanoma cancer and tanning devices (Zhang et al., 2012) along with UVR light exposure. Zhang et al. (2012) evaluate the risk effects of tanning beds with skin cancers involving female nurses for 20 years. The researchers investigated the frequency of tanning bed use from high school to college for participants ages 25–35. The findings showed a risk factor of melanoma cancer associated with the use of tanning beds at a younger age.

Seite, Del Marmol, Moyal, and Friedman (2017) conducted international cross-sectional research and investigated using a questionnaire, both online and by telephone,

that had questions pertaining to gender and age; participants were 15 to 65 years of age. The questions asked addressed sun exposure and protection, risk knowledge, and self-examination. The findings of the research showed women had more knowledge than men of risk factors associated with melanoma cancer and took more preventive measures to protect themselves. Women performed more self-examination on their skin than men did. The countries that had high levels of preventive measures were Australia, Chile, and Greece. Preventive measures included using sunscreens and wearing sunglasses. Parents noted sunscreen application on children under age 12, and participants older than 45 years noted the risk factors associated with this disease, such as UVR exposure. In addition, self-examination increased with age, 55–65 years.

UVR-emitting devices, solar radiation, and indoor tanning devices are carcinogenic to humans (International Agency for Research on Cancer, 1992). In many research studies of melanoma cancer, tanning has been the focus as a contributing risk factor.

Melanoma Cancer

Melanoma cancer is defined as a kind of skin cancer that begins in melanocytes, which can be found anywhere on the skin, and can impact other areas of organs and bones (Hassin & Alsafy, 2017). According to Hassin and Alsafy (2017), there are four types of melanoma cancers. First is superficial spreading melanoma, which can occur on any part of the body and may occur as an asymmetric plague in a variety of colors (black, red, brown, blue, and white) with pigment pattern and irregularity (notching of borders). Second is nodular malignant melanoma, which has a dome-shaped dark brown or black

nodule that ulcerates and bleeds and can be found on the trunk and other parts of the body. It can have an irregular edge and the nonpresence of multiple colors, with a well-defined border and symmetry in comparison to other melanomas. Third, lentigo malignant melanoma can develop on sun-exposed areas, such as the face, and consists of pink, gray, blue, and white color with borders that are highly irregular and notched. And, fourth, acral lentiginous melanoma can occur in the fingernails; it is a rare lesion that can be present in an acral location or on a mucous membrane, is flat and irregular, and can also be raised and subsequently nodular. It can have borders that are irregular and notched. The color for this type of melanoma can be blue, black, or amelanotic and often ulcerated. In the nail under the cuticle, it produces a streak in the nail plate.

ABCDE rule. Jensen and Elewski (2015) stated the "ABCDE rule" is recommended for patients to assist in identifying the possibility of the presence of melanoma. The ABCDE rule helps in classifying the clinical descriptions of melanoma. Jensen & Elewski (2015) describe the meaning for the ABCDE rule as follows: The A is for Asymmetry; B= Border irregularity; C=Color variation (both intralesional color variation as well as a color that is different from the patient's other nevi); D=Diameter greater than 6mm, and E=Evolving (a new or changing lesion). In addition to the "ABCDE rule" Jensen & Elewski (2015) incorporated the letter F into the rule, which stands for "Funny looking" to evaluate moles that may seem questionable. The ABCDE rule is the most common format mentioned in research findings when describing the assessment of possible melanoma cancers.

Risk factors. There are several risk factors associated with melanoma. UV

(Ultraviolet) light exposure is one of the major risk factors linked to melanoma cancer

(D'Orazio, Jarrett, Amaro-Ortiz & Scott, 2013). UV light exposure is emitted through the

sun and associated with sun lamps and tanning beds which has been correlated to skin

damage. (UV) has been classified as a "complete carcinogen" as described by (D'Orazio

et al., 2013) due to its ability to cause damage to the skin and can contribute to both a

tumor initiator and a tumor promoter. Moles are a major link to this disease and

individuals with large or irregular moles have been identified as being at risk for

developing melanoma. D'Orazio, Jarrett, Amaro-Ortiz and Scott (2013)) found many

melanomas are associated with pre-existing moles and having moles can be a risk factor

for melanoma cancer. Having fair skin complexion is another risk factor for this disease

based on low levels of a UV-blocking dark pigment called eumelanin in the epidermis

(D'Orazio et al., 2013). People who are light skin in complexion can be exposed to more

damaging effects from UV because it can penetrate the skin and can result in both

keratinocytes and melanocytes in the deeper layers of the epidermis (D'Orazio et al.,

2013).

A personal history with melanoma is a risk factor for this disease. If an individual

has had a history with melanoma there is a higher risk, they can develop another

melanoma (Dieng et al., 2015). A family history of melanoma cancer has been identified

as a possible risk factor for other people within a family to develop this disease. Potrony

et al., (2015) stated melanoma high-risk genes are defined as genes that when mutated in

an individual with the possibility of a high risk of developing melanoma associated with many cases within a family.

Older adults are more predisposed to melanoma cancer. At the time of diagnosis being older in age is associated with melanoma-specific survival (Weiss et al., 2016). The reduction in naive T-cells from a younger age to an older age has been correlated with possible melanoma. Differences in the natural history of melanoma between younger and older patients have been attributed to a reduction in naive T cells, decreased T cell functionality due to loss of co-stimulatory molecules, T cell exhaustion, and reduction in pro-inflammatory cytokine secretion (Vukmanovic-Stejic, Rustin, Nikolich-Zugich & Akbar, 2011).

Men are at a higher risk of melanoma due to research findings of men being less likely to engage in protective measures when sun tanning (Holman, et al., 2015).

A weakened immune system may result in an increased chance of developing melanoma cancer. A weakened immune system can be due to organ transplant recipients and forms of ultraviolet light-mediated immunomodulation (Rangwala & Tsai, 2011).

A rare condition called Xeroderma pigmentosum (XP) causes interferences with the skin cells which inhibits the repairing of the skin and is rare which can be inherited and result in melanoma cancer which has been defined as sun sensitivity from sunburns and exposure to the sun (Kraemer & DiGiovanna, 2003).

Tanning and sunscreen. Research related to tanning and melanoma cancer has been documented in many studies as a risk factor. Sample & He (2017) found exposure to ultraviolet (UV) radiation, namely UVA (315–400 nm) and UVB (280–315 nm) are a

major risk factor for melanoma development and Cumulative UV radiation exposure

from sunlight or tanning beds contributes to UV-induced DNA damage, oxidative stress,

and inflammation in the skin. Studies conducted on the behavioral reasons involving

theories with people who engage in indoor tanning and melanoma cancer have included

survey methods applying the Theory of Planned Behavior (Scott, Hillhouse & Turrisi,

2014) and Social Cognitive Theory (Noar, Myrick, Morales-Pico & Thomas, 2014).

Research has suggested most people who engage in indoor tanning are doing this for

appearance reasons (Scott et al., 2014). Indoor tanning for individuals who participate in

tanning believes the darkening of the skin makes them more attractive due to the

exposure of ultraviolet radiation with the belief of their peer acceptance (Noar et al.,

2014). Tanning is a component that has been the center of attention associated with

melanoma cancer, but many people find the appearance of having their skin tanned is

important to them versus the risk of developing melanoma cancer.

Stapletonand Crabtree (2017) conducted a qualitative research involving the

behavior of females between the ages of 18-25 who use indoor tanning salons at least 10

times in the past 12 months. Participants were indoor tanners who were interviewed along

with tanning salon employees. The researchers categorized two types of tanners. Indoor

tanners were categorized as first-time tanners who go to the tanning salon to obtain a

darker color for their skin in appearance for an event, such as proms, weddings,

graduations, and birthdays. The other type of individual tanner is the frequent tanner who

can be categorized into two subgroups, this included frequent individuals that tan on a

regular basis with set appointments for specific days of the week and the other type was

labeled as the educated frequent individual tanner that varies their visits to the tanning salon following the schedule of the instruction from the tanning salon. The findings concluded indoor tanners who use the salon are encouraged to tan more frequently by tanning salons employees, especially when they are first time tanners. Stapleton and Crabtree (2017) found from their finding that individuals that tan at tanning salons may not be informed of the dangers of UVR. Prevention and awareness are needed to inform tanners of the possible risk linked to tanning salons and melanoma cancer. Guy et al. (2015 stated the use of indoor tanning from a public health perspective in addition to the regularity of its use is a cause for public health concern.

Numerous studies have supported the issue of tanning as a major contributing risk factor in the prevention efforts of melanoma cancer. Fischer, Wang, Yenokyan, Kang and Chien (2016) conducted a cross-sectional population-based research using the US 2015 National Health Interview Survey data to research the link between skin cancer prevention and indoor tanning consistency and behaviors. The research findings revealed people who tan indoors had a regular tendency to sunburn, avoid sun protection and avoid skin cancer screening. Watson et al., (2015) stated most skin cancers have a high association with ultraviolet (UV) radiation exposure which comes from the sun and the use of UV-emitting indoor tanning devices (e.g., beds, booths, and lamps).

Brewer, Mcquinn, Lohse and Hassani (2015) using a non-experimental design with a self-reported traditional survey researched participants between the ages of 18-50 regarding the perception of tanning bed usage. The sample of participants were young adults at the Rochester Community College in Rochester, Minnesota. Participants for the

research received a paper copy of the survey with a verbal explanation for the research.

The participants were presented with a pamphlet by the American Academy of

Dermatology relating to the information on the ABCDEs of melanoma. The research

results showed half of the participants were not educated on the risks of melanoma and

more than half were not interested in obtaining information on melanoma. Important

findings of the research revealed 20 (57%) of the 35 participants who had never used a

tanning bed stated that they never take prevention measures from sunburn and 1 (11%) of

the 9 participants who had used a tanning bed in the past also stated that they never take

prevention measures from sunburn.

Past research findings have associated the health beliefs of people who tan

indoors as possessing a strong belief of perceiving a tan skin tone to be more attractive

than a non-tan skin tone which is socially accepted by their peers. In this proposal the

responses from the online melanoma cancer survivors in an online community of

survivors were explored to address if there is a relationship of people not protecting their

skin from the harmful effects of ultraviolet rays when engaging in the possible risk of

developing melanoma cancer which has been associated with tanning and analyzes with

current and past studies applied using traditional research of non-online methods. The

online community of melanoma cancer survivors may or may not reveal similar or

differences based on their beliefs and prevention practices. Whereas indoor tanning is

correlated as a risk factor for fostering melanoma cancer there are also people who tan in

other places without protecting their skin. Outside of a tanning salon individual daily

need to protect their skin from UVR. Individuals are exposed to UVR daily and even

while at the beach, park, pool and taking part in recreational activities. Daily exposure is another risk factor to consider as individuals not protecting their skin when it is exposed to the sun daily, can include UVR exposure and damaging outcomes to the skin. Sunscreens are another means which has been documented in research studies as a prevention method for the skin when it is exposed to UVR. Individuals that may not use tanning salons may also be at risk of developing melanoma cancer but may not perceive it as a high-risk factor due to their beliefs.

Sunscreens. Sunscreens continue to be at the center of attention when it comes to its effectiveness in providing adequate protection for skin damage from the sun. It is a protective measure that has been supported by many professional organizations and research findings. In supporting sun protection actions the UV Index acts as a risk communication tool for raising awareness (Giles, Deventer, Green, Sinclair, & Tinker, 2017). Sunscreens are viewed as being effective and non-effective in protecting the skin from damage due to UVR. Many controversial issues have included how much sunscreen is adequate and the variety of locations in terms of geography. The Global Solar UV Index was developed as an instrument for easy comprehension to measure the amount of biologically effective ambient solar ultraviolet radiation (UVR) at different locations on the earth's surface (Giles et al., 2017). Sunscreens are still considered a means for protecting the skin from the harmful dangers of the sun. The World Health Organization (WHO), the World Meteorological Organization (WMO), the United Nations Environment Programme (UNEP), and the International Commission on Non-Ionizing

Radiation Protection (ICNIRP) support the use of sunscreens to provide sun protection concerning UVR of the sun (Giles et al., 2017).

Varedi et al., (2018) researched the impact of outdoor recreation and sun exposure which can lead to the risk of skin cancer. This research explored the cumulative exposure to ultraviolet (UV) radiation with nine free skin cancer screenings conducted at Utah ski resorts between 2011 and 2016. The research included 394 participants. The research included The Sun Safe on the Slopes program. This program includes Huntsman Cancer Institute at the University of Utah and the Utah Cancer Action Network for the awareness of the risk of skin cancer and UV exposure. The program also includes the provision of free skin cancer screenings, outreach, and prevention education to local ski resorts. The outreach for this research included ski resort employees. The research employed the American Academy of Dermatology and SPOTme screening guidelines which were comprised of traditional research techniques of survey questions relevant to skin cancer history, demographics, sun safety behavior and recommendations for follow-up. The methods used to provide information to the participants included a website, printable education posters, educational video, sun safety, preventive measures, and local skin cancer screening. The participants were assessed by outreach and prevention education volunteer staff by conducting total body skin examination at the ski resorts. The findings of the research revealed the participants did not practice sun safety protective measures of applying sunscreen and protective clothing. 52% were females, 96% white participants had a mean age of 47years old, and the free skin cancer screening resulted in the presumptive diagnosis of 38 skin cancers. Varedi et al. (2018) stated 41% of the research

participants would not have seen a physician for their skin evaluation if they had taken part in the free skin cancer screening, 10% had revealed a previous diagnosis of skin cancer, 38% revealed using a sunscreen when outdoors, 32% seeking shade when outdoors and sun-protective clothing was only worn by 13%.

Holman et al., (2015) researched the patterns of sunscreen use on the face and other exposed skin body parts with US adults using cross-sectional data from the Summer Consumer Styles survey. The analysis for the research was a descriptive statistic which adjusts the risk ratios for characteristics of the regular usage of sunscreen application for more than 1 hour when outside during sunny days. The finding disclosed sunscreens were used by few adults on the face, more women than men used sunscreens on the face and almost 40% of the participants were not sure if sunscreens aided in sun protection for their skin. The analysis of the data included sunscreen being applied to the face for men was 18.1% at a 95% confidence interval (15.8-20.6) compared to women, 42.6%, 95% confidence interval of (39.5-46.7). Other parts of the body for men, 19.9%, at a confidence interval (CI) of 95%, (17.5-22.6) and women, 34.4% at a confidence interval of 95% (31.5-37.5). When combined for both the face and other exposed skin for men, 14.3% at a confidence interval of 95% (12.3-16.6) and 29.9% of women at a 95% CI (27.2-32.8). The age group for the research was 18-65 years of age. Holman et al., (2015) also established 65 years old and older participants were using more sunscreens in comparison to the younger research participants.

Age. Kiviniemi and Ellis (2013) investigated if people would be motivated to engage in preventative behaviors based on the perceived risk of the belief, they may be

exposed to skin cancer without sunscreen. The 2005 National Cancer Institute of Health Information National Trends Survey was analyzed based on a telephone, a list-assisted, random digit dial telephone technique survey data containing responses from participants who reported the cognitive perceived risk of developing skin cancer. Participants were 18 years old or older and were randomly selected to respond to question about skin cancer. Kiviniemi andEllis (2013) categorized perceived absolute risk for the skin using a 5-point scale ranging from 1(very low) to 5 (very high) with the question of, "How likely do you think it is that you will develop skin cancer in the future? and the perceived comparative risk was assessed with the question of "Compared to the average person your age, would you say that you are…", with a 3-point scale for responses of, *more likely to get skin cancer*, *less likely*, and *about as likely.* These included data from responses of worrying about the perceived risk of skin cancer and sunscreen behavior use. The analysis supported there was a relation between cognitively based perceived risk for skin cancer and sunscreen use related to worrying. The findings did not reveal there was a connection of worry on the relation between risk and behavior. Men and nonwhite participants reported less use of sunscreen.

Exposure to UVR can be harmful to the skin and may lead to skin cancer. Walkosz et al. (2017) using a quasi-experimental randomized controlled trial researched sun protection practices of various outdoor leisure and reactional sites during the warm seasons at North American resorts. A traditional survey was administered to adult guests in a cross-sectional research of some participants being observed (n=4091) and surveyed (n=3694). Data were collected from outdoor recreation and leisure locations from

commons/reception areas. The sun protection assessment by reaction activities included swimming pool, beach, marina, court lawn, golf course, and outdoor dining. The samples were categorized by sample 1 being the observed group for sun safety practices and sample 2 being the survey group with outdoor leisure and reaction activities using two annual cross-sectional groups with a controlled quasi-experimental design. The survey was a traditional survey of self-reported responses for the use of sunscreens and sun protection practices and other participants were observed by research investigators. The age for the participants in the research was 18 - 60+ years old. Females were more involved in sun protection compared to men, but women exposed more skin compared to men and were less likely to re-apply sunscreen. In the use of shade, there was no relevant difference between males and females. Older adults over 60 years old were reported as using more sun protection methods and 18-34-year-old were less practicing sun protection. Adults 35-40 years of age were reported as using more sunscreen compared to the younger age groups. Sample one participants (observed group) analysis revealed there were differences between genders. Walkosz et al. (2017) analysis based on age differences stated adults over the age of 60 were practicing using more shade; (18–34 years: pool 18.1%, beach 12.2%, marina 14.7%, golf 15.0%, court/lawn games 9.4%, dining 63.9%, commons/reception 26.4%; 35–60 years: pool 22.4%, beach 11.4%, marina 11.4%, golf 15.1%, court/lawn games 11.7%, dining 61.5%, commons/reception 27.1%; over 60 years: pool 26.7%, beach 31.8%, marina 25.3%, golf 21.8%, court/lawn games 30.8%, dining 70.8%, commons/reception 46.0%). Middle- aged adults from the

research were the only group which differed in activity areas and used the most shade (p

< 0.018; 18–34 years: 16.1%, 35–60 years: 24.6%; over 60 years: 18.5%).

In Sample 2, the surveyed group (Walkosz et al., 2017) reported participants in

the research age 60 and older used less sunscreen based on locations that included

waterside venues, including swimming pools (54.4%), beaches (70.0%) and marinas

(44.0%). Younger age groups tended to use sunscreen more at these areas (18–34 years:

62.9%, 79.2%, 45.4%; 35–60 years: 66.7%, 75.7%, 50.5%, respectively). By contrast,

older guests were more likely to use sunscreen at golf courses (35–60 years: 54.3%; over

60 years: 53.9%), court and lawn games (35–60 years: 55.1%; over 60 years: 50.0%), and

outdoor dining areas (35–60 years: 50.6%; over 60 years: 58.5%) than the youngest

guests (18–34 years: 31.2%, 44.0%, 41.4%, respectively), In addition the research finding

disclose participants over 60 years old (43.1%) and youngest (18–34 years: 47.7%) guests

were less likely to wear sunscreen in activity areas than middle-aged guests (35–60 years:

69.1%).

The findings from this research revealed most vacationers by age did wear

sunscreen at the pools and beaches, but it varied by place as to where some participants

were less likely to wear protective clothing when they were out being exposed to the sun.

Many studies have been conducted in relationships with melanoma cancer and

gender differences. In most studies, women have been documented as taking more

preventive methods to protect their skin when tanning and being exposed to UVR from

the sun. Julian, Bethel, Odden and Thorburn (2016) conducted a research examining the

gender differences involving indoor tanning and the relationship between cancer risk

perception related to skin cancer screening for 1,177 participant indoor tanners. They used the data from the 2010 National Health Interview Survey to analyze participants 18 years and older that used an indoor tanning device. The research results found less than 30% of indoor tanners for both men and women reported having their skin examined. Women compared to men revealed they rarely or never use sunscreen (51.4% of men vs. 36.4% of women). Julian, Bethel, Odden and Thorburn (2016) stated some indoor tanners who perceived themselves to be more prone to develop any type of cancer were less likely to receive a skin cancer examination in comparison to those with a high perceived risk. There was not a difference in skin cancer screening between the genders.

Hillhouse et al., (2016) conducted a longitudinal research of young indoor tanners of females between the ages of 12 and 18 years not involved and occupied with indoor tanning at the time of the initial assessment. The research included focusing on the risk of greater exposure to melanoma cancer due to the frequency and persistent behavior of tanning. Participants were selected by a Growth from Knowledge Network Panel that is an online panel of the random sample from the U.S. population, after a year the beliefs of the participants were evaluated about indoor tanning and the analysis of the responses included a Post-hoc Tukey comparison. Participants were assigned to groups of categories. Hillhouse et al., (2016) three groups from their findings stated, a low-risk, Anti-Tanning subgroup (18.6%) characterized by low scores on positive indoor tanning belief scales and high scores on beliefs about indoor tanning dangers; a moderate-risk Aware Social Tanner subgroup (47.2%) characterized by high scores on positive indoor tanning belief scales but also high scores on beliefs about indoor tanning dangers; and a

high-risk Risky Relaxation Tanner subgroup (34.2%) characterized by high scores on positive indoor tanning belief scales and low scores on beliefs about indoor tanning dangers. The researchers from this research also investigated the mother's tanning behavior based on the subgroups responses which determined The Risky Relaxation Tanner subgroup response to their mothers' s tanning behavior was (17%); the Anti-Tanning (4%) and the Aware Social Tanner (5%). The finding of this research uncovered teens who have mothers and friends who tan is more likely to engage in this behavior based on their beliefs.

Heckman, et al., (2015) studied participants within the last 30 days and their indoor tanning and tanning dependence of college-age females. The female participants completed a traditional questionnaire by online survey and telephone interview pertaining to the psychosocial correlation of behaviors linked to skin cancer. The results of the research concluded more tanning dependency and assessment in the spring and summer compared to the fall and winter. The research included 139 college female students that were recruited by e-mail and web from a psychology department research pool based on the psychosocial correlates of behaviors associated with skin cancer and indoor tanning. The age of the participants was 18-25 years old. An independent t-test and Pearson's correlations were used to access tanning dependence. The frequency of tanning outcomes variables included two multivariable linear regression for analysis. The analysis of the result was based on the average number of times women tanned indoors in the last 30 days. Heckman et al., (2015) statistical analysis was a 1.8 (SD = 4.5), with the square root transformation applied, the mean was 0.6 (SD = 1.2). Indoor tanning sessions for the

45

participants had a mean of 9.9 minutes (SD = 5.2), and the mean number of dollars spent

per tanning session was 5.6 (SD = 7.4). The researcher stated higher scores on tanning

dependence and assessment were found in the last 30 days of indoor tanning in the

spring/summer (versus the fall/winter). Participants with higher scores used indoor

tanning frequently and in a greater length of time.

Race and ethnicity. Race and ethnicity have been another factor from research

associated with melanoma cancer. Melanoma cancer is predominantly more common

among Whites than African Americans (Mahendraraj et al., 2017) and in other ethnic

groups (Apalla et al., 2017). People of different race/ethnicity have been studied in

relationship to melanoma cancer.

Sun protection strategies for the African American and Hispanic populations have

a perception they have a lower chance of developing skin cancer and they are less likely

to use sun protection strategies (Buchanan, et al., 2018). Melanoma cancer has been

associated with all racial and ethnic groups. The U.S. Cancer Statistics Working Group,

(2017) stated skin cancer rates are lower for the African Americans and Hispanic

population when compared to the White population. There is a difference in

race/ethnicity based on research findings which have concluded that these groups have

reduced diagnoses and survival rates when they are identified with skin cancer(Kaufman

& Alexis, 2017). The differences in race/ethnicity have been documented in studies of

skin cancer. Holman et al., (2018) found from a cross-sectional research finding sunburns

were highest for younger adults, non-Hispanic white individuals, and those with sun-

sensitive skin. Focusing on the differences between race/ ethnicity for melanoma cancer

and prevention efforts have included awareness to target this population. Not addressing

sun protection behavior for the Black and Hispanic population with their perception of

being at a lower risk for skin cancer may be tied to lower awareness (Manganello,

Gerstner, Pergolino, Graham, & Strogatz, 2016).

A research conducted on Hispanic women and men (Coups et al., 2014) revealed

Hispanic women compared to men were more likely to use sunscreen and stay in the

shade. The research had a large sample of 787 Hispanic adults (49.6% female, mean age

= 41.0 years) within the United States which completed an online survey in both English

and Spanish on sun protection related to sunscreen use, shade seeking, and use of sun-

protective clothing in relationship to suntan benefits, sun protection benefits and barriers,

skin color preference, perceived natural skin protection, photo-aging concerns, perceived

skin cancer risk, skin cancer worry, skin cancer fatalism. The research results revealed

this population of individuals reported sun protection barriers to be not associated with

perceived natural skin protection was associated with sunscreen usage, worrying about

skin cancer was noted as seeking shade and wearing protective clothing when being

exposed to the sun and skin cancer fatalism was not reported as any means of seeking

shade and skin color preference was also not reported as a reason to wear sun- protective

clothing.

Elderly African American adults in research studies also believe they do not need

to worry about skin cancer due to their skin tone. Caretti, Mehregan and Mehregan

(2015) found this to be relevant from their study in which they administered a 17-item

questionnaire for self-reporting concerning their perceptions of skin disease and

awareness of skin cancer. The research was a cross-sectional research. The research finding revealed less concern by elderly people of darker skin types concerning skin cancer. The age of the participants was 60-91 years of age, the (median age: 71 years). Most of the study participants were women (75.2%). Concern regarding skin cancer was reported by 40.6% of participants and regular skin examination was reported by 75.2%. The study participants (34.7%) did not believe people of darker skin types had to be concerned about skin cancer.

Mays, Atkins, Ahn and Tercyak (2017) research included the dependence on indoor tanning behavior and beliefs using a cross-sectional research within a community sample of 389 non-Hispanic white young adult women. The ages of the participants were 18 to 30 that had tanned indoor within the past year. The research participants completed an assessment survey for indoor tanning dependence pertaining to the beliefs and behaviors of indoor tanning. The study revealed 22.6% of the participants had a dependence on indoor tanning. The research analysis was conducted with a two-sample t-tests and Pearson's χ^2 tests to examine the associations between all independent variables measured and indoor tanning dependence. The findings revealed participants 23 years old were depend on indoor tanning initiation, having a tendency to have a behavioral addiction to indoor tanning for the purposes of physical appearance (age-adjusted odds ratio [aOR] = 0.79, P = .017), indoor tanning ≥ 20 times in the past year (aOR = 3.03, P = .015), stronger beliefs about the benefits of tanning (aOR = 2.15, P = .004), greater perceived susceptibility to indoor tanning risks (aOR = 2.72, P <.001), stronger beliefs about physical appearance (aOR = 1.73, P = .037). The researchers concluded White

women had behaviors related to an increased risk of skin cancer in addition to a strong belief related to the perceived benefits of tanning and that physical appearance was an important factor in tanning indoors.

Garnett, Townsend, Steele and Watson (2016) investigated Hispanics and melanoma cancer in the United States. The research examined the cancer incidence data from the National Program of Cancer Registries and the Surveillance Epidemiology and End Results program. The study focused on the epidemiology of melanoma related to Hispanics of 6,623 new cases from 2008 to 2012, with 54% of the cases being Hispanic females and White Hispanics cases of 93%. The median age for Hispanics diagnosed with melanoma cancer was 56 years, 61 years for men and 52 years for women. Sex, age and race were examined of cases of melanoma diagnosis. Hispanics melanoma incidence rate was 4.2 per 100,000. Menhad higher rates (4.6) compared to women (4.0); women younger than 55 years of age had higher rates than men; White Hispanics (4.2) compared to Hispanics of known other race (1.4). It was determined from the analysis young women had a higher rate of melanoma cancer compared to men. Hispanics men 80 years old and older showed a double incidence when compared to Hispanic women. This finding revealed the incidence rates were higher among Hispanic men than women which concluded a need for Hispanics to be provided with skin prevention cancer and awareness information.

Robinson, Penedo, Hay & Jablonski (2017) stated in the United States from their research finding, Latinos believe they are not at risk for skin cancer due to their natural skin tone which protects them from developing melanoma cancer. Skin pigmentation has

been identified as a risk factor for skin cancer, with lighter skin pigmentation being associated as having a greater chance for developing melanoma cancer.

Robinson et al., (2017) studied a sample of Latino adults of Puerto Rican and Mexican heritage from a Latino community health fair. The participants were verbally administered a self-reported response survey in either English or Spanish for responses on their skin and skin sensitivity which was evaluated with the spectrophotometry assessment of constitutive pigmentation. The research participants were asked by the researchers if after several months of not being in the sun, and staying outdoors for about 1 hour at noon for the first time in the summer in Chicago without sunscreen, would your skin burn or get irritated and tender? In addition, Robinson et al., (2017) also asked if over the next 7 days would they develop a tan, or would their sun-exposed skin get darker? The finding disclosed participants believed they would burn from the sun and they believe based on their skin tone they do have sensitive skin which can be damaged from the sun. Melanoma cancer varies across racial and ethnic groups and it is essential to promote awareness and prevention to all racial/ethnic groups.

Health Belief Model Theory, Health Maintenance and Skin Protection

The risk of a second melanoma for up to 20 years increases 10 times with a greater chance in comparison to the first melanoma (Bradford, et al., 2010). The Health Belief Model is a very common theory used in health behavior studies for melanoma prevention and the promotion of behavioral change (Glanz et al., 2015). The Health Belief Model consist of elements which can explain the behavior of individuals and their decisions. These includes severity, susceptibility, benefits, and barriers (Glanz, et al.,

2015). Melanoma cancer survivors may make decisions based on their beliefs of tanning and the severity of engaging in risky behaviors relevant to their health maintenance and skin protection beliefs.

Health maintenance and skin protection behaviors are important factors for melanoma cancer survivors to practice in preventing this disease. Research has expressed the significance of checking one's skin for early detection of possible skin cancer along with having a physician examination. A major preventive health behavior validated by physicians for melanoma survivors is Skin self-examination (SSE) practice (Coroiu et al., 2018). In maintaining the risk of developing possible melanoma cancer, survivors are encouraged to check their skin by SSE (Watts, et al., 2015 & Marciano et al., 2014). The early detection of skin cancer has mentioned in research as key component to decrease melanoma mortality (Katalinic et al., 2012).

In a randomized controlled trial study (Robinson et al., 2016) patients with melanoma and their partners ("dyads") along with physicians were investigated for Skin self-examination (SSE). The study consisted of Skin self-examination (SSE) and the new detection of melanomas. The study was conducted for 24 months with follow-up assessments. Dyads of the melanoma patients were randomly selected to have skills training intervention or be a part of the control group with customary care. The frequency of SSE was the main assessment and the detection of a new melanoma or recurrent melanoma by the physician and dyads was the secondary outcome. The third measurement was the amount of unscheduled physician appointment regarding lesions. The finding revealed 51.2% of the 494 participants in which 253 were females had a

mean age of 55 years old. Melanoma patients and their partners who had received

training did perform SSE with a dermatologist reinforcing training every 4 months.

Melanoma patients in the intervention group at 4, 12 and 24months ($P<.001$ for all),

showed an increase in SSEs with their partners compared to the control group mean

differences, 1.57 [95% *CI*, 1.29–1.85], 0.72 [95% *CI*, 0.39–1.06], and 0.94 [95% *CI*,

0.58–1.30]. New melanomas were identified by the intervention group compared to the

control group, which also did not have an increase in physician visits ($\chi21=28.77$, $P <$

.01 [*n* = 51 melanomas in situ] and $\chi21=6.43$, $P < .05$ [n = 18 invasive melanomas]).

Individuals who believe there is a threat to their health based on their perception

and perceived susceptibility regarding sunburns as a risk factor for developing melanoma

cancer may engage in taking prevention measures. People who perceive the benefits of

tanning out weight the risk of possible developing melanoma may continue to tan and not

worry about any perceived barriers of protection behaviors (Glanz, et al, 2015). Self-

efficacy from the Health Belief Model theory states the individual can take prevention

measures to take prevention measures. Each of these components of the Health Belief

Model theory proposes an explanation of an individual belief and their decision to

practice or not practice skin protection behaviors to prevent this disease. Individuals

based on their beliefs may think tanning makes them look more attractive and not worry

about the possible threat of another melanoma.

Individuals may believe taking prevention measures is not something they need

to do based on their age. Melanoma cancer is most common in the age group of 25-29

years of age, 52 years old is the mean age of diagnosis and for adolescents it is the second

most common cancer for young adults ages 15-29 years old (Goldsmith et al., 2012).

Younger adults in research have reported engaging in tanning and non-protective

behaviors based on their beliefs and do not worry about the possible consequences of

developing melanoma cancer (Kiviniemi & Ellis, 2013; & Walkosz et al., 2017).

Previous researchers have noted women have a higher belief in tanning

dependency, 18-25 years of age (Heckman et al., 2015). White women in research have

the belief indoor tanning made them look better in physical appearance (Mays et al.,

2017).

African Americans and Hispanics believe their perception of the risk of getting

melanoma cancer is low due to their darker skin tone (Buchanan et al., 2018) and (Coups

et al., 2014) found Hispanic women were more likely to use sunscreen compared to

Hispanic men. Latinos in a study (Robinson et al., 2017) found they believe they were not

at risk for melanoma cancer due to their skin tone. People with darker skin tones, believe

they are not at risk for developing melanoma as compared to lighter skin individuals.

Elderly adults believe they do not have to worry about skin cancer due to their skin tone

also.

The beliefs of individuals in addressing age, gender and race/ethnicity within past

tradition non-online study findings have been discussed in the above paragraphs. This

study explored these findings and compare them to the responses of the on-line

community of melanoma cancer survivor beliefs from the survey finding in reference to

health maintenance and skin protection behaviors.

Past non-online research has been conducted applying traditional research tools, such as face-to-face interviews, focus groups, phone interviews and surveys. Not much information is known about the health maintenance and skin protection behavior of the on-line community of cancer survivors in an online cancer survivor's network. Past research findings have found younger adults engage in more tanning and do not take prevention measures when compared to older adults and females take the risk of tanning even with the possible high outcome of developing melanoma cancer due to their appearance of wanting to look physically attractive with a tan. White women have been reported as being more likely to tan for their appearance and African Americans and Hispanics have the belief, they are not at risk for melanoma cancer based on their skin tone.

Byrne (2020) in a recent study focused on the incidence of melanoma cancer as it relates to skin cancer knowledge and sun related behaviors. The study was a cross-sectional study involving 312 participants in which 213 were females (65.27%) and 108 (34.73%) were males. Most of the participants were 21-25 years old. The participants had a positive attitude with a tan, 201 (64.63%) reported they felt more attractive with a suntan and 174 (55.94%) revealed they felt better about themselves with a suntan. 196 (54.17%) half of the participants revealed they had gotten a suntan last year, sunbathing was reported by 171 (54.81%), sunburn was reported by 188(60.26%) and 30 (9.61%) of the participants reported using sunbeds. Sunbathing, sun tanning and sunburns were more associated with participants who had a positive attitude. This study supported focusing on the tanning attitudes for skin cancer prevention.

This research aims to focus on the online community of melanoma cancer and their health maintenance and skin protection behaviors. Research within this area can provide insight into their beliefs and what they believe when it comes to protecting their skin from the possible risk of melanoma cancer. Cancer survivors have important narratives to tell that can be extremely helpful to other survivors. Thousands of cancer patients within virtual communities (generated via online support groups and blogs) share their experiences to inform others and obtain support (Banerjee et al., 2018).

Research conducted with melanoma cancer survivors (Vogel et al., 2018) have found some individuals do take more protective measures and do practice UVR protection but the researcher also disclosed many of the participants still do not practice adequate protection from sun exposure, sunburns and UVR protective behaviors. This researcher also stated there is a need to improve sun protection to decrease the risk of melanoma for melanoma survivors. Study findings from melanoma survivors have suggested there is a demand to improve sun behavior (Bowen et al., 2012). Individuals today use the Internet to explore health issues and resources to share and access information. This study intended to focus on the on-line population within the American Cancer Society Cancer Survivor Network. Many current studies used traditional methods when exploring melanoma cancer survivors but few studies have researched melanoma cancer survivors within an on-line community exclusively. This study intended to gain insight into this community. A number of current studies as mentioned previously, have researched melanoma cancer but a study within an on-line community solely, regarding

health maintenance and skin protection behavior has not been conducted for melanoma cancer survivors.

Summary

Research studies concerning melanoma cancer and tanning have various common themes in relation to age, gender and race/ethnicity. Studies have revealed younger people have a higher tendency to engage in riskier behaviors that may put them at risk for melanoma cancer (Walkosz et al., 2017; Kiviniemi & Ellis, 2013). Gender is another important risk factor that has been presented in past studies (Julian et al., 2016); Hillhouse et al., (2016) & Heckman et al., (2015). Race/ethnicity from past research and sources have showed Whites have a higher incidence of being at risk for melanoma cancer due to their skin tone and high-risk behavior when it comes to protecting their skin from the harmful side effects of UVR exposure compared to other racial/ ethnicity group (Mahendraraj, et al., 2017; Buchanan et al., 2018; Buchanan et al., 2018; Kaufman & Alexis, 2017; Holman et al., 2018; Caretti et al., 2015; Mays et, al., 2017; Garnett et al., 2016; Robinson et al., 2017). Whites are more associated with the risk factor of using tanning indoor beds. Sunscreen usage is applied based on the perception of the individuals. Younger people are not as a concerned with the effect of tanning based upon the perception of having an acceptable appearance which is viewed acceptable by their peers. Women are more in tune with taking safety measures when it involves prevention measures to protect their skin. African Americans and Hispanics are less prone to developing melanoma cancer compared to Whites. Non-whites from an ethnic point of

view may have challenges when it comes to this being at risk for melanoma cancer and prevention efforts.

The literature review has supported each of these factors as being associated with melanoma cancer and prevention efforts from traditional survey findings. In my proposed research, I investigated tanning behavior and melanoma prevention efforts of melanoma cancer survivors and prevention efforts focusing on age, gender, race/ethnicity in an online community melanoma cancer survivor network exclusively. Little is known about melanoma cancer survivors in this community. This online community of melanoma cancer survivors will provide information on their melanoma prevention efforts. The results of this research assisted with prevention efforts and provide awareness of melanoma prevention needs of an online community of melanoma cancer survivors- a unique population of people who share information online and have not been investigated on their prevention efforts. The results from this research can add additional information and insight that can aid in future research for supplementary prevention efforts to improve health outcomes, adding an additional perspective from this population.

In Chapter 3 the research design, population, sampling and rationale, and power analysis will be discussed. Also, the data collection process, instrument and data analysis plan of the independent variables and dependent variables will be presented.

Chapter 3: Research Method

The purpose of this research was to investigate whether age, gender, and race are associated with melanoma prevention efforts (health maintenance and skin protection) in an online community of melanoma survivors. I compared these results to the results from nononline communities to see if there are differences between prevention behaviors found in online research of melanoma survivors and nononline research. In this cross-sectional study of melanoma cancer survivors, I used a quantitative method to assess their prevention behaviors. A cross-sectional study design is often used to assess the prevalence of a disease, attitudes, and knowledge (Kesmodel, 2018). In this study, I focused on the prevention measures of melanoma survivors in an online community to assess similarities and differences with participants in nononline past studies relevant to prevention behaviors. A cross-sectional study was selected based on past similar cross-sectional studies that have explored melanoma cancer survivors and prevention measures (Fischer, Wang, Yenokyan, Kang & Chien, 2016; Holman et al., 2015; Kamińska-Winciorek, Gajda,Wydmański, & Tukiendorf, 2015; Mays, Atkins, Ahn, &Tercyak, 2017;Pinault & Fioletov, 2017;; Seite, Del Marmol, Moyal & Friedman, 2017; Stole, Nilsen and Joranger, 2019; Vogel et al., 2017 & Walkosz et al., 2017.). Also, a cross-sectional study was selected due to financial and time limitations.

Research Questions and Hypotheses

The aim of the research was to answer the following questions and test the associated hypotheses:

RQ1: How often do ages (18-88 years old) melanoma cancer survivor's engage in prevention efforts in an online community?

H01: There is no relationship between age (18-88 years) melanoma cancer survivor's and how often they engage in prevention efforts in an online community.

Ha1: There is a relationship between age (18-88 years) melanoma cancer survivor's and how often they engage in prevention efforts in an online community.

RQ2: How often do, gender (Male, Female, Other) melanoma cancer survivor's engage in prevention efforts in an online community?

H02: There is no relationship between gender (Male, Female, Other) melanoma cancer survivor's and how often they engage in prevention efforts in an online community.

Ha2: There is a relationship between gender (Male, Female, Other) melanoma cancer survivor's and how often they engage in prevention efforts in an online community.

RQ3: How often do, race-ethnicity(Hispanic or Latino); White (Not Hispanic or Latino); Black or African American (Not Hispanic or Latino); Native Hawaiian or Pacific Islander (Not Hispanic or Latino); Asian (Not Hispanic or Latino); Native American or Alaska Native (Not Hispanic or Latino) and Two or More Races (Not Hispanic or Latino) melanoma cancer survivor's engage in prevention effort within an online community?

H03: There is no relationship between race-ethnicity(Hispanic or Latino; White (Not Hispanic or Latino); Black or African American (Not Hispanic or Latino); Native Hawaiian or Pacific Islander (Not Hispanic or Latino); Asian (Not Hispanic or Latino);

Native American or Alaska Native (Not Hispanic or Latino) and Two or More Races (Not Hispanic or Latino) melanoma cancer survivor's engage in prevention efforts within an online community.

Ha3: There is a relationship between race-ethnicity (Hispanic or Latino; White (Not Hispanic or Latino); Black or African American (Not Hispanic or Latino); Native Hawaiian or Pacific Islander (Not Hispanic or Latino); Asian (Not Hispanic or Latino); Native American or Alaska Native (Not Hispanic or Latino) and Two or More Races (Not Hispanic or Latino) melanoma cancer survivor's in how often they engage in prevention effort within an online community.

The goal of this study was to determine whether age, gender, and race are associated with melanoma prevention efforts defined as health maintenance and skin protection in an online community of melanoma survivors.

Methodology

Population

The research population was an online community of melanoma cancer survivors in a network affiliated with the American Cancer Society. The population included a sample that is computer savvy and already has access to a computer to respond to the online survey. The melanoma cancer survivor network is for melanoma cancer survivors only. The research population varied by age, which was a variable under analysis.

Sampling Procedures and Sample Size

The sampling population included volunteers who chose to be a part of the research. The recruitment strategy included an introduction letter describing the study on

the American Cancer Society cancer survivors network with information describing the study. This included the time period of the study, 2 weeks with an additional 2 weeks if the required minimal sample size was not obtained. The recruitment of participants also included the confidentiality of the study and let them know they had the option to opt in or out of participation.

The minimal sample size required for the study based on G-power analysis to reveal some possible level of significance from the study population was 88. I needed at least 88 study participants from the sample population to achieve the power of 80%. The alpha level was set at .05 with a power level of .80 (80%).

The sample population consisted of melanoma cancer survivors in an online community in the American Cancer Society's survivor network. In analyzing the data obtained from this research, the chi-square (χ^2) test was applied to test the hypotheses of the independent variables effecting the dependent variables from the online community of melanoma cancer survivors. Chen et al. (2016) found significant differences in gender and prevention behaviors after melanoma cancer diagnosis; women were more engaged in prevention measures compared to men. However, men were more likely to wear a hat when they went outdoors compared to women. This research was expected to reveal similar results between genders, with a moderate effect size (0.3–.05). This effect size was used for the a priori estimation of the sample size, using the G-power software. The output is shown in Figure 1.

```
χ² tests – Goodness-of-fit tests: Contingency tables
Analysis:    A priori: Compute required sample size
Input:       Effect size w                        =  0.3
             α err prob                           =  0.05
             Power (1–β err prob)                 =  0.80
             Df                                   =  1
Output:      Noncentrality parameter λ            =  7.9200000
             Critical χ²                          =  3.8414588
             Total sample size                    =  88
             Actual power                         =  0.8035275
```

Figure 1. GPower output.

The alpha level was set at .05 with a power level of .80 (80%). In reference to this study, the null hypotheses will be accepted if the *p* value is greater than .05, and the null hypotheses will be rejected if the *p* value is less than .05 to conclude there may be a significant difference between the two groups.

Setting and Sample

The population surveyed was provided with an online survey placed on the American Cancer Society's survivors network website with details of the study for this population to volunteer to participate in the study. An invitation to participate in the study was provided on the survivors network with information for the study. The survey was listed on the website for 2 weeks for participants to respond. I planned to extend the survey 2 weeks more if the minimum number of participants did not respond within the first 2 weeks. The data for the nononline melanoma cancer survivor participants were extracted from past research study findings using nononline research methods. This research setting for the online population was the American Cancer Society cancer

survivors network website. This site is private and requires survivors to log in to share of

information. I submitted a request to the American Cancer Society to post on the cancer

survivors network site a recruitment letter of introduction that informed individuals about

the research and the criteria for participation along with next steps (see Appendix A). The

recruitment letter had information about the research and the request to have the

information shared on the American Cancer Society survivors network site; this

recruitment letter was placed on the website by Survey Monkey (Survey Monkey, 2019).

The informed consent form provided participants a choice to opt in or out of the

research, along with the option at any time to not take part in the research. There was a

statement as to why the research was being conducted and the how the data obtained

would be used for research purposes only. The survey (Appendix B) required the sample

population to provide their age, gender (male, female, other), and race/ethnicity (Hispanic

or Latino; White, not Hispanic or Latino; Black or African American, not Hispanic or

Latino; Native Hawaiian or Pacific Islander, not Hispanic or Latino; Asian, not Hispanic

or Latino; Native American or Alaska Native, not Hispanic or Latino); and two or more

races). These survey questions are questions selected from a previous study by Chen et al.

(2016); the researchers in that study provided permission publicly for other researchers to

use the survey, as long it is cited.

Health maintenance is important for melanoma cancer survivors to manage their

health, as melanoma has higher chances of reoccurring in individuals who have had the

disease; even after 20 years, there is still an elevated risk for melanoma diagnosis

(Bradford et al., 2010). Prevention behaviors includes skin protection, which includes

practicing sun protection when tanning indoors or outdoors, using sunscreen, and seeking skin cancer screening (Chen et al., 2016; Vogel et al., 2017). Numerous melanoma cancer survivors do not practice regular self-skin examination after being diagnosis (Körner et al., 2013). Skin cancer screening has been determined to be effective in detecting melanoma cancer, and primary care physicians and dermatologists who perform skin cancer evaluations of the body can detect possible suspicious lesions (Wernli, 2016).

Gender includes male, female, and other categories, based on past research studies applying this variable (Bowen et al., 2015; Chen et al., 2016; Ward-Peterson et al., 2016). Race/ethnicity were categorized as defined by the U.S. Equal Employment Opportunity Commission (2018) as follows:

- Hispanic or Latino: A person of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin regardless of race;

- White (not Hispanic or Latino): A person having origins in any of the original peoples of Europe, the Middle East, or North Africa;

- Black or African American (not Hispanic or Latino): A person having origins in any of the Black racial groups of Africa;

- Native Hawaiian or Pacific Islander (not Hispanic or Latino): A person having origins in any of the peoples of Hawaii, Guam, Samoa, or other Pacific Islands;

- Asian (not Hispanic or Latino): A person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian Subcontinent, including, for example, Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, the Philippine Islands, Thailand, and Vietnam;

- Native American or Alaska Native (not Hispanic or Latino): A person having origins in any of the original peoples of North and South America (including Central America) and who maintain tribal affiliation or community attachment; and

- Two or more races: All persons who identify with more than one of the above five races.

The responses were assembled and analyzed for examination based on each of the research questions. The age, gender, and race/ethnicity variables were examined for assessment, and statistical analysis was performed using the chi-square test to accept or reject the null hypothesis. The results of the research will be published in ProQuest and available to other researchers to make references and support prevention and awareness efforts in combating melanoma cancer. In addition, the study results have been shared with the American Cancer Society for the study participants.

Data Analysis Plan

Bivariate analysis. The summary of the data analysis plan is presented in Table 1. The chi-square statistical test of association was applied to explore the association between the dependent variable (each survey question) and independent variable (RQ1: age, RQ2: gender, and RQ3: race). Bolboacă et al (2011) stated the chi-square test of association can be used for a single population/sample (two variables at the same time) to compare frequencies of nominal or ordinal data. A chi-square of .05 is the accepted means of statistical significance. If the p value is less than or equal to the significance level of .05, I can reject the null hypothesis and infer there is statistically significant

association between the variables. If the *p* value is larger than the significance level, .05, I will not reject the null hypothesis because there is not enough evidence to conclude there is an association with the variables.

Covariates/confounders. The three covariates/confounders associated with this study include income level, marital status, and educational level. To control these, a multivariable analysis was used. Previous research pertaining to melanoma cancer has included education, marital status, and income level information. Vogel et al. (2017) explored education level, marital status, and income level based on UVR exposure and protection behaviors in regards to responses for long-term melanoma cancer survivors and noncancer controls. The researchers found the highest for both groups were college graduates, marital status reported as married and partnered, and an annual income level of $75,000–$149,000. In another study, Bowen et al. (2015) explored the effects of web-based intervention on risk reduction behaviors in melanoma survivors and found survivors with college degrees, married or living together participants, and with an annual income level of $70,000 or higher were impacted by web-based interventions regarding their prevention behavior changes.

Multiple linear regression. After performing bivariate analysis, I investigated the potential impact of all the main independent variables (age, gender, race) and covariates (educational level, marital status and income) on the Health Maintenance and Skin protection questions of the survey. To accomplish that, the outcome variable was a cumulative score adding up the score from all the questions of the survey according to each participant's responses; this sum score can have a range between 14 and 73 points

(please see Appendix B) for points for each survey question). The higher the score, the

more optimal health behavior and attitude related to skin protection.

Table 1

Research Questions, Variables and Statistical Tests

RQ	Independent variable	Dependent variable	Statistical test	Covariates/Confounders
1	age (18-88 years)	h-Health maintenance and skin protection questions	chi-square and multiple linear regression	education level, marital status and income lLvel
2	gender (male, female, other)	health maintenance and skin protection questions	chi-square and multiple linear regression	education level, marital status and income Level
3	Race/Ethnicity (hispanic or latino; white (not hispanic or latino); black or a-frican a-merican (not hispanic or latino); native hawaiian or p-Pacific islander (not h-ispanic or l-atino); asian (not h-ispanic or latino); native american or alaska native (not hispanic or latino) and t-wo or more races (nNt hispanic or latino)	health maintenance and skin protection questions	chi-square and multiple linear regression	education level, marital status and income level

Table 2

Survey Questions for the Dependent Variables for all Research Questions

Health maintenance
How often in the past year have you visited any physician for a skin examination?
How often in the past year have you had a full body skin check by a healthcare provider?
How often in the past year have you self-examined your skin for abnormal markings (changing color, getting bigger, new mole) for growths?
Skin protection
How often do you wear a hat with a wide brim all the way around?
How often do you wear long sleeved shirts?
How often do you wear sunscreen of at least SPF 30?
How often do you wear sunglasses?
How often do you wear pants that reach your ankles?
Sun avoidance behavior
How often do you limit your outdoor activity?
When outside, how often do you seek shade?
How often do you worry about developing another case of skin cancer?
How often do you wear a hat, scarf, cap, or use an umbrella?
Since being diagnosed with melanoma, how often do you take part in outdoor activities compared to before the diagnosis?
Since being diagnosed with melanoma, how often do you worry about melanoma compared to before the diagnosis?

Threats to Validity

Validity refers to the general population being studied and the way the study results are applied with credibility (Kallett, 2004). It is essential to consider both internal and external validity with a requirement to maximize external validity within a study. Researchers must consider both of these elements and minimize each of these threats. Minimizing threats to internal validity includes using studies that are evidence-based, gathering data which supports evidence-based research, applying the appropriate research design and monitoring bias that can occur in the study (Houser, 2012). External validity is minimized by maintaining the generalization of the findings relevant to other studies

and their settings (Houser, 2012). Since this is a cross sectional study, the results of the present study should be generalized to other populations with caution.

The American Cancer Society is a highly recognized and establish society which has a number of research entities recognized pertaining to public health issues. The American Cancer Society Survivor Network of melanoma cancer survivors is a private network online. Cancer survivors that join this network have access to resources and share their cancer experiences with each other. The American Cancer Society supports research and other public health issues involving prevention and awareness.

Ethical Consideration

Bryman and Bell (2007) stated it is important to consider these issues when discussing ethical considerations for your dissertation: (1) research participants should not be harmed. In this study the participants will not be harmed in any manner; (2) respect and dignity must be a priority for participants. The individuals in this study were respected and treated with dignity; (3) prior to the study participants provided their written consent. A consent form was presented to participants to decide to take part in the study with the option to withdraw at any time; (4) privacy and protection of the research participants were considered. The participants were ensured their protection and the data collected are protected and not use for any additional reason except for this study; (5)t he confidentiality of the research data is to safeguard. The participants were provided with a confidentiality information letter which confirms their privacy of the data collected; (6) anonymity of the participants was confirmed. The participants identity will not be disclosed, and the aim of the research is explained in introduction letter of the research.

The IRB at Walden University approved the elements of the study along with the

American Cancer Society. The data collection from the survey collection with Survey

Monkey was monitored by the researcher to conduct the statistical analysis and final

summary of the research findings. The data collection for each of the participants

includes a personal unique identification (ID) number. The data were stored separately

from the ID number by the researcher after collection for analysis. The only identifying

information for analytical purpose is to be extracted based on the ID. No personal data

are to use to identify any participants in the study.

Summary

In Chapter 3, I have provided a summary of the research methodology to be

applied for this study which consist of a quantitative cross-sectional retrospective cohort

study of melanoma cancer survivors. The research investigated age, gender and

race/ethnicity as it relates to health maintenance and skin protection in an on-line

community of melanoma cancer survivors within the American Cancer Society Cancer

survivor Network. The study results from the questionnaire will be compared to past

studies of non-online research to evaluate if age, gender and race/ethnicity affects

prevention efforts within an on-line community of melanoma cancer survivors differently

compared to non-online population. Research questions and hypothesis have been

presented and the sampling procedure and size have been determined by the G-Power

analysis for analyzing the data with the chi-square (χ^2) test for testing. The setting for the

sample is from the American Cancer Society Cancer Survivors Network, online

community. The threats, internal and external validity have been discussed for this

research along with the ethical considerations. The results of this study will be presented

in Chapter 4.

Chapter 4: Results

Introduction

The main purpose of this quantitative study was to investigate the prevention efforts and health maintenance of melanoma cancer survivors in an online community in relationship to age, gender, and race/ethnicity. Then, these results were compared with similar studies conducted in nononline melanoma cancer survivors to see if there are differences and similarities in preventive behaviors related to this type of cancer between the two groups.

In this chapter, I present the statistical results derived from an online community of melanoma cancer survivors within the American Cancer Society's cancer survivors network. Results are provided for each research question. According to the data analysis plan described in Chapter 3, chi-square and multiple linear regression analysis were applied to address the following research questions:

RQ1: How often do ages (18-88 years old) melanoma cancer survivor's engage in prevention efforts in an online community?

H01: There is no relationship between age (18-88 years) melanoma cancer survivor's and how often they engage in prevention efforts in an online community.

Ha1: There is a relationship between age (18-88 years) melanoma cancer survivor's and how often they engage in prevention efforts in an online community.

RQ2: How often do, gender (Male, Female, Other) melanoma cancer survivor's engage in prevention efforts in an online community?

H02: There is no relationship between gender (Male, Female, Other) melanoma cancer survivor's and how often they engage in prevention efforts in an online community.

Ha2: There is a relationship between gender (Male, Female, Other) melanoma cancer survivor's and how often they engage in prevention efforts in an online community.

RQ3: How often do, race-ethnicity(Hispanic or Latino); White (Not Hispanic or Latino); Black or African American (Not Hispanic or Latino); Native Hawaiian or Pacific Islander (Not Hispanic or Latino); Asian (Not Hispanic or Latino); Native American or Alaska Native (Not Hispanic or Latino) and Two or More Races (Not Hispanic or Latino) melanoma cancer survivor's engage in prevention effort within an online community?

H03: There is no relationship between race-ethnicity(Hispanic or Latino; White (Not Hispanic or Latino); Black or African American (Not Hispanic or Latino); Native Hawaiian or Pacific Islander (Not Hispanic or Latino); Asian (Not Hispanic or Latino); Native American or Alaska Native (Not Hispanic or Latino) and Two or More Races (Not Hispanic or Latino) melanoma cancer survivor's engage in prevention efforts within an online community.

Ha3: There is a relationship between race-ethnicity (Hispanic or Latino; White (Not Hispanic or Latino); Black or African American (Not Hispanic or Latino); Native Hawaiian or Pacific Islander (Not Hispanic or Latino); Asian (Not Hispanic or Latino); Native American or Alaska Native (Not Hispanic or Latino) and Two or More Races

(Not Hispanic or Latino) melanoma cancer survivor's in how often they engage in

prevention effort within an online community.

Data Collection

Data were obtained from members of an online community of melanoma cancer

survivors through the American Cancer Society's survivors network. The approval to

conduct the study was obtained from the Walden University Institutional Review Board

(IRB) on August 24, 2020 (#08-24-20-0030025). After I obtained approval from IRB, the

American Cancer Society permitted the study to be conducted online. The American

Cancer Society posted the study information to its website for the recruitment of

participants for the study. The consent and confidentiality information included a link for

participants to answer survey questions via the Survey Monkey website. The survey was

listed on the American Cancer Society's website for 4 weeks from September 22, 2020,

to October 8, 2020.

Data collection consisted of 101 participants from the American Cancer Society's

network of cancer survivors. The sample consisted of 71 (70.3%) women and 30 (29.7%)

men. The participants were distributed across age groups as follows: $n = 25$ (24.8%) 20-

28 years; $n = 29$ (28.7%) 29–35 years; $n = 25$ (24.8%) 36–50 years; and $n = 22$ (21.8%)

were over 50 years. Race/ethnicity distributions were $n = 12$ (11.9%) Hispanics/Latinos;

$n = 52$ (51.55%) White; $n = 15$ (14.9%) Black; and $n=22$ (21.8%) identified as Native

Hawaiian or Pacific Islander, Asian, Native American or Alaska Native, and two or more

races.

The independent variables were age, gender, and race/ethnicity. The Pearson's chi-square was performed to test the association between the independent and the dependent variables The obtained sample of 101 participants had adequate power since it met the minimum estimated sample size (88 participants) according to the G-power analysis conducted, as discussed previously in Chapter 3.

Bivariate Analysis for Each Survey Question

Question 1 asked: How often in the past year have you visited any physician for a skin examination? The results of Question 1 revealed no significant association between age, gender, and race/ethnicity of melanoma cancer survivors in an online community and visits to physicians for a skin examination. Age (χ^2) 1.2021; p value .752, and Cramer's V; .109; Gender (χ^2)1.880; p value, .170 and Cramer's V; .136 and Race/Ethnicity(χ^2) .572; p value .903 and Cramer's V; .075. The p value was greater than .05. Based on this, I must reject the null hypothesis for Question 1 of the survey. Results for Question 1 are displayed in Table 3.

Table 3

Past Year Skin Examination with a Physician

Independent variables	Dependent variable responses (%)	Total	χ^2	p	Cramer's V
Total		101	1.2021	.75	.109
Age (years)					
20–28		25			
Less often	14 (56.0)				
More often	11 (44.0)				
29–35		29			
Less often	16 (55.2)				
More often	13 (44.0)				
36–50		25			
Less often	11 (44.0)				
More often	14 (56.0)				
> 50		22			
Less often	10 (45.5)				
More often	12 (54.4)				
Gender			1.880	.170	.136
Female		71			
Less often	39 (40.0)				
More often	32 (45.1)				
Male		30			
Less often	12 (40.0)				
More often	18 (60.0)				
Race/Ethnicity			.572	.903	.075
Hispanic/Latino		12			
Less often	7 (58.3)				
More often	5 (41.7)				
White (not Hispanic/Latino)		52			
Less often	26 (50.0)				
More often	26 (50.0)				
Black (not Hispanic/Latino)		15			
Less often	8 (53.3)				
More often	7 (46.7)				
Other		22			
Less often	10 (45.5)				
More often	12 (54.5)				

Question 2 asked, How often in the past year have you had a full body skin check by a healthcare provider? Age (χ^2) 4.463, p value .216 and .210 Cramer's *V*; Gender (χ^2) .719, p value .396 and Cramer's *V* .084 and Race/Ethnicity (χ^2) 4.657, p value .199 and Cramer's *V* .215. The p values were greater than the 0.05 level. In this case, I fail to reject the null hypothesis. There is no relationship between age, gender and race-ethnicity and how often in the past year they had a full body skin check by a healthcare provider. Results are displayed in Table 4.

Table 4

Past Year Full Body Skin Check by a Healthcare Provider

Independent variables	Dependent variable responses (%)	Total	χ^2	p	Cramer's V
Total		101	4.463	.216	.210
Age (years)					
20–28		25			
Less often	11 (44.0)				
More often	14 (56.0)				
29–35		29			
Less often	17 (56.6)				
More often	12 (41.4)				
36–50		25			
Less often	18 (72.0)				
More often	7 (28.0)				
> 50		22			
Less often	11 (50.0)				
More often	11 (50.0)				
Gender			.719	.396	.084
Female		71			
Less often	42 (59.2)				
More often	29 (40.8)				
Male		30			
Less often	15 (50.0)				
More often	15 (50.0)				
Race/Ethnicity			4.657	.199	.215
Hispanic/Latino		12			
Less often	6 (50.0)				
More often	6 (50.0)				
White (not Hispanic/Latino)		52			
Less often	25 (48.1)				
More often	27 (51.9)				
Black (not Hispanic/Latino)		15			
Less often	11 (73.3)				
More often	4 (26.7)				
Other		22			
Less often	15 (68.2)				
More often	7 (31.8)				

Question 3 asked, How often in the past year have you self-examined your skin for abnormal markings (changing color, getting bigger, new mole) for growths? Age (χ^2)1.070, *p* value .784 and Cramer's *V*.102; Gender (χ^2).020 *p* value.889 and Cramer's *V*.014 and Race/Ethnicity 3.884(χ^2), *p* value .274 and Cramer's *V*.196. The *p* values were greater than .05, thus I fail to reject the null hypothesis. There is no significant association between age, gender and race/ethnicity and self-examination for abnormal skin marking for growth. Results are displayed in Table 5.

Table 5

Past Year Self-Examined Skin for Abnormal Markings(changing color, getting bigger, new mole) *for Growths*

Independent variables	Dependent variable responses (%)	Total	χ²	p	Cramer's V
Total		101			
Age (years)			1.070	.784	.102
20–28		25			
Less often	0 (0.0)				
More often	25 (100.0)				
29–35		29			
Less often	1 (3.4)				
More often	28 (96.6)				
36–50		25			
Less often	1 (4.0)				
More often	24 (96.0)				
> 50		22			
Less often	1 (4.5)				
More often	21 (95.5)				
Gender			.020	.889	.014
Female		71			
Less often	2 (2.8)				
More often	69 (97.2)				
Male		30			
Less often	1 (3.3)				
More often	29 (96.7)				
Race/Ethnicity			3.884	.274	.196
Hispanic/Latino		12			
Less often	0 (0.0)				
More often	12 (100.0)				
White (not Hispanic/Latino)		52			
Less often	1 (1.9)				
More often	51 (98.1)				
Black (not Hispanic/Latino)		15			
Less often	0 (0.0)				
More often	15 (100.0)				
Other		22			
Less often	2 (9.1)				
More often	20 (90.9)				

Question 4 asked, How often do you wear a hat with a wide brim all the way around? The statistical results for Age (χ^2)1.056, p value .788 and Cramer's V.102; Gender(χ^2) .186, p value .666 and Cramer's V.043 and Race/Ethnicity (χ^2)1.778 p value .620 and Cramer's V.133. The p values were greater than .05, thus I fail to reject the null hypothesis. There is no significant association between age, gender and race/ethnicity and

their behavior of wearing a hat with a wide brim all the way around. Results are

displayed in Table 6.

Table 6

Wear a Hat with a Brim All the Way Arounde

Independent variables	Dependent variable responses (%)	Total	χ^2	*p*	Cramer's V
Total		101			
Age (years)			1.056	.788	.102
20–28		25			
Less often	21 (84.0)				
More often	4 (16.0)				
29–35		29			
Less often	21 (72.4)				
More often	8 (27.6)				
36–50		25			
Less often	19 (76.0)				
More often	6 (24.0)				
> 50		22			
Less often	17 (77.3)				
More often	5 (22.7)				
Gender			.186	.666	.043
Female		71			
Less often	54 (76.1)				
More often	17 (23.9)				
Male		30			
Less often	24 (80.0)				
More often	6 (20.0)				
Race/Ethnicity			1.778	.620	.133
Hispanic/Latino		12			
Less often	10 (83.3)				
More often	2 (16.7)				
White (not Hispanic/Latino)		52			
Less often	42 (80.8)				
More often	10 (19.2)				
Black (not Hispanic/Latino)		15			
Less often	11 (73.3)				
More often	4 (26.7)				
Other		22			
Less often	15 (68.2)				
More often	7 (31.8)				

Question 5 asked, How often do you wear long sleeved shirts? Age (χ^2)1.127, p

value.771 and Cramer's V.106; Gender (χ^2).593, p value .441 and. Cramer's V . 077 and

Race/Ethnicity (χ^2) .5.587, 1.34 p value .1.34 and Cramer's V.235, each variable had p

value greater than .05, therefore I fail to reject the null hypothesis. There is no

relationship between age, gender and race/ethnicity and the behavior of wearing long

sleeve shirts. Results are displayed in Table 7.

Table 7

Wear Long Sleeved Shirts

Independent variables	Dependent variable responses (%)	Total	χ^2	p	Cramer's V
Total		101			
Age (years)			1.127	.771	.106
20–28		25			
Less often	18 (72.0)				
More often	7 (28.0)				
29–35		29			
Less often	19 (65.5)				
More often	10 (34.5)				
36–50		25			
Less often	15 (60.0)				
More often	10 (40.0)				
> 50		22			
Less often	13 (59.1)				
More often	9 (40.9)				
Gender			.593	.441	.077
Female		71			
Less often	44 (62.0)				
More often	27 (38.0)				
Male		30			
Less often	21 (70.0)				
More often	9 (30.0)				
Race/Ethnicity			5.587	.134	.235
Hispanic/Latino		12			
Less often	10 (83.3)				
More often	2 (16.7)				
White (not Hispanic/Latino)		52			
Less often	28 (53.8)				
More often	24 (46.2)				
Black (not Hispanic/Latino)		15			
Less often	11 (73.3)				
More often	4 (26.7)				
Other		22			
Less often	16 (72.7)				
More often	6 (27.3)				

Question 6 asked, How often do you wear sunscreen of at least SPF 30? Age (χ^2)

3.386; p value .336 and Cramer's V.183; Gender (χ^2)30.996 p value .000 and Cramer's

V.554 and Race/Ethnicity (χ^2) 7.158, p value .067 and Cramer's V.266. For age and

race/ethnicity, the p value was greater than .05, thus I fail to reject the null hypothesis for

these variables. There is no relationship between age and race/ethnicity and how often

they wear sunscreen of at least SPF 30. For gender it was revealed a significant statistical

result, the p value was .000, which was less than .05, which showed females were more

likely to wear more often sunscreen compared to males. The null hypothesis for gender

has to be rejected and accept the alternative hypothesis; There is a significant relationship

between gender and the preventive behavior of wearing sunscreen. Results are displayed

in Table 8.

Table 8

Wear Sunscreen of at least SPF 30

Independent variables	Dependent variable responses (%)	Total	χ^2	p	Cramer's V
Total		101			
Age (years)			3.386	.336	.183
20–28		25			
Less often	8 (32.0)				
More often	17 (68.0)				
29–35		29			
Less often	7 (24.1)				
More often	22 (75.9)				
36–50		25			
Less often	6 (24.0)				
More often	19 (76.0)				
> 50		22			
Less often	10 (45.5)				
More often	12 (54.5)				
Gender			30.996	.000	.554
Female		71			
Less often	10 (14.1)				
More often	61 (85.9)				
Male		30			
Less often	21 (70.0)				
More often	9 (30.0)				
Race/Ethnicity			7.158	.067	.266
Hispanic/Latino		12			
Less often	7 (58.3)				
More often	5 (41.7)				
White (not Hispanic/Latino)		52			
Less often	11 (21.2)				
More often	41 (78.8)				
Black (not Hispanic/Latino)		15			
Less often	6 (40.0)				
More often	9 (60.0)				
Other		22			
Less often	7 (31.8)				
More often	15 (68.2)				

Question 7, asked How often do you wear sunglasses? Age (χ^2).420, p value.936 and Cramer's V.064; Gender (χ^2) 9.270, p value .002 and Cramer's V.303 and Race/Ethnicity (χ^2)5.788, p value .122 and Cramer's V. 239. Age and race/ethnicity had no significant relationship involving wearing sunglasses, thus I fail to reject the null hypothesis. But gender showed a significant relationship between wearing sunglasses in an online community of melanoma cancer survivors, and females wear more often sunglasses compared to males. The p value was .002 which was less than .05. The null hypothesis has to be rejected and accept the alternative hypothesis for this survey question. Results are displayed in Table 9.

Table 9

Wear Sunglasses e

Independent variables	Dependent variable responses (%)	Total	χ^2	p	Cramer's V
Total		101			
Age (years)			.420	.936	.064
20–28		25			
Less often	17 (68.0)				
More often	8 (32.0)				
29–35		29			
Less often	20 (69.0)				
More often	9 (31.0)				
36–50		25			
Less often	16 (64.0)				
More often	9 (36.0)				
> 50		22			
Less often	16 (72.7)				
More often	6 (27.3)				
Gender			9.270	.002	.303
Female		71			
Less often	42 (59.2)				
More often	29 (40.8)				
Male		30			
Less often	27 (90.0)				
More often	3 (10.0)				
Race/Ethnicity			5.788	.122	.239
Hispanic/Latino		12			
Less often	11 (91.7)				
More often	1 (8.3)				
White (not Hispanic/Latino)		52			
Less often	31 (59.6)				
More often	21 (40.4)				
Black (not Hispanic/Latino)		15			
Less often	12 (80.0)				
More often	3 (20.0				
Other		22			
Less often	15 (68.2)				
More often	7 (31.8)				

Question 8 asked, How often do you wear pants that reach your ankles? Age (χ^2)5.437, p value1.42 and Cramer's V.232; Gender (χ^2.206), p value, .650 and Cramer's V.045 and Race/Ethnicity (χ^2) .4.549 , p value .208 and Cramer's V.212. Each variable had p values greater than .05, thus I fail to reject the null hypothesis. There is no relationship between age, gender and race/ethnicity and the behavior wearing pants that reach their ankles. Results presented in Table 10.

Table 10

Wear Pants that Reach Ankles

Independent variables	Dependent variable responses (%)	Total	χ^2	p	Cramer's V
Total		101			
Age (years)			5.437	.142	.232
20–28		25			
Less often	15 (60.0)				
More often	10 (40.0)				
29–35		29			
Less often	13 (44.8)				
More often	16 (55.2)				
36–50		25			
Less often	13 (52.0)				
More often	12 (48.0)				
> 50		22			
Less often	6 (52.0)				
More often	16 (72.7)				
Gender			.206	.650	.045
Female		71			
Less often	32 (45.1)				
More often	39 (54.9)				
Male		30			
Less often	15 (50.0)				
More often	15 (50.0)				
Race/Ethnicity			4.549	.208	.212
Hispanic/Latino		12			
Less often	9 (75.0)				
More often	3 (25.0)				
White (not Hispanic/Latino)		52			
Less often	22 (42.3)				
More often	30 (57.7)				
Black (not Hispanic/Latino)		15			
Less often	6 (40.0)				
More often	9 (60.0)				
Other		22			
Less often	10 (45.5)				
More often	12 (54.5)				

Question 9 asked, How often do you limit your outdoor activity? Age (χ^2)4.868, p value.182 and Cramer's V.220, Gender (χ^2) 1.266 p value .260 and Cramer's V .112 and Race/Ethnicity (χ^2) 3.142, p value .370 and Cramer's V.176, each variable had p value greater than .05, thus I fail to reject the null hypothesis. There is no relationship between age, gender and race/ethnicity and prevention efforts of how often they limit their outside activities. The results are displayed in Table 11.

Table 11

Limit Outdoor Activity

Independent variables	Dependent variable responses (%)	Total	χ^2	p	Cramer's V
Total		101			
Age (years)			4.868	.182	.220
20–28		25			
Less often	8 (32.0)				
More often	17 (68.0)				
29–35		29			
Less often	4 (13.8)				
More often	25 (86.2)				
36–50		25			
Less often	6 (24.0)				
More often	19 (76.0)				
> 50		22			
Less often	2 (9.1)				
More often	20 (90.9)				
Gender			1.266	.260	.112
Female		71			
Less often	12 (16.9)				
More often	59 (83.1)				
Male		30			
Less often	8 (26.7)				
More often	22 (73.3)				
Race/Ethnicity			3.142	.370	.176
Hispanic/Latino		12			
Less often	4 (33.3)				
More often	8 (66.7)				
White (not Hispanic/Latino)		52			
Less often	10 (19.2)				
More often	42 (80.8)				
Black (not Hispanic/Latino)		15			
Less often	1 (6.7)				
More often	14 (93.3)				
Other		22			
Less often	5 (22.7)				
More often	17 (77.3)				

Question 10 asked, When outside, how often do you seek shade? Age (χ^2)1.030, p value .794 and Cramer's V.101; Gender (χ^2).933, p value.334 and Cramer's V.096 and Race/Ethnicity (χ^2) 2.841, p value .417 and Cramer's V.168. The p values for each independent variable were greater than .05, thus I fail to reject the null hypothesis. There is no significant relationship between these variables and the prevention effort in how often they seek shade when outside. Results are displayed in Table 12.

Table 12

Outside Seeking Shade

Independent variables	Dependent variable responses (%)	Total	χ^2	p	Cramer's V
Total		101			
Age (years)			1.030	.794	.101
20–28		25			
Less often	4 (16.0)				
More often	21 (84.0)				
29–35		29			
Less often	4 (13.8)				
More often	25 (86.2)				
36–50		25			
Less often	2 (8.0)				
More often	23 (92.0)				
> 50		22			
Less often	2 (9.1)				
More often	20 (90.9)				
Gender			.933	.334	.096
Female		71			
Less often	7 (9.9)				
More often	64 (90.1)				
Male		30			
Less often	5 (16.7)				
More often	25 (83.3)				
Race/Ethnicity			2.841	.417	.168
Hispanic/Latino		12			
Less often	1 (8.3)				
More often	11 (91.7)				
White (not Hispanic/Latino)		52			
Less often	8 (15.4)				
More often	44 (84.6)				
Black (not Hispanic/Latino)		15			
Less often	0 (0.0)				
More often	15 (100.0)				
Other		22			
Less often	3 (13.6)				
More often	19 (86.4)				

Question 11 asked, How often do you worry about developing another case of skin cancer? Age (χ^2) 3.243, p value. 356 and Cramer's V.179; Gender (χ^2) 6.465, p value .011 and Cramer's V.253 and Race/Ethnicity (χ^2) 4.497, p value .213 and Cramer's V.211. Age and race/ethnicity were found not significantly associated with how often participants worried about developing another skin cancer, thus for these variables I fail to reject the null hypothesis. On the other hand, results revealed that there was an significant relationship between genders and behavior of how often they worried about

developing another skin cancer. The p value for gender was .011, which was less than

.05. Females reported in 95.8% that more often practiced this behavior but only 80% of

males did this more often. The null hypothesis had to be rejected and accept the

alternative hypothesis; There is a relationship between gender and the prevention effort of

worrying about developing another skin cancer. Results are displayed in Table 13.

Table 13

Worrying about Developing another Skin Cancer

Independent variables	Dependent variable responses (%)	Total	χ^2	p	Cramer's V
Total		101			
Age (years)			3.243	.356	.179
20–28		25			
Less often	1 (4.0)				
More often	24 (96.0)				
29–35		29			
Less often	2 (6.9)				
More often	27 (93.1)				
36–50		25			
Less often	2 (8.0)				
More often	23 (92.0)				
> 50		22			
Less often	4 (18.2)				
More often	18 (81.8)				
Gender			6.465	.011	.253
Female		71			
Less often	3 (4.2)				
More often	68 (95.8)				
Male		30			
Less often	6 (20.0)				
More often	24 (80.0)				
Race/Ethnicity			4.497	.213	.211
Hispanic/Latino		12			
Less often	0 (0.0)				
More often	12 (100.0)				
White (not Hispanic/Latino)		52			
Less often	3 (5.8)				
More often	49 (94.2)				
Black (not Hispanic/Latino)		15			
Less often	2 (13.3)				
More often	13 (86.7)				
Other		22			
Less often	4 (18.2)				
More often	18 (81.8)				

Question 12 asked, How often do you wear a hat, scarf, cap, or use an umbrella?

Age (χ^2) 4.138, p value .247 and Cramer's V.202; Gender (χ^2)1.356 p value.244 and

Cramer's V.116 and Race/Ethnicity (χ^2)3.081, p value .379 and Cramer's V.175. Since

all the p values were greater than .05, I fail to reject the null hypothesis. There is no

significant relationship between age, gender, and race/ethnicity and the preventive

behavior of wearing a hat, scarf, cap or use an umbrella. Results are displayed in Table

14.

Table 14

Wear a Hat, Scraf, Cap or use an Umbrella

Independent variables	Dependent variable responses (%)	Total	χ^2	p	Cramer's V
Total		101			
Age (years)			4.138	.247	.202
20–28		25			
Less often	16 (64.0)				
More often	9 (36.0)				
29–35		29			
Less often	16 (55.2)				
More often	13 (44.8)				
36–50		25			
Less often	15 (60.0)				
More often	10 (40.0)				
> 50		22			
Less often	8 (36.4)				
More often	14 (63.6)				
Gender			1.356	.244	.116
Female		71			
Less often	36 (50.7)				
More often	35 (49.3)				
Male		30			
Less often	19 (63.3)				
More often	11 (36.7)				
Race/Ethnicity			3.081	.379	.175
Hispanic/Latino		12			
Less often	9 (75.0)				
More often	3 (25.0)				
White (not Hispanic/Latino)		52			
Less often	27 (51.9)				
More often	25 (48.1)				
Black (not Hispanic/Latino)		15			
Less often	9 (60.0)				
More often	6 (40.0)				
Other		22			
Less often	10 (45.5)				
More often	12 (54.5)				

Question 13 asked, Since being diagnosed with melanoma, how often do you take

part in outdoor activities compared to before the diagnosis? Age (χ^2).295; p value .961;

Cramer's V .054; Gender (χ^2).006; p value .937; Cramer's V .008 and Race/Ethnicity (χ^2)

1.277; p value .735; Cramer's V .112. Age, gender and race/ethnicity had no significant

association with how often participants worried about developing another skin cancer.

Thus, I failed to reject the null hypothesis for this survey question. Results are displayed

in Table 15.

Table 15

Take part in Outdoor Activities Compared to before Diagnosis

Independent variables	Dependent variable responses (%)	Total	χ^2	p	Cramer's V
Total		101			
Age (years)			.295	.961	.054
20–28		25			
Less often	14 (56.0)				
More often	11 (44.0)				
29–35		29			
Less often	17 (58.6)				
More often	12 (41.4)				
36–50		25			
Less often	15 (60.0)				
More often	10 (40.0)				
> 50		22			
Less often	14 (63.6)				
More often	8 (36.4)				
Gender			.006	.937	.008
Female		71			
Less often	42 (59.2)				
More often	29 (40.8)				
Male		30			
Less often	18 (60.0)				
More often	12 (40.0)				
Race/Ethnicity			1.277	.735	.112
Hispanic/Latino		12			
Less often	7 (58.3)				
More often	5 (41.7)				
White (not Hispanic/Latino)		52			
Less often	32 (61.5)				
More often	20 (38.5)				
Black (not Hispanic/Latino)		15			
Less often	7 (46.7)				
More often	8 (53.3)				
Other		22			
Less often	14 (63.6)				
More often	8 (36.4)				

Question 14 asked, Since being diagnosed with melanoma, how often do you

worry about melanoma compared to before the diagnosis? Age (χ^2)1.070, p value .784

and Cramer's V.103; Gender (χ^2).020, p value .889 and Cramer's V .014 and

Race/Ethnicity (χ^2)5.530, p value .137 and Cramer's V.234. The p values were greater

than .05, thus I failed to reject the null hypothesis for these variables. There is no

relationship between age, gender and race/ethnicity and how often the participants worry

about melanoma compared to before the diagnosis. Results are displayed in Table 16.

Table 16

Worry about Melanoma compared to before the diagnosis

Independent variables	Dependent variable responses (%)	Total	χ^2	p	Cramer's V
Total		101			
Age (years)			1.070	.784	.103
20–28		25			
Less often	0 (0.0)				
More often	25 (100.0)				
29–35		29			
Less often	1 (3.4)				
More often	28 (96.6)				
36–50		25			
Less often	1 (4.0)				
More often	24 (96.0)				
> 50		22			
Less often	1 (4.5)				
More often	21 (95.5)				
Gender			.020	.889	.014
Female		71			
Less often	2 (2.8)				
More often	69 (97.2)				
Male		30			
Less often	1 (3.3)				
More often	29 (96.7)				
Race/Ethnicity			5.530	.137	.234
Hispanic/Latino		12			
Less often	0 (0.0)				
More often	12 (100.0)				
White (not Hispanic/Latino)		52			
Less often	0 (0.0)				
More often	52 (100.0)				
Black (not Hispanic/Latino)		15			
Less often	1 (6.7)				
More often	14 (93.3)				
Other		22			
Less often	2 (9.1)				
More often	20 (90.9)				

Adjusting for Covariates-Multiple Linear Regression

The relationship between the study covariates such as education, income and marital status were also analyzed along with age, gender and race/ethnicity using a multiple linear regression analysis for possible association with the prevention efforts and health maintenance (total score of the survey) within the melanoma cancer survivor's community (Table 17).

Table 17

Multiple Linear Regression Analysis Between Age, Gender, Race/Ethnicity, Marital Status, Income, Education and Prevention Efforts and Health Maintenance Total Score

Predictors	B	95.0% CI for B		b	t	p
Age	–0.700	–2.107	0.708	–0.117	–0.987	0.326
Gender	2.764	0.063	5.465	0.194	2.032	0.045
Race/ethnicity	–0.400	–1.367	0.567	–0.076	–0.822	0.413
Education	4.357	0.925	7.789	0.267	2.520	0.013
Income	2.721	–0.052	5.493	0.199	1.949	0.054
Marital status	1.225	–0.360	2.810	0.168	1.534	0.128

According to regression results, gender *(p= 0.045)*, education (*p*=0.013) and income(*p* value= 0.054) were found to be significantly associated with survey's total score. More specifically, females, and participants of higher education and income were significantly associated with increased total score of the survey, therefore with better prevention and health maintenance efforts.

Summary

The total sample of the study was 101 online melanoma cancer survivors. Bivariate and multiple regression analysis revealed that females, and participants of

higher education and income had significantly better prevention and health maintenance efforts. In the next chapter, these results will be interpreted and compared to similar ones of non-online melanoma cancer survivors. Also, the social change implications, recommendations and final conclusions from this study will be also provided in Chapter 5.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

The purpose of this study was to investigate prevention efforts among an online community of melanoma cancer survivors in the American Cancer Society's cancer survivors network. In the study, I focused on age, gender, and race/ethnicity as they related to prevention efforts and health maintenance among this population via self-reported responses to an online survey. Then, I compared these responses from this online population to results from traditional studies that were conducted with in-person methods, such as focus groups, phone calls, and other methods, to explore if responses related to prevention efforts and health maintenance were similar or different among these two groups. This chapter includes the key findings, interpretations of the results, conclusions of the study findings, and recommendations.

Interpretations of the Findings

In evaluating the research questions and the results from the study, the following key findings were revealed.

Age

There was no significant relationship within an online community of melanoma cancer survivors' prevention efforts and age. The age group that revealed practicing prevention methods more often was 29–35 years; they more often engaged in having skin examinations by a physician and health care provider; conducting self-skin examinations; wearing protective clothing, such as a brimmed hat, scarf, long-sleeved shirt, sunglasses, and pants that reach their ankles; applying sunscreen of SPF of 30 or higher; seeking

shade when outside; and limiting outdoor activity. This age group also worried more often about developing another skin cancer from engaging in outdoor activity compared to before diagnosis and worrying about melanoma cancer more often than before their diagnosis. This finding was different from previous studies in which the younger age groups had more risk of not practicing prevention efforts (Diffey & Norridge, 2009; Makin et al., 2013). On other hand, my findings are in accordance with Chen et al. (2016) who found that age was not a statistically significant predictor of preventive behaviors. Further, taking preventive measures may not be a concern to some age groups. As stated by Goldsmith et al. (2012), melanoma cancer is most common in the age group 25–29 years, 52 years old is the mean age of diagnosis, and it is the second most common cancer for young adults ages 15–29 years.

Gender

Gender was found as a significant predictor of prevention efforts in questions about wearing sunscreen of SPF of 30 or more; wearing sunglasses; and worrying about the possibility of another case of skin cancer. Women appeared to practice protective behaviors significantly more than men. This result is in accordance with previous studies with nononline data collection methods, in which women more often applied sunscreen and wore protective clothing compared to men. This was evident in findings from Chen et al. (2016), Holman et al., (2015), Pinault and Fioletov (2017),), Seite et al., (2017) and Walkosz et al. (2017). In the research finding by Chen et al. (2106) they found that women limited outdoor activities and sought more shade when outside than men. Men, however, wore a wide-brim hat more often than women according to Chen et al. (2016).

However, in my study, women wore a wide-brim hat more often: women 17, 23.9%, versus men, 6 (20%).

Race/Ethnicity

Race/ethnicity was not a significant predictor of melanoma cancer preventive behaviors in the online population investigated in this study. Most of the participants in this study were White compared to other races; this may have been because White people have been documented as having a higher incidence of melanoma cancer than other races/ethnicities (Mahendraraj et al., 2017). Although not statistically significant, in this study, White participants more often engaged in protective measures, which was different from past research findings in which White particicpants less often practiced prevention efforts (; Buchanan et al., 2018;Caretti et al., 2015;; Garnett et al., 2016; Holman et al., 2018; Kaufman & Alexis, 2017;Mahendraraj, et al., 2017; Mays et, al., 2017; &) Robinson et al., 2017. In this study, Hispanic/Latino participants practiced prevention means the least often. Kiviniemi and Ellis (2013) and Walkosz et al. (2017) stated that non-White people use sunscreen less. On the other hand, White people have a higher incidence of being at risk for melanoma cancer due to their skin tone and high-risk behavior when it comes to protecting their skin from the harmful side effects of UVR exposure (Buchanan et al., 2018); Kaufman & Alexis 2017); Holman et al., 2018; (Mahendraraj, et al., 2017; Caretti et al., 2015; Mays et, al., 2017; Garnett et al., 2016 & Robinson et al., 2017).

Income and Education

The regression analysis revealed that participants with higher education levels and higher income levels were practicing prevention and health maintenance efforts more often. Prior studies on melanoma cancer survivors have revealed higher income has been associated with individuals applying prevention efforts more often. Individuals with low income levels can be hindered from taking prevention measures due to their financial situation and an inability to buy sun-protective clothing or sunscreens (Holman et al., 2015; Tucker-Seeley & Thorpe, 2019). Participants reporting higher income levels revealed taking prevention measures more often. Additionally, individuals who experience financial challenges have an increased morbidity and mortality from melanoma skin cancer (Buster et al., 2012). People with higher levels of income can afford access to health care providers and can purchase protective clothing and sunscreen to protect their skin.

Higher educational levels have been associated with an increased level of engaging in prevention efforts in terms of performing skin self-examinations and having a higher perceived susceptibility to melanoma cancer compared to lower education levels. Individuals with less education have been shown to be less likely to have their skin examined and possess less information about skin cancer, moles, and risks associated with skin cancer (Albert & Davia, 2011; Glenn et al., 2017; Olsen et al., 2015; Pollitt et al., 2012). People with higher education may have more knowledge and information regarding the possible dangers of skin cancer and can take more precautions in protecting themselves against the risk associated with this disease.

Health Belief Model

The health belief model (Becker et al., 1974) provided an explanation of possible behaviors in relationship to prevention efforts being based on individuals' perception of the possibility of developing skin cancer, their risk-taking behavioral patterns, their perceived vulnerability, perceived severity, benefits/barriers to engaging in protective behaviors, cues that activated a desire to engage in protective behaviors, and self-efficacy. Age and race/ethnicity were not significant in relation to participants who worried more often about the possibility of developing another skin cancer, wearing sunscreen of SPF 30 or more, and wearing glasses to protect their skin. The risk in perceiving and worrying about the chances of having another skin cancer was more prevalent among women who worried or perceived engaging in more prevention efforts was a factor in their promotion determinations and health maintenance as a means to protecting their skin. In previous studies, younger people were more likely to lack in the practice of engaging in prevention efforts and health maintenance compared to older people. In this study, however, age was not significant. The belief of younger people within this online community may have been the reason, but the older age group from the online community showed they followed prevention efforts and health maintenance, while worrying more often compared to the younger age group. The younger group, as relevant from traditional findings, may have believed and perceived the risk of the possibility of developing another skin cancer may not be relevant to them because they prefer tanned skin and the benefits of looking good outweigh the possible negative consequences of developing another skin cancer from the sun or tanning.

Limitations of the Study

The research study was conducted on-line on the American Cancer Society's website for melanoma cancer survivors. The survey was only presented in English and only available to this population, not outside the United States. For time and financial reasons, the survey was made available for 4 weeks to collect data information, therefore the results could be different with a larger sample or with a longer period that the survey is available. The study did not include specific types of melanoma cancer or time period of melanoma cancer diagnosis. Further, some participant may have had language barriers in interpreting the questions, if English was not their primary language. Finally, the survey was limited to participants within the American Cancer Society and did not reflect other online sources/communities.

Recommendations for Future Research

Future on-line research studies for melanoma cancer survivors should focus on gender and their prevention efforts in terms of prevention information targeting gender. Age group of 29-35 years melanoma cancer survivors should be investigated to also gain insight into their prevention efforts as it relates their prevention efforts and health maintenance patterns. The health beliefs of the individuals online need to be explored in relationship to their perceived risk and reasons for their actions in taking or not taking prevention efforts.

This study finding was only conducted in English. Future studies need to present research studies for online melanoma survivors in other languages to capture other racial/ethnic groups which may not speak English as their primary language and capture

other population responses within other countries, not just the United States. The survey was presented for only 4 weeks and other future studies may conduct longer time frame studies to capture additional information from a larger population. Specific type of melanoma cancer may also reveal other results related to different types of melanoma cancer and specific prevention efforts and maintenance based on different types. Time frame of melanoma cancer can also be explored to investigate the impact of time of diagnosis which can be related to specific prevention effort and behavioral patterns. The survey used the American Cancer Society's Cancer Survivors Network which gathered only this communities' responses, while investing other online survivors networks, can allow the capture of other online prevention efforts and health maintenance methods.

Additional research may benefit from focusing on age and race/ethnicity to provide insight within these variables and their prevention efforts for online communities. This research has supplied information about the prevention efforts being practice within these communities sharing information online, which can be the base for future research to further investigate this growing population group.

Implications for Social Change

This research study has provided additional information for future studies and developing prevention efforts within an online population of melanoma cancer survivors. The study assisted in gaining insight into an online community of melanoma cancer survivors and their point of views in focusing on age, gender, and race. The findings produced answers in relationship to their prevention efforts and health maintenance. These finding can promote future research to gather additional information and

knowledge within an online community, as our society continues to advance in technological for public health information to access these communities online. Positive social change can be achieved by exploring online communities pertaining to melanoma cancer prevention can assist this community and other online communities in sharing their prevention patterns and health maintenance which can impact gathering information to support these online communities with information to develop public health initiates for targeting these online communities which exist in our society, in which they interact and share their experiences.

On-line technology is advantageous in terms of its ability to capture information from vast online communities and the cost is low and allows feedback to questions which can be answered for health issues, as it did with this study from an online melanoma cancer survivor community and their prevention efforts and health maintenance. This finding provides an opportunity for organizations to develop programs, services, and policies for online communities to keep them abreast of prevention measures to manage their health, and thus promote positive social change.

Conclusion

This research investigated the online community of melanoma cancer survivors within an online community of the American Cancer Society Cancer Survivor's Network and their prevention efforts and health maintenance. There is substantial evidence that the online community did show similarities among different age and race/ethnicity groups in prevention efforts. In terms of gender there were significant differences for females compare to males. Females were more engaging in wearing sunscreen with SPF 30 or

more, wearing sunglasses and worrying more about another skin cancer diagnosis, more often compared to males. The linear regression results from the study revealed that gender, education, and income were found to be significantly associated with survey's total score, meaning that females and participants of higher education and income were found to practice better prevention and health maintenance efforts.

This study partly filled a gap in the literature pertaining to providing insight into an online community of melanoma cancer survivors and their prevention efforts as it relates to age, gender and race/ethnicity, education, income, and marital status. The findings offer a guide for future research and exploring online melanoma cancer survivors. The better understanding of this online community of melanoma cancer survivors and their prevention efforts and health maintenance, as described by this study, allows additional awareness and prevention knowledge to design public health strategies to limit melanoma cancer and its consequences in both online and non-online communities.

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Appendix A: American Cancer Society Letter

Dear American Cancer Society,

My name is Lisa Chung and I am a doctoral student in the Public and Community Health Program at Walden University. I am completing my PH.D degree from Walden University in Public and Community Health. My research entails surveying melanoma cancer survivors in an on-line community and compare them to past non-line traditional methods findings.

I am writing to request a recruitment letter to be placed on the American Cancer Society's Cancer Survivors Network website to facilitate the recruitment of participants for a study pertaining. The study is for Melanoma Cancer Survivors and their prevention efforts. The request is to have the survey available for participants for 2 weeks for responses and an additional 2 weeks if the minimum number of responses are not received.

The research criteria for participants in study includes the age of participants to be 18-88 and have been diagnosed with melanoma cancer. Participants who do not meet these criteria are not eligible to participate in the research. The study participants have the option to participant or not in the study. There is no compensation for participants to be a part of the study.

Please email me at Melanomacancerresearch1@gmail.com with any questions.

Sincerely,

Lisa Chung, MS, MBA

Appendix B: Survey

Attention: Participants are required to be 18 or above years of age and diagnosed with Melanoma Cancer.

Please provide your **Age**: _____

Please make one selection by checking the box:

Gender:

- ☐ Male
- ☐ Female
- ☐ Other

Race/Ethnicity:

- ☐ **Hispanic or Latino** - A person of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin regardless of race.

- ☐ **White (Not Hispanic or Latino)** - A person having origins in any of the original peoples of Europe, the Middle East, or North Africa.

- ☐ **Black or African American (Not Hispanic or Latino)** - A person having origins in any of the Black racial groups of Africa.

- ☐ **Native Hawaiian or Pacific Islander (Not Hispanic or Latino)** - A person having origins in any of the peoples of Hawaii, Guam, Samoa, or other Pacific Islands.

- ☐ **Asian (Not Hispanic or Latino)** - A person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian Subcontinent, including, for example, Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, the Philippine Islands, Thailand, and Vietnam.

- ☐ **Native American or Alaska Native (Not Hispanic or Latino)** - A person having origins in any of the original peoples of North and South America (including Central America), and who maintain tribal affiliation or community attachment.

- ☐ **Two or More Races (Not Hispanic or Latino)** - All persons who identify with more than one of the above five race.

Education Level:

☐ Less than high school
☐ High school diploma or equivalent
☐ Some college, no degree
☐ Postsecondary non-degree award
☐ Associate degree
☐ Bachelor's degree
☐ Master's degree
☐ Doctoral or professional degree

Marital Status:

☐ Single
☐ Married
☐ Divorce
☐ Widowed
☐ Separated

Income Level:

☐ Less than $10,000
☐ $10,000 to $19,999
☐ $20,000 to $29,999
☐ $30,000 to $39,999
☐ $40,000 to $49,999
☐ $50,000 to $59,999
☐ $60,000 to $69,999
☐ $70,000 to $79,999
☐ $80,000 to $89,999
☐ $90,000 to $99,999
☐ $100,000 to $149,999
☐ $150,000 or more

Please complete the following questions:

Section I: Health Maintenance

(1)**How often in the past year have you visited any physician for a skin examination?**
☐ 1 point: 0 time
☐ 2 points: 1 time
☐ 3 points: 2 times
☐ 4 points: 3 times

☐ 5 points: 4 times
☐ 6 points: 5 times or more times

(2)**How often in the past year have you had a full body skin check by a healthcare provider?**
    ☐ 1 point: 0 time
    ☐ 2 points: 1 time
    ☐ 3 points: 2 times
    ☐ 4 points: 3 times
    ☐ 5 points: 4 times
    ☐ 6 points: 5 times or more times

(3)**How often in the past year have you self-examined your skin for abnormal markings (changing color, getting bigger, new mole) for growths?**
    ☐ 1 point: 0 time
    ☐ 2 points: 1 time
    ☐ 3 points: 2 times
    ☐ 4 points: 3 times
    ☐ 5 points: 4 times
    ☐ 6 points: 5 times or more times

Section II: Skin Protection

(4)**How often do you wear a hat with a wide brim all the way around?**
    ☐ 1 point: Never
    ☐ 2 points: Rarely
    ☐ 3 points: Sometimes
    ☐ 4 points: Most of the time
    ☐ 5 points: Always

(5)**How often do you wear long sleeved shirts?**
    ☐ 1 point: Never
    ☐ 2 points: Rarely
    ☐ 3 points: Sometimes
    ☐ 4 points: Most of the time
    ☐ 5 points: Always

(6)**How often do you wear sunscreen of at least SPF 30?**
    ☐ 1 point: Never
    ☐ 2 points: Rarely
    ☐ 3 points: Sometimes
    ☐ 4 points: Most of the time
    ☐ 5 points: Always

(7)**How often do you wear sunglasses?**
- ☐ 1 point: Never
- ☐ 2 points: Rarely
- ☐ 3 points: Sometimes
- ☐ 4 points: Most of the time
- ☐ 5 points: Always

(8)**How often do you wear pants that reach your ankles?**
- ☐ 1 point: Never
- ☐ 2 points: Rarely
- ☐ 3 points: Sometimes
- ☐ 4 points: Most of the time
- ☐ 5 points: Always

Section III: Sun Avoidance Behavior

(9)**How often do you limit your outdoor activity?**
- ☐ 1 point: Never
- ☐ 2 points: Rarely
- ☐ 3 points: Sometimes
- ☐ 4 points: Most of the time
- ☐ 5 points: Always

(10)**When outside, how often do you seek shade?**
- ☐ 1 point: Never
- ☐ 2 points: Rarely
- ☐ 3 points: Sometimes
- ☐ 4 points: Most of the time
- ☐ 5 points: Always

(11)**How often do you worry about developing another case of skin cancer?**
- ☐ 1 point: Never
- ☐ 2 points: Rarely
- ☐ 3 points: Sometimes
- ☐ 4 points: Most of the time
- ☐ 5 points: Always

(12)**How often do you wear a hat, scarf, cap, or use an umbrella?**
- ☐ 1 point: Never
- ☐ 2 points: Rarely
- ☐ 3 points: Sometimes
- ☐ 4 points: Most of the time
- ☐ 5 points: Always

(13)**Since being diagnosed with melanoma, how often do you take part in outdoor activities compared to before the diagnosis?**
- ☐ 1 point: Significantly less,
- ☐ 2 points: Slightly less,
- ☐ 3 points: The same,
- ☐ 4 points: Slightly more,
- ☐ 5 points: Significantly more

(14)**Since being diagnosed with melanoma, how often do you worry about melanoma compared to before the diagnosis?**
- ☐ 1 point: I worry a lot less,
- ☐ 2 points: I worry slightly less,
- ☐ 3 points: I worry about the same amount,
- ☐ 4 points: I worry slightly more,
- ☐ 5 points: I worry a lot more

Total Score: